March 2018

State Innovation Models (SIM) Initiative Evaluation

Model Test Year Four Annual Report

Prepared for

Jennifer Lloyd, PhD

Centers for Medicare
& Medicaid Services

7500 Security Boulevard
Mail Stop WB-06-05
Baltimore, MD 21244-1850

Prepared by

RTI International
3040 E. Cornwallis Road
Research Triangle Park, NC 27709

RTI Project Number: 0212790.007

Contract Number:
HHSM-500-2010-00021i

Task Order Number:
HHSM-500-T0007

[this page intentionally left blank]

State Innovation Models (SIM) Initiative Evaluation

Model Test Year Four Annual Report

RTI International
CMS Contract No. HHSM-500-2010-00021i
Task Order Number: HHSM-500-T0007
March 2018

This project was funded by the Centers for Medicare & Medicaid Services under contract no. HHSM-500-2010-00021i. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. RTI assumes responsibility for the accuracy and completeness of the information contained in this report.

[this page intentionally left blank]

SIM Initiative Evaluation Model Test Year Four Annual Report: Contributing Authors

RTI International
Richard Alterbaum
Peter Amico
Sarah Arnold
Chris Beadles
Heather Beil
Aubrey Collins
Julia Kish Doto
Patrick Edwards
Rose Feinberg
Sara Freeman
Emily Graf
Leslie Greenwald
Catherine Hersey
Elise Hooper
Sara Jacobs
Monika Juzumaite
Vince Keyes
Konny Kim
Stephanie Kissam
Marianne Kluckman
Marisa Morrison
Michelle Myers
Tim O’Brien
Sheila Patel
Melissa Romaire
Regina Rutledge
Noelle Richa Siegfried
Holly Stockdale
Elizabeth Tant
Matthew Toth
Carol Urato
Matthew Urato
Nathan West
Suzanne West
Nathaniel Wiecha
Alton Wright

National Academy for State Health Policy
Christina Cousart
Hannah Dorr
Maureen Hensley-Quinn
Scott Holladay
Diane Justice
Elizabeth McCaman
Jennifer Reck
Rachel Yalowich

The Urban Institute
Eva Allen
Kyle Caswell
Teresa Coughlin
Timothy Waidmann
Adam Weiss

[this page intentionally left blank]

Table of Contents

Chapter **Page**

Executive Summary ES-1

1. Introduction 1

1.1 Purpose of the Year 4 Annual Report.....1
1.2 Methods and Data Sources for the SIM Initiative Model Test Evaluation.....2
1.3 Year 4 Annual Report Overview.....4
1.4 References.....5

2. Cross-State Findings From SIM Initiative Implementation 7

2.1 Strategies and Policy Levers to Support Health Care Delivery System and Payment Models.....10
2.2 Stakeholder Engagement.....18
2.3 Behavioral Health Integration with Primary Care.....20
2.4 Quality Measurement and Reporting.....24
2.5 Health IT and Data Analytics Infrastructure.....26
2.6 Practice Transformation and Workforce Development.....31
2.7 Population Health.....34
2.8 Sustainability.....36
2.9 References.....39

3. Interim Impact Findings From SIM Initiative–Supported Delivery and Payment Models 41

3.1 Results.....45
  3.1.1 Primary care use and care coordination.....45
  3.1.2 Utilization and expenditures.....48
  3.1.3 Quality of care.....51
3.2 Conclusions.....53

Addendum A: Cross-State Methodological Issues 55

4. Summary of State-Specific Findings 65

4.1 Arkansas.....65
  4.1.1 Successes.....66
  4.1.2 Challenges.....67
  4.1.3 Lessons learned.....68
  4.1.4 Interim findings on the impact of the Medicaid PCMH model after 1 year of experience.....69
  4.1.5 References.....70
4.2 Maine.....70
  4.2.1 Successes.....72
  4.2.2 Challenges.....73

4.2.3 Lessons learned 74
4.3 Massachusetts 75
4.3.1 Successes....77
4.3.2 Challenges....78
4.3.3 Lessons learned....79
4.3.4 Interim findings on the impact of PCPRI after 7 quarters of experience....80
4.4 Minnesota....81
4.4.1 Successes....82
4.4.2 Challenges....84
4.4.3 Lessons learned....85
4.4.4 Interim findings on the impact of Medicaid Integrated Health Partnerships after 1 year of experience....86
4.4.5 Reference 87
4.5 Oregon....87
4.5.1 Successes....89
4.5.2 Challenges....90
4.5.3 Lessons learned....91
4.5.4 Interim findings on the impact of PCPCHs, 2011–2014 92
4.5.5 Reference 93
4.6 Vermont 93
4.6.1 Successes....95
4.6.2 Challenges....97
4.6.3 Lessons learned....98
4.6.4 Interim findings on the impact of the Medicaid Shared Savings Program after 2 years of experience 99

Appendices

Appendix A: Arkansas SIM Initiative Progress and Findings A-1
A.1 Synopsis of the SIM Initiative in 2016 .... A-1
A.2 Overview of the Arkansas SIM Initiative A-5
A.3 Implementation of the SIM Initiative in Arkansas After 3 Years of the Test Period.... A-7
A.4 Did the Medicaid PCMH Model Have an Impact on Key Outcomes After 1 Year of Implementation in Arkansas? A-38
A.5 References.... A-52
Sub-appendix A-1: Methods for Qualitative Data Collection and Analysis A-1-1
Sub-appendix A-2. Methods and Measures for Interim Impact Analysis A-2-1

Appendix B: Maine SIM Initiative Progress and Findings B-1
B.1 Synopsis of the SIM Initiative in 2017 ....B-1
B.2 Overview of the Maine SIM Initiative....B-4
B.3 Implementation of the SIM Initiative in Maine After 3.5 Years of the Test Period....B-7
B.4 References....B-38

Sub-appendix B-1. Methods for Qualitative Data Collection and Analysis B-1-1

Appendix C: Massachusetts SIM Initiative Progress and Findings C-1

C.1 Synopsis of the SIM Initiative in 2017 ....C-1
C.2 Overview of the Massachusetts SIM Initiative C-4
C.3 Implementation of the SIM Initiative in Massachusetts After 2 Years of the Test Period C-6
C.4 Did the Primary Care Payment Reform Initiative Have an Impact on Key Outcomes After 7 Quarters of Implementation in Massachusetts? C-29
C.5 References...C-46
Sub-appendix C-1. Methods for Qualitative Data Collection and Analysis C-1-1
Sub-appendix C-2. Methods and Measures for Interim Impact Analysis...................... C-2-1

Appendix D: Minnesota SIM Initiative Progress and Findings D-1

D.1 Synopsis of the SIM Initiative in 2017 .... D-1
D.2 Overview of the Minnesota SIM Initiative D-4
D.3 Implementation of the SIM Initiative in Minnesota After 3.5 Years of the Test Period D-8
D.4 Did Integrated Health Partnerships Have an Impact on Key Outcomes After 1 Year of Test Period in Minnesota? D-40
D.5 References... D-50
Sub-appendix D-1. Methods for Qualitative Data Collection and Analysis.................. D-1-1
Sub-appendix D-2. Methods and Measures for Interim Impact Analysis D-2-1

Appendix E: Oregon SIM Initiative Progress and Findings E-1

E.1 Synopsis of the SIM Initiative in 2017 ....E-1
E.2 Overview of the Oregon SIM Initiative E-4
E.3 Implementation of the SIM Initiative in Oregon After 3.5 Years of the Test Period E-10
E.4 Did Patient-Centered Primary Care Homes Have an Impact on Key Outcomes After Implementation in Oregon?...E-47
E.5 References...E-67
Sub-appendix E-1. Methods for Qualitative Data Collection and Analysis E-1-1
Sub-appendix E-2. Methods and Measures for Interim Impact Analysis...................... E-2-1

Appendix F: Vermont SIM Initiative Progress and Findings F-1

F.1 Synopsis of the SIM Initiative in 2017 ....F-1
F.2 Overview of the Vermont SIM Initiative..F-4
F.3 Implementation of the SIM Initiative in Vermont After 3.5 Years of the Test Period F-10
F.4 Did the Medicaid Shared Savings Program Have an Impact on Key Outcomes After 2 Years of Test Period in Vermont?...F-40
F.5 References...F-61
Sub-appendix F-1. Methods for Qualitative Data Collection and Analysis F-1-1
Sub-appendix F-2. Methods and Measures for Interim Impact Analysis F-2-1

List of Figures

Number **Page**

1-1 Framework for understanding implementation and impact of the SIM Initiative............ 3
3-1. Expected direction of outcome measures 45
A-1. Providers and populations reached by Arkansas's SIM Initiative–related delivery system and payment models A-3
A-2. Time periods covered by different analyses in this report A-5
A-3. Average treatment effect of PCMH on total PMPM payments, first quarter 2014 through fourth quarter 2014.. A-48
A-4. Cumulative treatment effect of PCMH on total PMPM payments, first quarter 2014 through fourth quarter 2014... A-48
A-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2010...A-2-14
A-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2011...A-2-14
A-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2012...A-2-15
A-2-4. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2013...A-2-15
A-2-5. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2014...A-2-16
A-2-6. Total PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group A-2-22
A-2-7. Other therapy PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and comparison group A-2-23
A-2-8. Inpatient PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group........................A-2-23
A-2-9. Inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group A-2-24
A-2-10. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and comparison group A-2-24
A-2-11. Physician visits per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group...A-2-25
A-2-12. Breast cancer screening rate, Arkansas Medicaid enrollees in PCMH and the comparison group, women ages 41–69 ....A-2-25

A-2-13. HbA1c testing rate, Arkansas Medicaid enrollees in PCMH and the comparison group A-2-25
A-2-14. Rate of follow-up after ADHD prescription, Arkansas Medicaid enrollees in PCMH and the comparison group, children ages 6–12 .... A-2-26
A-2-15. Rate of asthma control medication use, Arkansas Medicaid enrollees in PCMH and the comparison group, ages 5–64 with Asthma A-2-26
B-1. Providers and populations reached by Maine's SIM Initiative–related delivery system and payment models B-2
C-1. Providers and populations reached by Massachusetts' SIM Initiative-related delivery system and payment models C-3
C-2. Time periods covered by different analyses in this report C-3
C-3. Differences in the pre-post change in total per beneficiary per month expenditures for Massachusetts Medicaid beneficiaries in the Primary Care Payment Reform Initiative and comparison groups, first 7 quarters of implementation C-37
C-2-1. Weighted and unweighted propensity score density plots for the PCPRI and comparison groups, baseline period (2011–2014) C-2-13
C-2-2. Average total per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group C-2-17
C-2-3. Average total inpatient per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group C-2-18
C-2-4. Average emergency department per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group C-2-18
C-2-5. Average total primary care per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group C-2-19
C-2-6. Primary care visits per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group C-2-19
C-2-7. Emergency department visits per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group C-2-20
C-2-8. All-cause inpatient admissions per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group C-2-20
C-2-9. Probability of Massachusetts Medicaid beneficiary having a follow-up visit within 14 days of hospital discharge from July 2011 through March 2016, PCPRI and comparison group C-2-21
C-2-10. Probability of Massachusetts Medicaid beneficiary having at least one comprehensive well-care visit for individuals 12–21 years old, from July 2011 through March 2016, PCPRI and comparison group C-2-21

C-2-11. Probability of Massachusetts Medicaid beneficiary having an admission for an Ambulatory Care Sensitive Condition Hospitalization, from July 2011 through March 2016, PCPRI and comparison group C-2-22

D-1. Providers and populations reached by Minnesota's SIM Initiative–related delivery system and payment models, as of March 2017 .... D-3

D-2. Time periods covered by different analyses in this report D-4

D-3. Flow of beneficiaries, payments, and shared savings and losses between Minnesota and the MCOs D-16

D-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, overall Minnesota population D-2-14

D-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, Minnesota adult population D-2-15

D-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, Minnesota child population D-2-16

D-2-4. Average rate of mammogram screening, 2011 through 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group D-2-29

D-2-5. Average rate of follow-up visits 14 days post-discharge, 2011 through 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group D-2-30

D-2-6. All-cause acute inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group D-2-30

D-2-7. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2014, for the Medicaid beneficiaries in IHPs in Minnesota and the comparison group D-2-31

D-2-8. All-cause 30-day acute readmissions per 1,000 discharges, first quarter 2011 through fourth quarter 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group D-2-31

E-1. Providers and populations reached by Oregon's SIM Initiative–related delivery system and payment models E-2

E-2. Time periods covered by different analyses in this report E-4

F-1. Providers and populations reached by Vermont's SIM Initiative-related delivery system and payment models F-3

F-2. Time periods covered by different analyses in this report F-4

F-3. Timeline of Key Vermont Health Reform Activities (SIM Initiative October 2013–June 2017) F-42

F-4. Quarterly treatment effect of Medicaid SSP implementation on total PBPM payments, first quarter of 2015 through fourth quarter 2015 .... F-54

F-5. Cumulative difference in the pre-post change in total PBPM expenditures for Medicaid ACO-attributed beneficiaries and the comparison group, first 8 quarters of Medicaid SSP implementation F-55

F-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2011 .... F-2-14
F-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2012 .... F-2-14
F-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2013 .... F-2-15
F-2-4. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2014 .... F-2-15
F-2-5. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2015 .... F-2-16
F-2-6. Percentage of Medicaid beneficiaries with a follow-up visit within 7 days of discharge from hospitalization for mental illness, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-22
F-2-7. Percentage of Medicaid beneficiaries with a follow-up visit within 30 days of discharge from hospitalization for mental illness, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-23
F-2-8. Percentage of Medicaid adult beneficiaries with acute bronchitis who avoided antibiotic treatment, 2012 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-23
F-2-9. All-cause acute inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-24
F-2-10. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-24
F-2-11. Discharges with a readmission within 30 days per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-25
F-2-12. Average total PBPM payments for first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-25
F-2-13. Percentage of Medicaid beneficiaries who initiated treatment after an episode of alcohol and other drug dependence for 2011 through 2015, ACO and comparison group F-2-26
F-2-14. Percentage of Medicaid beneficiaries who engaged treatment after an episode of alcohol and other drug dependence, 2011 through 2015, Vermont ACO-attributed beneficiaries and comparison group F-2-26
F-2-15. Rate of admissions for ambulatory care sensitive conditions per 1,000 population, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-27
F-2-16. Percentage of Medicaid beneficiaries who had a developmental screening, 2012 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-27

F-2-17. Percentage of Medicaid beneficiaries who had an adolescent well care visit, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group F-2-27

List of Tables

Number **Page**

1-1. Prior reports, contents, and time periods covered 4
2-1. Summary of key activities in common domains across states, 2016–2017 9
2-2. PCMH/Health homes: Participating payers, providers, and populations in SIM-related models 12
2-3. Integrated care model: Participating payers, providers, and populations in SIM-related models 13
2-4. Themes in Health IT and data analytics 27
2-5. Sample topics covered in learning collaboratives convened in Model Test states........ 32
2-6. Sources of federal, state, and private funding to support continued delivery model implementation 37
3-1. Details of the SIM Initiative–supported payment and delivery model-specific analysis, by state 42
3-2. Difference in the change in care coordination outcomes for ACO beneficiaries and their comparison group 46
3-3. Difference in the change in primary care or physician use for PCMH beneficiaries and their comparison group........ 47
3-4. Difference in the utilization and expenditure outcomes for ACO beneficiaries and their comparison group 49
3-5. Difference in the utilization and expenditure outcomes for PCMH beneficiaries and their comparison group 50
3-6. Difference in quality of care outcomes for ACO beneficiaries and their comparison group 52
3-7. Difference in quality of care outcomes for PCMH beneficiaries and their comparison group 53
Addendum Table 1. Methods for PCMH programs........ 59
Addendum Table 2. Methods for ACO programs 62
A-1. Summary of SIM Initiative activities in Arkansas, through September 2016........ A-6
A-2. Stakeholder interviews conducted in Arkansas, September 2016........ A-7
A-3. SIM Initiative–related delivery system and payment models in Arkansas A-9
A-4. Implementation status of Arkansas's episodes of care........ A-17
A-5. Select performance and outcome quality measures implemented in SIM-related delivery system and payment models in Arkansas, Medicaid only........ A-31
A-6. Weighted baseline characteristics and standardized differences, PCMH and comparison groups, 2013........ A-42

A-7. Difference in the pre-post change in utilization for Arkansas Medicaid beneficiaries enrolled in PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014) A-45

A-8. Difference in the pre-post change in PMPM expenditures for Arkansas Medicaid beneficiaries enrolled in PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014) A-47

A-9. Difference in the pre-post change in quality of care outcomes for Arkansas Medicaid beneficiaries assigned to PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014)............................. A-50

A-1-1. Key informant interviews conducted in Arkansas, September 2016 ....A-1-2

A-1-2. Overview of focus group participants A-1-3

A-2-1. Asthma medications list A-2-8

A-2-2. ADHD medications description A-2-9

A-2-3. Codes to identify substance abuse A-2-9

A-2-4. Codes to identify follow-up visits A-2-9

A-2-5. Covariates for propensity score logistic regressions A-2-11

A-2-6. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2010...A-2-17

A-2-7. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2011...A-2-18

A-2-8. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2012...A-2-19

A-2-9. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2013...A-2-20

A-2-10. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2014...A-2-21

A-2-11. Differences in average quarterly PMPM Medicaid payments, Other Therapy Payments, and Inpatient payments during the baseline period, Arkansas SIM test and comparison group beneficiaries A-2-28

A-2-12. Differences in probability of use during the baseline period, PCMH and comparison group beneficiaries...A-2-29

A-2-13. Difference-in-differences estimate A-2-30

B-1. Summary of SIM Initiative activities in Maine, through Spring 2017........................ B-5

B-2. SIM Initiative-related delivery system and payment models in Maine...................... B-11

B-3. Quality measures implemented in SIM Initiative-related delivery system and payment models for MaineCare beneficiaries in Maine.. B-25

B-1-1. Key informant interviews conducted in Maine, March-April 2017 ....B-1-2

B-1-2. Overview of focus group B-1-3

C-1. Summary of SIM Initiative activities in Massachusetts, through Spring 2017............ C-5

C-2. Key informant interviews conducted in Massachusetts, November 2016 .... C-6

C-3. Components of Primary Care Payment Reform Initiative and Accountable Care Strategy pilot financing C-8
C-4. Number of quality measures by domain implemented or planned for SIM Initiative–related delivery system and payment models in Massachusetts C-20
C-5. Summary of the SIM Initiative activities in Massachusetts and sustainability plans C-28
C-6. Average characteristics of Massachusetts Medicaid Primary Care Payment Reform Initiative and comparison groups after propensity score weights were applied, baseline period C-32
C-7. Difference in the pre-post change in care coordination outcomes for Medicaid beneficiaries enrolled in the Primary Care Payment Reform Initiative in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014–March 2016) C-34
C-8. Differences in the pre-post change in PBPM expenditures for Massachusetts Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group through the seventh full quarter of implementation (July 2014–March 2016) C-36
C-9. Examination of the differences between the PCPRI capitation payment and fee-for-service equivalent payments for beneficiaries enrolled in the PCPRI in Massachusetts, through the seventh full quarter of initiative implementation (July 2014–March 2016) C-38
C-10. Differences in the pre-post change in utilization for Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014–March 2016) C-40
C-11. Difference in the pre-post change in quality of care outcomes for Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014-March 2016) C-42
C-12. Differences between health centers that participated or did not participate in the Massachusetts Medicaid PCPRI and that likely served patients in the comparison group C-43
C-1-1. Key informant interviews conducted in Massachusetts, November 2016 .... C-1-2
C-1-2. Overview of focus group participants C-1-2
C-2-1. Covariates for propensity score logistic regressions C-2-9
C-2-2. Unweighted and weighted means and standardized differences, PCPRI and comparison groups, baseline period (2011–2014) C-2-11
C-2-3. Unweighted and weighted means and standardized differences, PCPRI and comparison groups aged 1 year or older, baseline period (2011–2014) C-2-15
C-2-4. Differences in average quarterly per beneficiary per month (PBPM) Medicaid expenditures and expenditures per admission and per emergency department visit and per primary care visit during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries C-2-24

C-2-5. Differences in the probability of inpatient, emergency department, and primary care visits during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries C-2-24

C-2-6. Differences in the probability of 14-day follow-up after hospitalization, adolescent well-child visits, and ambulatory care sensitive conditions during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries C-2-25

C-2-7. Difference-in-differences estimate C-2-26

D-1. Summary of SIM Initiative activities in Minnesota, through Spring 2017 .... D-6

D-2. SIM Initiative–related delivery system and payment models in Minnesota D-10

D-3. IHP contract structure D-12

D-4. IHP versions D-13

D-5. eHealth grant rounds D-29

D-6. HDI and HIO comparison D-31

D-7. Weighted baseline characteristics and standardized differences, IHP and comparison groups, 2013 .... D-43

D-8. Difference in the pre-post change in care coordination for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014) ... D-45

D-9. Difference in the pre-post change in utilization for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014) D-47

D-10. Difference in the pre-post change in quality of care for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014) D-49

D-1-1. Key informant interviews conducted in Minnesota, April 2017 .... D-1-2

D-1-2. Overview of focus group participants D-1-2

D-2-1. Covariates for propensity score logistic regressions D-2-12

D-2-2. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2011 .... D-2-17

D-2-3. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2011 .... D-2-18

D-2-4. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2011 .... D-2-19

D-2-5. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2012 .... D-2-20

D-2-6. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2012 .... D-2-21

D-2-7. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2012 .... D-2-22

D-2-8. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2013 ....D-2-23
D-2-9. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2013 ....D-2-24
D-2-10. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2013 ....D-2-25
D-2-11. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2014 ....D-2-26
D-2-12. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2014 ....D-2-27
D-2-13. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2014 ....D-2-28
D-2-14. Differences in probability of use during the baseline period, Minnesota IHP beneficiaries and comparison group beneficiaries D-2-34
D-2-15. Difference-in-differences estimate D-2-35
D-2-16. Covariates for logistic regressions........D-2-36
E-1. Summary of SIM Initiative activities in Oregon supported in part or fully by SIM funding, through Spring 2017 ....E-6
E-2. Stakeholder interviews conducted in Oregon, April 2017 ....E-10
E-3. SIM Initiative–related delivery system and payment models in Oregon, 2015–2016 ....E-12
E-4. 2016 CCO incentive metrics E-33
E-5. Individual characteristics (average per person-month), by payer, across all years (2011 to 2014) E-51
E-6. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon Medicaid enrollees (2011–2014)........E-54
E-7. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon PEBB enrollees (2011–2014)........E-55
E-8. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon OEBB enrollees (2011–2014) E-56
E-9. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon commercially insured individuals (2011–2014)........E-57
E-10. Estimated effects of PCPCH recognition on quality of care, Oregon Medicaid enrollees (2011–2014)........E-59
E-11. Estimated effects of PCPCH recognition on quality of care, Oregon PEBB enrollees (2011–2014)........E-61
E-12. Estimated effects of PCPCH recognition on quality of care, Oregon OEBB enrollees (2011–2014)........E-62
E-13. Estimated effects of PCPCH recognition on quality of care, Oregon commercially insured individuals (2011–2014)........E-64

E-1-1. Key informant interviews conducted in Oregon, April-May 2017 .... E-1-2
E-1-2. Overview of focus group participants E-1-3
E-2-1. Codes for identifying inpatient and outpatient visits... E-2-7
E-2-2. Codes to identify prenatal and postpartum care visits E-2-9
E-2-3. Codes to identify deliveries resulting in live births E-2-9
E-2-4. Individual characteristics (average per person-month), by payer, across all years (2011 to 2014) E-2-12
F-1. Summary of SIM Initiative activities in Vermont, through Spring 2017......................F-6
F-2. Key informant interviews conducted in Vermont, March-April, 2017 ....F-10
F-3. ACOs, their characteristics, and calendar year 2015 SSP results...............................F-12
F-4. Payment measures for Vermont’s commercial and Medicaid ACO Shared Savings Programs and All-Payer ACO Model F-28
F-5. Vermont draft Sustainability Plan recommendations for key components F-39
F-6. Vermont ACOs F-43
F-7. Weighted means and standardized differences prior to Medicaid SSP implementation, Medicaid SSP and comparison groups, 2013 ....F-47
F-8. Difference in the pre-post change in care coordination outcomes for Vermont Medicaid ACO-attributed beneficiaries relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015) F-49
F-9. Difference in the pre-post change in utilization for Medicaid beneficiaries enrolled in ACOs in Vermont and the comparison group, first 2 years of SIM implementation (January 2014 through December 2015) F-51
F-10. Difference in the pre-post change in total PBPM payments for Vermont Medicaid ACO-attributed beneficiaries relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015) F-53
F-11. Difference in the pre-post change in quality of care outcomes for Medicaid beneficiaries enrolled in Vermont Medicaid ACOs relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015)...F-57
F-1-1. Key informant interviews conducted in Vermont, March-April, 2017 .... F-1-2
F-1-2. Overview of focus group participants F-1-2
F-2-1. Antibiotic medications list... F-2-6
F-2-2. Covariates for propensity score logistic regressions F-2-12
F-2-3. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2011 .... F-2-17
F-2-4. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2012 .... F-2-18
F-2-5. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2013 .... F-2-19

F-2-6. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2014 .... F-2-20
F-2-7. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2015 .... F-2-21
F-2-8. Differences in average expenditure, utilization, care coordination, and quality of care outcomes during the baseline period, Medicaid ACO beneficiaries and comparison group beneficiaries F-2-30
F-2-9. Difference-in-differences estimate F-2-31

List of Acronyms

Acronym	Definition
AC	Accountable Communities
ACH	Accountable Community for Health
ACO	accountable care organization
AHCPII	Arkansas Health Care Payment Improvement Initiative
AHRQ	Agency for Healthcare Research and Quality
APCD	all-payer claims database
BCBS	Blue Cross Blue Shield
BHH	behavioral health home
CCM	Coordinated Care Model
CCO	Coordinated Care Organizations
CFR	Code of Federal Regulations
CHIP	Children’s Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
DD	developmental disabilities
DHS	Department of Human Services
D-in-D	difference-in-differences
D-SNPs	Dual Eligible Special Needs Plans
DSRIP	Delivery System Reform Incentive Payment
ED	emergency department
EDIE	Emergency Department Information Exchange
EHR	electronic health record
ENS	event notification system or service
EOC	episode of care
ERISA	Employee Retirement Income Security Act
FFS	fee for service or fee-for-service (adj.)
FQHC	federally qualified health centers
GMCB	Green Mountain Care Board
HCBS	home and community-based services
HCH	health care home
HH	health home
health IT	health information technology
HIE	health information exchange
HPC	Health Policy Commission
I/DD	intellectual or developmental disabilities
IHP	Integrated Health Partnership

Acronym	Definition
LTSS	long-term services and supports
MCO	managed care organization
MCPAP	Massachusetts Child Access and Psychiatry Project
MMIS	Medicaid Management Information System
NCQA	National Committee for Quality Assurance
OEBB	Oregon Educators Benefit Board
PAP	principal accountable provider
PCC	Primary Care Clinicians
PCMH	patient-centered medical home
PCPCH	patient-centered primary care home
PCPRI	Primary Care Payment Reform Initiative
PEBB	Public Employees Benefit Board
PMPM	per member per month
QHP	qualified health plan
SIM	State Innovation Models
SPA	state plan amendment
SSP	Shared Savings Program
VHIE	Vermont Health Information Exchange
VPM	value-based payment model

[this page intentionally left blank]

Executive Summary

In the State Innovation Models (SIM) Initiative, the Centers for Medicare & Medicaid Services (CMS) is testing the ability of state governments to use their policy and regulatory levers to accelerate statewide health care system transformation. For Round 1, the Center for Medicare and Medicaid Innovation awarded $33–$45 million per state in 2013 to six Model Test states: **Arkansas, Maine, Massachusetts, Minnesota, Oregon, and Vermont**. These six Test states are leveraging their roles as health care payers, purchasers, regulators, and conveners to move providers—and the populations they treat—into value-based payment models (VPMs).[1]

States varied in the types of VPMs their SIM investment supported. In 2016, all six states supported patient-centered medical home (PCMH) or other health home/primary care home models; additionally, two states (Maine and Minnesota) supported behavioral health home models. Arkansas supported an episode of care (EOC) model, and the other five states supported implementation of an integrated care model, such as Medicaid contracts with providers who have organized as accountable care organizations (ACOs) (Maine, Massachusetts, Minnesota, Vermont) or with health plans that have adopted elements of a coordinated care model (CCM) (Oregon). All states commonly provided infrastructure such as health information technology (health IT) and learning opportunities to enable providers to transform care delivery.

The Year 4 Annual Report describes the experiences of providers, health systems, consumers, payers, and state officials during the final full implementation year for most Round 1 states (spring 2016 to spring 2017). The report also presents interim impacts on health care utilization, cost, and quality for individuals reached by SIM-supported VPMs during the SIM Initiative period, ranging between 2014 and early 2016 based on data availability in each state.

---

[1] Value-based payment models offer health care providers the opportunity to have at least some portion of their payment rest on quality or value of health care outcomes for their patients, rather than payments that are entirely volume based (e.g., traditional fee-for-service).

Key Findings

Reach of VPMs

- The SIM Initiative helped expand the reach of VPMs to more than half of the Medicaid population under Arkansas's, Oregon's, and Vermont's PCMH models, and Minnesota's and Oregon's ACO models.
- Arkansas and Vermont have achieved significant commercial payer alignment, but no SIM-related VPM has reached more than 40 percent of its commercially insured population.

Changes in care delivery

- Individual clinicians credited SIM-related investments in health information exchanges, quality measurement, new health workforce roles, and learning opportunities as key factors that facilitated changes in care delivery intended to improve care coordination.
- Similarly, individual clinicians in ACO models cited this VPM's potential for financial risks and rewards as driving investments in organizational infrastructure, which in turn influenced their ability to change care delivery. Individual clinicians who were exposed to financial rewards and risks under an episode of care model were more attuned to potential risk.

Changes in outcomes

- Although care coordination improved for most of the VPMs, these improvements generally did not result in fewer emergency department visits or hospitalizations, lower expenditures, or improved quality of care for patients served by VPM-participating providers during the early SIM test period.

SIM-supported VPMs reached large numbers of Medicaid beneficiaries, but fewer in other groups

Expanding VPM uptake among providers was the most common transformation goal states sought to achieve, and the SIM states have largely been successful in reaching increasing numbers of providers over time. SIM states also have been successful in engaging Medicaid and other state-purchased health insurance programs, but struggled to engage private payers and insurers. As a result of states' engagement efforts, PCMH and integrated care models reached the greatest percentage of the Medicaid population in Oregon (75 to 85 percent) and Vermont (46 to 70 percent), followed by Minnesota (59 percent) and Arkansas (51 percent); two states had smaller reach, Maine (15 to 17 percent) and Massachusetts (6 to 10 percent). Although SIM-supported VPMs were less successful in reaching commercially insured populations, two states made progress: Thirty-six percent of commercially insured Arkansas residents were served by providers paid under its EOC model and 37 percent were served by Vermont's PCMH model.

Limited interest among private payers and insurers in aligning their VPMs with others may explain the relatively low reach of SIM-supported VPMs for commercially insured populations.

All states struggled with effective engagement of private payers and insurers to expand VPMs beyond existing efforts and to achieve alignment across multiple payers. Although private payers and insurers were willing to discuss the states' conceptualization of VPMs, most did not make changes to the VPMs they offered to providers. Private payers were reluctant to change their established design of insurance products in response to a single state's recommendations, and they preferred maintaining their flexibility to make product design changes in response to their clients' needs. In states that had multi-payer participation (e.g., Arkansas), some payers were concerned that other nonparticipating payers were benefitting from the payment models without contributing support to them. As a result of limited interest among commercial payers, states ultimately focused on Medicaid or state employee health plans over which they had control.

The SIM Initiative facilitated investments in electronic alerts about hospital use, quality measurement, expanded team-based care, and technical assistance, all of which were critical to transforming care delivery.

Most states promoted the use of health information exchanges (HIEs), which included event notification services (alerting primary care of hospital use). Providers across states found these event notification services to be particularly helpful in improving care coordination. For example, Medicaid care managers and providers participating in Maine's behavioral health homes have used emergency department (ED) and hospital notifications offered through the statewide HIE to develop work flows. Similarly, ACOs have used Vermont's Patient Ping event notification system to enable better care coordination and engage federally qualified health centers and other providers whose electronic health record (EHR) systems do not already include these notifications. Consumers in Massachusetts, Oregon, and Vermont spoke of instances when their primary care providers knew that they had been to the ED or had an inpatient hospital stay. Although many providers touted the benefits of event notification services, some providers noted challenges with interoperability/data sharing between different health systems and EHR platforms, concerns with the high cost of accessing statewide HIEs, and frustrations with some state policies restricting certain providers' access to HIEs.

With regard to quality reporting, providers in Massachusetts and Oregon, for example, noted that the performance measure data helped them to better understand the quality of care provided to different patients and prompted them to make improvements to their practices. Some providers expressed concerns about the accuracy of the data used to calculate measures, and the time and resource burden associated with inputting data for quality measurement and reporting.

Physicians across states cited the importance of team-based care models that involve new staff roles (e.g., dedicated nurse care managers, social workers, community health workers, peer support specialists). These new staff roles provided care coordination (e.g., making connections to social services, referrals, and follow-up) that allowed physicians to focus on providing medical care. Finally, technical assistance that emphasized peer-to-peer learning and individualized support was particularly effective at driving practice transformation.

Opportunities for financial risk and reward under the ACO and EOC models influenced clinicians differently.

Many providers, especially those working in larger health systems, were not always aware that they were participants in an ACO and so were not subsequently motivated by the financial incentives offered under the ACO models. These providers cited the model as motivating changes at the ACOs' organizational level, rather than directly influencing how they and their colleagues deliver patient care. In contrast, clinicians under the state's EOC payment model, in which individual physicians are held financially accountable for all episode-related patient costs, felt vulnerable to financial risk. As a result, some clinicians were reluctant to perform certain procedures or take new Medicaid patients, whose patterns of care they perceived as particularly unpredictable, because of the potential financial penalties.

Care coordination and primary care use generally improved across the VPMs.

VPMs aim to control total spending in part by increasing primary care use to address patients' needs. Improvements in primary care-led care coordination and care management should ultimately lead to a decrease in ED visits and hospitalizations, and a decrease in total expenditures, with the same or better quality of care. Interim impact analyses in five of the six states examined care coordination, utilization, expenditure,[2] and quality of care outcomes for one VPM on the Medicaid population[3] relative to an in-state comparison group. Analyses compared changes for both groups between a baseline and test period (see ***Box ES-1*** for details). The dates of the test period ranged for each state, but covered at least the first year of the SIM Initiative test period. With the selection of the in-state comparison groups, and data limitations that constrained our ability to quantify the degree to which individuals attributed to the VPM or comparison group received care from providers in the other group, the analyses in some states (Maine, Vermont) are more likely to understate the impact of a model (i.e., be more conservative rather than overstate the VPM's impact).

---

[2] Except in Minnesota.

[3] The estimated impact of the PCPCH model in Oregon was also tested on state employee and commercially insured populations.

Box ES-1. Models analyzed in Year 4 Annual Report

State	Model	Test period
Arkansas	Medicaid PCMH	Jan–Dec 2014
Massachusetts	Medicaid Primary Care Payment Reform Initiative	Jul 2014–Mar 2016 (varies by clinic)
Minnesota	Integrated Health Partnerships (Medicaid ACO model)	Jan–Dec 2014
Oregon	Patient-Centered Primary Care Home (PCPCH) (multi-payer)	2011–2014 (varies by clinic)
Vermont	Medicaid Shared Savings Program (ACO)	Jan 2014–Dec 2015

Note: There were no impact analyses of SIM-supported VPMs in Maine conducted for this report.

In analyses of the Arkansas, Massachusetts, and Oregon PCMH models, Medicaid beneficiaries (or in Oregon's case, Medicaid beneficiaries and state employees) receiving care from PCMHs had relative improvements in use of physician visits and thus more physician visits in the test period relative to their comparison groups. We expect primary care utilization to increase as access to primary care improves under PCMH requirements. This finding is consistent with reports from consumers in Arkansas and Massachusetts that access to primary care did increase—for example, patients could get same-day appointments. Providers also noted that they changed care delivery in response to quality measurement associated with participation in the PCMH model, which would also lead to increased utilization to ensure more active monitoring of patients' health.

Similarly, Medicaid beneficiaries receiving care from providers participating in Minnesota's Medicaid ACO were more likely to have a primary care visit following a hospital discharge than the comparison group in 2014. We expect follow-up rates to improve as care management activities increase for ACOs. In Minnesota, providers reported receiving an increasing number of near real-time hospital discharge notifications to primary care practices, which helped practices identify more quickly their patients who were in need of a follow-up visit. In contrast, analyses of Vermont data showed no statistically significant difference in care coordination for Medicaid beneficiaries assigned to ACOs versus not in 2014–2015, as measured by follow-up after discharge from hospitalization for mental illness; interviews with providers at a later time point (2017) indicated far greater use of a hospital discharge notification service than observed in 2015.

During the test period, most VPMs did not demonstrate fewer emergency department visits, hospital admissions, or lower expenditures.

Relative improvement in primary care and physician services did not yet lead, as expected, to fewer ED visits or hospital admissions within the analytic period, except in Vermont, where ED visits declined for Medicaid beneficiaries after 2 years, and in Arkansas, where admissions for Medicaid beneficiaries declined after 1 year. These mixed findings suggest that increased use of primary care and care coordination may not necessarily substitute for ED and hospital services, and that changing provider and beneficiary behavior may take more time than the few years this report covers.

With the exception of Medicaid beneficiaries attributed to Vermont's Medicaid Shared Savings Program, total Medicaid expenditures either did not change or increased relative to the comparison group. It is not surprising that total spending increased (or at least did not decrease) with greater use of primary care, behavioral health, and other physician services without concomitant reductions in the use of the ED or hospital services.

Quality of care largely remained unchanged after 1–2 years.

As care coordination improves, and providers respond to specific quality metrics for which they are accountable under VPMs, quality of care should also improve. At the same time, the potential disruption to providers' workflow imposed by new or different organizational environments (e.g., new health IT, new members of the workforce) could have a short-term negative impact on quality. It is important to monitor quality measures that could reflect any negative impact on access to care as a response to a payment model's financial incentives to control costs. In the SIM states, a few process quality measures (e.g., preventive screenings and medication adherence) improved in several VPMs during the first 1 to 2 years of implementation. Others remained unchanged. We found no evidence of declining quality, but rather improved quality on measures that are part of VPMs (i.e., in Minnesota, Oregon, Vermont).

State officials and providers reported in 2017 greater progress in implementing changes in care delivery under the SIM Initiative than were observed in analyses of impact in 2014–2016.

Impact analyses conducted in a post-SIM Initiative implementation (test) period ranging from 1 to 2 years found improvements in primary care utilization, care coordination, and some quality of care measures for patients served by VPM-participating providers, but generally did not observe lower Medicaid expenditures or fewer ED visits or hospitalizations relative to a comparison group. Yet, by 3 to 3.5 years after SIM Initiative implementation, stakeholders in all states cited growth of relationships and collaborations across providers and sectors as an important accomplishment of the SIM Initiative and noted that investments in infrastructure were critical to transforming care delivery. Although the SIM Initiative focused state policy levers and strategies as intended, insofar as states implemented Medicaid VPMs and funding for health IT and other practice transformation infrastructure, the SIM Initiative fell short in four out of six states with regard to the extent to which commercial payers aligned with Medicaid VPMs to optimize the VPMs' impact for providers and patients. Still, changes in infrastructure such as electronic alerts about hospital use, quality measurement, expanded team-based care, and technical assistance, resulted either directly from SIM Initiative funding, or indirectly from provider organization investment spurred by SIM-supported VPMs.

[this page intentionally left blank]

1. Introduction

State governments have the potential to accelerate statewide health care system transformation. To test this potential, the Center for Medicare and Medicaid Innovation (CMMI) in 2013 awarded funds through the Round 1 State Innovation Models (SIM) Initiative to six states—Arkansas, Maine, Massachusetts, Minnesota, Oregon, and Vermont. These Test states are using policy and regulatory levers to enable or facilitate the spread of innovative health care models, integrating population health into transformation efforts, engaging a broad range of stakeholders, and leveraging existing efforts to improve health care delivery and outcomes.

Under the SIM Initiative, states have implemented a variety of methods to encourage health care providers to adopt models of health care that promote coordination across provider types, integration of primary care and behavioral health care, and attention to social determinants of health. For example, the state Medicaid programs are introducing value-based payment models (VPMs),[4] and where possible, aligning these VPMs with new or existing efforts across Medicare and commercial payers. States are also offering technical assistance to primary care practices, behavioral health care providers, social service and community-based organizations, and others to implement new delivery system models. Finally, states are developing or enhancing services—such as health information technology (health IT) and data analytic investment—that enable or improve model effectiveness.

To obtain an independent federal evaluation of the SIM Initiative, CMMI contracted with a team led by RTI International that includes The Urban Institute, National Academy for State Health Policy, and The Henne Group.

1.1 Purpose of the Year 4 Annual Report

As the fourth of five planned annual reports, the purpose of the report is to analyze stakeholder perceptions of the changes resulting from SIM Initiative implementation and to identify interim impact on health care outcomes. Accordingly, this report features both qualitative and quantitative evaluation findings. Qualitative findings focus on implementation successes and challenges based on final site visits at or near the end of states' period of performance (all but Massachusetts), and on the interim site visit to one state (Massachusetts), whose period of performance ends in 2018. This report also contains the first quantitative analysis of the impact of SIM-supported delivery and payment models on populations receiving care from participating providers. Our synthesized findings offer insights into how health care is

---

[4] Value-based payment models offer health care providers the opportunity to have at least some portion of their payment rest on quality or value of health care outcomes for their patients, rather than payments that are entirely volume based (e.g., traditional fee-for-service).

changing in states with Round 1 SIM Initiative Model Test awards. The research questions addressed in this report fall into two categories:

Stakeholder perceptions of transformation under the SIM Initiative

- What progress have the states made on SIM Initiative activities? These include:
  - supporting health system transformation
  - building and establishing new payment and delivery system models
  - integrating behavioral health and primary care
  - identifying key clinical or public health strategies to improve population health within new payment and delivery system models
  - aligning quality measures across multiple payers
  - enhancing health IT
  - engaging with payers, communities, providers, and target populations to facilitate health system transformation
- How do providers working within SIM Initiative–related health care delivery and payment models describe changes in care delivery?
- How do consumers (patients) served by providers working within SIM Initiative–related health care delivery and payment models describe changes in care they receive?
- What were the key successes, challenges, and lessons learned through the SIM implementation and testing process?
- Which policy and regulatory levers are the states using to transform health care delivery systems?

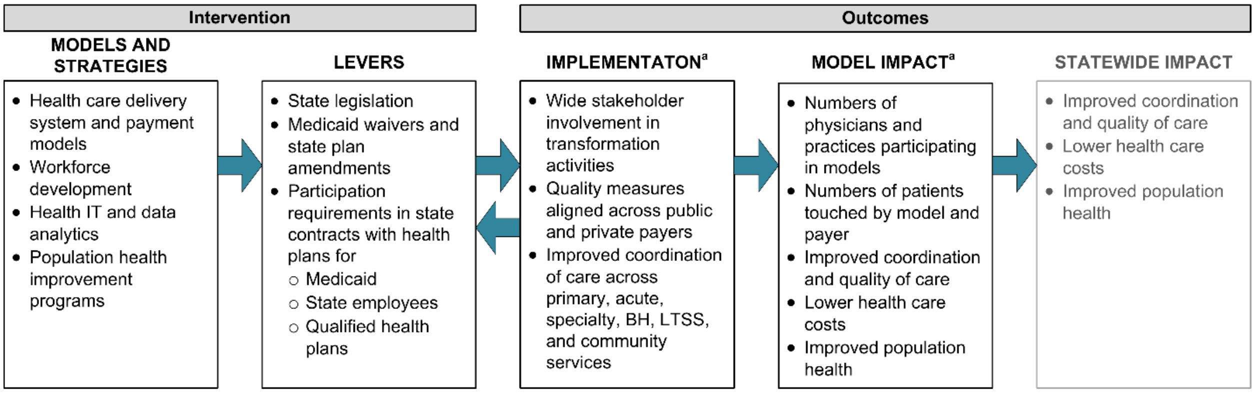
Interim estimates of the impact of SIM Initiative–related care models on individuals served by participating providers

- What were the impacts on care coordination, health care utilization, expenditures, and quality of care?

1.2 Methods and Data Sources for the SIM Initiative Model Test Evaluation

The federal SIM Initiative evaluation is designed to collect and analyze data to understand *what* health care delivery system models and health care transformation strategies states are implementing; *how* states are implementing them; and *whether* any impact occurred that would be predicted from SIM implementation activities. ***Figure 1-1***, which depicts the framework for how the SIM Initiative could affect key outcomes of health and health care, guides our approach to the evaluation. As the examples in Figure 1-1 illustrate, each state's SIM Initiative consists of one or more health care delivery and payment reform models; strategies to enable the operation of these models, such as health IT and data analytics investment and workforce development, and plans for integrating population health activities; and policy levers

Figure 1-1 Framework for understanding implementation and impact of the SIM Initiative



BH = behavioral health; health IT = health information technology; LTSS = long-term services and supports.

[a] Implementation and model impact outcomes are reported in this Year 4 Annual Report.

to facilitate the spread of these models and strategies throughout the state. In this report, each state's evaluation consists of a qualitative analysis of ***implementation*** using the most recent data available (spring 2016–spring 2017) and a quantitative analysis of the impact on people receiving care from providers participating in SIM-supported models (***model impact***) using the most recent data available (varies by state, generally ranging from 2014 to early 2016).[5] State-specific analyses are summarized in ***Chapter 4*** and provided in fuller detail in ***Appendices A-F***. A final quantitative analysis of any differences in health and health care for the entire state population between the SIM states and non-SIM comparison group states (***statewide impact***) will be available in the Year 5 Annual Report.

The qualitative analysis of SIM Initiative implementation (examining models and strategies, policy levers, and implementation activities as described in ***Figure 1-1***) draws from site visit interviews with key informants, focus groups, monthly evaluation calls with state officials, and review of documents such as states' annual and quarterly reports, operational plans, and relevant news articles. Interviews and focus groups are a particularly rich source for understanding the extent of changes resulting from implementing the SIM Initiative (qualitative data collection and methods available in ***Sub-appendix 1*** of each state appendix). The qualitative data analysis from current and past years also helps guide interpretation of the model impact analysis on care coordination, utilization, expenditure, and quality outcomes for individuals served by providers participating in SIM Initiative–related delivery and payment models. More detail on each state's SIM Initiative implementation can be found in other reports (see ***Table 1-1*** for a description of reports and the time period they cover following the October 1, 2013, implementation start date).

---

[5] The only exception is Maine, for which there were no impact analyses of SIM-supported VPMs conducted for this report.

Table 1-1. Prior reports, contents, and time periods covered

Report	Contents	Calendar dates
Baseline report (Gavin et al., 2014)	Description of Test states' plans and initial implementation progress	Mid-2014 (3–6 months after implementation)
Year 2 Annual Report (Gavin et al., 2016)	Analysis of progress, challenges, and lessons learned	Spring 2015 (1.5 years after implementation)
Year 3 Annual Report (RTI International, 2017)	Updated the analysis of SIM Initiative implementation	Spring 2016 (2.5 years after implementation)

To evaluate the impact of the SIM Initiative using quantifiable metrics, we present state-reported numbers of the reach of VPMs across the state: providers participating in SIM-supported models and numbers of individuals served by those providers. Where possible, we calculate these numbers as a percentage of providers statewide or of the population (data sources and methods available in ***Sub-appendix 1*** of each state appendix).

We use model-specific analyses to capture the impact of the discrete model, comparing outcomes for people receiving care from providers participating in SIM-supported models with outcomes from a within-state comparison group of populations getting care from nonparticipating providers (Gavin et al., 2016). For each state, the model-specific analyses used a difference-in-differences design, comparing changes in trends from a baseline period to the first 1 to 2 years after model implementation within the SIM Initiative test period for relevant measures of care coordination, health care utilization, total per person expenditures, and quality of care, for the intervention (receiving care under SIM-supported models) and comparison ("usual care") groups. Following comparison group selection for each state (with the exception of Oregon, for which a different statistical model was used), we constructed annual person-level propensity score weights to balance model and comparison group residents on individual and county characteristics. We used Medicaid claims data in each state (except for Oregon where we used data from its All Payer All Claims reporting program) to derive outcomes. Data availability varied by state, and the data period ranged from 2010 through first quarter 2016 (quantitative methods, including data, measures, comparison group selection and weighting, and statistical methods, are available in ***Sub-appendix 2*** of each state appendix).

1.3 Year 4 Annual Report Overview

Chapter 2 of this report offers a cross-state analysis of SIM Initiative implementation as of April 2017, comparing stakeholder perceptions of the differences in health care delivery resulting from the SIM Initiative. ***Chapter 3*** describes interim results from state-specific analyses of measures of care coordination, utilization and expenditures, and quality of care and reports any significant differences for the patient populations served by providers participating in SIM Initiative–related delivery and payment models. ***Chapter 4*** contains state-specific summaries of successes, challenges, and lessons learned during the period April 2016 to April 2017, and the interim impact results for time periods earlier in the SIM Initiative test period, which varies by state (approximately 2014 only or 2014–2015).

Evaluation findings from each of the six Round 1 Model Test states are presented in ***Appendices A-F***, with accompanying state-specific methods in sub-appendices to each appendix. Each state-specific appendix offers an overview of the SIM Initiative in that state, an evaluation of the most recent SIM Initiative implementation activities and stakeholders' perceptions of initiative results, and (except for Maine) the interim impact results based on quantitative analyses.

1.4 References

Gavin, N., et al. (2014, November). *State Innovation Models (SIM) Initiative Evaluation: Model Test Base Year Annual Report.* Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/SIM-Round1-ModelTest-FirstAnnualRpt_5_6_15.pdf

Gavin, N., et al. (2016, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Two Annual Report.* Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-round1-secondannualrpt.pdf

RTI International, et al. (2017, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Three Annual Report.* Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

[this page intentionally left blank]

2. Cross-State Findings From SIM Initiative Implementation

As of April 2017, four of the six Round 1 Test states (Maine, Minnesota, Oregon, and Vermont) have spent 3.5 years in the test period of the SIM Initiative. Arkansas completed its Round 1 SIM Initiative in September 2016, after a 3-year test period. Massachusetts—which delayed the start of its test period—completed 2 years of the test period by the time of this report. This chapter focuses on common themes and critical findings related to how states implemented the SIM Initiative, emphasizing recent progress in advancing strategies and policies to change health care delivery system and payment models in 2016 and through early 2017.

Highlights From the SIM Initiative Across Round 1 States

- All states achieved increasing provider participation in SIM-supported value-based payment models (VPMs),[6] a central strategy in advancing changes in health care delivery.
- All states emphasized behavioral health by incorporating monitoring measures and payment elements specific to behavioral health care into VPMs.
- Providers in most states reacted positively to health information technology infrastructure that alerts primary care providers of hospital use (e.g., event notification systems) and connects behavioral health homes to health information exchanges (HIEs). However, providers also reported ongoing barriers in using HIEs, such as cost and functionality.
- SIM-funded practice transformation support that emphasized peer-to-peer learning and individualized technical assistance was considered particularly effective in driving change.
- Commercial payers articulated barriers to participating in multi-payer initiatives, including the desire to pursue their own business goals, maintain proprietary information, and avoid having the benefits of their investments accrue to nonparticipating payers.
- Regardless of payers' alignment around new payment models, new VPMs may not be the driving force for change in the short run. Individual clinicians more readily credit SIM investments in HIEs, quality measurement, new health workforce roles, and learning opportunities—not financial incentives—as the impetus for making changes that enable better care coordination for patients.

---

[6] Value-based payment models offer health care providers the opportunity to have at least some portion of their payment rest on quality or value of health care outcomes for their patients, rather than payments that are entirely volume based (e.g., traditional fee-for-service).

This chapter draws from document review, conversations with state officials, stakeholder interviews, and provider and consumer focus groups conducted during site visits in fall 2016 or spring 2017. The analysis describes the activities—and perceived impact—of each state's SIM Initiative. The analysis focuses on delivery system and payment model design, adoption, and adaptation (***Section 2.1)*** and stakeholder engagement and governance ***(Section 2.2)***. Other topics describe the strategies and policy levers used to advance efforts that support health system transformation: behavioral health integration with primary care (***Section 2.3),*** quality measurement and reporting (***Section 2.4***), health information technology (IT), health information exchange and data analytics (***Section 2.5***), workforce development and practice transformation (***Section 2.6***), and population health (***Section 2.7***). Each section describes stakeholders' reflections on successes, challenges, and lessons learned. The chapter concludes with a comparison of states' approaches to sustaining elements tested under the SIM Initiative (***Section 2.8***). A summary of state activity in selected domains appears in ***Table 2-1***.

Table 2-1. Summary of key activities in common domains across states, 2016–2017

	Delivery system reform & payment models	Integration of behavioral health and primary care	Quality measurement and reporting	Health IT & data analytics
Arkansas	• Multi-payer PCMH & EOC	• Planned changes to Medicaid rates and other policies; removes barrier to co-location • BH-related EOCs	• Quality measurement & reporting for PCMHs and providers in EOC	• Multi-payer portal for performance reports • Changed HIE vendor • Real-time alerts of hospital use from local hospital networks
Maine	• Medicaid HH & BHH • Medicaid ACO	• Technical assistance to BHHs to improve care coordination, including coordinating with a patient's primary care provider • HIE for BHHs	• Shifted focus away from alignment towards improvement in diabetes • Data-focused learning collaboratives	• Technical assistance to providers on how to use data analytics tools • Piloted a risk prediction tool for care managers • HIE for BHHs
Massachusetts	• PCPRI, a Medicaid PCMH with BH integration, shared savings (ended) • Pilot Medicaid ACOs	• Massachusetts Child Access and Psychiatry Project expansion • Formal relationships between ACOs and BH partners • Co-location of BH in PCPRI	• Quality measure reporting by providers	• HIE policy and regulations to increase use • E-Referral to facilitate referrals from primary care to community resources
Minnesota	• Medicaid ACO • Medicaid BHH	• BH was the focus of some ACHs • Practice transformation assistance	• Models leveraged existing statewide quality measurement system • Grants for quality improvement	• Grant program for providers to use health IT, data analytics, and exchange health information
Oregon	• Multi-payer participation in coordinated care model • Multi-payer PCMH	• Technical assistance to PCMH model participants • Incorporation of BH metrics for CCO-contracted providers	• Performance metrics by which all CCOs are evaluated	• System to offer real-time alerts of ED and inpatient use • Telehealth pilots to increase specialty care in rural areas
Vermont	• Multi-payer ACO & PCMH • All-Payer ACO model	• Incorporation of BH metrics in ACO efforts • Regional Collaborations	• Selection of quality measures for use in All-Payer ACO model	• System to offer real-time alerts of ED and inpatient use • Data repository for BH data • Telehealth pilots to improve access to care

2.1 Strategies and Policy Levers to Support Health Care Delivery System and Payment Models

KEY INSIGHTS

- States continued to implement existing delivery and payment reforms, with new or modified accountable care organization (ACO) models launched in Massachusetts and Vermont.
- The reach of SIM-supported models expanded among providers in most states, and for Medicaid populations; less so for commercially insured populations.
- Many providers who participated in ACOs, and in Oregon coordinated care organizations (CCOs),[7] did not report awareness of the payment model or exposure to individual financial risk. In these cases, the payment model itself was a distal cause in precipitating change in clinical care delivery, with more proximal causes being other infrastructure developments such as investments in health information exchanges (HIEs), quality measurement, new health workforce roles, and learning opportunities.
- Individual clinicians more directly exposed to financial risk in an Episode of Care model expressed concern that patient behavior and other factors, such as rising prescription drug costs, contributed to total cost of care calculations yet were outside of their control.
- With the exception of Arkansas and Vermont, the lack of voluntary multi-payer engagement continued to be a challenge to expanding these models beyond Medicaid. Even within Medicaid, choices in payment model implementation have consequences for Medicaid managed care organization (MCO) participation and relationships.

States continued to implement existing payment and delivery system models, with two states launching new ACO models between April 2016 and April 2017. The majority of SIM Round 1 Test states continued to use SIM funds to support the implementation of payment and delivery system models initiated prior to the October 2013 beginning of their SIM Initiatives. Major models predating the SIM Initiative included:

- Patient-centered medical home (PCMH)[8] and episode of care (EOC) payments (2012) in Arkansas
- Integrated Health Partnerships (IHPs) (2013), a Medicaid ACO model, and Health Care Homes (HCHs), in Minnesota
- Patient-centered primary care homes (PCPCHs) (2011) and CCOs (2012), a Medicaid ACO-like model, in Oregon

---

[7] CCOs are ACO-like networks of different provider types (e.g., physical, behavioral, and oral health) that operate under global budgets to provide coordinated care to Medicaid beneficiaries in their community.

[8] The CMS-sponsored Comprehensive Primary Care Initiative.

- Blueprint for Health (2008), a PCMH model, and the Medicare ACO Shared Savings Program (SSP) (2013) in Vermont
- Health homes (2013), a delivery system reform model based on the PCMH initiative in Maine

States also continued to implement models launched during their SIM Initiatives:

- Behavioral health homes (BHHs) (2014) and Accountable Communities (2015), a Medicaid ACO model, in Maine
- The Primary Care Payment Reform Initiative (PCPRI) in Massachusetts' Medicaid program (ended December 2016)
- Accountable Communities for Health (ACHs) (2014) in Minnesota
- Medicaid and commercial SSPs (2014) in Vermont

A full list of current models is available in ***Supplemental Table A*** at the end of this chapter.

Massachusetts and Vermont launched new or modified ACO models between April 2016 and April 2017. After limited uptake by providers in its voluntary PCPRI, Massachusetts decided to discontinue that model as of December 2016 and instead use its SIM funds to support the design and implementation of an Accountable Care Strategy, which the state began piloting in December 2016. In January 2017, Vermont began the first phase of implementation of its new All-Payer ACO Model with the launch of its Medicaid strand in four communities, representing what state officials there described as the next step in the evolution of its existing SSP. (For further details on all the models, see the individual state chapters, ***Appendices A-F***.)

SIM-supported delivery system and payment models are primarily Medicaid-only, with some exceptions. Commercial insurers in Arkansas participate in the PCMH and EOC models; state employee health plans in Oregon have adopted elements of the Coordinated Care Model (CCM), including support for PCPCHs; and Vermont has established a commercial ACO SSP. HCHs in Minnesota, a model that predated the SIM Initiative and that the SIM Initiative continued to support with technical assistance to practices, continued to have multi-payer participation.

The reach of SIM-supported models expanded among providers and for Medicaid populations in most states, but less so for commercially insured populations. States set out to deliver a "preponderance of care" through value-based payment models (VPMs), defined by the Center for Medicare and Medicaid Innovation as having 80 percent of payments from all payers be under value-based purchasing or alternative payment models (Hughes, Peltz, & Conway, 2015). Because this definition of "preponderance of care" was established after the start of the Round 1 SIM Initiative, states reported different metrics than percentage of payments under value-based purchasing. Instead, as a proxy for percentage of payments, states reported the numbers of providers participating in SIM-related delivery system models and the individuals reached by these models. The reach of PCMHs and health homes is reported in ***Table 2-2***. The number of providers participating in PCMH models increased in 2016 in Minnesota, Oregon, and Vermont. The PCMH model reached nearly three-quarters of the Medicaid-covered population in Oregon and Vermont, two states where the PCMH model predated the SIM Initiative. The reach of integrated care models—such as ACO-type models (names and models vary by state) and, in Oregon, insurers who have adopted elements of the CCM—is reported in ***Table 2-3***. The number of providers participating in ACO models increased in 2016 in Massachusetts (under its new Medicaid ACO pilot), Minnesota, and Vermont. The percentage of the Medicaid-covered population reached by ACO-like models was 85 percent in Oregon, 59 percent in Minnesota, and 46 percent in Vermont.

Table 2-2. PCMH/Health homes: Participating payers, providers, and populations in SIM-related models

	Participating payers	Number of participating providers	Percentage of Medicaid population reached
Arkansas PCMHs (as of September 2016)	Medicaid, BCBS, QualChoice, Centene/Ambetter, United Healthcare, self-insured	878[a]	51%
Maine HHs (as of September 2016)	Medicaid	--	17%
Massachusetts PCPRI (as of December 2016, discontinued)	Medicaid	--	6%
Minnesota HCHs (as of March 2017)	Medicaid, state employees, commercial insurers	3,472	--[b]
Oregon PCPCHs (as of March 2017)	Medicaid, Public Employees Benefit Board, Oregon Educators Benefit Board, Aetna	2,636[c]	75%
Vermont Blueprint for Health (as of December 2016)	Medicaid, BCBS Vermont, MVP Health Care, Cigna, some self-insured, Medicare	795	70%

-- Numerator not reported by state.

BCBS = Blue Cross and Blue Shield; HH = health home; HCH = health care home; PCMH = patient-centered medical home; PCPCHs = patient-centered primary care home;. PCPRI = primary care payment reform initiative.

[a] Number of providers reported by Medicaid. Participating commercial insurers report different numbers of participating providers: Arkansas Blue Cross Blue Shield (678), QualChoice (618), Centene/Ambetter (606), United Healthcare (295).

[b] Percentage of Medicaid population not reported. The state reports that 69 percent of the state population is served by an HCH.

[c] Represents 67 percent of active patient care primary care physicians in Oregon.

Table 2-3. Integrated care model: Participating payers, providers, and populations in SIM-related models

	Participating payers	Number of participating providers	Percentage of Medicaid population reached
Maine ACs (as of September 2016)	Medicaid	--	15%
Massachusetts ACS (as of December 2016)	Medicaid	2,400[a]	10%
Minnesota IHPs (as of March 2017)	Medicaid	10,971	59%
Oregon CCM (as of March 2017)	Medicaid, Public Employees Benefit Board	9,589[b]	85%[c]
Vermont ACO SSPs (as of December 2016)	Medicaid, BCBS Vermont, Medicare	1,105[d]	46%

-- Numerator not reported by state.

AC = accountable community; ACO = accountable care organization; ACS = accountable care strategy; BCBS = Blue Cross and Blue Shield; CCM = coordinate care model; IHP = integrated health partnership; SSP = shared savings program.

[a] Represents primary care physicians only.

[b] Represents 83 percent of all active physicians in Oregon.

[c] Additionally, the state reports 97 percent of state employees are served under the CCM and 54 percent of Medicare-Medicaid enrollees are served under the CCM.

[d] Providers reported by participating commercial payer. The state reports 996 providers participating in the Medicaid SSP and 933 providers participating in the Medicare SSP.

SIM-supported models generally reached more providers and a greater proportion of the Medicaid population over time. Across states, the number of participating providers remained stable or increased since March 2016, when we last reported states' progress in the SIM Initiative Round 1 Year 3 Evaluation Report. Models in four states made substantial progress since March 2016 in reaching a larger portion of their Medicaid populations, accompanying gains in provider participation: EOCs in Arkansas, ACOs in Massachusetts, IHPs in Minnesota, and PCPCHs in Oregon. For example, the proportion of Medicaid beneficiaries attributed to IHPs in Minnesota rose 15 percentage points to 59 percent between March 2016 and March 2017.

Some states identified goals for populations served by their models and, in these cases, were mostly successful in making substantive progress toward them or meeting them:

- Arkansas is reaching almost half of its total Medicaid population through its PCMH program (Table 2-2), and over 80 percent of Medicaid beneficiaries "eligible" to be served by PCMHs (data not shown).
- Maine came close to meeting its goal to serve 8,500 Medicaid beneficiaries with its BHHs and served more than 46,000 Medicaid beneficiaries with Accountable Communities.

- Massachusetts is serving 160,000 (10 percent) of its Medicaid population under ACOs in its Accountable Care Strategy pilot program. With letters of intent from over 20 potential ACOs interested in participating in the full-scale launch in 2018, the state expects to reach nearly 60 percent of its Medicaid population.
- Minnesota aimed to served 3.7 million individuals with its HCHs and 200,000 Medicaid beneficiaries with its IHPs, and surpassed goals for individuals served by HCHs and IHPs, serving over 3.7 million and 460,000, respectively.
- Oregon came close to its goals of serving 90 percent of its Medicaid population and 100 percent of state employees with CCM, reaching 85 percent of Medicaid beneficiaries and 97 percent of state employees.
- Vermont increased between March and December 2016 the number of providers serving Medicaid and commercial populations in ACOs (to 996 and 1,105, respectively) and increased the number of physicians participating in Blueprint for Health to 795 by December 2016.

The potential impact of these SIM-supported models increases with the growing numbers of providers participating in them. The remainder of this section reports the experiences and perspectives of participating providers, their patients, and payers with the implementation of new delivery and payment models across the states.

Providers in ACO models attributed the availability of more support staff and team-based care, and quality of care measurement and goals, as factors leading to improved care coordination—and did not attribute changes in staff and quality measurement to a new delivery and payment model or participation in an ACO. Clinicians across states cited the importance of team-based care models that involve new staff roles (e.g., dedicated nurse care managers, social workers, community health workers [CHWs], peer support specialists). These new staff roles provided care coordination needs—such as connections to social services, referrals, and follow-up—which allowed physicians to focus on medical care. The perceived impact of quality measurement requirements varied by state. In Oregon, clinicians believed quality measures set forth by CCOs provided a strong incentive to change care delivery, whereas clinicians participating in IHPs, Minnesota Medicaid's ACOs, felt the opposite. Some providers working in larger health systems[9] reported not even being aware that they were participants in an ACO (i.e., IHP in Minnesota or Accountable Community in Maine). So, although participation in a new payment model at the organizational level may be the impetus for organizations to introduce new staff roles and focus on quality improvement, the specific terms of the payment model's financial risk is not the driving force for changing care delivery among individual providers within these integrated care models.

---

[9] Includes providers in Maine, Minnesota, and Vermont.

Under Arkansas's EOC model, individual providers were more likely to identify financial incentives and penalties as factors shaping care delivery; some policy change has resulted. In Arkansas, the EOC model has the potential to penalize the principal accountable provider for average patient total cost of care for an episode above a certain dollar threshold,[10] which some providers perceived as beyond the type of risk they would be willing to take. For, example:

> *My concern is … with some of these programs is that I will be financially penalized for this mother's overuse of emergency services and what I fear that my only response is going to ultimately be … well I'm not going to be able to provide care for this patient. You're going to have to go to some other doctor's office and then therefore I can check that off as I'm not going to have to worry about being financially penalized because it's not my problem anymore.*—Arkansas provider

Additionally, Arkansas providers cited the unpredictability of increases in drug prices as an example of another uncontrollable factor that might result in financial penalties for them, regardless of the quality of care they delivered. To address a specific concern about variation in payers' negotiated rates with hospitals and specialists, the Arkansas state legislature protected physicians held accountable under new payment models from financial penalties perceived to be outside of a physician's control in a piece of 2015 legislation, Act 902.[11]

Across states, consumers reacted to changes in care delivery spurred by SIM-related models—not always embracing the changes intended as improvements. For example, consumers had mixed responses regarding team-based primary care: Some were happy with the increased access that a team approach offered them in terms of reductions in wait times for appointments, while others were displeased with seeing different clinical staff members during different office visits as a result of the team-based care approach. Additionally, some providers in Vermont were discouraged by their limited influence on patient behavior. They cannot make patients go to recommended classes, such as nutrition or exercise, which providers see as expanded benefits under the ACO that would help improve outcomes for which ACOs would be

---

[10] All providers continue to receive fee-for-service (FFS) payments from payers, but principal accountable providers (PAPs) deemed responsible for the total cost of select episodes may receive supplemental payments for commendable care or the provider may have to return payment if care was deemed unacceptable. Only valid episodes are counted, based on algorithms and exclusion criteria specific to the EOC. Each PAP's average cost of care for valid episodes is calculated and compared to that of other PAPs being measured on the same type of episode; each payer sets its own cost thresholds (CMS, 2016).

[11] In the case of Arkansas, financial penalties could accrue to providers in an EOC model because of differences in rates negotiated by insurers for hospital reimbursement, which may make the same EOC more or less costly for patients who choose one hospital or another. The Act states: "A healthcare payor doing business in this state, when determining any gain-sharing or risk-sharing for a physician, shall not attribute to a physician any costs that are a result of variations in the healthcare payor's freely negotiated contract pricing with other persons or entities outside the physician's practice if including the costs reduces a physician's gain-sharing amount or increases a physician's risk-sharing amount." As of January 1, 2017, this act applies only to fully insured lines of business, and not self-insured lines of business; ERISA, which covers self-insured lines of business, preempts this state law (Arkansas Blue Cross and Blue Shield AHCPII Help Desk, 2017).

taking on financial risk. Thus, consumers' response to new care delivery model implementation is not always as intended, and how consumer behavior affects providers' ability to optimize their performance under new models is an open question.

Payers have not uniformly embraced SIM-supported models; with few exceptions, the delivery system and payment reform models in SIM Initiative Round 1 Test states continued as primarily Medicaid-only models. Maine and Minnesota both had Medicaid-only ACO models, although both states worked to engage commercial payers without tangible results. Although Oregon's CCOs serve only Medicaid beneficiaries, the state did have some success, albeit reaching only a relatively limited number of individuals, in using its purchasing power to spread elements of the CCM through commercial health plans offered by the Public Employees Benefits Board (PEBB) starting in 2015 and more recently by the Oregon Educators Benefit Board (OEBB).[12] Arkansas and Vermont were the two main exceptions, with both states building off extensive pre-SIM multi-payer engagement in their payment models. Vermont's multi-payer engagement was the most robust, including both commercial payers and Medicare (via developing the waiver to implement the All-Payer ACO Model) alongside Medicaid.

Several factors inhibit multi-payer alignment around common payment models, which some states attempted to address. Except in Arkansas and Vermont, commercial payers have not voluntarily taken up or supported payment models championed by state Medicaid agencies. Stakeholders observed several payer concerns that tie back to commercial payers' business interests:

1. **Lack of alignment in business goals across Medicaid and commercial payers.** Commercial payers in Maine reported a disconnect between their business goals and the state's SIM goals related to value-based insurance design and multi-payer measure alignment. This disconnect stemmed from:
    a. The state's insufficient engagement with payers when those goals were established, and
    b. Commercial payers' reluctance to change the design of their insurance products in response to a single state's recommendations, and preference for making product design changes in response to their clients' needs.
2. **Desire to maintain proprietary information.** Minnesota state officials described reticence among commercial payers to share proprietary information, such as details on quality and utilization measures and performance reports for providers. This reticence limited the type of dialog necessary to advance multi-payer payment reform.
3. **Concern over losing competitive advantage from payer-specific innovation.** Payers that have invested in changes in payment reforms are concerned that the

---

[12] PEBB and OEBB health plans combined cover 270,000 members (employees and dependents), about 6 percent of Oregon's total population. About half of these members have chosen a health plan that incorporates CCM elements (Loretz & Fairbanks, 2017).

returns on those investments are accruing to other parties. Examples include the following:

a. Arkansas. Even in Arkansas, which did have multi-payer participation in both its PCMH and EOC payment models, state officials noted some payers' concern that nonparticipating payers may be benefiting from the payment models without contributing support to them. State officials in Arkansas recommended including as many different payers as possible in future initiatives to minimize these concerns.
b. Minnesota. Even within a Medicaid-only payment model, Minnesota's Medicaid MCOs expressed frustration with the lack of transparency around attribution of patients to IHPs, leading to fears that their own MCO-specific performance incentives to IHP providers may be costing them twice, once to invest in their own provider incentives and once in having to pay out shared savings to IHPs.

Some states are using different strategies to overcome some of these concerns. For instance, to better align business goals across Medicaid and commercial payers, Arkansas encouraged commercial payers to select among the EOCs that Medicaid developed and implement only those that made business sense. To help foster discussion across payers, Oregon passed legislation in 2015 (Senate Bill 231) to establish the multi-payer Primary Care Payment Reform Collaborative, which included limited antitrust exemptions. With SIM funds, Maine developed a multi-stakeholder committee charged with developing a proposal to CMS for Medicare participation in delivery system reform. To garner more payer participation, Vermont negotiated its All-Payer ACO Model with commercial payers and Medicare. States with approaches to address one concern from payers may still face other concerns, however.

Several states decided to narrow the focus of their efforts during the course of the test period. Over the course of their SIM Initiative, several states made strategic decisions to limit the focus of their work based on their experiences implementing payment models and delivery system reforms. Most recently, in late 2015, Maine created a Strategic Objective Review Team, resulting in the decision to cease working on voluntary multi-payer growth cap, value-based insurance design, and quality measure alignment across payers (which stakeholders reported were having limited impact), and instead to focus on a few priorities, such as diabetes prevention and management (e.g., helping health homes and BHHs improve performance on HbA1c monitoring for MaineCare enrollees with diabetes). Arkansas originally envisioned launching more than 80 separate EOCs but greatly reduced the number of EOCs it plans to develop; 14 were in operation as of the end of its test period in September 2016. Likewise, Vermont originally planned on launching EOC payments but decided its work on the other delivery and payment models in the state was already creating high demands on providers.

2.2 Stakeholder Engagement

KEY INSIGHTS

- Most stakeholders embraced opportunities to build new relationships under SIM Initiative convening activities.
- Pockets of stakeholder resistance to state-determined priorities shaped the trajectory of some states' SIM Initiative.
- Individual clinicians have limited time and resources to participate in policy discussions, hampering the ability of Test states to gain robust provider feedback and leading to provider concerns over VPMs.
- Unclear decision-making processes and lack of consensus regarding reforms posed some challenges to the sustained and productive engagement of important stakeholders.

The SIM Initiative provided states with resources to develop materials, facilitate meetings, and logistically support strategic dialog and relationship-building between the state and key stakeholders. For some states, including Arkansas and Vermont, these resources led to the development of relationships and communication channels between state agencies that, prior to the SIM Initiative, had largely been siloed, such as Medicaid, Departments of Mental and Behavioral Health, Departments of Public Health, and Departments of Insurance. Similarly, developing governance and stakeholder work groups enabled states to bring together providers, payers, and purchasers for shared discussions about intended reforms. Oregon's SIM Initiative funded the Transformation Center to communicate with providers, payers, consumers, and other stakeholder groups about health care transformation activities, in addition to the targeted technical assistance its staff provided. Vermont may have had the most extensive structure for stakeholder engagement in 2016–2017, which included regular meetings of several topic-focused workgroups, public education sessions pertaining to its proposed all-payer payment model, and public comment opportunities for several of its proposals including the all-payer model and population health plan. These multi-modal activities contributed to high rates of involvement and new conversations between participants that stakeholders felt was one of the highest achievements of the SIM Initiative. Originally, Vermont dedicated one full-time employee to direct its stakeholder engagement, but then increased staffing to three full-time equivalent staff to keep up with the work of preparing for more than 20 hours of monthly public meetings and keeping the health care innovation website up to date.

Some states developed stakeholder engagement strategies to explicitly target a particular stakeholder group such as providers (e.g., Arkansas's early-morning calls for a selected group of working physicians) and community partners (e.g., Minnesota's Community Advisory Task Force and Oregon's technical assistance to CCOs in engaging Community Advisory Councils, which included consumers). Both providers and payers in Arkansas noted that the SIM Initiative facilitated meaningful conversations between them and the state. Similarly, state officials in Minnesota reported that SIM Initiative-funded investments enabled relationship building especially between diverse provider types (e.g., primary care, behavioral health, local public health, and social service providers).

Stakeholder groups' disengagement from state-led SIM priorities in a few states affected the direction of those states' SIM Initiatives. Some stakeholders in Maine felt that their input was limited by major decisions regarding the SIM Initiative predetermined by the state. For example, Maine state officials convened payers in a value-based insurance design work group to help design a model template for insurance products that encourage use of services from higher-quality, lower cost providers. Yet, payers felt the goal of establishing a template for use across all payers did not reflect the reality of their business models, which require them to have flexibility over product design rather than adhere to a template. Without payer interest and collaboration, the state discontinued support for the work group. As reported in the Year 3 Annual Report, Massachusetts terminated its PCPRI, in part because Medicaid MCOs did not sign on, limiting the overall reach of the initiative in the Medicaid-covered population.

Some physicians in Arkansas felt that state decision-makers were too far removed from daily clinical practice to understand what would work effectively. In response, these Arkansas physicians reported using diagnostic codes that were still clinically valid but could avoid triggering an EOC payment. Providers in the state also reported that they have considered reducing access to Medicaid beneficiaries or discontinuing performing some procedures to avoid potential financial penalties. These behaviors, of which the scope is unknown, are unintended changes in care delivery following new payment model implementation, and are worthy of monitoring. Additionally, these types of shifts in care delivery could have implications for the performance findings related to Arkansas' EOC payment model, and should be considered when interpreting results (although as of this report's publication date, only the state evaluation has analyzed outcomes related to the EOC model).

States tailored strategies to communicate and collaborate according to stakeholder type, but still could not reach everyone. States conducted informational activities (e.g., webinars, listening sessions, work group presentations) to help describe basic definitions, concepts, or goals of the SIM Initiative for some stakeholder types who would benefit most, including consumer advocates and social service agency partners. Additionally, some states established working sessions in which state SIM leadership could work through practical considerations of implementing their SIM Initiative with other stakeholders, including state agency representatives, payers, accountable care entities, and those developing quality measures.

However, providers working in smaller, independent practices, especially solo practitioners, indicated a need for greater flexibility in scheduling opportunities for participation in SIM-related meetings. They cited being unable to attend meetings scheduled during business hours because, unlike those working in larger health systems or clinical teams, solo providers have no colleagues to cover their absence. In response, Arkansas instituted 7 a.m. conference calls to convene its Strategic Advisory Group of physicians. Still, stakeholders in multiple states indicated that the providers engaged in SIM Initiatives were most often those who have typically engaged in wide-scale initiatives (e.g., major hospitals, provider association representatives) and therefore not necessarily representative of the breadth of perspectives among providers of diverse specialties or that serve in underrepresented communities.

In a few states, some stakeholders noted areas where communication about when, where, and how decision-making is made on key health reform strategies could be improved. In Maine, some providers noted that there was confusion about when (i.e., at what meeting) critical decisions impacting providers would be put forward for discussion and feedback. In Vermont, a few work group participants noted a lack of transparency over how recommendations from the work groups and Steering Committee were ultimately used. Perhaps a victim of its own efforts to engage a broad range of perspectives, one stakeholder expressed uncertainty over whether state officials were actively ignoring certain recommendations, or whether "ignored" recommendations were just a result of compromises in the interest of appealing to the many diverse stakeholders it was attempting to engage. Regardless, the perceived closed-door nature of the team making final decisions resulted in concerns from some in Vermont about the value of stakeholder input and "minority opinion."

2.3 Behavioral Health Integration with Primary Care

KEY INSIGHTS

- A key success among most SIM Initiative Round 1 states was facilitating relationships and collaboration between behavioral health and primary care providers (PCPs).
- States made progress in incorporating measures and payment for behavioral health services into VPMs.
- States used SIM funds for technical assistance to provider groups to facilitate integration of behavioral health and primary care services, outside of any specific payment model.
- Despite progress in payment models, quality measurement, and technical assistance, providers and consumers observed continued room for improvement.
- Policy and technical barriers to exchanging health information continue to impede progress on integrating behavioral health with other aspects of the health care delivery system in almost all Test states.

All six SIM states are incorporating measures and payment for behavioral health services into VPMs. Maine implemented a Medicaid BHH program that integrates behavioral health services for adults with serious mental illness and children with serious emotional disturbances with primary care services. In Massachusetts, the PCPRI program included contractual milestones related to behavioral health integration that providers had to meet to participate in the program and receive incentive payments. Additionally, new ACOs in Massachusetts must formalize contractual relationships with behavioral health providers to receive enhanced funding. Oregon based 4 of the 17 performance metrics for CCOs on behavioral health metrics. These metrics were tied to payments from a quality incentive pool that was funded through withholding from the CCOs global budgets.

Arkansas also initially planned to implement a Medicaid BHH; however, the state's plans were paused because of extensive provider pushback, primarily from large, private behavioral health providers who were concerned about the revenue implications of the proposed tier system and the per member per month payments to health homes. Nonetheless, Arkansas did develop EOCs focused on behavioral health conditions, including attention deficient/hyperactivity disorder (ADHD) (operational in 2012) and oppositional defiant disorder (operational in 2013). In Vermont, stakeholders recognized the need to engage behavioral health providers in any coordinated care effort while also recognizing the challenges in fully integrating these providers in health care transformation. As an interim step, behavioral health measures and mandatory integration of certain behavioral health services are included in the quality framework for the All-Payer ACO Model that began January 1, 2017. Vermont also used SIM funds to indirectly enhance the state's existing BHH program, by supporting the Integrated Communities Care Management Learning Collaborative and ACO participation in regional collaboratives, which in some health service areas involve teams working with the BHH population. Minnesota reported that the SIM funds were instrumental in supporting practice transformation efforts to increase practice success in the parallel (non-SIM funded) BHH initiative in mid-2016.

Beyond payment models, Test states succeeded in implementing specific strategies to build relationships between behavioral health and PCPs. With regard to strategies to facilitate integration of behavioral health providers and others, states:

1. supported communication between providers through telehealth initiatives that integrate behavioral health into primary care clinics (Oregon and Massachusetts),
2 mandated contractual relationships between ACO PCPs and behavioral health providers (Massachusetts),
3. encouraged colocation of behavioral health providers and PCPs (formerly in Massachusetts under PCPRI and currently in Oregon through Medicaid's contracts with CCOs), and
4. used health information exchanges (HIEs) to promote sharing of information between behavioral health and physical health providers (Maine).

In addition to facilitating relationships through the specific strategies mentioned above, states also promoted collaboration by using their convener status to get stakeholders talking at the same table. For example, stakeholders in Minnesota expressed that one of the key benefits of the SIM Initiative was intentional relationship building that took place between physical and mental health providers. Likewise, in Oregon, one state official credited the state's SIM Initiative with helping to build the relationships necessary to coordinate behavioral health care required outside of the primary care setting, such as following up on referrals to specialists by helping providers connect "outside of practice walls."

Providers in states with VPMs that focused on better integrating behavioral health with primary care reported positive results, even while recognizing room for further improvement. By late fall 2016 and early spring 2017, providers in Maine, Massachusetts, and Oregon had experience with VPMs that specifically focused on integrating behavioral health with other care under the BHH model, PCPRI, and CCOs, respectively. In Massachusetts, providers highlighted positive impacts of behavioral health integration from the PCPRI, which required participating practices to co-locate with behavioral health providers. Examples of these impacts included improved coordination among primary care and behavioral health providers, better follow-up rates, greater ability to engage hard-to-reach populations in behavioral health care, and a more integrated referral process. Providers in Maine reported improvements in behavioral health-PCP relationships with the BHH model and emphasized the importance of addressing mental health, physical health, and social health together under this model.

State officials cited behavioral health–related CCO quality metrics, like screening for substance use, as an important driver for increasing focus on integration. Providers in Oregon described feeling more connected with their patients because they have other team members who can support the patients' behavioral health needs. Providers confirmed that CCOs were useful in driving the demand for integrating primary care and behavioral health, for example:

> *Clinics quickly learned that if you are screening everyone for drug and alcohol abuse and you don't have anyone on staff remotely prepared to have behavior change conversations with people that is a problem. Some of those CCO metrics helped people see how having in-house behavioral health would make a difference. You can't achieve the CCO metrics without doing that.*—Oregon provider

Even as many providers and consumers noted positive impacts of the BHHs in Maine provider and consumer focus groups, these same providers also reported that behavioral health and primary care services are still not fully integrated under the model. Limited bidirectional information sharing, because of policy barriers to sharing behavioral health data with PCPs such as the requirement to have patients opt-in to allow providers to share information, was evident in consumer focus groups in Maine, where many consumers reported that there was little to no care coordination between their behavioral health providers and PCPs. State officials in Oregon acknowledge that even though they provide incentives to CCOs to undertake behavioral health integration, consistent progress in integration of services across the CCOs has not yet been achieved. For example, although the state included behavioral health services in its global budgets paid to CCOs, some CCOs continued to rely on mental health managed care plans to administer behavioral health benefits separately. In addition, not all CCOs implemented VPMs to support integration of primary care and behavioral health care.

States also undertook nonpayment initiatives to support practice transformation to facilitate integration of behavioral health and primary care services. All states facilitated behavioral health integration through practice transformation efforts including technical assistance, training, learning collaboratives, peer-to-peer learning opportunities, and access to consultants and experts. For example, in 2016 Oregon launched a behavioral health integration library, which is a collection of behavioral and physical health integration resources for providers and organizations including "virtual clinic visit" videos that explore models of care within five specific clinics who have undertaken behavioral health integration efforts, and expert interviews on topics such as behavioral health integration in maternity care and psychiatric evaluation. The library includes guides for specific populations, depression screening webinars, organizational readiness self-assessment, and other resources. Through their training efforts, Oregon learned that it is most helpful to providers to learn best practices related to integration from their peers (i.e., from other providers). In Minnesota, the state used SIM funding to contract with the National Council on Behavioral Health to provide technical assistance to practices and develop training modules and learning communities related to behavioral health integration. In Vermont, behavioral health team members received training alongside primary care providers in learning collaboratives for care management.

Policy and technical barriers to exchanging health information continue to impede progress on behavioral health integration with other aspects of the health care delivery system in almost all Test states. Providers commonly cited challenges in sharing patient information from behavioral health providers to PCPs in particular; barriers to information sharing are partially a result of federal statute 42 CFR Part 2 (2017), a federal law governing the confidentiality of patient records related to alcohol and drug abuse which requires patient consent to share substance abuse information between providers. Other communication and data sharing challenges stem from the lack of infrastructure and capacity to enable providers and agencies delivering behavioral health services to access and exchange patient information electronically. Maine has made progress connecting its behavioral health homes to Maine's HIE, but bidirectional exchange of information through the HIE between BHHs and PCPs is still limited because of privacy laws and providers are concerned that the connection is not sustainable because of high subscription costs that providers must pay to connect to the HIE. With support from the SIM Initiative, some behavioral health providers received subsidies to cover the subscription cost and expressed concern over their ability to afford it once the subsidies end. In Vermont, the data infrastructure is now in place for data sharing; however, the state cannot currently connect the mental health data to its HIE because of the consent requirements under 42 CFR Part 2. Mental health agencies can nonetheless share information about patients among providers within their own network, which is a preliminary step in fully integrating behavioral health into primary care.

2.4 Quality Measurement and Reporting

KEY INSIGHTS

- Quality measures emphasized by each state are different, but they target common areas, including (1) improved care coordination and preventive services in primary care settings, and (2) reduction in avoidable emergency and inpatient utilization.
- SIM funding in several states was used for quality measure reporting or grants to support quality improvement initiatives by providers.
- Providers recognize the value of getting more data to identify opportunities for improvement, but find the number of quality measures and process for documenting them to be burdensome.
- In an effort to reduce measure fatigue and duplication of effort by providers, all states have made at least some effort to align quality measures across payers and providers. In general, states relying on voluntary efforts have not achieved multi-payer alignment.

Although each state's VPM(s) supported under the SIM Initiative has its own set of quality measures, the measures target common areas. All states have incorporated a core set of measures related to chronic illness management, including prevention and wellness. All states adopted measures to track avoidable hospital utilization, such as readmissions, while some have also included measures such as hospitalizations for ambulatory care–sensitive conditions. Most states have included measures related to tracking the number well-child and well-care visits for adolescents and children. States with models that include pediatric populations, such as PCMHs, have incorporated measures related to the quality of care for children, such as the appropriate use of asthma medication and the continuation and maintenance of ADHD medication.

States continue to offer provider organizations' staff and individual physicians support for quality measure reporting and interpretation and have used SIM funding for providers' quality improvement initiatives. In Massachusetts, PCPRI providers used reports generated with state assistance to implement quality improvement processes to improve the care delivered to patients with the most complex conditions. Maine provides quality performance data to primary care practices, BHHs, and Accountable Communities. The state also engages in a public reporting effort in which cost and quality metrics can be reviewed on a website—GetBetterMaine.org—devoted to publicly reporting quality information on Maine doctors and hospitals. Additionally, states are making investments to improve quality of care for specific populations. For example, Minnesota focused one of its practice transformation grants on high utilizers of emergency department services. In Maine, a data-focused learning collaborative was rolled out for health homes and BHHs to share best practices for using claims-based quality measures to improve diabetes care for people with diabetes.

Providers in several states noted benefits of the increased quality metric reporting requirements associated with participation in new payment models, while providers in

other states expressed dissatisfaction. Providers in Massachusetts and Oregon discussed the benefits from increased quality reporting, including increased accountability, identifying “super users” of the health care system and identifying, through screening, previously undiagnosed cases of chronic disease. They also described the ability to use provider-specific data delivered by payer(s) under the new payment models to better understand the quality of care provided for different subsets of their patients. As one provider in an Oregon focus group said:

> *I would assume I was taking good care of my diabetics, but I would have no idea if that was true or not. I would have some, probably based on my most recent day, some percentage in my mind of how well I was doing, but it’s really getting the feedback [from performance reports].*—Oregon provider

On the other hand, providers thought the documentation required by the initiatives took time away from patient care (expressed by providers in Massachusetts, Minnesota, Oregon, and Vermont). For example, providers said they tracked quality measures in different reporting systems and spent extra time inputting data into their electronic health records (EHRs) to ensure correct calculation of quality measures, all activities considered to be burdensome. Others described quality metrics that were not appropriate and created pressure to perform care without clinical relevance, such as performing substance abuse screenings on a known addict to meet screening targets (Oregon provider focus group). Many providers also expressed that there were too many measures (Massachusetts, Oregon, and Vermont focus groups).

> *[T]the biggest challenges are time constraints, and having to do more and more of that busy work—making sure you’re checking all those boxes all the time. It’s less and less time engaged with the patient, and more and more time making sure you’re checking all the right boxes and doing all the right things.*—Minnesota provider

> *Time-consuming processes resulting from Vermont’s initiatives are causing some providers to see fewer patients in any day and provide less care to needy patients. Some even say they are burning out.*—Vermont provider

Providers often questioned the validity, reliability, and timeliness of performance feedback reports they received. Providers in Arkansas were frustrated that the data used to generate reports were too old to be useful, saying they cannot succeed at quality improvement if they receive old data. In Massachusetts, primary care providers did not trust their attributed patient panels to be correct because they did not recognize many of the names the state identified as their patients. Further, many of the physicians in Massachusetts did not understand how the type of information in performance feedback reports could help them identify performance-improving changes in practice. They were thus frustrated that they would be unable to recover quality withhold payments.

> *Until you have an accurate static panel, it really is hard to really trust the quality measures that are coming our way.*—Massachusetts provider

Despite state efforts under the SIM Initiative, measure alignment has generally not yet occurred using a voluntary approach. Providers from most states reported feeling overwhelmed by the large number of quality measures they tracked, saying that the measures are fragmented and requirements can vary by payer. Many states have attempted strategies to achieve better alignment. Vermont successfully took lessons learned from the process of developing and aligning the measures for the Medicaid ACO SSP model and commercial SSP models and applied them to the process they used to develop the measures for the All-Payer (Medicaid, Medicare, and commercial) ACO Model. In Minnesota, IHPs are required to report a subset of the metrics in the Statewide Quality Reporting and Measurement System, a standardized set of quality measures for health care providers used by all payers. Shared savings and loss calculations are tied to performance on these measures, although the state allows for variation and flexibility on the full measures list for some IHPs that serve specific populations. Arkansas, Maine, Oregon, and Vermont have engaged payers to help to determine the appropriate measures to monitor and track, although in most of these states this process has resulted in a proliferation of measures specific to each payer's population.

For the most part, alignment efforts that extend beyond state payers have been entirely voluntary, and no state has had success advancing uptake of a streamlined measure set using a voluntary alignment strategy. Oregon has pursued alignment with legislation requiring a state work group to set a consistent quality measurement system across payers under the control of the state government (Medicaid, state employees, and educators). However, as in all other states besides Vermont, the alignment mandated by Oregon will be limited to a small number of payers, which means providers will continue to face the burden of multiple systems. In terms of future plans, Massachusetts's Health Policy Commission is planning to convene commercial plans for discussion on measure alignment with Medicaid as a way to reduce reporting burden among providers.

2.5 Health IT and Data Analytics Infrastructure

KEY INSIGHTS

- States invested SIM funds in HIEs to support delivery system reform models, with providers citing event notification services (via HIEs or another mechanism) as particularly useful in improving care coordination.
- Several states used SIM funds to develop analytic platforms to better understand how their delivery models are facilitating care coordination, although all did so differently.
- Most states reported that health IT efforts required significant investment of time and money, and the challenges were daunting.

SIM-supported health IT activities in 2016 and early 2017 transitioned from an earlier emphasis on connectivity and capacity building to a greater concentration on data sharing and data analytics to support payment and delivery models. Some states offered telemedicine to extend delivery models to rural areas or underserved populations. ***Table 2-4*** provides an overview of themes across all states. We further expand on the themes by featuring one activity for each state.

Table 2-4. Themes in Health IT and data analytics

	AR	ME	MA	MN	OR	VT
SIM-funded HIE/ENS activities						
Expansion or improvement of statewide HIEs	●	●	●		●	●
Support of provider-driven HIE networks				●		
Development or implementation of ENSs, enabling better care coordination		●	●		●	●
Data reporting and analytics						
Improvement of data analytics to support quality improvement and payment reform (e.g., performance reports)	●	●	●	●	●	●
Policy levers or strategies to support use of HIEs						
New legislation or requirements	●		●	●	●	
Technical assistance		●		●		
Toolkits		●		●		
Expanding the use of telehealth technology						
Telehealth to support behavioral health access or care			●		●	●
Telehealth to expand access in rural areas or support care management					●	●
Challenges (identified in provider focus groups or stakeholder interviews)						
Lack of EHR interoperability	●		●	●	●	●
Providers choosing to use their own EHR system over a statewide HIE	●			●	●	●
Reluctance to use HIEs because of costs or time	●	●				●
Confidentiality and privacy barriers regarding mental health and substance use disorder data		●			●	●
Complexity of health IT systems or projects resulting in slow progress	●		●	●		●

AR = Arkansas; EHR = electronic health record; ENS = event notification system; HIE = health information exchange; ME = Maine; MA = Massachusetts; MN = Minnesota; OR = Oregon; VT = Vermont.

SIM investments in the design, scope, and support of HIEs have taken different forms in each state. The most positive impacts related to delivering information on hospital admissions or ED use. With the exception of Minnesota, all states (Arkansas, Maine, Massachusetts, Oregon, and Vermont) had working statewide HIEs when their SIM awards were funded and used SIM funds to expand their capabilities, focus, or functionalities. Minnesota launched its HIEs through the SIM Initiative. Using HIEs for event notification services (alerts of hospitalizations, ED use, discharges, and transfers) was a common and successful strategy for providing meaningful exchange of data. Oregon's SIM funding early in the SIM Initiative supported the development, implementation, and spread of its Emergency Department Information Exchange (EDIE) to which all hospitals in the state are now connected and able to share information. EDIE helps hospitals identify patients who use EDs often or have complex health needs and direct them to more appropriate care settings. Ongoing costs for EDIE are currently paid by the participants—hospitals, health plans, and CCOs.[13] Oregon's SIM funding has also supported PreManage—a subscription-based tool that enables health plans, organizations, and providers to view patient information, receive ED notifications, and upload patient information to EDIE. Specifically, SIM funding covered the subscription costs for assertive community treatment teams who provide mental health treatment and services. CCOs and PCPs in Oregon have been very pleased with EDIE and the companion tool PreManage. As an example, a provider focus group participant indicated that the practice's care manager uses EDIE for patient follow-up after discharge and that "it's been great for helping with transitions of care." The consumer focus groups indicate patient awareness of these care management efforts also. In three states (Massachusetts, Oregon, and Vermont), consumer focus group participants responded that their PCPs knew if they had been to the ED or had an inpatient hospital stay, indicating benefits of event notification systems either through statewide HIEs or network EHRs.

States are using data reporting and data analytics to monitor and advance health reform initiatives. Several states (Arkansas, Maine, Minnesota, Vermont) are using SIM funds to develop analytic platforms and programs to better understand how their delivery models are facilitating care and to provide actionable information to health care providers participating in new delivery and payment models. Arkansas has developed an analytics engine and algorithms to track achievement for both the Medicaid PCMH and retrospective episode of care (EOC) models. For example, Arkansas gives physicians who are paid under the EOC model for specific episodes a report on their quality outcome and cost metrics compared to other physicians for each episode. The report also indicates whether the provider is eligible for a gain share incentive payment. Arkansas's newest data analytics initiative is its data transparency/integration of EOCs and PCMH—the Medical Neighborhood Performance Report. This initiative allows PCMH providers to view the cost and outcome information from the EOCs, which helps PCMH

---

[13] CCOs are provider networks that operate under global budgets to provide care to Medicaid beneficiaries.

providers determine referrals for specialty care. The initial report featured the Upper Respiratory Infection EOC; similar reports will be developed for current and future EOCs.

Some states are adopting policy levers to increase the use of health IT uptake during the SIM Initiative test period or remove barriers to using health IT. As documented in previous SIM Initiative Evaluation Reports, all states have used a combination of legislation, regulations, or requirements to implement and support health IT and data infrastructure. In the most recent year, these levers include legislation related to consent for sharing health information (Minnesota) and new regulations or requirements related to HIE participation (Arkansas and Massachusetts). For example, Massachusetts enacted policy in 2017 to support increased use of its HIE, the Massachusetts Health Information Highway (Mass HIway), both by adding positive incentives and removing barriers. As positive incentives, the state will offer capacity-building grants to support HIE utilization. Additionally, Massachusetts regulations established a timetable for hospitals, community health centers, and ambulatory medical practices to connect to the Mass HIway. (As a negative incentive, in the future the state may impose monetary penalties for organizations not meeting the schedule.) Massachusetts has incorporated provider connection requirements into its Medicaid managed care contracts and is determining how to require ACOs to increase Mass HIway use. To remove barriers, Massachusetts regulations also addressed patient consent for electronic record sharing. The rules streamline opt-in and opt-out processes, such as aligning the direct messaging component with Health Insurance Portability and Accountability Act (HIPAA) requirements, which enables authorization for record sharing to be incorporated into providers' consent for medical treatment forms or HIPAA release forms.

States are creating toolkits and providing technical assistance to support providers in the use of health IT and data analytics. Two states—Minnesota and Maine—stood out in their recent SIM Initiative efforts to support organizations and providers in using health data. To address providers' concerns about conflicts between Minnesota Law and HIPAA, Minnesota's SIM Initiative funded a Privacy, Security and Consent Management for Electronic Health Information Exchange grant to create the Foundations in Privacy toolkit. This publicly posted toolkit helps providers and provider organizations from both a legal aspect—understanding state and federal laws, rules, and regulations related to the use or disclosure of patient information—and an operational one—developing policies or procedures and training staff. To accomplish those tasks, the toolkit features four categories of documents: template policies and procedures, flow charts, template agreements, and checklists. There are also webinar training videos to assist providers in using the toolkit.

Maine implemented a Clinical Analytics Dashboard that merges Medicaid claims data with clinical data from the state's HIE to support MaineCare care managers in population monitoring, care management, and care coordination. The state recognized that the dashboard itself was not sufficient—care managers needed to understand how to use the dashboard to monitor patient utilization, costs, and quality of care. Further, BHH providers connected to the

HIE needed assistance in how to use the HIE data to improve patient care. As one site visit interviewee noted, “You can have a great new tool and nothing happens with it because there aren’t resources to figure out how to integrate it within the current workflow.” With technical assistance from Maine’s SIM Initiative partners, HealthInfoNet and Maine Quality Counts, participating providers in Maine’s BHHs and MaineCare (Medicaid) care managers detailed how they developed work flows in response to ED and hospital notifications offered through the HIE and how they used patient medical records to check medications, review lab results, develop care plans, and coordinate care with PCPs.

Some states are using telemedicine to improve health care and access. Three of the six Round 1 Test states have incorporated telemedicine into their SIM efforts. Each of these states—Massachusetts, Oregon, and Vermont—is using telemedicine to provide behavioral health services and reduce barriers to behavioral health care. Both Oregon and Massachusetts have focused on child psychiatric services. Massachusetts has expanded its program to reach mothers experiencing postpartum depression and other perinatal mental health issues. Vermont is implementing a behavioral health telemedicine pilot for opioid-dependent individuals. The project involves improving patient access to medication-assisted treatment through the at-home use of buprenorphine or methadone dispensing wheels and patient daily uploads of cellphone videos documenting appropriate usage. The pilot aims to improve adherence by reducing transportation and time barriers associated with traditional daily medication visits. Initial patient response to this pilot has been strongly positive. Although the staff implementing the pilot were encouraged by early patient feedback, the project is more labor intensive than was expected. Implementation tasks and challenges included the logistics of identifying the appropriate dosage and forms of drugs to fit within the “Med-O-Wheels”; the time involved in training patients and staff in the taping, uploading, and accessing of videos; and ongoing time involved in both staff training and clinician monitoring if patients were noncompliant.

In addition to behavioral health services mentioned previously, Oregon has implemented telehealth projects focusing on dementia care, oral health care, medication management for HIV/AIDS patients, and reducing hospital readmissions. Vermont’s second telehealth pilot involves home health nurses connecting their visit clinical data via a telemonitoring system to patient EHRs and the state HIE.

2.6 Practice Transformation and Workforce Development

KEY INSIGHTS

- SIM support that emphasized peer-to-peer learning and individualized technical assistance was considered particularly effective for driving practice transformation.
- Clearly defining roles and responsibilities for new types of health workers is essential to creating unified and well-integrated care teams.
- States' plans for sustaining workforce initiatives is uncertain, but states are considering some innovative options including creating toolkits and developing certification standards for providers to obtain reimbursement for care coordination services

Practice transformation support that emphasized peer-to-peer learning and individualized technical assistance was considered more beneficial in driving practice transformation than traditional forms of instruction such as expert presentations and lectures. Stakeholders valued practice transformation assistance that provided opportunities for providers to learn from one another (i.e., learning collaboratives) as opposed to educational activities that featured experts to teach or lecture on select topics. One provider from Vermont noted that peer-based instructional models facilitated engagement of participants and helped them form more collaborative relationships with each other and community partners. Four states convened learning collaboratives as part of SIM-related support to transforming care delivery. Specific topics addressed in learning collaboratives included meeting PCMH, Health Home, or other delivery model certification requirements, data collection for quality measurement, strategies for effective behavioral health integration, care management, and population health (see ***Table 2-5***). In Maine, a data-focused learning collaborative aimed at understanding and implementing a HbA1c quality measure was considered particularly helpful to providers monitoring diabetes-related outcomes. Providers participating in a care management learning collaborative in Vermont reported applying their training to create web-based care plans to help enhance care coordination.

Table 2-5. Sample topics covered in learning collaboratives convened in Model Test states

	ME	MN	OR	VT
Meeting certification requirements for transitioning to a PCMH, Health Home, or other alternative delivery model	✓	✓	✓	
Behavioral Health Integration	✓		✓	
Data Collection for Quality Measurement	✓	✓	✓	
Population Health	✓			
Care Management/Care Coordination	✓		✓	✓
Using Community Health Workers to Address Social Determinants of Health		✓		
Training for Health Care Interpreters			✓	

ME = Maine; MN = Minnesota; OR = Oregon; PCMH = patient-centered medical home; VT = Vermont.

In addition to peer-to-peer learning opportunities, stakeholders from several states touted the value of individual technical assistance tailored to the unique needs of practices. In Oregon, primary care home staff performed one-to-one verification site visits with practices to help providers meet PCPCH certification requirements. As part of the site visit, a quality improvement specialist reviews clinic processes and helps practices address any problems or concerns. Massachusetts' SIM Initiative leaders reported delivering individualized technical assistance to pilot ACOs on developing the infrastructure necessary to support data exchange across multiple providers and building a clinical data repository. In Arkansas and Maine, technical assistance vendors offered both one-on-one technical assistance and telephonic support to help providers address specific issues that were difficult to resolve during teleconferences or webinars. Specifically in Arkansas, SIM leadership hired a physician outreach specialist to work with individual practices to troubleshoot challenges related to EOC implementation.

Results from pilot-testing the integration of new types of health workers into care teams indicate the importance of clearly defining roles and responsibilities for new care team members. Two states (Maine and Minnesota) used SIM funds to test the integration of new types of health workers into clinical care teams. Maine implemented a CHW pilot program in four primary care settings and Minnesota offered grants to integrate CHWs into primary care practices, dental therapists[14] into dental offices, and community paramedics into hospitals. When integrated successfully, these new health care workers can help clinicians work at the top of their license by assuming practice responsibilities that do not require clinical training. For example, in Minnesota, dentists initially expressed concern over the addition of dental therapists to the care team, but over time they began to appreciate not having to spend as much time performing minor

---

[14] A dental therapist is a licensed oral health professional who practices as part of the dental team to provide educational, clinical, and therapeutic patient services. See Minnesota Dental Association for additional information: https://www.mndental.org/careers/dentistry/therapist/

tasks and procedures. Similarly, hospitals in Minnesota noted the valuable role community paramedics play in delivering follow-up services to patients discharged after an admission. In both cases, clearly defining roles and responsibilities for these new team members was considered a facilitator to successful integration. In contrast, providers participating in the Maine CHW program expressed difficulty incorporating CHWs into their practice given the lack of clarity around their functions and purpose. To help facilitate better integration of CHWs moving forward, Maine created a CHW stakeholder work group to develop core competencies and a training curriculum for CHWs and supervisors.

To sustain workforce development activities, states are considering some innovative options including developing toolkits and creating certification standards for providers to receive reimbursement for services delivered by new types of health workers. State officials in Minnesota identified toolkits as a strategy for furthering the integration of new health care workers into care teams once the SIM period of performance ends. The state has created a toolkit containing information on practice scope, training, licensure, and return on investment for each of the three new types of health workers it pilot-tested under the SIM Initiative (CHWs, dental therapists, and community paramedics). In Oregon, the state legislature passed legislation authorizing the creation of certification standards and reimbursement rules for traditional health workers (THWs)[15] to perform oral health assessments and other preventive services. Without reimbursement, sustainability for new types of health workers depends increasingly on demonstrating a business case for their value. For example, in Minnesota, hospitals plan to continue funding community paramedics post-SIM Initiative because they have been shown to decrease ED visits and reduce costs. Similarly, many dentists in Minnesota have elected to retain dental therapists in their practice as revenues increased after their integration.

---

[15] THWs include CHWs, peer support counselors, health care navigators, and doulas. A link to additional information on the Oregon TWO program can be found at http://www.oregon.gov/OHA/OEI/Pages/Traditional-Health-Worker-Program.aspx.

2.7 Population Health

KEY INSIGHTS

- Population health plans developed as part of state SIM Initiative Operational Plans generally referenced existing State Health Improvement Plans (SHIPs) and other public health activities outside the direct scope and funding for the SIM Initiative.
- State officials aligned SIM activities to coordinate with existing public health activities and drew synergies between programs whenever possible. This alignment between SIM-funded and existing public health activities was most evident in the use of quality and performance metrics that focus on improvements in conditions that address population health priorities.
- States used investments in health IT to advance longer term population health improvements.
- Integrating population health metrics into their payment reform models, states have increased providers and other stakeholders' attention to population health and social determinants of health.

Rather than designing new SIM-specific population health activities using SIM funding, states drew connections between existing public health programs and their SIM Initiative. Under the SIM Initiative, states were required to develop a population health plan as part of their SIM Operational Plans. States often leveraged State Health Improvement Plans (SHIPs), created independent of the SIM Initiative, as one way to create synergies and connections between the SIM Initiative and long-term population health initiatives. Some states also modified their existing SHIPs to expand public health activities to include newer SIM-supported activities. SHIPs give direction to population health goals, are necessary to achieve public health accreditation and help states receive grant funding (such as CDC's National Public Health Improvement Initiative). SHIPs are long-term, systematic plans developed by state health departments to define how the health department and local communities will improve the health of the population. SHIPs can be used to set priorities, direct the use of resources, and define specific projects to meet population health goals. States used these existing activities under SHIPs to make connections to the SIM Initiative when possible, even as many population health activities were not highly integrated into core SIM-funded activities.

For example, Maine added diabetes to the health priorities in its existing SHIP as a result of its SIM Initiative. Maine is implementing the National Diabetes Prevention Program (NDPP developed by CDC), a yearlong effort to help pre-diabetics avoid diabetes through lifestyle coaching; the NDPP program existed pre-SIM Initiative but was expanded using SIM funding. Oregon used SIM funds to support Division of Public Health staff members who were part of the team that developed its SHIP. Although not required to do so, most CCOs—Medicaid-focused entities supported by other SIM activities—have aligned their community health improvement plans with the seven key priority areas outlined in the Oregon SHIP. The most commonly addressed health improvement priority areas among CCOs include reduction of harms associated with alcohol and substance use, improvement in oral health, slowing the increase of obesity, and prevention and reduction of tobacco use.

Vermont used its development of a population health plan to engage stakeholders in defining population health. In developing its population health plan, the state used SIM activities including quality measurement, learning collaboratives, data analytics, and ACHs. Vermont's increased focus on health care transformation has brought greater attention across stakeholders to issues of holistic, population-based care, including how transformation efforts can incorporate social determinants of health.

SIM-funded investments in health IT and data sharing are viewed as supporting ongoing and future improvement in population health. State officials said that identifying opportunities and tracking population health performance has been a critical key to improving population health. States used SIM-funded health IT and data sharing initiatives to enhance population health performance monitoring in different ways, generally either to develop tools for providers to address individual needs or to help organizations or the state themselves pursue population health opportunities.

One example of a provider tool to address individual needs is in Massachusetts, where the state established an e-Referral system (standalone software or through the Mass HIway) to encourage greater use of preventive care and adoption of healthy behaviors. The Massachusetts Department of Health developed this bidirectional referral system to help PCPs exchange electronic referrals and feedback reports with local, community resources (e.g., for smoking cessation, fall prevention, chronic disease self-management, and diabetes education programs).

Other states used health IT to track system-level performance. For example, Vermont engaged in a project to provide a secure data connection from its HIE to ACOs' analytics vendors, which will allow ACOs direct access to timely data feeds for population health analytics. Additionally, one area the state has targeted for further exploration is better use of public health data, recognizing these data as a potentially underutilized source to target future health improvement initiatives.

All states seized the opportunity to integrate population health metrics into their payment reform models, **ensuring a consistent vision for holding the health care system accountable for long-term improvements in population health.** States focused their quality metrics for their payment reform models to coordinate with population health goals and existing public health initiatives, usually focused on specific populations or chronic illnesses. In Arkansas, PCMHs are using process measures for patients with diabetes to help interdisciplinary care teams monitor patient care. Similarly, Maine is working with health homes and BHHs in a learning collaborative environment to teach them how to use diabetes-related claims-based quality measures to improve outcomes for individuals with diabetes in Medicaid. Oregon has included two population health-related metrics (tobacco use prevalence and childhood immunization status) in the CCO Incentive Measure set.

Other states used implementation of ACO-type models to incorporate performance measures that monitor elements of population health. For example, future ACOs in Massachusetts will have contractual requirements to meet population health goals. Vermont's payment reform initiatives, including the design of the All-Payer ACO Model and Medicaid Pathway, encourage the use of population-based metrics and support the state's population health efforts. Minnesota's Medicaid ACOs (known as IHPs) are held accountable for performance metrics that include some population health metrics,[16] and their ACHs also include population health metric reporting.[17] This integration of population health into payment reform models, along with work group conversations and learning collaboratives, has helped increase providers and other stakeholders' attention to population health and social determinants of health.

2.8 Sustainability

KEY
INSIGHTS

- All states report plans to continue implementing key delivery models (PCMH, ACOs, health homes, BHHs, and EOCs) initiated or supported under the SIM Initiative.
- Sustaining SIM investments outside of core delivery and payment models presents challenges for states, but some states have identified strategies to continue investments.
- Relationships and partnerships formed throughout the duration of the SIM award will help advance future health system transformation efforts.

All states report plans to continue implementing key delivery models initiated or supported under the SIM Initiative (see *Table 2-6*). In Arkansas, Medicaid officials remarked that the delivery models supported under the SIM Initiative (PCMHs and EOCs) have become "an integral part of the Department of Health Services budget" ensuring their sustainability for years to come. Stakeholders from both Arkansas and Vermont noted the critical role that commercial health plans play in sustaining delivery system transformation in their respective states. To finance transformation efforts into the future, states are relying on a combination of state and federal funding streams. For example, Oregon, despite facing a $1.6 billion budget deficit, included funding for its PCPCH program and Transformation Center in the Oregon

---

[16] More information about performance measurement in IHPs is available from the Request for Proposals for IHPs posted on the Minnesota Department of Human Services website, http://www.dhs.state.mn.us.

[17] More information on performance measurement in Minnesota's ACHs is available in a report from the Minnesota Department of Health, "Accountable Communities for Health: Perspectives on Grant Projects and Future Considerations" (October 2016), available at http://www.dhs.state.mn.us/main/groups/sim/documents/pub/dhs-290682.pdf

Table 2-6. Sources of federal, state, and private funding to support continued delivery model implementation

State	Delivery model	Sustainability plans
Arkansas	Multi-payer PCMH and EOC	Continued Medicaid and participating private payers support for PCMH and EOC models.
Maine	Health Homes, Behavioral Health Homes, and Accountable Communities	Continued Medicaid support for all three delivery models.
Massachusetts	ACO	Federal support: DSRIP funding for 5 years
Minnesota	Integrated Health Partnerships	Continued Medicaid support: IHPs funded through December 2017; request for additional funding included in 2018–2019 state budget request
Oregon	PCPCH	State support: PCPCH and Transformation Center funded through December 2017; request for additional funding included in 2018–2019 budget request Continued Medicaid support: Oregon's Medicaid waiver supports CCOs.
Vermont	All-Payer ACO	Federal support: CMS is providing an initial $9.5M to fund care coordination and practice transformation support for participating practices participating in the All Payer ACO Model during Year 0. During Years 1–5, Vermont's All Payer Model will mirror the payment structure adopted for the Next Generation ACO Model, which allows providers to adopt different financing mechanisms depending on their level of risk. Continued Medicaid support: CMS approved a five-year extension of Vermont's section 1115(a) Medicaid demonstration waiver, which allowed the state and OneCare to launch a risk-bearing Medicaid ACO for a pilot performance period of calendar year 2017. Funding extends through 2022 (State of Vermont, 2017).

ACO = accountable care organization; CCO = Coordinated Care Organization; DSRIP = Delivery System Reform Incentive Payment; EOC = episode of care; IHP = Integrated Health Partnership; PCMH = patient-centered medical home; PCPCH = Patient-Centered Primary Care Home.

Health Authority 2018–2019 budget request. Similarly, state delivery reform legislation passed in Minnesota in 2010 provides continued authorization for its IHP initiative. Maine Medicaid plans to continue financing its HHs, BHHs, and ACs, and Massachusetts received $1.8 billion in federal Delivery System Reform Incentive Payment funds to implement its Medicaid ACO initiative. Vermont is the only state that is receiving federal support to enlist Medicare participation via its All-Payer ACO Model.

Sustaining SIM investments outside of core delivery and payment models presents challenges, but several states have identified strategies to sustain some enhancements. Financing for enabling strategies developed to advance health system transformation (i.e., technical assistance for practice transformation, health IT, workforce development) is less certain, but approaches are emerging. For example, in Minnesota, ACHs have received or are seeking grant and foundation assistance to continue their activities. Maine is exploring different payment models to reimburse new health care workers (i.e., CHWs), and in Vermont an ACO grant recipient is supporting a SIM-financed telehealth intervention after modifying it to make it easier to incorporate into day-to-day operations. Without state support, sustainability often falls to the providers who prefer evidence of either improved outcomes or reduced costs to maintain an intervention. Other sustainability strategies applied by states include shifting some of the provision of practice transformation assistance from vendors to internal state staff (Maine), developing provider toolkits or other resources to encourage continued adoption of reforms (Minnesota, Oregon), charging user fees to fund health IT tools (Oregon), and authorizing surcharges on commercial health plans to finance SIM interventions such as the Massachusetts Child Psychiatry initiative.

Relationships and partnerships formed throughout the duration of the SIM award will help advance future health system transformation efforts. Stakeholders from several states praised the SIM Initiative for helping state officials, providers, and payers form collaborative relationships with many disparate stakeholders. States applied SIM funding not only to support providers and payers directly in implementing health innovations, but also to establish committees, work groups, and task forces to discuss approaches and strategies for facilitating health system change. Even though not all SIM investments will continue, many of the relationships and partnerships forged during implementation will persist, creating a foundation for future delivery reform activities. According to one stakeholder from Minnesota, the SIM Initiative has helped change the conversation about how providers and payers think about health.

> *The narrative has changed in Minnesota about "What is health?." There has been a big shift in the awareness of social determinants……SIM provided a venue and some funding opportunities to accelerate those conversations, and to put them into practice…*—Stakeholder
>
> *While SIM funding ends, this work will continue to be ongoing, largely because of infrastructure and relationships…*—State official, Oregon
>
> *The SIM project, by having work groups, even though it was a complex project and resource intensive, created mechanisms for bring representatives of diverse groups together to talk about significant issues and recommendations to take.*—Stakeholder, Vermont

2.9 References

42 CFR Part 2 (2017). *Confidentiality of Substance Use Disorder Patient Records*.

Arkansas Blue Cross and Blue Shield AHCPII Help Desk. (2017). *Principal Accountable Provider Manual*. Available at http://www.arkansasbluecross.com/doclib/documents/providers/Arkansas%20Health%20Care%20Payment%20Improvement%20Initiative%20Program%20Overview_060817_06_30_2017.pdf

Centers for Medicare & Medicaid Services (CMS). (2016). *Arkansas SIM Initiative Final Progress Report, Attachment Volume 1*. Available from CMS.

Loretz, K, & Fairbanks, M. (2017). *Public Employees' Benefit Board/Oregon Educators Benefit Board 2017–2019*. Human Services Legislative Subcommittee on Ways and Means.

[this page intentionally left blank]

3. Interim Impact Findings From SIM Initiative–Supported Delivery and Payment Models

One goal of the SIM Initiative Round 1 evaluation is to determine whether the states' investments in delivery and payment model implementation—and supporting infrastructure to help providers optimize performance under new models—may be associated with measurable impacts on cost and quality. To accomplish this goal, we estimated how key expenditure, utilization, care coordination, and quality of care outcomes changed for individuals served by each state's SIM-supported delivery and payment models relative to an in-state comparison group once implementation began.

Key Findings

- Use of primary care and care coordination services statistically significantly improved for participants in most state models relative to the comparison group. These findings are corroborated by provider reports of increased real-time discharge information and consumer and provider reports of same-day appointments.
- But improvements in these primary care services did not translate (largely) as expected to statistically significant lower rates of outpatient emergency department (ED) visits or inpatient hospital admissions. These mixed findings indicate that corresponding shifts in beneficiary and provider behavior may take more time than the few years we were able to evaluate.
- Likewise, total expenditures either did not change or statistically significantly increased relative to the comparison group for most state models. Given that patients are being connected to more primary care, behavioral health, and other physician services but not using the ED or hospital services less often, it is not surprising that total spending is not decreasing or in some cases is increasing.
- A few process quality measures (such as screenings and medication adherence) improved across several models, but there were generally few statistically significant improvements in quality of care for model participants during the first 1 to 2 years of implementation. During the early implementation period, the clinical teams may not have had all the work processes in place yet to see differences in care.

In this report, we include analyses for the SIM-supported delivery and payment models and payer populations described in ***Table 3-1.*** Although not all the SIM-supported delivery and payment models in each state could be evaluated for this report, we have selected among the core delivery and payment models, and plan to include analyses of additional models, including models implemented in Maine (not included in this report), in the next federal evaluation annual report.

Table 3-1. Details of the SIM Initiative–supported payment and delivery model-specific analysis, by state

Model name	Payer population(s)	Model and comparison groups[a]	Analysis period	Weighted number of total person-years[b]
Arkansas				
Patient-centered medical homes (PCMHs)	Medicaid	MG: Beneficiaries who are first assigned to a newly enrolled PCMH practice January 2014. A third of the 111 intervention practices were pediatric and 63% were family practice. CG: To identify the comparison group, we selected the 21 practices that enrolled in PCMH in 2015 and selected beneficiaries who were first assigned to these practices in January 2015.	2010–2013 *(pre)* **2014** *(test)*	MG: 962,879 CG: 742,825
Massachusetts				
Primary Care Payment Reform Initiative (PCPRI) (PCMH model)[c]	Medicaid	MG: Fee-for-service beneficiaries enrolled in Primary Care Clinician (PCC) plans who selected or were attributed to a PCPRI-participating practice.[d] CG: Beneficiaries eligible for PCPRI by being in a PCC plan but were not attributed to a PCPRI-participating practice.	January 2011–June 2014 *(pre)* **July 2014–March 2016** *(test)*	Pre-period only: MG: 109,405 CG: 110,809
Minnesota				
Integrated Health Partnerships (IHPs, Minnesota-specific Medicaid Accountable Care Organization)	Medicaid	MG: Beneficiaries attributed to an IHP if a provider within that IHP supplied a health care home service, or, if the beneficiary received the plurality of primary care or specialist services from an IHP provider. CG: Beneficiaries not ever attributed between 2013 and 2015 to an IHP but were eligible.	2011–2013 *(pre)* **2014** *(test)*	MG: 585,315 CG: 577,854
Oregon				
Patient-Centered Primary Care Home (PCPCH) (PCMH model)	Medicaid PEBB OEBB Commercial	MG: Those who received the plurality of their medical services at a given PCPCH-certified clinic. CG: The comparison group received the plurality of medical services at clinics that were not PCPCH certified. Patients without primary care services in the study window were not included in the analysis.	2011–2014 *(pre and test vary by individual practice)*	Medicaid[e]: 17,003,526 person-months
Vermont				
Shared Savings Program (SSP) (Accountable Care Organization model)	Medicaid	MG: Beneficiaries assigned to providers associated with a Medicaid SSP. Beneficiary attribution occurred on an annual basis, and to be eligible members had to have been enrolled for at least 10 months in the year of attribution. Attribution occurred either through a claims-based algorithm or through the affiliation of the beneficiary's assigned primary care provider. CG: Beneficiaries assigned to a provider not affiliated with an SSP *or* a provider associated with a commercial SSP only.	2011–2013 *(pre)* **2014–2015** *(test)*	MG: 313,865 CG: 315,111

(continued)

Table 3-1. Details of the SIM Initiative–supported payment and delivery model-specific analysis, by state (continued)

CG = comparison group; MG = model group; OEBB = Oregon Educators Benefit Board; PEBB = Public Employee Benefits Board.

Note: Impact analyses of SIM-supported models in Maine are planned for the next federal evaluation annual report, and thus do not appear in Table 3-1.

[a] Medicaid beneficiaries are under age 65, not Medicare-eligible, and have full benefits.

[b] The number of comparison group observations is weighted by the inverse probability weight (1/(1-propensity score)), the number of intervention group observations is unweighted. Person-years are the sum of the weighted N for each year in the analysis, as reported in tables found in *Section 2.4 Propensity score evaluation* of each state chapter appendix's second sub-appendix.

[c] We classify the PCPRI model as a PCMH model because it is a primary care–based model. However, the model does have aspects of an accountable care organization model also as it holds providers accountable for total cost of care (one-sided risk) and non–primary care services (two-sided risk).

[d] In Massachusetts, Medicaid beneficiaries are restricted to those in the fee-for-service (FFS) Medicaid program (i.e., not enrolled in a Medicaid Managed Care Organization because only FFS beneficiaries were eligible for PCPRI).

[e] Although the Oregon analysis includes four payers, we focus on the Medicaid results in this chapter because it was the only payer making any incentive payments to PCPCHs during the period of analysis for this report.

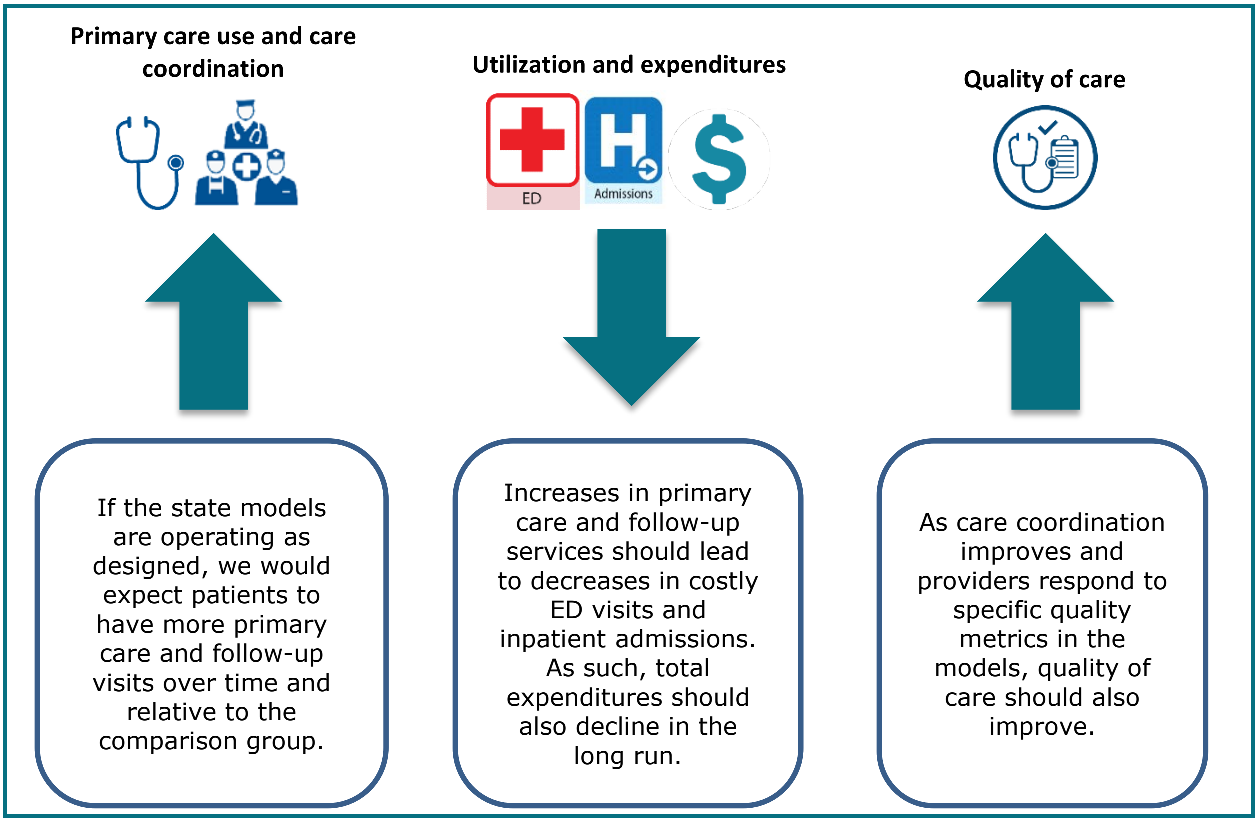
For each model, we compare changes in outcomes before and after model implementation for beneficiaries attributed to the state's payment and delivery model and an in-state comparison group. Three states implemented patient-centered medical home (PCMH)-type models: Arkansas, Massachusetts and Oregon. Even though each of these states implemented a PCMH model, the models were state-specific and there was considerable variation in their implementation, payment structure, and populations included. Moreover, states varied in the data available for analysis. Accordingly, the methods we used to assess each of these models also differed. Likewise, two states implemented Accountable Care Organization (ACO) type models: Minnesota and Vermont. There was some variation in the payment structure and data availability for these two states, so the methods we used to assess each of these models differed slightly. Additional detail relevant to individual states can be found in the state chapter appendices (***Appendices A-F***), and all methods are available in the state chapters' respective sub-appendix (***Sub-appendices A-2, B-2, C-2, D-2, E-2,*** and ***F-2***). ***Addendum A*** to this chapter offers a more technical discussion of similarities and differences for each of the analyses.

In each state, the payment and delivery model tested aims to control total spending by substituting primary care and care management services for emergency department (ED) visits and hospitalizations. Controlling and lowering costs is a core objective for states that are supporting delivery and payment models under the SIM Initiative, although states varied in the models they chose and the infrastructure in which they invested to support those models. A common element of all models is directing patients toward primary care and care management, through setting requirements for models of care (e.g., PCMHs), the incorporation of primary care–centric quality measures and financial incentives to earn shared savings, or both. Quality of care is also expected to improve after implementation as providers respond to specific quality metrics and improve coordination of care for patients with chronic diseases. Even so, given the time it takes to change patterns of health care use and achieve practice transformation, we do not expect to see large impacts on outcomes during the early implementation period included in this report. That does not mean that states are not making progress; it just means that measurable outcomes of these goals may take some more time to become observable.

There are limitations in interpreting the impact of the SIM Initiative on person-level outcome measures, but the evaluation design is strong. Variation in providers' readiness to make changes to care delivery under each model is not precisely captured in the analyses, nor is providers' use of SIM-supported infrastructure such as quality measure data reports or health information exchange systems. However, the evaluation design is strong, comparing the changes over time *before* model implementation and *after* model implementation (i.e., the model test period) for both populations served by providers *participating* in the model and served by provider *nonparticipants* (the model and comparison groups are listed in ***Table 3-1*** above). Across most analyses, two factors are present that could bias results to be more conservative (i.e., to not find an effect when one truly exists). First, the outcomes of model participants in the test period reflect likely outcomes of realistic roll-out of payment and delivery models, which often have uneven uptake by providers, length and intensity of exposure for beneficiaries, and variable significance and implementation for providers involved. Second, the comparison group that did not participate in the model being tested may still have some exposure to similar patterns of health care delivery as the model participants.

Figure 3-1 **describes the expected direction for each group of outcome measures.** We expect primary care utilization to increase as access to primary care improves with practice transformation requirements for PCMHs and as primary care practices (PCPs) take a more active role in monitoring and promoting their patients' health. Likewise, we expect follow-up rates to improve as care management activities increase for ACOs. The increase in primary care and care coordination is expected to result in reductions in more expensive ED use and preventable hospitalizations. As such, total cost of care should decline over time, although we do not expect to see cost reductions in the period of analysis for this report.

Figure 3-1. Expected direction of outcome measures



If the state models are operating as designed, we would expect patients to have more primary care and follow-up visits over time and relative to the comparison group.

Increases in primary care and follow-up services should lead to decreases in costly ED visits and inpatient admissions. As such, total expenditures should also decline in the long run.

As care coordination improves and providers respond to specific quality metrics in the models, quality of care should also improve.

3.1 Results

We present results across states in the order of outcomes described in ***Figure 3-1***, and we group state-specific results by model type (ACO or PCMH). First, we discuss care coordination outcomes for Medicaid beneficiaries served by ACOs relative to their comparison groups and primary care or physician use among Medicaid beneficiaries served by PCMHs relative to their comparison groups. Next, we examine utilization and expenditure outcomes across the models. Finally, we present results on quality of care measures.

3.1.1 Primary care use and care coordination

- Consistent with the goals of the models, PCMH and ACO model participants had statistically significant improvements in primary care use and care coordination relative to the comparison group, respectively.
- These findings are consistent with program requirements for increased access to primary care for PCMH practices and corroborate consumer’s and providers’ perception of same-day appointment availability.

- **ACO models.** Trends in care coordination[18] were mixed (see ***Table 3-2***).
  - In Vermont, the difference between ACO beneficiaries and beneficiaries in the comparison group in rates of post-discharge follow-up office visits following mental illness–related hospitalizations was not statistically significant, although these rates increased for both groups.
    - The improvement in follow-up rates within 7 days found in both groups could indicate that changes were attributable to the preexisting Blueprint for Health PCMH model or to spillover SIM activities that reached the broader Medicaid population.
  - Rates of post-discharge follow-up visits statistically significantly increased for beneficiaries receiving care from Minnesota's Medicaid ACOs, called Integrated Health Partnerships (IHPs), relative to the comparison group.
    - This finding corroborates reports from providers that the prevalence of near real-time discharge notifications increased during this period. Additionally, the findings could reflect increasing care management activities in IHPs.

Table 3-2. Difference in the change in care coordination outcomes for ACO beneficiaries and their comparison group

		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		MG	CG			
MN	Follow-up within 14 days of discharge from acute hospitalization (%)	⬆	⬆	2.56 (1.60, 3.53)	4.9	0.000
VT	Follow-up within 7 days of discharge from hospitalization for mental illness (%)	⬆	⬆	3.86 (−1.45, 9.17)	7.7	0.231
VT	Follow-up within 30 days of discharge from hospitalization for mental illness (%)	⬆	⬇	3.44 (−1.09, 7.98)	4.3	0.212

ACO = accountable care organization; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; MG = model group; MN = Minnesota; VT = Vermont.

Note: For Minnesota, the implementation period is 2014, for Vermont, the implementation period is 2014–2015. For both states, the baseline period is 2011–2013.

---

[18] As measured by likelihood of a post-discharge follow-up visit.

- **PCMH models.** In Arkansas, Massachusetts, and Oregon, rates of primary care use generally increased or declined more slowly for PCMH model participants relative to the comparison group (see ***Table 3-3***).
  - – In Arkansas and Massachusetts, the rate of physician visits declined for both the PCMH model group and the comparison group in the period of implementation, but the rate declined statistically significantly *less* for beneficiaries assigned to model practices relative to those in the comparison group.
    - These results suggest that the primary care activities that would increase access to primary care, such as increased attention to whether patients have received all appropriate screenings and same-day scheduling, may be mitigating a more general decline in primary care use among Medicaid beneficiaries in Arkansas and Massachusetts.
  - – Likewise, in Oregon, the probability of having a primary care visit in any given month increased by just under 1 percentage point (or 4.6 percent relative to the mean, $p < 0.05$) for Medicaid beneficiaries after Patient-Centered Primary Care Home (PCPCH) recognition.
    - This is consistent with the expectation that PCPs will take a more active role in monitoring and promoting their patients' health after PCPCH recognition.

Table 3-3. Difference in the change in primary care or physician use for PCMH beneficiaries and their comparison group

		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		MG	CG			
AR	Physician visits	↓	↓	28.34 (7.00, 49.68)	6.1	0.029
MA	Primary care visits	↓	↓	5.47 (3.77, 7.18)	1.4	0.000
OR	Percent with primary care visit	N/A	N/A	0.92 (0.20, 1.63)	4.6	0.035

AR = Arkansas; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; MA = Massachusetts; MG = model group; N/A = not applicable because of different statistical approach used because of differences in data available for Oregon (see ***Sub-appendix E-2*** for more information); OR = Oregon; PCMH = patient-centered medical home.

Note: For Arkansas, the baseline period is 2010–2013 and the implementation period is 2014. For Massachusetts, the baseline period is January 2011–June 2014 and the implementation period is July 2014–March 2016. For Oregon, the study period is 2011–2014 and the baseline and implementation periods vary by individual practice.

3.1.2 Utilization and expenditures

- Despite improvements in primary care use and care coordination, there were few statistically significant changes in ED or inpatient utilization and total expenditures across all models.
- Only Vermont had statistically significant reduced rates of ED use and a greater decrease in total expenditures for ACO-attributed beneficiaries, relative to their comparison group.
- Patterns of care delivery under new payment models that are effective in reducing utilization and cost may take time and additional resources to implement. Moreover, there may be more incentive to change relationships between providers, and therefore patterns of care delivery, in arrangements with the potential for shared savings.

- **ACO models.** Although Minnesota beneficiaries served by IHPs in 2014 showed improvements in care coordination, they did not translate into lower rates of ED visits or inpatient admissions for beneficiaries in the ACO model.[19] Only Vermont ACO beneficiaries had greater reductions in rates of ED use and a greater decrease in total expenditures relative to their comparison group (see ***Table 3-4***).
  - – Contrary to expectations, the rate of inpatient admissions in Minnesota decreased less in the IHP-attributed group than in the non-IHP group.
    - The decline in the rate of inpatient admissions among children in the IHP-attributed group was similar to, but not as great as, children in the comparison group. However, adults in the IHP-attributed group exhibited a slight increase in the rate of inpatient admissions compared to a decrease in the comparison group. IHP-participating providers in focus groups told us that increased use of community health workers and care teams allowed them to engage patients with complex conditions more than before; this new outreach may have led to a short-term increase in utilization in the adult population.
    - Additionally, although the IHP model is expected to align financial incentives between the inpatient and office settings to change patterns of care that lead to reduced utilization in the inpatient setting, developing these relationships may take more time than the current test period, and therefore more time before impacts on admission and ED visit rates would be observable.
  - – The ED visit rate did decline statistically significantly more for the ACO group in Vermont relative to the comparison group.
    - The faster decline in the ED visit rate for Vermont ACO participants could be associated with increased care management efforts by ACO providers.

---

[19] We were not able to measure expenditures in Minnesota because its Medicaid data do not include payment information for managed care encounters.

Table 3-4. Difference in the utilization and expenditure outcomes for ACO beneficiaries and their comparison group

ED Admissions $		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		ACO	CG			
VT	ED visits	↓	↓	−4.50 (−6.04, −2.95)	−3.4	0.000
VT	Inpatient admissions	↓	↓	0.10 (−0.44, 0.64)	0.7	0.755
VT	Total expenditures ($)	↓	↓	−16.51 (−23.35, −9.68)	−3.3	0.000
MN	ED visits	↓	↓	−0.30 (−1.27, 0.68)	−0.2	0.618
MN	Inpatient admissions	↓	↓	1.75 (1.32, 2.17)	5.0	0.000

ACO = accountable care organization; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; MG = model group; MN = Minnesota; VT = Vermont.

Note: For Minnesota, the implementation period is 2014, for Vermont, the implementation period is 2014–2015. For both states, the baseline period is 2011–2013.

        - Additionally, in site visit interviews, ACO representatives specifically identified reducing ED visits and reducing hospital readmissions as targets of efforts to optimize savings under the earlier Medicare Shared Savings Program. We would expect those ED visit–related activities to carry over somewhat to their Medicaid populations.

    – Total expenditures decreased at statistically significantly greater rates for ACO-attributed beneficiaries in Vermont relative to comparison group beneficiaries in the first 2 years of implementation.

        - This finding could indicate that ACOs are providing care in a more efficient way.

- **PCMH models.** Except for Arkansas, the relative increase in PCMH primary care use did not lead to significantly lower rates of ED visits or inpatient admissions (see ***Table 3-5***). The change in total expenditures did not differ between PCMH beneficiaries and comparison group for Arkansas or Oregon Medicaid beneficiaries; however, expenditures significantly increased for the PCMH group relative to the comparison group for Massachusetts.

Table 3-5. Difference in the utilization and expenditure outcomes for PCMH beneficiaries and their comparison group

ED Admissions $		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		PCMH	CG			
AR	ED visits	↓	↑	−5.35 (−10.74, 0.00)	−5.4	0.103
AR	Inpatient admissions	↓	↑	−5.58 (−6.89, −4.28)	−34.6	0.000
AR	Total expenditures ($)	↑	↑	−11.89 (−35.0, 11.21)	−3.2	0.163
MA	ED visits	↑	↓	16.55 (15.19, 17.92)	9.0	0.000
MA	Inpatient admissions	↓	↓	4.14 (3.54, 4.73)	15.5	0.000
MA	Total expenditures ($)	↑	↑	78.81 (68.50, 89.11)	12.3	0.000
OR	ED visits	N/A	N/A	1.35 (−0.02, 2.72)	2.1	0.105
OR	Inpatient admissions	N/A	N/A	−0.26 (−0.91, 0.38)	−2.7	0.503
OR	Total expenditures ($)	N/A	N/A	10.60 (−1.04, 22.25)	3.8	0.134

AR = Arkansas; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; MA = Massachusetts; N/A = not applicable because of different statistical approach used because of differences in data available for Oregon (see ***Sub-appendix E-2*** for more information); OR = Oregon; PCMH = patient-centered medical home.

Note: For Arkansas, the baseline period is 2010–2013 and the implementation period is 2014. For Massachusetts, the baseline period is January 2011–June 2014 and the implementation period is July 2014–March 2016. For Oregon, the study period is 2011–2014 and the baseline and implementation periods vary by individual practice.

- In Arkansas, the inpatient admission rate (and thus inpatient expenditures) declined substantially more among PCMH beneficiaries than among comparison group beneficiaries, but there was no statistically significant difference in the change in ED visit rate or total expenditures during the first year of PCMH implementation.
  - Although providers' perceptions that PCMH practices are intervening with their patients at early stages to avoid hospitalizations corroborate the favorable finding on inpatient admissions, this finding could also be related to underlying differences between the intervention group and comparison group

    (i.e., practices that enroll early in the PCMH program may be better positioned to meet the PCMH requirements than those that enroll later).

  - In Massachusetts, outreach efforts by care coordination staff may have resulted in identification of previously undiagnosed chronic conditions, which could have contributed to the relative increases in inpatient admission and ED visit rates. The relative increase in total expenditures is in part the result of the Primary Care Payment Reform Initiative capitation payment, but it is also related to increases in primary care, ED, and inpatient utilization.
  - For Oregon Medicaid beneficiaries, increases in primary care utilization were not accompanied by statistically significant changes in ED use, inpatient admissions, or total expenditures.
    - The changes in primary care use are in line with the goals of patient-centered primary care. It may take more time to observe changes in ED use, hospitalizations, and total expenditures.

3.1.3 Quality of care

- There were some improvements in quality metrics (e.g., some screening rates, medication adherence) across most states, but minimal changes during the early implementation period.
- Clinical teams may not have had work processes fully in place to see short-term differences in care, but providers noted that the greater availability of support staff and team-based care, and quality of care measurement and goals, likely contributed to improvements in patient care over time.

- **ACO models.** Care coordination and incentives to meet quality targets may help explain statistically significant improvements in some quality measures (see ***Table 3-6***).
  - For example, developmental screenings increased at a greater rate among beneficiaries in Vermont than among those in the comparison group. Developmental screening was the only quality measure in this analysis that was included in the Medicaid Shared Savings Program (SSP) and not the commercial SSP, which could explain why it is the only measure (out of 5)[20] that resulted in a statistically significant difference.

---

[20] The Vermont analysis included the following quality measures in addition to developmental screening: initiation of treatment and engagement of treatment after episode of alcohol and other drug dependence, hospitalizations for ambulatory care sensitive conditions, and adolescent well-care visits.

Table 3-6. Difference in quality of care outcomes for ACO beneficiaries and their comparison group

		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		ACO	CG			
MN	Breast cancer screening (%)	↑	↓	1.73 (0.85, 2.61)	4.7	0.001
VT	Developmental screenings (%)	↑	↑	8.80 (4.86, 12.75)	28.5	0.000

ACO = accountable care organization; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; MN = Minnesota; VT = Vermont.

Note: For Minnesota, the implementation period is 2014, for Vermont, the implementation period is 2014–2015. For both states, the baseline period is 2011–2013.

  - Breast cancer screening rates in the first year of implementation increased for the IHP group in Minnesota and declined for the comparison group, leading to a statistically significant difference. Because efforts to improve process measures like screening rates may be easier to implement in the short term, these types of measures may be more likely to see immediate impacts.

- **PCMH models.** For analyses with quality of care outcomes, there were few improvements or substantial changes (see ***Table 3-7***).
  - Except for the rate of asthma control medication use declining less among those with asthma in PCMH (relative to a comparison group), there were no other changes in quality of care outcomes after 1 year of implementation in Arkansas.[21]
  - Likewise, we did not find statistically significant changes in the rate of adolescent well visits or admissions for ambulatory sensitive conditions after 7 quarters of implementation in Massachusetts.
  - In Oregon, there were no improvements in the quality of care measures included in the Medicaid analyses except for colorectal cancer screenings, which increased after the primary care clinics received PCPCH recognition.[22]

---

[21] The other Arkansas quality of care measures include breast cancer screening, HbA1c testing, and follow-up visit within 30 days of prescription for ADHD.

[22] The Oregon data allowed for a wide range of quality measures to be included. Oregon analysis included the following quality of care measures: percent/number of beneficiaries with screenings for depression, cervical cancer, colorectal cancer, and Screening, Brief Intervention, and Referral to Treatment; percent/number of diabetics with HbA1c and Low-density Lipoprotein Cholesterol tests; percent/number of discharges with readmissions within 30 days; and percent/number of pregnant women with prenatal and postpartum care visits.

Table 3-7. Difference in quality of care outcomes for PCMH beneficiaries and their comparison group

		Change in outcome from baseline to implementation period		Regression adjusted D-in-D (90% CI)	Relative difference (%)	p-value
		PCMH	CG			
AR	Asthma control medication use (%),age 5–64 years with asthma	⬇	⬇	5.1 (2.27, 7.90)	6.8	0.003
MA	Adolescent well-child visit (%)	⬇	⬇	−1.06 (−3.12, 1.00)	−1.8	0.397
MA	Hospitalization for ambulatory care sensitive condition	⬆	⬇	0.04 (−0.15, 0.22)	3.5	0.759
OR	Number of colorectal cancer screenings, ages 51–64, per 1,000 person months	N/A	N/A	1.13 (0.10, 2.15)	17.2	0.071

AR = Arkansas; CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; OR = Oregon; MA = Massachusetts; N/A = not applicable because of different statistical approach used because of differences in data available for Oregon (see ***Sub-appendix E-2*** for more information); PCMH = patient-centered medical home.

Note: For Arkansas, the baseline period is 2010–2013 and the implementation period is 2014. For Massachusetts, the baseline period is January 2011–June 2014 and the implementation period is July 2014–March 2016. For Oregon, the study period is 2011–2014 and the baseline and implementation periods vary by individual practice.

3.2 Conclusions

Use of physician services, including specifically primary care visits, showed improvement across the PCMH models, which is consistent with reports from consumers in Arkansas and Massachusetts that access to primary care did increase—for example, patients could get same-day appointments. Providers also noted that they changed care delivery in response to quality measurement associated with participation in the PCMH model, which would also lead to increased utilization to ensure more active monitoring of patients' health.

Likewise, care coordination improved for ACO beneficiaries in Minnesota. The improved care coordination in Minnesota is corroborated by Minnesota provider reports of increased real-time discharge information for their patients during this time period, which helped practices identify more quickly their patients who were in need of a follow-up visit. In contrast, analyses of Vermont data showed no statistically significant difference for Medicaid beneficiaries assigned to ACOs versus not in 2014–2015 in care coordination as measured by follow-up after discharge from hospitalization for mental illness; interviews with providers in 2017 indicated far greater use of a hospital discharge notification service than observed in 2015, the time period for which these analyses were performed.

Despite improvements in care coordination and primary care use, ED visit and hospitalization rates did not decline in most states. Increased access to primary care and follow-up visits may have been easier to implement in the short term, but longer term outcomes like ED and hospital utilization will likely take multiple years to manifest. Likewise, except for Vermont's Medicaid SSP group, which saw a significantly greater decline in total expenditures, total expenditures either did not change or increased relative to the comparison group for each state's model. Given that patients are being connected to more primary care, behavioral health, and other physician services but not using the ED or hospital services less often, it is not surprising that total spending has not declined for beneficiaries in most payment models during the early implementation period.

Overall, we found little movement in quality metrics across the states during the early implementation period, although there were some improvements in screening measures and medication adherence outcomes that were part of value-based payment models. Providers noted that the availability of more support staff and team-based care and quality of care measurement goals were important factors leading to improving the care provided to patients. During the early implementation period, the clinical teams may not have had all the work processes in place yet to see differences in care. Even so, we also found no evidence of declining quality even though the potential disruption to providers' workflow imposed by new or different organizational environments (e.g., new health information technology, new members of the workforce) could have a short-term negative impact on quality.

Addendum A: Cross-State Methodological Issues

This cross-state methods addendum details the programmatic and methodological differences and similarities across the two types of model groupings included in the Year 4 Annual Report: patient-centered medical home (PCMH) models and accountable care organization (ACO) models. Further, the addendum addresses the effect of mortality on our analyses.

A.1 PCMH Models

Three states implemented PCMH-type models: Arkansas, Massachusetts, and Oregon. Although each of these states implemented a PCMH-type model, the models were state specific, and there was considerable variation in their implementation, including payment structure and populations included. Moreover, states varied in the data availability for analysis. Accordingly, the methods we used to assess each of these models also differed. ***Addendum Table 1*** below describes the program structure, data, and analysis choices for each model. This addendum provides an overview on features that differ between the models; the specific methods are detailed in each state's sub-appendix (***Sub-appendices A-2, C-2,*** and ***E-2***).

PCMH program structure

- In Arkansas, the PCMH program began in 2014 and was built off prior Medicaid reforms, replaced primary care management fees, and extended the framework of Arkansas's Comprehensive Primary Care. Providers enrolled in PCMH receive a per member per month (PMPM) fee to cover ongoing transformation costs (costs associated with meeting criteria to become a medical home) and care coordination, in addition to fee-for-service payments. Although this program is multi-payer, this report includes analysis only on the Medicaid population.
- In Massachusetts, MassHealth (Medicaid) launched the Primary Care Payment Reform Initiative (PCPRI) in March 2014. Under PCPRI, practices that chose to participate received a capitated primary care payment plus a capitation payment for care coordination with responsibility for total cost of care for each Primary Care Clinician (PCC) plan beneficiary in their care; Managed Care Organization (MCO) enrollees were excluded from PCPRI and thus this analysis.
- In Oregon, the PCPCH program was established by Oregon's Legislature in 2009 and began recognizing clinics in October 2011 on a rolling basis. Clinics receive an incentive to become PCPCH-recognized from payers, although only some Medicaid Accountable Care–like Organizations, called Coordinated Care Organizations (CCOs),[23] were paying an incentive to certified practices during the analysis period included in this report. For Oregon, this report includes analysis on the Medicaid, state employee (Oregon Educators

---

[23] Almost all Medicaid beneficiaries are enrolled in CCOs, which are provider networks that operate under global budgets to provide care to Medicaid beneficiaries.

Benefit Board [OEBB] and Public Employees Benefit Board [PEBB]), and commercial populations.

Intervention and comparison groups

- PCMH rollout in Arkansas for Medicaid beneficiaries began with the first group of practices starting January 1, 2014, and with subsequent groups of practices starting July 1, 2014, and January 1, 2015. This staggered rollout created the opportunity to identify in-state beneficiaries who were assigned to PCMHs in the early and later waves of enrollment as the intervention and comparison population, respectively. One benefit of this method is that it creates more comparability between the types of providers serving beneficiaries in the intervention and comparison groups; we understand anecdotally that providers who have chosen to not become PCMHs are close to retirement, or for other reasons are not interested in investing in practice infrastructure required for the program, such as implementing an electronic health records system. In Arkansas, Medicaid enrollees were attributed to a PCMH based on their selection of a primary care provider (PCP) once they have enrolled in Medicaid. We used practice and beneficiary enrollment files supplied by Arkansas to identify beneficiaries who are first assigned to a newly enrolled PCMH practice in January 2014 and comparison group beneficiaries newly enrolled in January 2015.
- In Massachusetts, beneficiaries were given the option of choosing their PCP when they join MassHealth and could change at any time, but if they do not choose one, they are automatically assigned to a PCP. The PCP is the basis for which a beneficiary is attributed to PCPRI. Providers could choose to join PCPRI after the program initiated and beneficiaries could be assigned at any time after the program initiation, so the intervention group had rolling entry and therefore each beneficiary had a different length of exposure to treatment. The state provided a list of PCPRI-attributed beneficiaries by month, which formed our intervention group. The in-state comparison group includes Medicaid beneficiaries who were eligible for PCPRI by being in a PCC plan and who were never attributed to a PCPRI provider.
- In Oregon, we did not receive a list of participants from the state. Instead, we developed an attribution algorithm to identify the intervention and in-state comparison group based on the plurality of visits. Model participants are defined as those who received the plurality of their primary care services at a given PCPCH-certified clinic. Note that not all clinics achieved PCPCH certification, and those that did achieve PCPCH certification could do so at any point between 2011 and 2014 (the study period), so patients who received the plurality of their services at the time the clinics were non-PCPCH are considered nonparticipants.

Effect of the Affordable Care Act on model

- In Arkansas, the population that became newly eligible for Medicaid under the Affordable Care Act (ACA) was covered under the health insurance marketplace starting in 2015. We did not have access to data on this population (baseline or otherwise) and therefore the analyses in this report represent only the traditional Medicaid population in the state PCMH model.

- In Massachusetts, a significant portion of both PCRPI participants and comparison group members began a new period of Medicaid enrollment coinciding with the start of PCPRI in March 2014. Because of the spike in utilization after gaining coverage, we lagged the intervention period by one quarter after enrollment to capture the spike in utilization during the baseline period.
- Because Oregon also includes commercial data, to avoid confounding the analysis because of new insurance options via the ACA, and consequent changes in the composition of individuals insured by a given payer, the sample is limited to individuals first observed as insured by a given payer in 2011, the earliest year for which we have data.

Statistical analysis

For Arkansas and Massachusetts, we used a longitudinal design with an unbalanced panel. We conducted difference-in-differences (D-in-D) regression analyses using logistic and ordinary least squares to estimate the effect of the PCMH on (1) service utilization and expenditures and (2) quality of care. For both states, we estimated propensity score weights to balance the intervention and comparison groups on many individual and county-level characteristics. To adjust for factors that might confound the relationship between PMPM payments and individual-level utilization and expenditures, we controlled for individual demographics, health status characteristics, and practice- and area-level characteristics.

For Arkansas, the baseline period was 2010 through 2013, and the post period was 2014 for every beneficiary. For Massachusetts, we used a customized baseline period of 3 years prior to the first quarter of attribution for each PCPRI beneficiary because they could become attributed to the intervention group over the 7 quarters we analyzed. Therefore, each PCPRI beneficiary had their own unique baseline period based on when they were attributed to PCPRI. In both analyses, to account for beneficiaries who were not enrolled the entire time, we use an eligibility fraction for each individual, defined as the number of months enrolled divided by the total number of months in the study period. In Arkansas, we control for clustering at the provider level to account for multiple observations per provider. In Massachusetts, we control for clustering at the beneficiary level because the state provided us beneficiary-level information on enrollment and attribution to PCPRI, but not on attribution to any single provider, so we have no data available to control for provider characteristics or clustering among the intervention or comparison groups.

To accommodate the fact that Oregon clinics could have become PCPCH-recognized at any time between October 2011 and December 2014, the period for which data were available, the pre- and post-periods for clinics vary considerably. To address variation in time over which a clinic could be PCPCH-recognized, we estimate D-in-D models that account for the fact that the post-treatment period is not equal across clinics with clinic and year-month fixed effects. The unit of analysis in all models is clinic-month-year (as opposed to the beneficiary-level analysis conducted for all other states in this report). Ordinary least squares models were estimated for all outcomes. Separate models are estimated for each subpopulation (Medicaid, commercial, OEBB, PEBB) and performance measure. The models control for age and sex except for outcomes that are gender specific (in which case sex is omitted from the model). Patients' age and sex account for the fact that individuals of different ages and sex have different health care needs, which influences different types of medical utilization. Each clinic-month observation is weighted by the number of individuals represented by the given year-month cell such that the results are interpreted as effects, if any, on individuals (not clinics). Standard errors are clustered at the clinic level.

In the Oregon analysis, clinic fixed effects account for characteristics specific to each individual clinic, related with health and medical care utilization that do not change over the sample period. This could include geographic characteristics of the clinic (e.g., community, local social norms, general economic status of the local population or those who frequent the clinic, medical service pricing and the overall supply of primary care, and capacity to offer services specific to the community's needs). It may also account for a given clinic's general practices or administration that could influence medical care received (e.g., appointment reminders, unique treatment capacities or skills of staff). Year-month fixed effects account for any general trends in the outcomes studied that are common to both PCPCH-certified clinics and non–PCPCH certified clinics. For example, if there were seasonality effects in the utilization of medical services, or overall economic changes, which influenced medical treatment, the year-month fixed effects would control for such changes over time.

Addendum Table 1. Methods for PCMH programs

	Payment Structure	Practice enrollment	Attribution method and data	Medicaid expansion	Statistical analysis	Analysis period	Payer population(s)
Arkansas	Per member per month fee to practices for each beneficiary enrolled to fund practice transformation and care coordination	Practices entered in three waves. We compare outcomes for Wave 1 practices starting January 1, 2014, to Wave 3 practices starting January 1, 2015.	Beneficiaries attributed to PCMH based on assignment of primary care physician (PCP) at two points in time: 2014 and 2015. State provided list of PCMH participants for 2014, which formed the intervention group, and 2015, which formed the comparison group.	Not present in traditional Medicaid data (expansion occurred through marketplace).	D-in-D analysis controlling for clustering at provider level and balancing comparison group with propensity score weighting. Unit of analysis at the beneficiary level.	2010–2013 *(pre)* **2014** *(test)*	Medicaid
Massachusetts	Capitated primary care payment plus a capitation payment for care coordination plus option for behavioral health payment with responsibility for total cost of care for each PCC plan beneficiary in their care	Rolling entry of practices and members starting March 2014.	Beneficiaries attributed to PCPRI based on assignment of PCP on a rolling basis. State provided list of PCPRI participants by month which formed the intervention group and eligible beneficiaries assigned to non-participating practices formed the comparison group.	Delayed start date of post period to minimize impact of pent-up demand.	D-in-D analysis controlling for clustering at beneficiary level and balancing comparison group with propensity score weighting. Unit of analysis at the beneficiary level. Did not cluster at provider level because data were not available.	January 2011–June 2014 *(pre)* **July 2014–March 2016** *(test)* Note that baseline period varies by entry date for each PCPRI beneficiary	Medicaid

(continued)

Addendum Table 1. Methods for primary care medical home (PCMH) programs (continued)

	Payment Structure	Practice enrollment	Attribution method and data	Medicaid expansion	Statistical analysis	Analysis period	Payer population(s)
Oregon	Incentive payments for PCPCH recognition by some Medicaid CCOs	Rolling entry of practices and members starting in October 2011.	Beneficiaries assigned to PCPCH and comparison practices on rolling basis using algorithm we developed based on plurality of visits.	Excluded from sample.	D-in-D models that account for unequal post-treatment period across clinics with clinic and year-month fixed effects. Unit of analysis at the clinic level.	2011–2014 *(pre and test vary by individual clinic)*	Medicaid PEBB OEBB Commercial

CCO = Coordinated Care Organization; D-in-D = difference in differences; PCC = Primary Care Clinician; PCP = primary care provider; PCPRI = primary care payment reform initiative; PCMH = patient-centered medical home; PCPCH = patient-centered primary care home; PEBB = Public Employees Benefit Board; OEBB = Oregon Educators Benefit Board.

A.2 ACO Models

Two states implemented ACO-type models: Minnesota and Vermont. There was some variation in the payment structure and data availability for these two states, so the methods we used to assess each of these models differed slightly. ***Addendum Table 2*** below describes the program structure, data, and analysis choices for each model. This addendum provides an overview on features that differ between the models, the specific methods are detailed in each state's sub-appendix ***(Sub-appendices D-2*** and ***F-2)***.

ACO program structure

The delivery system and payment model in Minnesota that is the focus of this analysis, Medicaid ACOs known as Integrated Health Partnerships (IHPs), was created through 2010 legislation. IHP implementation introduced the opportunity for groups of providers to share **one- or two-sided risk** with the Medicaid program, regardless of their contracts with Minnesota's Medicaid MCOs; thus, Medicaid managed care enrollment does not determine nor exclude eligibility for IHP attribution. The first round of IHP contracts were in place on January 1, 2013; at the start of each subsequent year, new groups of providers were awarded IHP contracts. In 2017, when the state had 21 IHPs engaged in the program, 59 percent of the total Minnesota Medicaid population—almost all who were eligible to be attributed to an IHP—were receiving care from more than 10,000 individual IHP-affiliated clinicians; to achieve this level of participation, the Minnesota Department of Human Services has contracted with more IHPs each year, and more providers have joined IHPs each year.

From 2014 to 2016, Vermont partnered with existing ACOs to implement an alternative payment model called the Shared Savings Program (SSP). With support from the SIM Initiative, Vermont's SSPs allowed participating ACOs to share in savings with **one-sided risk models** based on achieving cost and quality targets among their attributed beneficiaries. Vermont's payment reforms included both state and commercial payers; however, the quantitative impact analysis in Appendix F, ***Section F.4***, focuses only on the performance of Medicaid SSP beneficiaries.

Intervention and comparison groups

- Minnesota attributes beneficiaries yearly, retrospectively. A beneficiary is attributed to an IHP if:
  - a provider within that IHP provided a health care home service ("health care home" is a state-specific definition for a type of primary care practice), or,
  - the beneficiary did not receive any health care home services during the year but the IHP providers supplied the plurality of primary care services to that beneficiary and the beneficiary was enrolled in Medicaid for 9 months of the year.

Addendum Table 2. Methods for ACO programs

	Payment Structure	Attribution method and data	Statistical Analysis	Analysis period	Payer population(s)
Minnesota	Groups of providers share **one- or two-sided risk** with the Medicaid program based on achieving cost and quality targets for their attributed beneficiaries	The state provided us with lists of beneficiaries attributed to the ACOs. Beneficiary attribution occurred on an annual basis, and to be eligible members had to have been enrolled for at least 9 months in the year of attribution. A beneficiary is attributed to an IHP if a provider within that IHP provided a health care home service, or, if the beneficiary did not receive any health care home services during the year, the IHP providers provided the plurality of primary care services to that beneficiary. We used the state's algorithm to identify the comparison group of beneficiaries attributed to non-IHP providers.	D-in-D analysis controlling for clustering at the beneficiary level and balancing comparison group with propensity score weighting. Did not cluster at the provider level because data were not available. Unit of analysis at the beneficiary level.	2010–2013 *(pre)* **2014** *(test)*	Medicaid
Vermont	Participating ACOs share in savings with **one-sided risk models** based on achieving cost and quality targets among their attributed beneficiaries	The state provided us with lists of beneficiaries attributed to the ACOs and to the comparison group. Beneficiary attribution occurred on an annual basis, and to be eligible members had to have been enrolled for at least 10 months in the year of attribution. Attribution occurred either through a claims-based algorithm or through the affiliation of the beneficiary's assigned primary care provider.	D-in-D analysis controlling for clustering at the provider level and balancing comparison group with propensity score weighting. Unit of analysis at the beneficiary level.	2010–2013 *(pre)* **2014–2015** *(test)*	Medicaid

ACO = Accountable Care Organization; D-in-D = difference-in-differences; IHP = Integrated Health Partnership.

Minnesota provided beneficiary-level files, which included an attribution flag for beneficiaries attributed to an IHP in 2013, 2014, and 2015, and an indication of beneficiaries who were eligible but not attributed. Minnesota attributes beneficiaries yearly, retrospectively. The state also provided a file indicating the organizational national provider identifiers (NPIs) participating in an IHP. Prior to attributing the comparison group, we excluded beneficiaries who were ever attributed to an IHP during 2013–2015 to prevent comparison group beneficiaries from becoming test group beneficiaries in future analyses. Subsequently, we used Minnesota's IHP attribution methodology, using professional claims, to attribute eligible but non–IHP-attributed beneficiaries to a non-IHP participating organization to form the in-state comparison group.

- In Vermont, the state provided us with lists of beneficiaries attributed to the ACOs and to the in-state comparison group. Beneficiary attribution occurred on an annual basis, and to be eligible members had to have been enrolled for at least 10 months in the year of attribution. Attribution occurred either through a claims-based algorithm or through the affiliation of the beneficiary's assigned primary care provider.

Effect of the ACA on model

Both Minnesota and Vermont had expanded Medicaid to childless adults prior to ACA-related expansions occurring in 2014 and increased ACA-related expansion in 2014. For both states, we have no reason to believe the expansion affects the intervention and comparison groups differently, and therefore the study design did not exclude new enrollees from analyses.

Statistical analysis

For both states, we used D-in-D models to compare pre- and post-trends of the ACO group to the in-state comparison group. For both states, the pre-period was 2011–2013; Minnesota had 1 year of post data (2014) and Vermont had 2 years of post data (2014–2015). For both states, if a beneficiary was ever attributed to an ACO, they were excluded from the comparison group. For both states, we estimated propensity score weights to balance the intervention and comparison groups on many individual and county-level characteristics. The Vermont analysis used ordinary least squares for spending outcomes (expenditure data were not available for Minnesota) and both analyses logistic regression for binary outcomes. To adjust for factors that might confound the relationship between ACO attribution and individual-level utilization and expenditures, we controlled for individual demographics, health status characteristics, and area-level characteristics.

For Vermont, all analyses use clustered standard errors at the provider level, using the provider-level NPIs provided by the state. In Minnesota, all analyses used beneficiary-level clustered standard errors to account for repeated observations from the same beneficiaries over time. Even though clustering at an organizational level is a commonly applied strategy for obtaining unbiased standard errors in D-in-D models (Bertrand, Duflo, & Mullainathan, 2004), we did not do this in Minnesota because accurately identifying organizational clusters over time would require making several ad hoc assumptions to track organization NPIs across observation periods, and because organization NPIs do not represent all of the treatment providers with whom beneficiaries actually engage. Accordingly, these factors would greatly reduce our confidence that clustering at an organizational level is correcting the bias in our standard errors. Furthermore, it is likely that this is a minor limitation because ignoring organizational-level interdependence is associated with a downward bias in standard errors in D-in-D models, suggesting that some hypotheses with p-values just below 0.10 should in fact be rejected.

However, we had virtually no marginally significant findings (i.e., with p-values just below 0.10). In fact, many of our statistically significant findings would remain significant even if standard errors were downwardly biased by as much as 100 percent. Finally, we did cluster at an individual level, and individual-level clustering likely removes a substantial amount of bias in our standard errors.

A.3 Mortality

For each PCMH and ACO model analyses, we excluded beneficiaries dually eligible for Medicare and Medicaid because they were either not included in the intervention or we did not have complete data for them. As such, the populations included in the analyses are generally young because Medicaid primarily covers children. As such, we have no reason to believe that mortality is having an impact on our analyses. People who drop out of the Medicaid samples tend to do so for other reasons such as losing eligibility because of changes in income. In addition, each sample had a substantial subgroup who was enrolled for the entire study period (for example, 47 percent in Arkansas and 50 percent in Vermont). However, we are limited in the ability to conduct sensitivity analyses to assess the impact of mortality on our analyses because Medicaid data do not include a date of death like Medicare data do. Sensitivity analyses for one state examined the presence of any utilization among individuals in the post-period as a proxy for the individual remaining alive throughout the study period and did not find a differential drop-off in either the intervention or the comparison group. For us to do a more complete sensitivity analysis on the impact of mortality, we would need to purchase registry data and merge them to the Medicaid claims.

A.4 Reference

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics, 119*, 249–275.

4. Summary of State-Specific Findings

4.1 Arkansas

The SIM Initiative in Arkansas supported what is known as the Arkansas Health Care Payment Improvement Initiative (AHCPII). The primary goal of the AHCPII is to shift the state's payment system from one that primarily reimburses for services based on volume to a more sustainable, value-based model. Moreover, a core principle of the AHCPII is to develop a system that is "patient-centered, clinically appropriate, practical, and data-driven."

Arkansas was the first SIM Initiative Round 1 state to complete its 3-year test period, with funding for the SIM Initiative ending in September 2016. SIM funding helped to implement two multi-payer delivery system reforms—patient-centered medical homes (PCMHs) and episodes of care (EOCs). These models became integral to health care delivery in Arkansas, and administration of these programs became a routine part of operations at the state Department of Human Services (DHS). These two models act synergistically, with the PCMH model focused on efficient provision of primary care services and care management and the EOC model used primarily for value-based purchasing of specialty services, although primary care is also impacted by the EOCs. Arkansas Medicaid and private payers implemented both models, and public and private payers attributed the models' success to this multi-payer support. For both models, Arkansas state officials continued to assist providers with practice transformation and data analytics support.

Care coordination models for special populations—those with behavioral health needs, those with intellectual or developmental disabilities, and beneficiaries using long-term services and supports (LTSS)—were not implemented during Arkansas's 3-year SIM Initiative funding period. The SIM award allowed the state to develop the foundation for models for these special populations, engaging stakeholders to assist with model design, but a change in administrations and the initiation of the State Legislative Task Force in 2015 resulted in a de facto moratorium on development efforts. The state planned to continue working with stakeholders on care coordination models—potentially a health home or a managed care entity—to serve these special populations.

Key Results From Arkansas's SIM Initiative, April 2016–September 2016

- Arkansas's SIM Initiative successfully engaged several payers in the state through legislative action and flexibility in how payers could adopt models.
- By the end of the SIM award period, Arkansas Medicaid and the state's two major commercial insurers were implementing episodes of care (EOCs) and patient-centered medical homes (PCMHs), with EOCs reaching 15 percent and PCMHs reaching 51 percent of Medicaid enrollees.
- PCMH enrollees experienced significantly fewer inpatient visits, a smaller decrease in physician visits, and a decline in inpatient expenditures, relative to the comparison group. These findings were consistent with focus group and provider feedback on increased same-day access to primary care offered by PCMHs, which providers said helped them intervene with patients prior to emergency department visits and potential hospitalizations (this evaluation's analysis of EOC outcomes not yet available).
- There were no statistically significant differences between the PCMH and comparison groups for most quality of care outcomes after 1 year, with one exception: Those enrolled in PCMHs had similar use of asthma control medications over time whereas those in the comparison group had declining asthma medication use. However, these results may be the result of unobserved differences in area- and practice-level characteristics between the PCMH and comparison groups.
- Arkansas built sustainability into its SIM model through multi-payer collaboration, full integration of the EOC and PCMH models into the state's Department of Human Services, and automation of data efforts. As a result, state officials were optimistic that SIM efforts will continue and expand in the future.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to September 2016. Additionally, we present interim results from an analysis of outcomes for Medicaid beneficiaries after 1 year of PCMH model implementation. The full Arkansas report is available in ***Appendix A*.**

4.1.1 Successes

Arkansas engaged a range of payers through a combination of legislative action and model design flexibility. Arkansas Medicaid, DHS, and the state's two major commercial insurers—Arkansas Blue Cross and Blue Shield and QualChoice of Arkansas—partnered in implementing both the PCMH and EOC models. Arkansas achieved multi-payer participation for PCMH by promulgating Rule 108 under the authority of the Health Care Independence Act of 2013, which required qualified health plans (QHPs) participating in the Arkansas Health Insurance Marketplace to enroll members (including the Medicaid expansion population) in PCMHs on or after January 1, 2015, and pay a per member per month (PMPM) fee. Engagement of commercial payers in the EOC models was enhanced by allowing them to implement a subset of the 14 EOCs (3 of which are for upper respiratory infection) developed by the state, with their choice typically determined by the health needs of their covered lives.

SIM funding was integral to establishing relationships across the state, especially between DHS and payers. Even though the care coordination models for special populations were not implemented during the SIM test period, state officials and providers recognized that the SIM Initiative was a mechanism for facilitating meaningful conversations between the state and provider groups. Similarly, the state's ability to convene multi-payer meetings facilitated meaningful cooperation and goal alignment across stakeholders.

Provider participation spread the PCMH model to a growing number of Medicaid beneficiaries, and the state reported associated reductions in hospital utilization in 2015. The PCMH program was well entrenched in the state, with 878 primary care providers (PCPs) treating Medicaid patients participating in PCMHs—reaching more than 300,000 Medicaid beneficiaries by the end of the SIM award period in September 2016 (CMS, 2016). According to Arkansas's State Tracking Report for Year 3, inpatient admissions and emergency department (ED) use decreased in 2015 when compared to 2014 (Arkansas Center for Health Improvement, 2017). PCMH expansion was also occurring among private payers in both the commercial and Medicaid expansion populations, in part because of Rule 108.

Like PCMHs, Arkansas's retrospective EOCs also broadened delivery reform to multiple payers and providers and demonstrated cost savings according to the state. Focused primarily on specialists, the EOCs were developed so that one provider, the principal accountable provider (PAP), was responsible for all the relevant costs incurred for care provided to beneficiaries in a given time period. The state estimated that more than 2,400 providers had been PAPs for the state's 14 active EOCs. Despite concern that providers were able to avoid the episode by the diagnoses they chose for their patients, the state still found savings for both the Medicaid and commercially insured populations (CMS, 2016).

State officials and their vendors spent the last year of their SIM Initiative ensuring that both **PCMH and EOC models were fully integrated within DHS operations.** The management structure and budget for the Arkansas Medicaid program included ongoing administration of these payment and delivery system reforms by full-time state employees. Payers and state officials agreed that the statewide health care delivery and payment models developed under the SIM Initiative had become an integral part of Arkansas DHS such that operation of the models would proceed regardless of SIM funding.

4.1.2 Challenges

Primary and specialty care providers reported a need for more timely data and additional resources to educate patients on appropriate health care practices, to avoid financial penalties or loss of PCMH certification. Providers said that Medicaid resources, including practice transformation support and PMPM payments, were not sufficient to coordinate care for Medicaid-covered patients. They also noted that more timely information on quality and utilization would be beneficial; however, state officials noted that this was challenging because providers are allowed up to 12 months to submit medical claims.

Individual physicians were frustrated with EOC implementation. State officials and their contractors observed that PAPs under the EOC model appeared to be avoiding the triggering of an episode by altering the diagnoses they are using to bill for patients' visits. Provider participants in focus groups similarly suggested that when faced with financial penalties, they would begin to turn away Medicaid-covered patients who they deemed to be more challenging to manage, leading to decreased health care access for Medicaid beneficiaries. Finally, providers noted the challenge in keeping up with an understanding of how episodes were defined, especially because definitions were subject to annual changes.

Legislative roadblocks and provider resistance hindered progress on LTSS and behavioral health reforms. Changes planned to take place for behavioral health care and LTSS were stalled for nearly 2 years because of political shifts within the state and resistance from some provider organizations. Arkansas used the delay period to continue conversations with stakeholders and review the state's long-term objectives for behavioral and LTSS health care services. In May 2016, as a result of findings from the Legislative Task Force, the Governor and the DHS director signed a Memorandum of Understanding with LTSS provider groups committing providers to develop and implement a plan to save $250 million over 5 years. State officials also reported that some for-profit behavioral health providers who initially resisted change became more supportive of making changes in Medicaid if they stave off implementation of Medicaid managed care. This breakthrough in garnering provider support for changing models of care for special populations was likely initiated by discussions facilitated early in the SIM Initiative test period, but no SIM funds were used for health homes in the last year of the award.

4.1.3 Lessons learned

Arkansas responded to stakeholder feedback by adapting the EOC payment model and PCMH requirements. In 2015 the state passed Act 902 "to limit the use of factors not under a physician's control in determining reimbursement in alternative payment systems." This law was meant to protect PAPs from financial penalties under the EOC payment model that might result from factors beyond their control, such as higher rates paid by payers to some hospitals. The state also relaxed PCMH requirements to connect to the state health information exchange (HIE), known as SHARE, because of feedback from providers about the high cost of connectivity. Arkansas's original PCMH requirements mandated providers to have a certified electronic health record (EHR); however, requirements were changed to allow participation by physicians who were capable of receiving hospital discharge reports electronically, which could include by secure e-mail, as opposed to solely through an EHR.

Arkansas initially planned to roll out 75–100 episodes for a broad range of conditions but later changed course to focus on fewer, more targeted episodes. Arkansas recognized that EOCs for time-limited procedures such as cholecystectomies and exacerbations of asthma and chronic obstructive pulmonary disease were more readily implemented than EOCs for chronic conditions such as attention deficit hyperactivity disorder. Chronic condition management is best handled by PCPs under the PCMH model. State officials particularly noted that tonsillectomy and joint replacement were ideal episodes because they had a defined start and end date and there were enough episodes to influence provider behavior. According to state officials there was also a limited number of EOCs that could significantly impact cost and utilization across the entire state, and EOCs must be cost-effective enough to justify the considerable resources needed to develop and maintain each episode.

Arkansas's leverage of legislative mandates was key to the success of the PCMH model. The state engaged a substantial proportion of eligible patients and providers in the PCMH model by requiring QHPs to fund and implement PCMH for their patients receiving care through the health insurance marketplace, including individuals covered under the Medicaid expansion private option (Rule 108). State officials noted the importance of sending consistent signals to providers to move the state's health care landscape toward patient-centered, clinically appropriate care. Arkansas was able to begin shifting care toward PCMH for a range of payers through voluntary and mandated participation.

4.1.4 Interim findings on the impact of the Medicaid PCMH model after 1 year of experience

Practices participating in the PCMH model were expected to improve care coordination for patients and provide high-quality, patient-centered care that would lower expenditures and decrease avoidable utilization. At the same time, access to care for PCMH patients was expected to increase because of enhanced efforts by PCMH practices such as 24/7 accessibility, development of patient care plans, and increased quality measurement and reporting.

We conducted a difference-in-differences analysis using claims and enrollment data in the baseline and test periods (2010–2013 and 2014, respectively) for Medicaid beneficiaries assigned to practices that became a PCMH in early 2014 (intervention group) and beneficiaries assigned to practices that that were not certified as a PCMH in 2014, but instead became a PCMH in 2015 (comparison group).[24] After 1 year of PCMH implementation in Arkansas, we found more improvement in utilization and expenditure outcomes for Medicaid beneficiaries

---

[24] We excluded from the comparison group beneficiaries receiving services from primary care providers who never became PCMHs or the few practices that became PCMHs in 2016. This decision has the effect of creating a more "apples to apples" comparison in terms of practice types in the intervention and comparison groups, although differences between the two groups remained.

assigned to the 2014 PCMH cohort relative to the comparison group. We found statistically significant changes for the following:

- A slower decrease in physician visits
- Decreased inpatient admissions and inpatient expenditures
- Similar use of asthma control medications in the 2014 PCMH group but a reduction in use for the comparison group

There were no statistically significant differences in total expenditures and ED visits between the intervention and comparison groups. These findings corroborate consumers' reports of access to primary care (e.g., being able to get same-day appointments with their primary care provider), which physicians indicated helped them intervene with patients to avoid a potential hospitalization.

Even so, because it takes time to change provider and consumer behavior and ramp up a new program, it was unlikely that findings after only 1 year of implementation could be solely attributed to the PCMH program. Although we balanced the analytic sample on key individual characteristics, unobserved differences in both the providers and beneficiaries enrolled in each group still existed, which may have biased our results. We expect that practices that enrolled early in the PCMH may have been better positioned for practice transformation, so our results may be biased toward finding improvements associated with the PCMH model. We found only one relative improvement among the quality of care outcomes, which was perhaps not surprising because providers reported long data lags in receiving quality reports early in the program.

4.1.5 References

Arkansas Center for Health Improvement (ACHI). (2017). *Arkansas Health Care Payment Improvement Initiative, 3rd Annual Statewide Tracking Report*. Little Rock, AR: ACHI.

Centers for Medicare & Medicaid Services (CMS). (2016). *Arkansas SIM Initiative Final Progress Report, Attachment Volume 1*. Available from CMS.

4.2 Maine

As of March 2017, after approximately 3.5 years of SIM Initiative implementation, Maine has continued to make progress toward achieving its six stated strategic objectives: (1) strengthening primary care, (2) integrating primary care and behavioral health, (3) developing new workforce models, (4) supporting development of new payment models, (5) centralizing data analytics, and (6) engaging people and communities. The Maine SIM Initiative has been working with three non-state partners—Maine Health Management Coalition, Maine Quality Counts, and HealthInfoNet (HIN)—and one state partner—the Maine Center for Disease Control to implement its SIM objectives.

Maine's delivery reforms under the SIM Initiative center on two key initiatives operating within MaineCare (Maine's Medicaid program): behavioral health homes (BHHs) and Accountable Communities (ACs). These models build on an earlier initiative by the state to create patient-centered, primary care health homes, hereafter referred to as health homes (HHs), for Medicaid beneficiaries with chronic conditions. Although HHs were implemented prior to the SIM Initiative, they are a critical component of the BHH and AC initiatives and an integral component of Maine's delivery system model for Medicaid. BHHs are community mental health providers who manage the behavioral health needs of a very targeted population—MaineCare adults with serious and persistent mental illness and MaineCare children with severe emotional disturbance. BHHs are expected to manage their attributed MaineCare members in partnership with the patients' primary care provider or HH (if the beneficiary is also enrolled in an HH). ACs are accountable care organizations (ACOs); ACs are integrated provider organizations that provide care coordination and administrative support to providers to ensure that comprehensive primary, acute, and chronic health care services are provided to attributed MaineCare members. ACs can share in savings generated if participating provider organizations meet a set total cost of care and quality benchmarks.

Key Results From Maine's SIM Initiative, April 2016–March 2017

- As of September 2016, MaineCare has enrolled 6,691 Medicaid beneficiaries (2 percent of the Medicaid population) in 24 behavioral health homes (BHHs) and 51,236 Medicaid beneficiaries in 100 health homes (HHs). As of July 2016, MaineCare has enrolled 46,395 Medicaid beneficiaries (15 percent of the Medicaid population) in four Accountable Communities (ACs)—Medicaid Accountable Care Organizations. Since program implementation began in 2014, enrollment has increased significantly.
- ACs were reluctant to accept two-sided risk (i.e., sharing in savings and losses) because they had not yet gained the experience to influence utilization within the Medicaid population.
- The BHH model was viewed as transformational because the model gave providers the same supports that primary care providers receive in a patient-centered medical home. BHH providers were given a capitated monthly payment to provide care management services along with health information technology support, practice transformation assistance, and data to monitor performance.
- Connecting BHHs the state's health information exchange was viewed as a key success by state officials/partners and BHH providers.
- The state curtailed efforts to garner multi-payer alignment on quality measure and payment models to focus on improving diabetes care for Medicaid beneficiaries and identifying high-utilizers for care management services.

From April 2016 to March 2017, Maine continued to finance strategic investments in its health information and analytics capabilities to support BHHs and HHs. These investments include connecting BHHs to Maine's HIE, piloting the use of predictive modeling to identify patients at greater risk for being high cost or high users of the hospital or ED, and preparing feedback reports on cost, utilization, and quality, all of which are tools to help providers better coordinate and manage care for their patients. Maine also sponsored data-focused learning collaboratives for HHs and BHHs, which are learning networks designed to promote practice improvement with a focus on improving diabetes care by increasing HbA1c testing rates. The state partnered HHs and BHHs with high testing rates with those that had lower testing rates with the intention of facilitating the sharing of best practices.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to March 2017. Impact analyses of two of Maine's SIM-supported delivery system and payment models, BHHs and ACs, are planned for the next federal evaluation annual report; no impact analysis results for either model appears in this section or ***Appendix B***, which is the full Maine report.

4.2.1 Successes

The BHH model has been well received by providers and was viewed by state officials as transformational to Maine's behavioral health delivery system. The BHH model, which incorporates health information technology (health IT) support, practice transformation assistance, and quarterly cost and quality feedback reports, was generally well received by providers. State officials considered the model transformational because it brought behavioral health providers more in line with primary care, which had significantly more experience in monitoring a population to better manage their care under the PCMH model. State officials and providers observed that the capitated monthly payment gave providers the flexibility to take a more holistic, patient-centered approach toward managing patients' needs and to integrate behavioral health and primary care with their health home partners.[25] Both consumers and providers in spring 2017 focus groups observed improvements to the patient-provider relationship under this patient-centered model. BHH providers noticed changes in patient engagement and felt they were able to provide more person-focused care, particularly for higher need consumers. However, the model was not without some limitations. BHHs are currently required to bill at least 1 hour per patient per month to receive the capitated monthly payment. Certain BHH providers were confused over this requirement, with some thinking that it restricted them to only providing an hour of care a month. Further, consumers indicated that the high turnover rate in BHH staff impacted their ability to grow strong provider relationships.

---

[25] BHHs receive a capitated monthly payment of $394.20 from MaineCare to provide care management for their MaineCare patients enrolled in the BHH. This payment is not paid for with SIM funding.

The connection of BHHs to HIN was viewed as a success by providers. Maine recognized that behavioral health providers lacked access to data to better manage their patients. Under the SIM Initiative, 20 behavioral health organizations (18 of which were BHHs) received technical and financial support to use Maine's HIE to manage and coordinate patient care. Behavioral health organizations were using the HIE to receive notifications when their patients are admitted to the ED or hospital and were developing workflows to follow up with patients upon receipt of these notifications. Behavioral health organizations were also obtaining physical health data on their patients through the HIE, which providers reported was very useful in obtaining a comprehensive understanding of their patients' health. Bidirectional exchange of information, however, was still somewhat limited, with only 13 organizations able to share mental health records with the HIE. Requirements to obtain approval from patients to share their mental health data with the HIE also hindered the use of the HIE. Finally, there were concerns over the financial sustainability of the behavioral health organizations' connection to the HIE after the SIM Initiative; some of these organizations were reliant on SIM funding to pay the costly HIE subscription fees.

Technical assistance provided by Maine Quality Counts and HIN continued to be well received by health home and BHH providers. Site visit interviewees and provider focus group participants—particularly staff from BHHs—had very positive experiences with the technical assistance they received from Maine Quality Counts and HIN. The in-person technical assistance provided by Maine Quality Counts was noted more often than the Learning Collaborative events held by Maine Quality Counts, although some BHH providers did indicate that the Learning Collaboratives were helpful in designing and tailoring their BHH model. However, some state officials did not view the Learning Collaboratives as a success, considering them too didactic and lacking in peer-to-peer learning opportunities.

4.2.2 Challenges

Without experience managing care for the MaineCare population, ACs were less likely to accept additional risk for sharing in savings and losses in an accountable care arrangement. None of the four ACs in the state opted to take on two-sided risk; they were sharing in savings but not losses, thus potentially diminishing the potential for the model to reduce the total cost of care. ACs reported that they do not yet have enough experience managing the care of MaineCare beneficiaries and so are reluctant to accept the potential for financial losses. In addition, some ACs reported the need for more timely and accurate performance and expenditure data than what is currently available. Furthermore, some ACs considered their activities separate from the SIM Initiative and did not associate it with their success and overall performance. ACs attributed this disconnect in part to a relative lack of support and technical assistance from the state in comparison to the HHs and BHHs.

Maine had difficulty attracting and sustaining participation and engagement from stakeholders outside MaineCare. Involvement by commercial payers in SIM-related activities was limited, particularly after the value-based insurance design (VBID) and voluntary total costs of care growth cap initiatives were discontinued in the third year of the SIM Initiative test period. These payers were reluctant to make changes to VBID designs or growth caps, reducing the potential of the SIM Initiative to enact reform on a multi-payer level instead of just MaineCare. State officials also reported that consumer engagement in SIM workgroups and the SIM Steering Committee was limited and hard to foster. Consumers, providers, and other stakeholders noted that through the SIM Initiative, MaineCare and its partners held numerous work groups to plan for and implement workplan activities. However, these initiatives resulted in meeting fatigue, which was cited by numerous state officials as a real challenge to keeping stakeholders continuously engaged in SIM activities.

Maine's population health and workforce development initiatives had limited reach. Maine used SIM funding to support and expand training of lifestyle coaches under the National Diabetes Prevention Program (NDPP). However, trainer turnover and a lack of financial incentives to teach NDPP classes were challenges. According to several SIM partners, there was a general perception that because trained coaches do not teach classes, program implementation was not as robust as it could be. Another initiative, the Community Health Worker (CHW) pilot, which was operational at four project sites, leveraged CHWs to reach patients within their communities and help them access primary and preventive care. Pilot participants reported difficulty defining roles for CHWs and incorporating them into primary care practices, limiting their potential impact. An additional project by the Maine Development Disabilities Council (MDDC) taught providers how to better treat patients with developmental disabilities. Several stakeholders considered MDDC's efforts siloed from the rest of the SIM Initiative and insufficiently integrated.

4.2.3 Lessons learned

The state used the Strategic Objective Review Team (SORT) process to refocus its priorities during the no-cost extension period, but stakeholders can have mixed reactions to this process. Over the course of the SIM Initiative, the state has had the opportunity to test numerous activities. In the summer of 2015, SIM state officials and partners formed the SORT process to decide which SIM activities have had the greatest impact and would receive continued funding through Maine's no-cost extension period. Many state officials and partners agreed that the process was necessary to ensure that SIM funding was allocated to activities that would help Maine meet its SIM objectives and achieve an optimal return on the investment of SIM funds. However, some stakeholders described the state as not being sufficiently receptive to feedback and partnership with key stakeholders; others felt that the SORT process led to the state being more directive regarding certain activities. Additionally, several site visit interviewees reported that as priorities shifted because of the SORT process, some stakeholders, such as commercial payers, became less involved or connected to SIM activities.

With SORT, Maine has shifted from focusing on model implementation to providing tools and technical assistance to providers to use health care utilization data to more effectively manage the health of a population. As Maine shifted toward a greater focus on improving outcomes, the state recognized that to effect change, it needed to give providers the necessary tools to do so. In response, the state is currently piloting a predictive analytics tool in three primary care practices with the goal of providing a tool that will help care managers identify patients at risk for extensive use of the hospital or ED and subsequently better manage their care. If the pilot is found to have a significant impact on health care costs and utilization, Maine may expand the tool to other providers. In addition, Maine implemented a data-focused learning collaborative to assist HHs with improving HbA1c monitoring for diabetics and BHHs with improving HbA1c screening rates for BHH members on certain antipsychotic medications the diabetes. This data-focused learning collaborative was viewed as a complement to the state's goal to support practices in monitoring outcomes and implementing quality improvement initiatives. However, several BHHs expressed confusion over the purpose of the collaborative, with a few providers questioning whether the focus on HbA1c screening was the most relevant quality measure for the BHH members, which include adults with serious and persistent mental illness and children with serious emotional disturbance. There were other noted challenges, including lags in receiving accurate HbA1c screening rate data and lack of clarity over how the collaborative was structured with respect to identifying BHHs as high performers or needing improvement.

Integrating BHHs and HHs into a coordinated team takes time. BHH providers conducted outreach to PCPs to educate them on the role of the BHH. These BHH providers noted that PCPs began to shift their perception of behavioral health providers as a key member of the clinical care team as a result of this outreach. There was a general perception among site visit interviewees and provider focus group participants that the relationship between behavioral health providers—including members of the clinical care team such as peer supports and care managers—and primary care was improving. However, HH and BHH providers were still working to define a clear locus of responsibility for each patient and better align behavioral health and primary care workflows to manage patient care.

4.3 Massachusetts

As of March 2017, 2 years after the test period of the SIM Initiative began in Massachusetts, the state made significant progress in the development and implementation of a Medicaid accountable care strategy (ACS). MassHealth, the Massachusetts Medicaid agency, shifted from its initial payment and delivery reform initiative, the Primary Care Payment Reform Initiative (PCPRI), to the ACS. Between April 2016 and March 2017, the state applied for and received approval for its 1115 waiver to introduce the ACS, which state officials consider a better path for widely implementing value-based payments and achieving closer alignment with other payers' delivery models. The initial strategy, PCPRI, engaged primary care practices whose clinicians were held responsible for the total cost of care of their attributed members. The ACS focuses on controlling total cost of care but includes a wider array of providers outside of primary care.

MassHealth launched a pilot test of the ACS model in December 2016, serving 160,000 Medicaid beneficiaries, and will continue designing the full-scale launch through 2017, which is projected to cover up to 950,000 beneficiaries. The ACS will include the development of LTSS and behavioral health Community Partners for ACOs, which together will help address users with high LTSS and behavioral health needs. The Massachusetts SIM Initiative also supported additional investments designed to complement the ACS, which included an initiative to increase use of the state's HIE for sharing records between providers; behavioral health integration with primary care through the Massachusetts Child Psychiatry Access Project (MCPAP) and MCPAP for Moms; and expansion of the population health effort to implement e-Referrals, an electronic service to facilitate referrals by primary care clinicians to community services.

Key Results From Massachusetts' SIM Initiative, April 2016–March 2017

- Massachusetts designed and received Medicaid Section 1115 waiver approvals to implement accountable care organizations (ACOs) and use Delivery System Reform Incentive Payment funding to support the development of Community Partners (i.e., behavioral health and long-term services and supports organizations).
- Massachusetts continued its efforts to expand the use of health information technology to support communication among health care provider organizations and between clinicians and community resources.
- As of March 2017, six pilot ACOs enrolled 160,000 Medicaid beneficiaries, or 10 percent of the total Medicaid population in Massachusetts.
- Despite achieving low provider participation in PCPRI, providers in focus groups praised the co-location of behavioral health providers as a practice that facilitated timely access to behavioral health care services.
- PCPRI did not lead to reductions in spending or utilization for participating members during the first 7 quarters of the model. This may be because of the generous primary care capitation payments or the lack of clarity around the shared savings methodology. Additionally, there were no statistically significant changes in measures of care coordination or quality of care.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to March 2017. Additionally, we present interim results from an analysis of outcomes for Medicaid beneficiaries after 2 years of PCPRI implementation. The full Massachusetts report is available in ***Appendix C.***

4.3.1 Successes

Massachusetts anticipated a seamless transition from supporting delivery system reform using SIM funding to supporting it using Delivery System Reform Incentive Payment (DSRIP) program funding. CMS approved Massachusetts's Medicaid Section 1115 waiver and provided $1.8 billion in DSRIP program funding. The state's Medicaid Section 1115 waiver amendment, which authorizes the ACO pilot, was approved effective November 4, 2016, through June 30, 2017. CMS also approved an extension of the Medicaid Section 1115 waiver, effective July 1, 2017, through June 30, 2022. The waiver extension authorizes $1.8 billion of DSRIP funding over 5 years to support the ACOs and Community Partners. DSRIP overlaps with SIM funding for approximately 10 months. After the completion of SIM funding, DSRIP will support the continuation of the ACS.

Provider co-location facilitated compliance with the PCPRI requirement for access to behavioral health services and improved providers' satisfaction. State officials, providers, and relevant stakeholders described the co-location of behavioral health providers within primary care clinics, which helped PCPRI participants meet PCPRI requirements, as a success. PCPRI required structural changes at the provider delivery sites. At the care delivery model level, all providers were required to provide both care coordination and care management to their members with behavioral health conditions. At the payment level, some providers opted for a higher PMPM rate but were required to have at least one master's- or doctoral-level behavioral health provider on site for 40 hours per week and a psychiatrist 8 hours a week as part of the multidisciplinary team. The majority of providers that participated in the focus groups found that having a behavioral health specialist co-located in their practice was extremely helpful.

Massachusetts used state legislation, regulations, and procurement requirements to facilitate health IT that supports providers' increased collaboration. During the first 2 years of the Massachusetts SIM Initiative, multiple health IT initiatives were supported with SIM funding. Several of those were completed by mid-2015, and others were cancelled when the state reset the SIM Initiative in 2015. Since the transition to the ACS, the state focused its health IT efforts on expanding provider use of the Massachusetts Health Information Highway (Mass HIway), the state's HIE, to support coordination of care among providers, particularly between acute care hospitals, ambulatory medical practices, and community health centers (CHCs). These efforts have included streamlining the connection process, promulgating new state rules that allow authorization for electronic record sharing to be incorporated into providers' consent for medical treatment forms or Health Insurance Portability and Accountability Act (HIPAA) release forms, and establishing Medicaid contractual requirements for ACOs and Community Partners.

The state also continued SIM Initiative support for the electronic referral program known as e-Referral, aimed at facilitating referrals from PCPs to community resources.

MCPAP expanded the capacity of pediatric providers to offer child psychiatry consultation services. The MCPAP project delivers child psychiatry consultation services via telephone to approximately 60 percent of practicing pediatricians in the state. The SIM Initiative made it possible to develop MCPAP as a population health model that is available to any child, regardless of their insurance or network affiliation. In addition, the state expanded MCPAP for Moms, a prenatal and postpartum psychiatric consultation and care coordination support for managing postpartum depression and other perinatal mental health issues.

4.3.2 Challenges

PCPRI faced challenges in recruiting providers to participate because of managed care organization (MCO) nonparticipation. One of the major shortcomings of PCPRI was the lack of participation from MCOs in the state. If MCOs had participated, providers would have received incentive payments for Medicaid beneficiaries enrolled in MCOs in addition to Primary Care Clinician plan participants. It is likely this extra payment would have increased the number of providers willing to join PCPRI. Given the lack of participation from both MCOs and providers, PCPRI's reach was limited to 90,000 Medicaid beneficiaries in the state. MCOs cited several reasons for not participating in PCPRI. First, the state implemented PCPRI at the same time it was procuring MCO contracts, which stretched the MCOs' resources and ability to respond to PCPRI opportunity. Second, external factors, such as the emergence of expensive prescription drugs and operational problems with the Massachusetts Health Connector, the state's Health Insurance Marketplace, distracted MCOs from considering the initiative.

The data reporting infrastructure was not sufficient. Providers had negative reactions about the data reporting system that PCPRI used to support providers' management of their patient panels. Provider focus group participants felt that the data were delayed, they did not understand the attribution process and believed it was an inaccurate reflection of their patient panels.

Uncertainty about the PCPRI shared savings methodology caused concern for providers. After the program started, the state revised its total cost of care targets because the original methodology did not control for shifts in patient population demographics and acuity. As the initiative ended, providers were still unsure if they had achieved savings or losses. One provider mentioned that it was still holding funds in reserve for this possibility.

Providers reported challenges in expanding the number of community resources participating in e-Referral and in the usability of e-Referral feedback reports. CHCs are responsible for conducting their own outreach to find suitable Community Partners. The types of community-based organizations they target to form partnerships depend on the needs of their patient population. CHCs typically had partnerships with two to five community organizations. Although the number of referrals for programs on diabetes prevention, asthma care, falls prevention, and home-delivered meals increased in 2016, the process of onboarding community resources proved difficult. Obtaining buy-in from community organization leaders, ensuring HIPAA compliance, and training staff to use the online portal posed barriers to adding new partners, such as homeless shelters. Additionally, every time a CHC recruits a new partner, a third-party vendor has to make the change to the CHC's EHR, which can take up to 3 months. CHCs noted that feedback reports from community organizations are often quite incomplete. CHCs do not receive feedback reports for all patients, and when they do, they cannot always tell whether the patient actually completed the program to which they were referred, and they are not notified when feedback arrives.

4.3.3 Lessons learned

Lessons learned from PCPRI were incorporated into the design, planning, and implementation of Medicaid ACOs to enhance provider participation and cover greater numbers of Medicaid beneficiaries. The state began using its contracts with Medicaid MCOs to require them to participate in all MCO-administered models in their geographic area in Year 1 through 5. To ensure buy-in to the new model, the MCOs were involved in conversations for more than a year and were part of extensive workgroups and stakeholder engagement that Medicaid conducted. Medicaid also changed the way beneficiaries are attributed to the new model. In the ACS, beneficiaries choose a PCP first, and the arrangement that the PCP has with an ACO/MCO partnership or an ACO determines whether a beneficiary is enrolled in an MCO or not. By linking beneficiary enrollment in an MCO to the beneficiary's ACO provider, the model encourages MCOs to contract with ACOs. If an MCO does not contract with multiple ACOs, it will lose volume because enrollment is now tied to a beneficiary's selection of an ACO (via selection of a PCP, if the PCP is involved in an ACO) rather than an MCO. The ACS is also less prescriptive than PCPRI. Under the ACS, provider groups may receive financial incentives without adhering to a specific practice structure. For example, PCPRI required on-site behavioral health providers, but this is not a requirement in the ACS.

State officials said that lessons learned from PCPRI and the ACO pilot will inform their approach to technical assistance and program support for ACOs and the Community Partners. Program support and technical assistance for pilot ACOs includes monthly meetings of the ACOs with the Massachusetts Medicaid team to discuss implementation issues and share best practices and opportunities for individualized support such as "office hours" appointments with their contract manager and a dedicated e-mail box. PCPs participating in the full ACO program will receive technical assistance from the ACOs. Technical assistance support for Community Partners will be financed through the DSRIP.

4.3.4 Interim findings on the impact of PCPRI after 7 quarters of experience

The SIM Initiative in Massachusetts began to transition from a primary care–based payment model with a focus on total cost of care (PCPRI) to a wider range of responsibility for total cost of care shared among the providers of an ACO. This section focuses on the results from the PCPRI model among Massachusetts' Medicaid beneficiaries in the first 7 quarters of the initiative. Participating PCPRI practices were expected to provide patients with care management and coordination services and behavioral health integration. These services were expected to result in lower total costs of care by shifting care from inappropriate setting such as EDs to lower cost settings such as primary care facilities. Participating practices received a monthly capitation payment that covered two items: (1) the risk-adjusted expected primary care spending, and for some practices, behavioral health spending, for the attributed beneficiary; and (2) an additional amount to cover care coordination and behavioral integration. In addition, practices had quality incentives and they could share savings or losses based on their attributed members' total cost of care, excluding primary care.

We used Massachusetts Medicaid data covering a 3-year baseline period and the first 7 post-period quarters of PCPRI implementation to compare beneficiaries assigned to PCPRI practices to beneficiaries assigned to non-PCPRI practices with a difference-in-differences regression analysis. With regard to care coordination, we expected to find an increase in the measure of 14-day follow-up visits after inpatient discharge because of the additional care management put in place under PCPRI, but this was not the case; there was no statistically significant change for PCPRI participants relative to the comparison group. Additionally, the quality of care measures—adolescent well-child visits and hospitalizations for ambulatory care sensitive conditions—did not significantly change for PCPRI participants relative to the comparison group.

We found that total expenditures increased more for PCPRI participants relative to the comparison group in the first 7 quarters of implementation. This difference in change in total expenditures is in part the result of the generosity of the PCPRI capitation payment. As such, we did not find that the PCPRI program was successful in controlling total costs in the first 7 quarters of operation. However, the shared savings methodology was not yet finalized during this period; thus, providers were still uncertain of their performance. Therefore, it is not likely that they aggressively managed their patients' total cost of care without understanding which specific areas of care in which they were poorly performing. Therefore, we expect to see less of an impact on total expenditures during the time frame described in this report.

We also found that although primary care visits declined for PCPRI participants, they declined less relative to the comparison group. Additionally, this did not result in fewer ED visits or inpatient stays for PCPRI participants relative to the comparison group. The increase in ED visits could reflect the time it takes to change patient behavior and utilization patterns. Many of the patients may be used to seeking primary care in the ED, and this pattern takes time to change. The findings could also be in part the result of underlying differences between health centers that volunteered to participate in the PCPRI program and health centers that did not. For example, many of the participating health centers achieved Level III PCMH designation from the National Committee for Quality Assurance, and the comparison practices differed in this regard. The more sophisticated health centers (Level III) may have better patient tracking systems and outreach capabilities, which in turn may differentially lead to increased utilization. As such, our results should be interpreted with caution.

4.4 Minnesota

As of April 2017, 3.5 years after the SIM Initiative began, Minnesota's SIM Initiative continued to give resources directly to providers to facilitate their ability to meaningfully participate in an "accountable health model" that supports "integration of medical care, behavioral health, and long-term care and community prevention services" (Minnesota Accountable Health Model Webpage, 2016). As its main focus, Minnesota expanded and accelerated an ACO model for Medicaid beneficiaries under age 65 called the Integrated Health Partnerships, or IHPs. Minnesota's SIM Initiative awarded grants to support Accountable Communities for Health (ACHs), which are partnerships between IHPs or other ACO-like entities and community-based service providers, and to facilitate health information exchange and data analytics, practice transformation,[26] and integration of emerging professionals into the health care workforce. Minnesota also invested in developing resources for the provider community at large, such as the eHealth roadmap, emerging professions toolkits, a health information privacy and security toolkit, and a series of Learning Communities and Storytelling Projects. Much of this work was explicitly intended to (1) accelerate development of the state's major delivery and payment reform initiative, IHPs; and (2) encourage clinical and service delivery integration between primary care and what Minnesota refers to as the "priority settings": behavioral health, local public health, social services, and long-term and post-acute care providers.

---

[26] Minnesota offered providers both practice transformation grants, which helped practices implement existing transformation plans, and practice facilitation grants, which helped practices develop transformation plans.

Key Results From Minnesota's SIM Initiative, April 2016–April 2017

- The SIM Initiative funded a broad range of grants and other activities to support locally defined relationships between health care providers and the Minnesota-defined "priority settings."
- The primary focus of the SIM Initiative was to move providers into Integrated Health Partnerships (IHPs). The reach of the IHPs is high and increasing among the Medicaid population.
- Despite statewide engagement of different types of providers, engagement of payers was less successful. Minnesota Medicaid's unilateral approach to implementing IHPs caused some tension with Medicaid managed care organizations.
- Minnesota continued to provide robust support to the SIM Initiative grantees and IHPs with respect to data analytics; still, health information exchange and interoperability outside of health systems continued to pose challenges.
- Analysis of the IHP model showed improvements in care coordination and quality of care measures, with increased follow-ups and screenings, but had little impact on utilization measures.
- Minnesota developed tools and resources disseminate the lessons learned from SIM activities, but the onus of maintaining the SIM-facilitated relationships will shift to the health care provider community.

Minnesota built on an existing base of reform and used the SIM Initiative as an opportunity to expand and accelerate those programs, rather than begin entirely new programs. SIM funding did not directly finance the main payment and delivery system reforms (IHPs, Health Care Homes [HCHs], BHHs), but aimed to support providers in successful participation in these activities. Minnesota SIM funds sought to expand successful participation in particular models: HCHs, a model that predates the SIM Initiative and is supported by multiple payers, and Medicaid-specific IHPs and BHHs. The Minnesota SIM Initiative supported these efforts by funding grants directly to providers, regardless of payer mix, in areas such as health IT, data analytics, practice facilitation and transformation, and integration of the priority settings.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to April 2017. Additionally, we present interim results from an analysis of outcomes for Medicaid beneficiaries after 2 years of IHP implementation. The full Minnesota report is available in ***Appendix D.***

4.4.1 Successes

Minnesota focused its resources on an expansion and acceleration of the IHP program. That focus achieved results. Through robust support, Minnesota is actively and deliberately increasing the total number of providers that feel comfortable entering into, and remaining in, accountable health models. As of March 2017, 3,472 providers were participating in HCHs, and 10,971 providers were participating in IHPs. As of April 2017, the state had achieved its goal of having 67 percent of primary care clinics delivering patient-centered and coordinated care through either an IHP, HCH, BHH, or similar model.

All stakeholders consistently noted that the value of the SIM Initiative was the intentional relationship building that took place on all levels, facilitated by SIM-supported activities. Minnesota was very purposeful in directing potential grantees to develop relationships throughout the health care system to improve health outcomes in the community. The state felt that relationships between traditional providers of care, such as primary care, and the priority settings (behavioral health, local public health, social services, and long-term and post-acute care) were integral to expanding true patient-centered coordinated care. SIM funds helped expand relationships between providers and priority settings from single-person contacts into ongoing conversations. The grants forced people, in the words of one stakeholder, to "co-manage, come together, and talk about" what they are doing. ACH grants connected IHPs or other ACO-like organizations with community providers to develop a common health goal that each partner felt was important to their community. eHealth and health IT grants were targeted toward organizations looking to intentionally use health IT to communicate outside of their organization, with the goal of improving health in their community.

Additionally, Medicaid's contracts with IHP offered an incentive to include providers in the priority settings of behavioral health, public health, social services, and post-acute care in the IHP: an extension of nonreciprocal two-sided risk in the first year of a new agreement period (the fourth year of participation). This was a more favorable financial arrangement that set the percentage of losses the IHP could share to be smaller than the percentage of savings it could share, rather than automatically continuing reciprocal risk.

Overall, stakeholders were unsure if these relationships will last, but feel hopeful. As one state official shared, "The hope is that once the light is turned on, it's hard to turn it off."

Minnesota continued to provide flexibility in its models, facilitating broad provider participation. In 2016 the IHP model adjusted its assignment algorithm based on provider feedback and introduced a one-sided risk option for less experienced providers. In 2018, the IHP will make more significant adjustments, including a population-based payment made retrospectively every quarter, to offset the challenge of having any lump sum shared savings payment distributed retrospectively 6–12 months later. The state offered flexibility with respect to quality measurement for both IHPs and ACHs. IHPs with unique populations, such as high-risk children, could incorporate quality measures more relevant to their population. The flexibility provided by the state allowed locally defined models to target their specific population needs.

With SIM Initiative funds, the state enhanced data analytics and provided robust technical assistance to provider grantees to help these models be successful. Fifty-six practice transformation grants awarded directly to practices enabled meaningful participation as HCHs and BHHs by more providers. The National Council on Behavioral Health and the Institute for Clinical Systems Improvement received practice facilitation grants to provide technical support to practices implementing quality improvement and additional practice-level changes. Learning Community grants facilitated technical support to ACHs and for the integration of behavioral health and community providers.

The state provided IHPs with data across their entire Medicaid populations, including patient-level data for quality measures. There were also 11 IHP provider grants that developed analytic capabilities within IHPs, and the state hired a contractor to facilitate improvement in data analytics across IHPs. Universally, providers praised both the data and the support provided by the state.

4.4.2 Challenges

Organizations of health care providers entered new payment contracts with Medicaid under the IHP model, but individual clinicians were not exposed to financial risk or reward under most internal IHP policies. During focus groups, many IHP providers noted that they were expected to meet thresholds for these performance metrics but were also still paid on a volume basis (e.g., fee-for-service [FFS]), although some noted that they had contracts that were not solely based on visit volume. As with most ACO models, these providers receive payment for services under a FFS model, but the payer (in this case Medicaid) uses shared savings/losses calculations to incentivize appropriate resource use. This results in the financial incentive being realized well after the care is delivered. Moreover, shared savings incentives under the IHP model are relatively small compared to the reimbursement that comes from the FFS claims. Additionally, one provider noted that although there were medical providers championing care delivery transformation, the transformation was “very much on the administrative business side and the financial side,” and much more needs to be done on the “culture development side.”

Although engagement of providers by the state was successful, engagement of commercial payers was not achieved. Engagement in any level of all-payer reform did not materialize as originally envisioned. In Multi-Payer Alignment Task force discussions, members representing private payers were reluctant to share information they considered proprietary. One notable point of tension was the relationship between the state IHP and Medicaid MCOs. The relationship between Minnesota, Medicaid MCOs, and IHPs is both unique and complex, with MCO-enrolled beneficiaries being attributed by the state to the IHPs and the IHP providers being paid for services provided to those beneficiaries under the applicable MCO contract. MCOs felt the state did not engaged them in development of the model despite their experience in risk management and data analysis. Further, MCOs expressed concern over the state driving IHPs as the only model for the Medicaid population.

Minnesota faced challenges with health IT implementation, specifically health information exchange and interoperability. Minnesota has a market-driven "networks of networks" model for health information exchange that includes Health Information Organizations (HIOs) and Health Data Intermediaries (HDIs), which, when certified, are referred to collectively as state-certified HIE. HDIs are typically vendors; HIOs perform many of the same functions as HDIs. A state official described HIOs as organizations that "provide a governance structure over the data and have increased expectations for interoperability between them, serving as the backbone to statewide interoperability in Minnesota." This market-driven system introduced competition and complication that may have hindered adoption of meaningful exchange of health information. Compounding this challenge has been the dominance of the EHR vendors Epic and Cerner in Minnesota. For smaller providers that do not use Epic, it can be challenging to convince the larger providers to exchange data. As a practice transformation grantee noted, the state's "laissez-faire" approach to health information exchange yielded a lot of "proprietary systems that are competitors" that put "safety net providers and culturally specific providers at a severe disadvantage." Further, Minnesota faced initial challenges with implementation of health IT when 6 months after the first eHealth grants were awarded, the state's single HIO and an HDI left the market. This delay in having sustainable HIOs affected the ability of the state to reach the level of connectivity between HIOs that it had initially envisioned at this point and made it more challenging to push states toward connecting directly toward HIOs. The practice transformation grantee cited above further stated, "Minnesota was pretty active in health IT pretty early…I'm struck by how much didn't change."

4.4.3 Lessons learned

Encouraging new professions in the health care workforce was more successful when they had clear role definitions and demonstrated value to health systems and other providers. For example, dental therapists had very clearly defined roles, performing things like minor procedures, that allowed dentists to focus on higher end services and generated increased revenues for the practice. Similarly, community paramedics had clearly defined roles and were also able to demonstrate value to many of the hospitals and health systems that used them. In contrast, CHWs were more challenging to integrate because the practice itself needed to decide what role the CHW could provide.

Sustainability of some medical-social service provider partnerships depends on the presence of a business case. A social service agency that received a number of SIM grants indicated that it built a business case for its role. The agency feels it can convince new medical partners of the advantage to partnering with it, thus generating new business that can further perpetuate the work it has done through the SIM Initiative. With respect to ACHs, a state official expressed her hope that even if an immediate benefit is not apparent, the relationships have been positive enough that a benefit is foreseeable, “whether in dollars or in improved partnerships.” Some stakeholders felt more positively about ACHs, stating that “SIM money pushed it along and now the cost benefit is clear and it will continue.”

Investment in a broad range of initiatives sets the stage for implementation but made it challenging to implement all initiatives fully. The state invested in a variety of initiatives, such as health IT, IHPs, ACHs, and BHHs, and providing grants and support to these activities. This state support helped implement the activities; however, sustainability and full development of all initiatives was not achieved because of widespread focus. The state intentionally wanted the providers to develop the partnerships and models that best suited their needs and the needs of their communities. The diffuse nature of these innovations makes it challenging for the state to play a central role in sustaining the relationships or the interventions. The onus of sustaining the SIM relationships and the SIM innovations rests with the providers and communities that developed them.

4.4.4 Interim findings on the impact of Medicaid Integrated Health Partnerships after 1 year of experience

After 1 year of SIM Initiative funding, process measures improved for IHP beneficiaries relative to non-IHP beneficiaries, but there were no improvements in utilization outcomes. We compared changes in outcomes for Minnesota Medicaid beneficiaries receiving care in IHPs to beneficiaries never enrolled in IHPs after the first year of SIM Initiative implementation (2014) using a difference-in-differences regression analysis. We did not have access to reliable expenditure data for this report, so outcomes instead focused on care coordination, utilization, and quality of care. We found that beneficiaries attributed to an IHP had significantly better care coordination (as measured by a follow-up visit within 14 days of hospital discharge) and slightly higher rates of breast cancer screening relative to the comparison group (statistically significant difference). IHP providers reported an increasing prevalence of near real-time discharge notifications during this time, which may have facilitated identifying those patients who needed such follow-up. Additionally, process measures like screening rates may be easier to implement in the short term.

However, utilization measures (inpatient admissions, readmissions, and ED visits) did not improve for IHP beneficiaries relative to the comparison group. The rate of inpatient admissions decreased more slowly in the IHP-attributed group relative to the non-IHP group. These inpatient admissions rates—which were similar to the comparison group for children but actually increased slightly for adults—may reflect outreach that care teams did with the sickest patients, thus engaging them in the system in new ways. Moreover, the IHP model is expected to better align financial incentives between the inpatient and office settings to change patterns of care that lead to reduced utilization in the inpatient setting, but developing relationships between providers and between providers and patients that result in change would likely take more time than the 1 year of implementation studied in this analysis.

It is important to remember that IHP providers do not represent the universe of providers who were incentivized to reform how they deliver care as part of the SIM Initiative, nor was the SIM Initiative the only initiative incentivizing providers in the state. The broad-ranging nature of the SIM Initiative may mute the specific effect of IHPs.

4.4.5 Reference

Minnesota Accountable Health Model Webpage (2016). *Health Reform Minnesota. State of Minnesota*. Available at www.health.state.mn.us/healthreform

4.5 Oregon

As of April 2017, 3.5 years after initial implementation of the SIM Initiative, Oregon continued to focus on reinforcement of the Coordinated Care Model (CCM)[27] by spreading key features of the model to new payers and populations beyond Medicaid. The state used its purchasing power to require integration of CCM elements into Oregon Educators Benefit Board (OEBB) health plans beginning in the upcoming 2017–2018 benefit year. Earlier, the CCM was adopted for Oregon Health Plan (Medicaid) beneficiaries through the implementation of Coordinated Care Organizations (CCOs)[28] in 2012 and then was spread as part of the SIM Initiative to public employees through Public Employees Benefit Board (PEBB) health plans beginning in 2015.

Major SIM-supported activities to advance the spread of the CCM include expansion of the Patient-Centered Primary Care Homes (PCPCHs) and dissemination of best practices and technical assistance to CCOs, particularly around adoption of value-based payments and integration of physical and behavioral health care, through the Transformation Center. SIM funds helped support several small-scale initiatives and projects, including the Housing with Services (HWS) program, which successfully integrated health care and social support services for the older adults and people with disabilities residing in public housing. Other key projects funded by the SIM Initiative underpinning Oregon's delivery system change include development of health IT infrastructure, workforce development and practice transformation strategies, and population health efforts. Although the quality measurement and reporting activities were not funded

---

[27] Oregon's CCM aims to achieve better health, better care, and lower cost by using best practices to manage and coordinate care, encouraging providers and consumers to share responsibility for health, increasing transparency in price and quality, measuring performance, paying for better quality and health outcomes, and achieving sustainable rate of growth. For more details on Oregon's CCM see https://www.oregon.gov/oha/pebb/2016Benefits/Coordinated%20Care%20Model.pdf

[28] CCOs are ACO-like networks of different provider types (e.g., physical, behavioral, and oral health) that operate under global budgets to provider coordinated care to Medicaid beneficiaries in their community. There are 16 CCOs in Oregon. See http://www.oregon.gov/oha/HSD/OHP/Pages/Coordinated-Care-Organizations.aspx

directly by the SIM Initiative, stakeholders believed that CCO incentive measures were an important driver of health delivery system change in keeping with SIM Initiative goals.

Key Results From Oregon's SIM Initiative, April 2016–April 2017

- More than two-thirds of eligible primary care clinics across the state adopted the PCPCH, exceeding the state's goal for the program. State and nonstate stakeholders considered the PCPCH program one of the most successful initiatives advanced by the SIM Initiative because of high engagement of providers in the model and achieved reductions in total health care costs found in the state's own SIM-funded study.
- The independent federal evaluation analysis of the impact of the PCPCH model on utilization, expenditures, and quality of care since the model's inception in 2011 through 2014, presented in this report, revealed that the PCPCH model increased the use of primary care, particularly among adolescents, and increased quality as measured by several indicators of disease screening. At the same time, it increased total cost of care per person, at least in the short run, among patients who had been enrolled in their plans since the beginning of the program.
- According to state officials, CCM health plans extended to state employees had not yet had the desired impact on costs, and members newly enrolled in CCM plans reported perceiving little difference in how they accessed and experienced care compared to traditional health plans.
- The impact of CCM on primary care providers serving Medicaid patients seemed to vary by Coordinated Care Organization (CCO). Although some providers felt that treating Medicaid patients enrolled in CCOs was business as usual, others reported that CCOs were driving quality improvements for their Medicaid population and all other patients.
- Although progress was made, integration of behavioral health and primary care was still in process. Many primary care providers reported having behavioral health specialists on staff and appreciated the added focus on the behavioral and psychosocial needs of their patients; however, integration varied across CCOs. Integration of dental health and primary care was at an early stage of development.
- State and many nonstate stakeholders believed that the SIM-sponsored Transformation Center had been very effective in assisting CCOs in adoption of the CCM. Some nonstate stakeholders, however, were doubtful of the value the Transformation Center brought to the state's health care reforms.
- With the SIM Initiative ending, Oregon prioritized sustainability of the Transformation Center and PCPCH program to continue the CCM spread. However, securing multi-payer participation in the CCM may be necessary for lasting effects of Oregon's health system transformation efforts.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to April 2017. Additionally, we present interim results from an analysis of outcomes from the PCPCH program between 2011 and 2014 for four groups with different insurances: Medicaid, PEBB, OEBB, and other commercial. The full Oregon report is available in ***Appendix E.***

4.5.1 Successes

Following significant delays because of turnover at OEBB and the complexity of negotiations, Oregon successfully used its purchasing power to spread the CCM beyond Medicaid and PEBB to OEBB health plans beginning in the 2017–2018 benefit year. A CCM plan option was offered to public employees through PEBB health plans beginning in 2015. As of 2017, about half of PEBB members had selected the CCM plan option.

The number of primary care clinics certified as a PCPCH, a cornerstone of the CCM, continued to rise and was favorably viewed across a range of stakeholders. As of April 2017, 659 primary care clinics statewide were certified as a PCPCH, representing an estimated two-thirds of eligible clinics statewide. This was up from 610 PCPCH-certified clinics in first quarter 2016. Through various means (e.g., CCO quality metrics, technical assistance, coaching, peer learning, and in some cases payments from CCOs), Oregon actively supported the PCPCH model, and, in general, the model was viewed positively by state officials and other stakeholders.

Many stakeholders regarded Oregon's Transformation Center as effective in convening stakeholders and considered it the hub for all health system reform efforts; a few stakeholders downplayed its role in overall health system change. State officials and some other stakeholders regarded the Transformation Center role as critical in transforming Oregon's health care system, particularly in bringing stakeholders together to network and share ideas, challenges, and successes. The Council of Clinical Innovators program, which gives funding to CCO providers to conduct clinically based work that supports CCOs and the spread of the CCM, was also viewed by stakeholders as a successful Transformation Center initiative. A few state officials also commented that the Transformation Center helped to organize the Oregon Health Authority (OHA) around health care transformation. However, CCOs, the primary target of many Transformation Center activities, seemed to be underwhelmed by the technical assistance offered by the Center. One stakeholder commented that even though Oregon had implemented some health care innovations, the presence of the Transformation Center was not necessary for that to happen; another remarked that the center "ha[d] failed to capture the attention and the involvement of CCOs leadership, health system leadership in general."

Oregon's system of performance measurement was credited with changing health care delivery in CCOs. State officials, CCO leadership, and other non-state stakeholders identified performance metrics by which CCOs are evaluated, and which directly affect incentive payments they receive, as promoting desired changes in Oregon's health care delivery system. Although there was originally skepticism within CCOs about the value of some metrics, that resistance had softened and some CCOs began to see value in previously discounted metrics. In focus group discussions, providers treating CCO members generally agreed that CCO metrics forced them to focus more on preventive care and behavioral health issues and were responsible for driving quality improvement processes.

The HWS program successfully integrated health care and social services and received positive feedback from consumers. The SIM Initiative provided startup funding that helped launch the HWS program, bringing together housing, social services, and health care providers to integrate and coordinate health care and social services for low-income seniors and people with disabilities residing in public housing. HWS beneficiaries participating in focus groups were generally very pleased with assistance and services made available in their buildings as part of the HWS program.

4.5.2 Challenges

Although Oregon had successfully spread the CCM to PEBB health plans, the strategy had limited effect on containing costs and received mixed consumer responses. Although it had not yet been rigorously evaluated, the transition to CCM plans for PEBB members did not appear to have had the desired effect on costs. Indeed, according to one state official, the cost trend for PEBB enrollees since 2015 had been rising compared to the relatively flat trend line of commercial plans in Oregon. In addition, despite PEBB members being offered a reduction in their premium share if they enroll in a CCM plan, many had not transitioned to a CCM plan and instead remained in a Preferred Provider Organization plan. In focus groups, PEBB state employees who had enrolled in a CCM plan reported mixed experiences with their health care, with some indicating it was the same, some saying it was better, and some saying it was worse compared to their previous plans.

Oregon payers have been slow in adopting payment reforms. Although the PCPCH program was generally viewed favorably, payers have been slow to voluntarily make additional payments to PCPCH-certified clinics for providing care coordination and case management. The state's hope was that payers, including CCOs, commercial plans, and Medicare, would voluntarily pay some additional amount to primary care clinics that became PCPCH certified. The extent to which this happened has been very limited, however. Stakeholders offered various reasons private payers have not embraced the PCPCH model, including feelings that the model was not a sufficiently robust patient-centered care model to warrant a change in payment or that the PCMH model they already had in use was superior to the PCPCH. In 2016, in response to legislation, the Transformation Center staffed the multi-payer Primary Care Payment Reform Collaborative, which produced a series of recommendations. Although mandating payers to make recognition payments to PCPCHs was not one of them, the collaborative did recommend that all payers be required to devote a set percentage of their spending to primary care.

Despite improvements on many performance metrics, payment reform efforts within CCOs have also progressed slowly. According to the latest data available from the state, the share of CCO payments to providers who were not paid on a FFS basis was only 35.9 percent in fourth quarter 2016 (Oregon Health Authority, 2016), well short of the state goal of 57 percent. Some CCO representatives interviewed this year reported that many payment reform models were still under development or only being tested at a few sites, suggesting that much work remained in this area to meet the state's goal and that payment models implemented by CCOs have not been a driving force behind changes in health care delivery.

Challenges to dental health integration with primary care under CCOs included resistance by dental providers, cultural differences between primary care and dental practice, and lack of metrics to encourage dental integration. Stakeholders reported resistance among dental providers to being included under the CCOs' global budget because of concerns about losing their autonomy. Several state officials also highlighted cultural differences between primary care, which is increasingly team-based oriented, and dental care, where the solo practitioner model continues to prevail, as a barrier to integration. Finally, although several of the 2016 and 2017 CCO performance metrics related to dental care, none are metrics intended to encourage dental and primary care integration.

Alignment of metrics across payers remained a critical yet unfinished task. Providers in focus groups remained frustrated by having multiple sets of metrics from different health plans, and a variety of state and other stakeholders viewed alignment of metrics across payers other than Medicaid as essential to sustaining momentum for transformation. State legislation required OEBB and PEBB health plans to align their quality metrics with CCO quality metrics by January 2018, and although some alignment had already occurred, these efforts did not yet include commercial and self-insured plans.

Sustainability of key SIM Initiative efforts hung in the balance as the state faced a $1.6 billion deficit for the 2018–2019 budget cycle. Among others, the Transformation Center and the PCPCH program were identified by the state as central to keeping Oregon's health system change momentum, and thus requiring ongoing financial support after SIM funding ended. The OHA budget request for the next biennium (2018–2019) included funding for both the Transformation Center and the PCPCH program, albeit at lower levels than were available under the SIM Initiative. Given that the state was facing an estimated $1.6 billion budget deficit, it was uncertain at what levels, if at all, these pillars of Oregon's health care system reforms would be funded.

4.5.3 Lessons learned

State efforts to expand delivery and payment reforms by garnering voluntary participation had limited impact. As described above, despite generally favorable responses to the PCPCH model, the willingness of private payers to make PCPCH recognition payments had been limited. Similarly, even within Medicaid, not all CCOs paid an additional amount to PCPCHs and only about 40 percent of all provider payments across CCOs were value-based or alternative payment models in early 2017. In retrospect, not working out what the PCPCH payment model should be up front was viewed as a mistake by some site visit interviewees. “We saved the thorniest thing for last,” one stakeholder said. Tools and strategies developed by the SIM-sponsored CCM Alignment Work Group to spread the CCM to the private market had little success so far in getting commercial payers to voluntarily adopt the CCM.

More deliberate and forceful action might be needed to effect change in the private market. Oregon used multiple levers throughout the SIM Initiative test period to encourage health system change, most notably state purchasing power, legislation, and its role as a convener of stakeholders. Although successful in transforming Medicaid, the combined impact of these policy levers and SIM activities failed to bring the private market on board with the CCM to effect meaningful change in the health care delivery system for all Oregonians. Some stakeholders believed the state could do more and should exercise its authority to the fullest to get multi-payer participation in the delivery and payment system efforts.

Providers needed appropriate technical assistance to achieve effective integration of primary care and behavioral health and payment models which support that integration. Although the integration of behavioral health at an administrative level (i.e., by being part of the CCO’s global budget) was necessary, it was not sufficient to achieve integration at the clinic level; technical assistance and supporting payment models are required. State officials learned that it was not sufficient to merely add a behavioral health provider to clinic staff but that technical assistance and guidance on how to best integrate these providers into the clinic workflow was required to ensure that they were used effectively. At the clinic level, it was most helpful to providers to learn best practices related to integration from their peers (i.e., from other providers). A final lesson learned shared by both state officials and other stakeholders was the importance of having a payment model that supports behavioral health and primary care integration.

4.5.4 Interim findings on the impact of PCPCHs, 2011–2014

Our estimates of the changes in utilization, expenditure, and quality of care after a primary care clinic becomes certified as a PCPCH suggest that the effects of the program are generally consistent with its goals. Predating the SIM test period by 2 years, the PCPCH model was introduced in 2011 and attracted a growing number of practices through 2014. During the SIM test period, Oregon used SIM funds to support the spread of the PCPCH model and to provide technical assistance to primary care practices seeking PCPCH certification, thereby increasing the number of recognized PCPCHs. Our analysis of effects of the PCPCH model on utilization, expenditures, and quality of care spanned the model’s inception in 2011 through 2014 and used a two-way interaction difference-in-differences model with clinic and time fixed effects to identify the impacts of PCPCH recognition on four groups of Oregonians: those covered by Medicaid, a PEBB plan, an OEBB plan, or a commercial insurance plan.

Results revealed that, as intended, the PCPCH model increased the use of primary care across all populations. This increased use was seen particularly among adolescents; the rate of adolescent well-child visits increased for all groups except Medicaid. Also as intended, the PCPCH model increased quality as measured by several indicators of disease screening; colorectal cancer screening increased for all groups. At the same time, total cost of care per person increased for all populations except Medicaid. Although not necessarily expected, the total cost of care finding may well reflect increased primary care use that may result in lower inpatient and other costs in the future.

We did not find evidence that effects were any stronger for Medicaid patients than for other patients, even though Medicaid patients were the only group for whom providers received financial incentives for being a PCPCH. Even so, provider stakeholders noted that there was not enough financial support for PCPCHs during the period of analysis for this report, so effects could be greater over time as financial incentives from other payers to become a PCPCH increase. Future analyses will explore whether effects differ when including data from 2015, when financial incentives increased and spread to other payers occurred, most notably certain PEBB plans.

We give two caveats in interpreting results. First, since the Affordable Care Act was implemented in 2014, with many Oregonians gaining coverage through Medicaid or the Marketplace, the composition and risk profile of Oregon's insured population changed, potentially biasing impact estimates. To avoid this bias, we limited the samples for each payer to persons first observed with that type of coverage in 2011. Doing so, however, may limit our ability to forecast the behavior of newly insured Oregonians. Second, the attribution of patients to a primary care provider is inexact and thus may introduce error in measurement and bias impact estimates toward zero. However, the use of the average utilization experience of providers' entire patient panels should greatly reduce the size of any bias introduced by individual attribution errors.

4.5.5 Reference

Oregon Health Authority(d). *SIM Quarterly Report, Quarter 4, 2016*. 2017 Jan.

4.6 Vermont

As of March 2017, 3.5 years after its SIM Initiative began, Vermont continued its implementation efforts concentrating on payment and delivery models, practice transformation, and health data infrastructure. Its signature advancement was the launch of its new All-Payer ACO Model, beginning with implementation of a Next Generation Medicaid ACO model in four communities. Concurrently, Vermont's focus shifted to completion of practice transformation and health IT projects; evaluation efforts, including stakeholder interviews, consumer focus groups, and provider surveys; and sustainability planning and transitioning in advance of its performance period ending in June 2017.

Key Results From Vermont's SIM Initiative, April 2016–March 2017

- Vermont concluded Year 3 of its Medicaid and commercial ACO Shared Savings Programs (SSPs) in December 2016. At that time, the Medicaid SSP served 46 percent of all Medicaid-only beneficiaries.
- This evaluation's quantitative analysis of the Medicaid SSP, and the state's program results, both found mixed impact in the first 2 years, 2014–2015. We found statistically significant results in the desired direction for ACO-attributed Medicaid beneficiaries relative to the Vermont non-ACO attributed Medicaid comparison group for emergency department visits, total expenditures, and one quality of care outcome. Vermont reported that one ACO earned shared savings in Year 2 (down from two in Year 1), and both ACOs participating in the Medicaid SSP improved their quality scores.
- Building on lessons learned from the Medicaid and commercial SSPs, Vermont reached an agreement with CMS to advance an All-Payer ACO Model, which features an all-inclusive population payment to be paid by each payer to the risk-bearing ACO. Year zero of the model's staggered implementation began in January 2017 with the launch of the Vermont Medicaid Next Generation ACO program.
- In tandem with the continued evolution of its delivery and payment reform initiatives, Vermont's community-level collaborations evolved and converged to become Regional Collaborations, featuring local governance and priorities that could sustain beyond the SIM Initiative period of performance. Regional Collaborations and various locally defined initiatives integrate three overlapping SIM projects: alignment of Blueprint for Health and ACO SSP payment model efforts; Integrated Communities Care Management Learning Collaboratives; and Accountable Communities for Health Peer Learning Lab. These efforts were buoyed by strong support from medical and nonmedical providers and organizations.
- Stakeholders view their engagement and the new connections and awareness of other participants' needs and systems as the greatest achievement of Vermont's SIM Initiative. State officials and stakeholders perceive that these engagements and connections led to improved coordination between providers and across initiatives in the state.

Beginning in January 2016, Vermont worked in close collaboration with CMS leadership on the design of the state's All-Payer ACO Model. Negotiations continued through October when the final agreement was signed by CMS and the Governor. The first phase of implementation of the All-Payer ACO model kicked off in January 2017 with a pilot year, when OneCare Vermont launched as a Vermont Medicaid Next Generation ACO. Medicare and commercial payers will transition to an aligned ACO model beginning in 2018.

In January 2016, Vermont's Medicaid and commercial Shared Savings Program (SSP) ACOs embarked on the third year of the program. Three ACO entities participated in the commercial SSP, OneCare Vermont, Community Health Accountable Care (CHAC), and Vermont Collaborative Physicians. OneCare Vermont and CHAC also participated in the Medicaid SSP (and the Medicare ACO SSP which preceded the SIM Initiative). State officials lauded continued improvement in data collection and analytics, care management, and population health as key achievements of the SSP participants.

Vermont continued operation of its Blueprint for Health programs, including its PCMH model, laying groundwork to facilitate integration between the Blueprint and the all-payer model including through aligned measure sets and care coordination efforts. The state also developed a strategic framework, known as the Medicaid Pathway, for comprehensive Medicaid reform involving a systematic review of all providers and services that receive Medicaid funding. Initial planning for the Medicaid Pathway focused on value-based purchasing for mental health and substance abuse services, followed by LTSS.

Beyond the payment reform initiatives described above, Vermont leveraged SIM funding to finance a variety of discrete projects to promote efficiency and quality of its care delivery systems. This included projects funded through the Sub-Grantee Program and the Frail Elders Project. Findings from these projects have and will inform ongoing efforts of the state to achieve lower cost, higher quality care.

This section elaborates on the state's successes, challenges, and lessons learned in supporting new delivery system and payment models and pursuing the SIM Initiative's goals more broadly from April 2016 to March 2017. Additionally, we present interim results from an analysis of outcomes for Medicaid beneficiaries after 2 years of ACO SSP implementation. The full Vermont report is available in ***Appendix F.***

4.6.1 Successes

Stakeholder engagement was viewed as the greatest achievement of Vermont's SIM Initiative. Through SIM-related collaborations, such as stakeholder meetings and workgroups, providers noted strengthened community relationships and that progress was made in having people think differently about the way they deliver care. As one site visit interviewee noted, echoing the sentiments of nearly all participants: "The SIM project, by having work groups, even though it was a complex project and resource intensive, created mechanisms for bringing representatives of diverse groups together to talk about significant issues and recommendations to take." Strong stakeholder engagement was key to developing, refining, and aligning the ACO SSP quality measures. Collaborations fostered by the SIM Initiative have had a lasting effect on practices' efforts to improve patient care.

The SIM Initiative accelerated Vermont's capacity to reform payment and delivery systems. Prior to the SIM Initiative, Vermont had already laid significant groundwork toward delivery and payment reform. This includes establishment of the Blueprint for Health, the Green

Mountain Care Board, and ACO participation in the Medicare SSP. These building blocks were pivotal to Vermont's achievements to date. One ACO executive, for example, credited the work of the Blueprint for Health in creating a "foundation" from which providers could understand certification processes and payment flow in the context of delivery and payment reform. Operation of the Medicare SSP prior to the SIM Initiative enabled Vermont to identify key components necessary for the operationalization of a coordinated care model, which enabled the SIM Initiative to accelerate adoption of the models through strategically focused SIM investments. These investments now form the underpinnings that enable Vermont to transition to the All-Payer ACO Model.

Vermont's Learning Collaborative work was noted as an especially successful investment of the SIM Initiative. The SIM Initiative financed Vermont's Integrated Communities Care Management Learning Collaboratives (Learning Collaboratives), a rapid-cycle quality improvement initiative operating in local communities. The Learning Collaboratives focused on improving cross-organization care management for at-risk populations and provided a forum for providers and other stakeholders to gain the capacity, knowledge base, and operational readiness needed to participate in health transformation efforts, including payment reforms. The Learning Collaboratives, which have since merged with the state's Regional Collaborations, were also used to encourage involvement in the local community and strengthened relationships between groups that coordinate care. State officials noted success in the ability of the Learning Collaboratives to attract a diverse set of provider types, especially from smaller providers and practices that may lack resources to otherwise invest themselves in training programs.

Patient Ping, an event notification system, was important for less-connected providers in supporting their care coordination efforts. Following 2 years of planning and discovery and the selection of a vendor, Vermont launched the Patient Ping event notification system in April 2016 and has been expanding it throughout the past year. The system notifies providers of hospital admissions, discharges, and transfers. The cost to providers for Patient Ping is subsidized by the SIM Initiative during Vermont's period of performance (through June 2017).

The Vermont Care Partners' Data Repository addressed the need for storing and accessing protected behavioral health data. Because of 42 CFR Part 2 privacy restrictions, substance abuse data could not be stored in the Vermont Health Information Exchange (VHIE). The SIM Initiative funded the creation of a centralized repository for data submitted by Designated Mental Health Agencies and Specialized Service Agencies. Efforts on this task in the most recent year focused on improving data quality and the creation of analytic dashboards for member agencies. Expanding the reach of health IT to these specialty providers was a key accomplishment in systemwide health care reform in Vermont.

4.6.2 Challenges

Incentives such as shared savings may not be sufficient to sustain provider engagement. A few providers raised concerns that financial incentives designed to attract providers to Vermont's payment reform strategies, such as shared savings under the ACO model, are insufficient and do not enable providers to effectively engage in coordinated care models or even to remain competitive in the state. These providers noted challenges that hinder adoption of coordinated care: perverse incentives for providers to overprescribe services, lack of incentive to spend time with patients, payment structures that prohibit collaboration across organizations, and funding disparities that inhibit "underresourced" providers from keeping pace with reforms. These examples suggest that Vermont's SIM-supported models may not go far enough in both their design and adequacy of payments to address common challenges in health care delivery.

Some participants perceived lack of transparency and clarity over the SIM Initiative's governance structure and overall goals, to their consternation. A few work group participants noted a lack of transparency over how recommendations from the work groups and Steering Committee were ultimately used. Specifically, there was some angst over how the Core Team made decisions without consulting the topic-appropriate work group, which led to uncertainty over how much the state appreciated the value of partnerships fostered through the work groups and how much the state actually valued the "minority opinion." There was also a lack of clarity over the SIM Initiative itself. Although work group participants recognized the importance of the SIM Initiative, many lacked confidence in being able to definitively describe Vermont's goals for the initiative, or even the major components.

The lack of available, standardized, and "capturable" data is an ongoing barrier to performance measurement. As during previous years, stakeholders expressed concerns over the lack of data available in the VHIE and data that support performance measures. Another ongoing challenge heard was the need to standardize and transfer data to increase its use for quality measurement purposes and to make them ready for performance measurement analytics.

EHR systems improve care coordination, but lack of interoperability limits their impact. Vermont completed its EHR expansion efforts in 2016. Most, but not all, providers use EHRs and credited them with helping to manage patients' care. Many noted, however, that they use more than one system because of a lack of interoperability between each provider network's system. Providers expressed frustration with having to use multiple systems and that it influenced their assessment of VITLAccess, the link to VHIE.

Diversity of provider types, resources, and needs poses an ongoing barrier to adoption of a risk-bearing payment model. Early conceptualization of the All-Payer ACO Model coincided with discussions among Vermont's three ACOs to potentially merge into one unified ACO, the Vermont Care Organization. However, differences in the capacities, provider composition, and patient population of the ACOs hindered the ability of the entities to easily blend into one ACO. Beyond concerns over payment structures, providers and payers also reported concerns over the ability of diverse providers to build and maintain the infrastructure necessary to participate in the model.

Participation in the SIM Initiative is viewed as a catalyst for health reform in Vermont but costs providers time. Providers viewed the SIM Initiative as highly significant for bringing people together from different perspectives. However, providers expressed difficulty finding time to work on SIM activities, whether it be administrative reporting or attendance at decision-making meetings. Providers were constantly faced with multiple priorities, and when the assured benefit to their patients is not greater than the cost of the provider's time and effort to initiate a change, it becomes a challenge for providers to participate.

4.6.3 Lessons learned

Stakeholder engagement requires significant dedicated resources, even in a "small" state. Originally, the state dedicated one full-time employee to direct its stakeholder engagement efforts. However, Vermont increased staffing to three full-time equivalent staff after realizing the high demand and interest in working groups and the amount of time involved preparing for more than 20 hours of monthly public meetings and all that the meetings entail.

Health IT lessons learned. Vermont's SIM Initiative health IT efforts yielded three key lessons learned: (1) connecting providers to EHRs is one piece of needed infrastructure, but connecting EHR systems is as important; (2) it is not enough to just aggregate data; data need "to be improved in terms of quality, consistency, and translating it" to enable its usefulness; and (3) it is important to understand the potential and gap of existing health IT. "Prior to the initiative, people thought you just build an interface and it will work correctly." Health IT is a progression.

Adoption of an all-payer risk-bearing model requires dedicated engagement from federal partners, providers, and other stakeholders; however, negotiations take time. Over a nearly 10-month period, Vermont and CMS officials negotiated a funding and risk model that would include Medicaid, Medicare, and commercial payers. "Collaborative discussions" with CMS leadership were noted by stakeholders as important. However, the prolonged and closed discussions between state officials and CMS fostered some uncertainty in the state and ultimately led to a contracting delay and a limited opportunity for stakeholders to provide feedback on the final model. One advocate described that lack of transparency of the negotiations with CMS fostered "anxiety" among consumer groups and expressed sentiments that "opportunities were missed" to include certain populations in the ACO model design.

4.6.4 Interim findings on the impact of the Medicaid Shared Savings Program after 2 years of experience

Vermont's SIM Initiative Medicaid SSP, implemented in January 2014, was designed to encourage ACOs to better coordinate care to improve both the efficiency of care (thus achieving savings through mitigating cost growth) and the effectiveness of care (as measured through quality metric performance). To assess the impact of Vermont's Medicaid SSP, we conducted a difference-in-differences regression analysis comparing Vermont Medicaid beneficiaries attributed to an ACO to Vermont Medicaid beneficiaries who were eligible but were not attributed because their provider was not participating in a Medicaid SSP ACO.

We found three statistically significant results in the desired direction for ACO-attributed Medicaid beneficiaries: (1) average per beneficiary per month payments decreased at a greater rate; (2) ED visits that did not lead to a hospitalization decreased by a greater amount; and (3) likelihood of developmental screenings in the first 3 years of life increased at a greater rate. The first two findings could be related to ACOs focusing on providing care at the appropriate setting and reducing higher-cost utilization, especially ED visits, to meet the Medicaid SSP requirements to achieve cost targets and meet quality standards. Our site visit interviews and documents posted by ACOs on their websites support that connection. An ACO representative specifically noted that reducing ED visits was a target for their *Medicare* ACO efforts. Those Medicare ACO efforts would likely spill over to the Medicaid population.

The finding that the likelihood of developmental screenings in the first 3 years of life increased more for ACO-attributed beneficiaries relative to the comparison group could be associated with ACO efforts focused on this measure, the only one specific to the child subpopulation. Additionally, the developmental screening quality measure is the only payment measure in Vermont's Medicaid SSP and not also in the commercial SSP, reducing the spillover effects of commercial SSP ACO participation in the comparison group for our analysis.

Other measures of utilization, care coordination, and quality of care were not statistically significantly different between the ACO-attributed beneficiaries and the comparison group. It is not surprising that we found only one significant quality of care result in the early Medicaid SSP implementation period covered in this analysis. In these years ACOs were more focused on startup activities and developing quality improvement processes. Additionally, many of the early ACO efforts targeted *Medicare* SSP quality measures, such as prevention of falls, which might not align with the Medicaid SSP quality measures.

[this page intentionally left blank]

Appendix A: Arkansas SIM Initiative Progress and Findings

A.1 Synopsis of the SIM Initiative in 2016

The SIM Initiative in Arkansas, which began implementation in October 2013, sought to shift to a higher quality and more cost-efficient system of care through the implementation of two major delivery system and payment reforms: patient-centered medical homes (PCMHs) and episodes of care (EOCs) (Arkansas Health Care Payment Improvement Initiative, 2017).[29] These two reforms act synergistically—with PCMH focused on efficient provision of primary care services and care management and EOC used for value-based purchasing of both primary and specialty services. The two payment models reward providers for achieving desired outcomes, particularly with respect to quality of care and affordability. Technical assistance is available to help providers to better understand and use quality of care and cost metrics reports to analyze their practice patterns and to identify any needed changes to the way they deliver care. See ***Section A.2*** for more details on these two models.

At the end of September 2016, a little over 3 years after the SIM Initiative began in Arkansas, the state completed the 3-year test period and funding for the initiative ended. The evaluation team's qualitative analyses of Arkansas's SIM Initiative implementation show that at the end of the SIM award period, PCMH and EOC were integral to health care delivery in Arkansas (see ***Section A.3*** for more detail), and administration of these programs was a routine part of state operations at the Department of Human Services (DHS). Additionally, at the end of the SIM award period, nursing facilities were collaborating more closely with the state Medicaid program to implement an assessment to determine eligibility for a nursing facility.

In 2017, the state continued to implement the two models supported by Medicaid and commercial payers. Arkansas also continued to support providers in adopting PCMHs and EOCs via strategies that include practice transformation support and data analytics. In addition, the state intended to make changes to the Home & Community-based Services (HCBS) program, with a net effect of increasing use of HCBS rather than nursing facilities (State of Arkansas, 2016a).

---

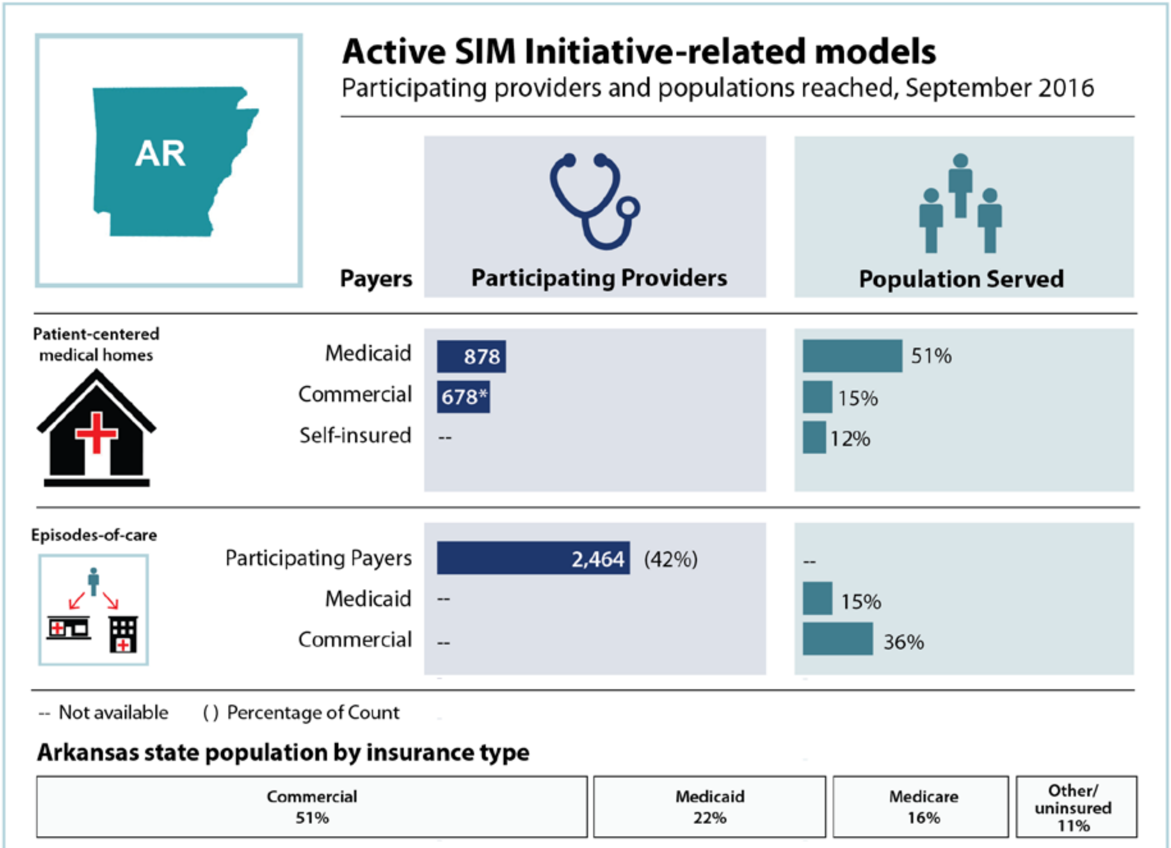
[29] Initially, Arkansas's SIM Initiative also included health homes to provide care coordination for individuals with behavioral health needs, intellectual and developmental disabilities, and those needing long-term services and supports (LTSS). During the initial years of the SIM award, Arkansas used SIM funds to engage health home stakeholders to transform current delivery models; however, it was not able to implement health homes for any of the special populations during the model test period. Because this third component has not been implemented to date, we do not discuss further the health homes component.

Key Results From Arkansas's SIM Initiative, April 2016–September 2016

- Arkansas's SIM Initiative successfully engaged several payers in the state through legislative action and flexibility in how payers could adopt models.
- By the end of the SIM award period, Arkansas Medicaid and the state's two major commercial insurers were implementing episodes of care (EOCs) and patient-centered medical homes (PCMHs), with EOCs reaching 15 percent and PCMHs reaching 51 percent of Medicaid enrollees.
- PCMH enrollees experienced significantly fewer inpatient visits, a smaller decrease in physician visits, and a decline in inpatient expenditures, relative to the comparison group. These findings were consistent with focus group and provider feedback on increased same-day access to primary care offered by PCMHs, which providers said helped them intervene with patients prior to emergency department visits and potential hospitalizations (this evaluation's analysis of EOC outcomes not yet available).
- There were no statistically significant differences between the PCMH and comparison groups for most quality of care outcomes after 1 year, with one exception: Those enrolled in PCMHs had similar use of asthma control medications over time whereas those in the comparison group had declining asthma medication use. However, these results may be the result of unobserved differences in area- and practice-level characteristics between the PCMH and comparison groups.
- Arkansas built sustainability into its SIM model through multi-payer collaboration, full integration of the EOC and PCMH models into the state's Department of Human Services, and automation of data efforts. As a result, state officials were optimistic that SIM efforts will continue and expand in the future.

Reach of SIM Initiative-related delivery system and payment model among providers and populations. ***Figure A-1*** depicts the scope of participation in Arkansas's PCMH and EOC models in terms of individual providers participating in Medicaid, commercial, and self-insured plans as of September 2016. The first column presents the absolute number of individual providers in each delivery system/payment model, as reported by each participating payer. The next column shows the percentage of each payer's population served by participating providers, as reported by the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with Medicaid or commercial insurance coverage, to give some insight into the reach of each model. The methods for qualitative data collection and analysis for this appendix, including document review that produced ***Figure A-1***, are available in ***Sub-appendix A-1***.

Figure A-1. Providers and populations reached by Arkansas's SIM Initiative–related delivery system and payment models



Notes on reported data: The state does not report the count of providers serving self-insured patients in PCMHs (patient-centered medical homes) separately from the count of providers reaching commercially-insured patients in PCMHs, but does report the proportion of the self-insured population reached under the PCMH model. For the purposes of categorizing the Arkansas state population by insurance type, the self-insured population is counted as having commercial insurance. The percentage of physicians participating is reported for the EOC model, in addition to the total count, because the state reported an unduplicated count of providers across participating payers.

*The number of participating providers in the patient-centered medical home model for the commercially insured population is approximate due to uncertainty in the overlap of primary care providers reported by participating commercial carriers: Arkansas Blue Cross Blue Shield (678), QualChoice (618), Centene/Ambetter (606), United Healthcare (295).

The scope of provider and population participation in Arkansas's PCMH model as of September 2016 was as follows:

- A total of 878 individual primary care providers (PCPs) in PCMHs served Medicaid beneficiaries. This number exceeded the state's original goal of 225 providers serving its Medicaid population (CMS, 2016). These providers and practices enrolled in the PCMH program represented almost 87 percent of all PCPs in the state, and 71 percent of all primary care practices in the state, according to Arkansas's final progress report (CMS, 2016).

- These 878 PCPs served 326,000 Medicaid beneficiaries, 51 percent of the total Medicaid population (CMS, 2016). According to Arkansas's final progress report (CMS, 2016), of Medicaid beneficiaries eligible to participate, 83 percent were served by PCMHs.
- Four other commercial payers, Blue Cross and Blue Shield (BCBS) of Arkansas, QualChoice, Centene/Ambetter, and United Healthcare, reported their own counts of PCPs receiving PCMH payments: 678, 618, 606, and 295, respectively (ACHI, 2017). These PCPs reached 14 percent of commercially insured individuals in September 2016.
- The number of self-insured individuals including state employees, served by PCMHs increased to 67,000 individuals (12 percent of the estimated self-insured population as reported by the state) (ACHI, 2017).
- By September 2016, the number of individual providers paid under the EOC model across Medicaid and participating commercial payers increased to 2,464 providers, or 42 percent of total providers in the state (ACHI, 2017). Arkansas launched additional EOCs into production in 2016, which may account for part of the increase.
- Because all providers treating Medicaid beneficiaries were subject to the EOCs, all Medicaid beneficiaries served by providers paid under EOCs were potentially eligible to be exposed to the EOC model.
- In September 2016, a total of 94,793 Medicaid beneficiaries (15 percent of the state's total Medicaid population) had conditions that made their providers eligible for an EOC payment, which is 60,305 more than the number triggered since the first quarter of 2016. This increase could have resulted from more EOCs being in production during this time frame.
- Commercial payers reported 544,000 individuals, or 36 percent of the commercially insured population, triggered an episode for a potential risk/gain share in September 2016.

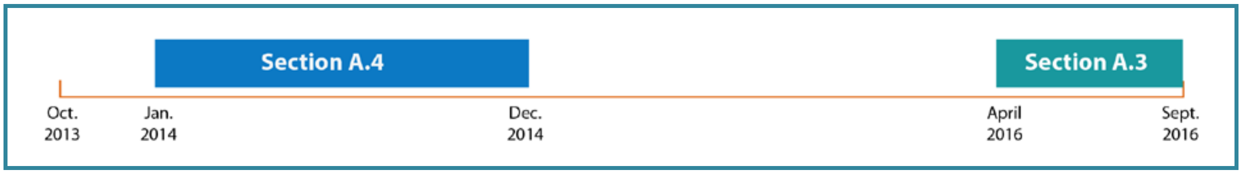
Impact of Medicaid PCMHs after 1 year (2014). In January 2014, Medicaid offered primary care providers the opportunity to become Medicaid-certified PCMHs by adhering to state-specified standards such as installing a certified electronic health record and increasing access through same-day appointments, 24/7 consultation, and other policies. To assess the early impact of the Medicaid PCMH model, (using data that were only available for 1 year of the test period, 2014), we conducted a difference-in-differences (D-in-D) analysis. The intervention group was composed of beneficiaries assigned to practices that became a PCMH in early 2014 (the intervention group). We used claims and enrollment information during this same time window for beneficiaries who were not yet attributed to a PCMH in 2014 but who would be later assigned to a PCMH practice in the subsequent year (the comparison group).[30] In the first year of implementation, Medicaid beneficiaries assigned to the PCMH intervention group in 2014

---

[30] We excluded from the comparison group beneficiaries receiving services from primary care providers who never became PCMHs or the few practices that became PCMHs in 2016. This decision has the effect of creating a more "apples to apples" comparison in terms of practice types in the intervention and comparison groups, although differences between the two groups remained.

showed greater improvements in utilization and expenditure outcomes than the comparison group. Specifically, the intervention group had a statistically significant decline in inpatient admissions and inpatient expenditures, relative to the comparison group. The intervention group also showed relative improvements in use of physician visits and thus more physician visits in the test period relative to the comparison group. There were no statistically significant differences in total expenditures and emergency department (ED) visits between the intervention and comparison groups. These findings corroborate consumers' reports of access to primary care (e.g., being able to get same-day appointments with their primary care provider), which physicians indicated helped them intervene with patients to avoid a potential hospitalization. With one exception, there were no significant differences between the intervention and comparison group with regard to measures of care delivery that are more within a practice's control, such as quality of care measures, 1 year following PCMH implementation. All data and a brief discussion of these results appears in ***Section A.4*** of this appendix; detailed information about data sources and analytic methods are available in ***Sub-appendix A-2***. ***Figure A-2*** depicts the time periods covered by different analyses in this report, with implementation analysis reported in ***Section A.3*** and interim impact analysis reported in ***Section A.4***.

Figure A-2. Time periods covered by different analyses in this report



A.2 Overview of the Arkansas SIM Initiative

The SIM Initiative in Arkansas, which began implementation in October 2013, grew from the Arkansas Health Care Payment Improvement Initiative (AHCPII) established in 2011. In the AHCPII, Arkansas Medicaid, the Arkansas DHS, Arkansas BCBS, and QualChoice of Arkansas partnered to shift to a higher quality and more cost-efficient system of care (Arkansas Health Care Payment Improvement Initiative, 2017). The payment models implemented under AHCPII are multi-payer and reward providers for achieving desired outcomes, particularly with respect to quality of care and affordability. The core principles of the SIM Initiative follow those of the AHCPII: to develop a system that is patient-centered, clinically appropriate, practical, and data-driven (Arkansas Department of Human Services, 2017).

Arkansas's original SIM Initiative award was focused on three major delivery system and payment reforms: PCMHs, EOCs, and health homes to provide care coordination for individuals with behavioral health needs, intellectual and developmental disabilities, and those needing long-term services and supports (LTSS). During the initial years of the SIM award, Arkansas used

SIM funds to engage health home stakeholders to transform current delivery models but was not able to implement health homes for any of the special populations during the model test period. In contrast, SIM funds were instrumental in successfully implementing and sustaining the PCMH and EOC models. The reforms supported with SIM Initiative funding as of September 2016 are shown in ***Table A-1***.

Table A-1. Summary of SIM Initiative activities in Arkansas, through September 2016

Activity type	Activity	Payers	Provider types	Dates	Supporting policies (if any)
Delivery/ Payment System	Primary care PCMHs	Medicaid QHPs Medicare D-SNPs Commercial: BCBS and QualChoice plans	Primary care	Medicaid: January 1, 2014 to date; QHPs, D-SNPs, and commercial plans: mid-2015 to date	SPA Medicaid provider manual[a] State law[b] Insurance regulation[c] MIPPA contracts[d]
	EOC payment models	Medicaid Commercial: in BCBS and QualChoice plans (only some plans, see Table A-3)	Primary care Specialty care Hospitals	July 31, 2012 to date	SPAs Provider manuals
Practice transformation	Practice transformation coaching	Medicaid and commercial	PCMH practices and those seeking certification	2014–2016	
	Care coordinator services	Medicaid and commercial	PCMH practices and those seeking certification	2015	
Quality measure-ment	Quality measurement and reporting	Medicaid, BCBS, and QualChoice	Principal Accountable Providers (for EOCs); PCMH practices	PAPs: 2012 to date; PCMHs: 2014 to date	

BCBS = Blue Cross and Blue Shield; D-SNPs = Medicare Advantage Dual Eligible Special Needs Plans; EOC = episode of care; MIPPA = Medicare Improvements for Patients and Providers Act; PAP = principal accountable provider; PCMH = patient-centered medical home; PMPM = per member per month; QHP = qualified health plan; SPA = state plan amendment.

[a] Arkansas laid out the rules for Medicaid PCMH participation and payment in its Medicaid provider manual.

[b] State law requires QHPs to pay PMPMs to PCMHs.

[c] Insurance regulation implementing the state law referenced above.

[d] D-SNPs are required by MIPPA to contract with state Medicaid agencies.

A.3 Implementation of the SIM Initiative in Arkansas After 3 Years of the Test Period

This section synthesizes findings on SIM Initiative implementation in Arkansas after 3 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix A-1***.

- Stakeholder interviews (***Table A-2***) were conducted in Little Rock September 12–15, 2016. Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.
- Focus groups were conducted with providers and consumers involved with some aspect of the SIM Initiative in Little Rock and Pine Bluff. Providers selected for focus groups were PCPs who may or may not have been involved in PCMHs and specialists who were likely to be principal accountable providers (PAPs) for EOCs; a total of 25 participated in four focus groups. The consumers were Medicaid beneficiaries, some of whom had coverage through Qualified Health Plans (QHPs) on Arkansas's health insurance exchange; a total of 33 consumers participated in four focus groups. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health information technology (health IT), and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.
- Document review, including state-developed reports and local news articles.
- Telephone conversations with state officials used to gather more in-depth information on select topics and to review other evaluation-related news.

Table A-2. Stakeholder interviews conducted in Arkansas, September 2016

	Number of interviews
State officials	8
Payers and purchasers	3
Providers and provider associations	3
Consumer advocacy groups	2
Other	2
Total	18

A.3.1 What changes to health care have SIM-related delivery system and payment models yielded?

KEY INSIGHTS

- SIM funding was used to develop two major multi-payer delivery system reforms: PCMHs and EOCs, which reached a substantial number of providers in the state.
- The state calculated that both models showed improved quality and cost outcomes for Medicaid beneficiaries by the end of the SIM award period. However, some PCPs reported needing more resources beyond what PMPMs could support to meet the PCMH requirements for caring for a challenging population. Providers paid under the EOC model reported concerns that potential financial penalties under the EOC model could affect their willingness to serve all patients.
- SIM funds initiated planning for health home delivery system reform but because of provider resistance and legislative delays, reform was not able to move forward.

In the third year of its implementation, Arkansas's SIM Initiative continued to support PCMH and EOC operations. The state's models for delivery system and payment reforms, including payment model characteristics and operational status, are summarized in ***Table A-3*** and described in more detail below. The state continued to extend the PCMH program to its Medicaid beneficiaries in 2016. QHPs offering coverage on the insurance exchange and dual-eligible special needs plans (D-SNPs) were required to participate in the state PCMH program with enrollment in 2015.[31,32] As shown ***Table A-4***, 14 EOCs were in production in 2016, including 3 for upper respiratory infection, with others under development.

---

[31] The Arkansas Health Care Independence Act of 2013 requires QHPs to make PMPM payments to PCMHs (http://www.achi.net/Content/Documents/ResourceRenderer.ashx?ID=122). The Arkansas Insurance Department's Rule 108 implemented the law (https://insurance.arkansas.gov/pages/industry-regulation/legal/bulletins/).

[32] Arkansas Center for Health Improvement. Arkansas's SIM Year Three Self-Evaluation Report for 10/1/2015–9/30/2016; December 31, 2016.

Table A-3. SIM Initiative–related delivery system and payment models in Arkansas

Delivery system model	Payment model	Participating payers	Retrospective or prospective	Payments based on whom?	Risk[a]	Payment targets	Implementation progress
Episodes of care	FFS payment + Risk/Gain Sharing	Medicaid FFS; BCBS (subset of episodes); QualChoice (subset of episodes)	Retrospective	For patients based on EOC-specific criteria	Two-sided	Financial and quality	Operational
PCMH	FFS + PMPM for care coordination and overall practice transformation	Medicaid FFS	Prospective	Quarterly $1-$30 PMPM risk adjusted payment (average = $4 PMPM for beneficiaries assigned to PCMH)	N/A	Process measures (10 PCMH activities during first 2 years)	Operational
		BCBS commercial products in mid-2015	Prospective	For beneficiaries assigned to PCMH	N/A	N/A	
		QHPs—4 carriers beginning in 2015: Ambetter, BCBS, QualChoice, UnitedHealth	Prospective	$5 PMPM for beneficiaries assigned to PCMH	N/A	N/A	
		Medicare Advantage D-SNPs (5 carriers)	Prospective	$5 PMPM for beneficiaries assigned to PCMH	N/A	N/A	
		Self-funded employers (3 employers)	Prospective	For beneficiaries assigned to PCMH	N/A	N/A	
PCMH	PCMH Shared savings	Medicaid FFS	Retrospective	Annual payment for beneficiaries who selected PCP	One-sided	Financial and quality	Operational
		BCBS	Retrospective	Annual payment for beneficiaries who selected PCP or were attributed based on geographic location	One-sided	Financial and quality	

BCBS = Blue Cross and Blue Shield; BH = behavioral health; D-SNPs = Dual Eligible Special Needs Plans; EOC = episode of care; FFS = fee-for-service; N/A = not applicable; NCQA = National Committee for Quality Assurance; PCMH = patient-centered medical home; PCP = primary care provider; PMPM = per member per month; QHP = qualified health plan.

[a] One-sided risk means that providers are eligible to earn shared savings for meeting lower total cost target but are not subject to penalties for higher-than-expected costs; two-sided risk means that providers are eligible to earn shared savings (the percentage earned is usually higher than one-sided risk options) for meeting lower total cost target and are expected to pay back money if costs are higher than expected.

Patient-Centered Medical Homes

Arkansas leveraged its participation in the CMS-sponsored Comprehensive Primary Care (CPC) initiative, which began in 2012, to launch its own multi-payer PCMH model statewide using SIM funding. SIM funds were used to pay consultants to conceptualize a PCMH program that would target a wider diversity of practices, especially pediatric practices. According to an Arkansas DHS Business Operations Manager for Health Care Innovation, the SIM funds were used to develop and operationalize the program, facilitate stakeholder outreach, initiate practice enrollment, conduct practice transformation/ coaching, perform analytics and data validation, and design and produce consistent reports for both the PCMH and EOC models (personal communication, Margaret M. Newton, May 18, 2017). Arkansas Medicaid certifies PCMHs using its own PCMH requirements that were modified from the Medicare-focused CPC PCMH model, rather than relying on accreditation from a group such as the National Committee for Quality Assurance. The state began enrolling practices into its Medicaid PCMH model beginning on January 1, 2014, and subsequently enrolled new PCMHs in mid-2014, January 1, 2015, and thereafter on an annual basis.[33] As mentioned above, commercial payers that offer QHPs are required to follow the requirements of Arkansas's Medicaid PCMH model or model their PCMH program after nationally accepted models. The state's next "evolution" of the PCMH program is participation as a statewide market in Round 1 of CMS's Comprehensive Primary Care Plus (CPC+) initiative, which began January 1, 2017.[34]

The Arkansas PCMH model

The PCMH model aimed to increase patient care coordination across providers. The care team was responsible for all aspects of the patient's health care experience, with the goal of reducing cost and quality variations for similar services. Each practice participating in the PCMH model received $4 PMPM, on average, to engage in practice transformation activities including 24/7 live voice access to a health professional, care plans as necessary, flexible same-day visit scheduling, use of Meaningful Use certified electronic health records (EHRs), and assessment of opportunities for practice improvement. Additionally, practices were eligible for one-sided risk shared savings payments for meeting financial and quality targets (ACHI, 2015, 2017).

Arkansas has strict requirements for acceptance into its Medicaid PCMH program. To be considered for enrollment in Arkansas's Medicaid PCMH program and receive monthly PMPM payments, practices had to enroll in ConnectCare Primary Case Management Program with at least 300 attributed beneficiaries at the time of enrollment; practices were required reenroll annually. PCMH practices were required to include operations that facilitate care coordination, including 24/7 voice access to a health professional, processes for identifying high-

---

[33] Two of the 111 practices certified under the Medicaid PCMH on January 1, 2014, and one practice certified on January 1, 2015, were also participants in the CPC initiative.

[34] CPC+ is a CMMI-funded advanced primary care model that aims to increase access to primary care and to improve the quality, cost, and efficiency of primary care delivery.

risk patients and developing care plans for them, the option for same-day office appointments, and use of a certified EHR software. These requirements, although adjusted over time to be a bit less stringent and revised to address provider concerns, were successfully implemented with planned sustainability after the SIM award concluded. Arkansas anticipated that improved care coordination activities, as required by the PCMH program, will likely lead to improved health care utilization such as reduced hospitalizations and ED visits.

Many pediatricians have enrolled in the Medicaid PCMH program, indicating that many of Arkansas's children were cared for by PCMH practices. According to consumer organizations, pediatricians generally embraced the PCMH model and enrolled in significant numbers. Arkansas Children's Hospital is the state's largest pediatric provider and made active investments in building entire care teams for their participation in the PCMH program. Many local and statewide provider organizations, including the state chapter of the American Academy of Pediatricians, were actively involved with the PCMH program and looked for ways to make it better from the pediatric perspective. With greater acceptance of the PCMH program by pediatricians, state officials initiated discussions to determine whether the current measures used in the Medicaid PCMH model can be more balanced to represent both the adult and pediatric populations.

Providers working in small practices and rural settings noted barriers to PCMH participation. Rural providers felt that many of the PCMH program requirements did not account for their more limited resources. For example, the state requires a minimum Medicaid panel size and an EHR system. Although the minimum Medicaid panel size for PCMH participation was actuarially determined to ensure that the PMPM amounts were viable and more sustainable over time, providers thought otherwise. Practices that lacked the minimum patient panel to participate in the PCMH shared savings program were given the option to pool with other small practices, although no providers we encountered in focus groups were enthusiastic about this option. Practices that pooled together to qualify to become a PCMH noted that the pools suffer when one doctor has poor performance on quality or financial measures. The cost of purchasing an EHR system can be too great among smaller practices with more limited resources.

Arkansas reached a substantial proportion of patients through the PCMH model, and achieved multi-payer PCMH participation, through a state legislative mandate. With Arkansas Rule 108, QHPs that offer benefits to the Medicaid expansion population in the health insurance marketplace[35] were required to provide support for, and align with, the Medicaid PCMH program. Additionally, commercial payers were voluntarily participating in the PCMH model for their fully covered and self-insured populations, aligning their PCMH requirements

---

[35] QHPs offer benefits to Medicaid beneficiaries who are eligible under Arkansas's "Private Option" approach to expanding Medicaid eligibility to childless adults under 138 percent of the federal poverty line.

with the state model. For example, two self-insured employee groups administered by a commercial payer, Walmart and Arkansas State Employees and Public School Employees, had employees served by PCMHs. As one state official noted, it is important to "send consistent signals to payers." By aligning PCMH requirements across payers, PCPs were better able to provide similar care to their patients with little regard for how each patient's care was financed. Similarly, payers aligned their PCMH quality metrics and reporting requirements to lessen provider burden and fatigue, given the numerous state and federal programs that affect how they care for their patients, their costs, and reimbursements. One commercial payer was particularly pleased with the multi-payer participation of the program, in which all payers in the state convened to determine the core metrics that best align with their quality goals and agreed to measure outcomes according to these metrics.

Arkansas Rule 108 required that all beneficiaries enrolled in QHPs be assigned a PCP, which QHPs would not have done voluntarily. Stakeholders reported that patients are shifting from relying on hospital EDs and urgent care facilities to coordinate care through a PCP. This shift is anticipated to result in more favorable and desired outcomes, particularly in Medicaid cost savings. Because of mandatory PCP selection that is done prospectively, payers felt that they are better able to monitor their enrollees' ED use and specialty care.

State officials in Arkansas indicated that Medicaid PCMHs have achieved improved coordination, care delivery, and cost reductions. Because many providers caring for Medicaid beneficiaries, especially children, were certified as PCMHs, PCPs were seeing patients earlier to prevent worsening of symptoms or complications to the point where more expensive treatment is needed. According to the state's own analysis, both hospitalization rates and ED visits decreased in 2015 when compared to 2014 (Arkansas Center for Health Improvement, 2017); the federal evaluation of beneficiaries attributed to Medicaid PCMH showed statistically significant decreases in hospitalizations relative to a comparison group in 2014 (methods and results are described in more detail in ***Section A.4***).[36] State officials also noted that other expenditure decreases occurred for outpatient procedures and outpatient radiology. Another facilitator of care coordination was the PCMH requirements to schedule follow-up appointments within 10 days of a hospital admission. During these follow-up visits, the PCPs were to assess whether the patient needed any post-discharge care and provide guidance on how to manage their care to prevent future hospitalizations.

State officials believed that the PCMH model made a contribution to care improvement observed in the EOC program too, but noted that PCPs question some of the PCMH requirements. Specifically, state analyses indicated that patients whose providers were

---

[36] Note that we are describing two different analyses here. Arkansas's analyses were descriptive, examining hospitalizations and ED visits for 2014 compared to 2015. The federal independent evaluation used a difference-in-differences method, which is a pre-post design comparing trends in the intervention group relative to a comparison group.

paid under the total joint replacement episode had fewer post-hospital complications after implementation of the PCMH and episode payment models (Arkansas Center for Health Improvement, 2017), perhaps because of the PCMH requirement that PCPs schedule follow-up appointments within 10 days of a hospital admission. However, state officials heard through their Strategic Advisory Group that many PCPs are pushing back on the requirement for a follow-up visit requirement within a 10-day period after hospitalization because patients who are bedridden or recovering from a serious illness or procedure are unable to make an in-person office visit. At the time of our interviews, the state was considering whether to revise this requirement to allow a follow-up phone call within the 10-day period instead of an office visit.

Primary and specialty care providers reported a need for more timely data and additional resources to educate patients on appropriate health care practices to avoid financial penalties or loss of PCMH certification. As was true in early years of the SIM Initiative evaluation, providers and stakeholder organizations reported a need for more timely information on their quality and utilization measures so that they can improve care delivery earlier. However, the state still struggled with long data lags for its claims-based measures, which was exacerbated by allowing providers 12 months to submit medical claims. The state was actively pursuing ways for PCMHs to begin receiving more timely data through EHRs, eCQM (electronic Clinical Quality Measures),[37] and participation in CPC+, with the expectation that receiving data from other sources would help providers better manage their patients.

Providers complained about being held accountable for patient behavior they could not control and emphasized the need for patient education about the SIM models—thus the need for additional education and resources. Providers felt that patient education is an important part of their clinical duties but acknowledged that providers cannot always change patient behavior regardless of how much they try to educate them. As one provider stated, "We've not done a good job educating the population about what they should and should not be doing." Providers were especially frustrated with patient behaviors that reflect poorly on EOC and PCMH performance—such as patients visiting the ED or seeking antibiotics from another provider or urgent care facility—asking why they should be penalized for patient behavior they cannot control. One provider even suggested that it may be worthwhile to give PMPM payments to patients as an incentive for appropriate use of medical services and self-management.

Additionally, providers felt that care coordination for Medicaid beneficiaries required more resources than Medicaid offered. Providers reported being penalized for challenging patient behavior, such as not being able to complete a care plan for a high-risk patient (as is required as part of PCMH certification) who repeatedly does not show up for appointments.

---

[37] eCQMs are quality measures based on data from EHRs and used in CMS quality reporting and incentive programs.

> *Then you go back to the large percentage of no-shows that those patients usually have and you've set aside a 20- or 30-minute slot of time for this care plan, for this kid with multiple problems, and they don't show up for it. Then you get penalized…They're not showing up for two or three appointments.*—Provider

The majority of providers expressed deep frustration with consumers' behavior in seeking emergency medical services without first consulting their doctor's office. Providers felt they were being penalized for consumer behavior that they could not control.

> *True emergencies… is in the eyes of the lay person. What they consider to be an emergent issue is really probably [not] 75 percent of the time… they're not true emergencies. They're true clinic type things that could be handled the next day but in their mind this toothache's been going on for 4 or 5 days then, all of a sudden 10:00 at night 'I've got to go the emergency room and get it taken care of.' … Again that's the variable that's never really factored in, in terms of the patient variable, in terms of how their response will be.*—Provider

New urgent care centers disrupted the care delivery system at the same time that PCMHs were being held financially accountable for care patients seek from any care setting. Providers reported competing with urgent care clinics that have more widely publicized extended hours and said that patients usually do not consult their office before seeking urgent care. Providers recognized that new urgent care facilities were attractive to consumers because they offer walk-in appointments at all hours of the day. Providers were also aware that some patients visit an urgent care facility if their PCP did not prescribe them an antibiotic and noted that urgent care facilities are more likely to offer antibiotics to patients. Providers also complained that it is difficult to get patient encounter data from these facilities because most are individually owned and for-profit and have no affiliation with local health care facilities.

> *I think where the disconnect is, they don't call you, they'll just go to an urgent care center or someplace else because it's more convenient or they didn't want to miss a day of work so they'll wait till night. They'll go to the emergency room for non-emergencies …we see a lot of that.*—Provider
>
> *We have a lot more of the urgent care type places that have cropped up at this point in time, those type things discourage this program basically, the patient-centered medical homes because it tells people… we're going to be open extended… some of the places 8:00am to 10:00pm…But that kind of encourages people to utilize that service and I think that's contradictory to what patient-centered medical home is all about.*—Provider

Payers indicated that Arkansas should have required full payer participation in the PCMH model to achieve total system transformation. Payer representatives noted that providers made care improvements required by the PCMHs regardless of whether the patient's payer adopted the PCMH model (and was paid PMPM fees). This was especially true for members of self-insured plans that did not support the PCMH model. This spillover created a “freeloader” dynamic that payers felt the state needed to address aggressively to ensure that all insurers pay into the system.

Consumers had mixed views on the PCMH program regarding assignment of PCPs, care coordination, and access to care. Among those who reported having a regular PCP, a hallmark of the Arkansas PCMH program, many complained that they went to the same doctor’s office regularly, but were not always able to see the same doctor.

> *When you get a different doctor come in, he read up on it but he really don’t know. Once you get used to that one doctor and he know your problem, the next time you come back it’s a different doctor and you have to pretty much start all over it seem like.*—Consumer

Consumers were asked about the timeliness of receiving health care, including same-day appointments and wait times at the doctor’s office. Most participants said they could get same-day appointments, and parent participants reported using same-day appointments often for sick children. Participants said, however, that same-day appointments were typically not with their PCP and often were with an advanced practice nurse instead of a physician, which they did not like. A minority of participants reported being unable to get same-day appointments, which then led to ED use.

> *When I call there, they be like, ‘Well, we’ll have the nurse to call you back,’ I talk to the nurse or whatever, and it’ll be like 2 weeks or maybe 3 ‘til she’ll have an opening… So, I go to the emergency room. I go to the emergency room a lot because I know I’m going to be taken care of once I go there. They read my chart and see what I’m going through.*—Consumer

Many participants reported long wait times at the doctor’s office, including both in the waiting room and the exam room. Consumers were also frustrated that doctors often seem rushed and the wait time is often longer than the time they are able to spend talking with the doctor.

Some participants reported seeing medical residents frequently, which prompted them to change to a different doctor where they would see their chosen PCP at each visit. A few parent participants similarly noted that their child never saw the same doctor, including one parent who said:

> *I ain’t never met the lady. She’s doctor to all five of my kids…but I never met her at all. Every time you go in, you get a different doctor.*—Consumer

Other consumers had more favorable views toward their PCPs:

> *I like my doctor now… I mean he listens. He’s not just standing outside the room, you know. He talks with me, he wants to know what’s going on with me, goes over my meds and all that with me.*—Consumer

> *Yeah, she real thorough. She explains everything to me, go by everything that's wrong with me. Let me know exactly what's happening with me. She explained a lot of things to me that's wrong with me and all that. She's real nice.*—Consumer

Consumers especially appreciated the assistance provided with medication self-management:

> *I explained to her I could not afford to get this and that and this and that, therefore she ended up fixing it where I can get all of my medication on my Medicaid card. So, I don't have a problem with that now.*—Consumer

State officials acknowledge that they did not expect model reform to be visible to consumers—it was primarily focused on providers. In the words of one state official, the PCMH model was "asking providers to be clinical leaders again and recognizing their critical [role] in system transformation." State officials believe it was important for payers to give providers the tools for making this happen: upfront PMPM payments, care coordination, and data feedback. As another stakeholder interviewed noted, "Knowing which patients should be high priority, and then knowing what to do with them, wasn't happening in the past." With the PCMH model, PCPs said they were prioritizing clinical visits for the upper 10 percent who need care the most, not only on those patients who want to be seen the most.

Episodes of care

As of September 2016, 14 EOCs were active, with an additional 7 under review or being promulgated into state administrative rules. Detailed information about active episodes and episodes still under development is included in ***Table A-4***. The two participating private payers—Arkansas BCBS and QualChoice—selected only a subset of the EOCs in which to participate. In addition, in response to Act 902 (discussed in further detail below), QualChoice made payment under EOCs voluntary.

The Arkansas EOC model

The EOC model held providers accountable for cost and quality outcomes via two-sided risk share. All providers continued to receive fee-for-service payments from payers, but Principal Accountable Providers (PAPs) who were held responsible for the total cost of select episodes based on which of Arkansas's EOC-specific algorithms were eligible to receive supplemental payments for commendable care. If care was deemed unacceptable, the provider may have had to return payment. Only valid episodes were counted, based on algorithms and exclusion criteria specific to the EOC. Each PAP's average cost of care for valid episodes was calculated and compared to that of other PAPs being measured on the same type of episode; each payer set its own cost thresholds (CMS, 2016, p. 19). Provider participation in the model was mandatory if the provider served patients covered by Medicaid or participating private payers.

Table A-4. Implementation status of Arkansas's episodes of care

Episode & Wave	Legislative review	State plan amendment effective date	Reporting period start date/episode launch	First performance period ends	Episode Status[a]	Payers
Active episodes						
Wave 1a						
1–3. URI	Spring 2012	10-1-12	7-31-12	9-30-13	Active (In Production)	Medicaid
4. ADHD	Spring 2012	10-1-12	7-31-12	12-31-13	Active (In Production)	Medicaid
5. Perinatal	Spring 2012	10-1-12	7-31-12	9-30-13	Active (In Production)	Medicaid, BCBS, QualChoice
Wave 1b						
6. CHF	Nov 2012	2-1-13	11-30-12	12-31-13	Active (In Production)	Medicaid, BCBS
7. Total joint	Nov 2012	2-1-13	11-30-12	12-31-13	Active (In Production)	Medicaid, BCBS, QualChoice
Wave 2a						
8. Colonoscopy	May 2013	10-1-13	7-31-13	9-30-14	Active (In Production)	Medicaid, BCBS, QualChoice
9. Gallbladder	May 2013	10-1-13	7-31-13	9-30-14	Active (In Production)	Medicaid, BCBS, QualChoice
10. Tonsillectomy	May 2013	10-1-13	7-31-13	9-30-14	Active (In Production)	Medicaid, BCBS
11. ODD	July 2013	10-1-13	10-31-13	03-31-15	Active (In Production)	Medicaid
Wave 2b						
12. CABG	July 2013	10-1-13	1-31-14	3-31-15	Active (In Production)	Medicaid, BCBS
13. Asthma	July 2013	10-1-13	4-30-14	06-30-15	Active (In Production)	Medicaid, BCBS
14. COPD	July 2013	10-1-13	10-31-14	12-31-15	Active (In Production)	Medicaid, BCBS

(continued)

Table A-4. Implementation status of Arkansas's episodes-of-care models (continued)

Episode & Wave	Legislative review	State plan amendment effective date	Reporting period start date/episode launch	First performance period ends	Episode Status[a]	Payers
Episodes under development or pending						
15. PCI	July 2013	10-1-13	TBD	TBD	In final design review for Medicaid, launched by BCBS[b]	Medicaid, BCBS, QualChoice
16–23. Neonatal	TBD	TBD	TBD	TBD	Undergoing further review	Medicaid
24. ADHD-ODD	July 2013	10-1-13	TBD	TBD	In design review	Medicaid
25. Tympanostomy ear tubes procedure)[c]	TBD	TBD	TBD	TBD	Commercial carriers may still be interested in this as an EOC	Unknown
26. Pediatric Pneumonia (in ED)	TBD	TBD	TBD	TBD	In promulgation process	Medicaid
27. Urinary Tract Infection (ED)	TBD	TBD	TBD	TBD	In promulgation process	Medicaid
28. Hysterectomy	TBD	TBD	TBD	TBD	In promulgation process	Medicaid
29. Appendectomy	TBD	TBD	TBD	TBD	In promulgation process	Medicaid

ADHD = attention-deficit hyperactivity disorder; BCBS = Blue Cross Blue Shield; CABG = coronary artery bypass graft; CHF = coronary heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; ODD = oppositional defiant disorder; PCI = percutaneous coronary intervention; SPA = state plan amendment; TBD = to be determined; URI = upper respiratory infection.

[a] In design review: components are being evaluated before episode launched.
Undergoing final review: still in the design phase but further along in the process.
Active (in production): the episode is "live," the state is collecting data and producing reports to providers.

[b] Arkansas Center for Health Improvement (2016). *Arkansas Health Care Payment Improvement Initiative, 2nd annual statewide tracking report*. Little Rock, AR: ACHI. Available at http://www.achi.net/Content/Documents/ResourceRenderer.ashx?ID=338

[c] Medicaid's research showed insufficient variations in the tympanostomy procedure or costs to justify launching this episode.

State officials noted that acute or procedure-based EOCs such as upper respiratory infections (URI) and total joint replacement with defined start and end dates were much easier to implement than chronic conditions or conditions requiring ongoing care such as attention-deficit hyperactivity disorder (ADHD) or asthma. Chernew and colleagues (2015), who also interviewed providers in the state, reported that providers believed conditions requiring ongoing follow-up were more appropriately handled within the PCMH model. Arkansas began with a broad vision for EOCs, anticipating the development of 75–100 episodes. Toward the end of the SIM award period, the state realized that 20–30 episodes was more ideal, with a focus on acute events and surgeries. State officials believe there are only a limited set of impactful episodes that significantly contribute to costs and utilization with sizable variation and that are therefore worth future planning and development.

State officials and state contractors supporting EOC implementation were starting to see desired outcomes for several of the episodes. Although the state remarked that health care expenditures have remained constant for episodes, despite an expected increase in spending, quality of care outcomes and some utilization metrics were improving (CMS, 2016). For example, likely a result of the perinatal episode, state officials were finding that elective C-section rates were decreasing and appropriate use of ultrasound was improving. Two important outcomes related to the URI episode, use of strep tests prior to prescribing antibiotics and more appropriate antibiotic prescribing, have also seen favorable outcomes (CMS, 2016). Consumers were noticing that providers were cutting back on antibiotics for colds:

> *He won't give me antibiotics. I'll ask him, even the nurse is like, 'You sound like you've got bronchitis,' and the doctor's like, 'You're fine.' Wouldn't give me a prescription for a zpak, he wouldn't give it to me. He told me to take some Mucinex and cough medicine.*—Consumer

State officials were also encouraged that physicians were reevaluating their clinical practice and making improvements that affect patient outcomes and cost containment because of the EOCs. One state official described the following when asked about the biggest success in health care delivery transformation:

> *Physicians [are] actually looking at things. Especially the older physicians, who have been doing the same thing for 30 years or more. They see there's another way to do it and are actually seeing their results as well…Enlightenment is the one word I would use to describe it.*—State official

Results from an October 2016 EOC Performance Summary provided by the state indicated that costs for the average adjusted episode cost for ADHD went from $4,405 in the baseline year to $1,808, $1,529, and $1,463 for performance years 1, 2, and 3, respectively (State of Arkansas, 2016b). Similarly, for total joint replacement, the average adjusted episode cost at baseline was $9,219 and was $9,194, $9,248, and $8,864 for performance years 1, 2, and 3, respectively. For other episodes such as asthma, cholecystectomy, colonoscopy, perinatal, and coronary artery bypass, the average adjusted episode cost stayed relatively constant across the performance years.

Representatives of provider associations believed their input and stakeholder engagement helped shape the design of episodes; however, individual physicians were frustrated with EOC implementation. Even after 3 years of implementation, some providers reported that some episodes are not defined appropriately regarding inclusion and exclusion criteria. Providers could adjust their behavior accordingly; as state officials and their contractors observed, PAPs appeared to be avoiding the triggering of an episode by altering the diagnoses they were using to bill for patients' visits. This appeared to be occurring most often for the URI, tonsillectomy, and ADHD EOCs. For example, providers were using billing codes for comorbidities of URI and ADHD that would avoid triggering the URI or ADHD EOC. Rather than improving quality, many providers felt that EOCs had only changed how providers document diagnoses. One provider said to another during the focus group: "The cold didn't go away. You said you haven't seen a cold in 2 years. Well, you have, it's just that you haven't diagnosed it as a cold. You're calling it something else." Another provider noted:

> *They also come in with three or four different complaints too, so it depends on which one you rank as the top one. No one just comes in for a cold…You can take a cold and call it rhinitis, cough, fever.*—Provider

Providers suggested that increased financial penalties would ultimately result in decreased health care access for Medicaid beneficiaries as providers start refusing to care for this population they deem to be more challenging to manage. Specialists said they may stop doing procedures such as tonsillectomies that are viewed as troublesome because they trigger an EOC, are poorly reimbursed, and involve patient hassles. Because these procedures are not financially significant enough to their practice, there is no reason to continue performing them.

Some providers were frustrated that they could not keep up with episode definitions that changed annually, although they identified episode-specific changes that should be made. A few also said that episode definitions were not well developed. For example, one gastroenterologist said that because the episode encompasses the 30 days following a colonoscopy procedure, he was penalized for unrelated expenses such as ED visits or CT scans. An obstetrician who expressed a similar concern regarding care a patient received during a perinatal episode did petition the state about an outlier case and did get resolution.

> *Then, there's situations where you'll have an OB patient who comes to you and you ask, 'Have you been to the ER?' The patient says 'No.' You do a delivery, and you find out the patient has been [getting care] all over Little Rock, and you're responsible for that care.*—Provider

Providers noted that the care location affected the cost of the EOC. If a patient was treated at a clinic that had a facility fee or at hospitals that charged more, their EOC cost was higher.

> *We talked to some of our colleagues and other groups. It wasn't the doctors. We were all scoring poorly because our hospital had a higher cost to bring patients there. It's the only hospital in the community. That was a big catch-22.*—Provider

During the focus groups, many providers noted discrepancies in how the different payers reimbursed for hospitalizations for the same EOC. For example, if a commercial payer agreed to reimburse hospitalization at one facility at a higher rate than another facility, the provider was held accountable for the higher costs even though cost negotiations were unrelated to the quality and cost of care provided by the individual provider. Medicaid recognized this discrepancy early on and "leveled the playing field" so that physicians practicing at more expensive hospitals were not penalized for practicing at hospitals where the state provided higher reimbursements. BCBS was unwilling to make this concession, saying that the physician chose to practice at the hospital with higher costs. Moreover, providers noted that there were some costs that were completely outside their control, such as facility fees, and these costs negatively impacted their EOC performance.

Providers who reported having filed appeals related to their EOC performance noted that the process was time consuming and labor intensive and suggested that the state should have implemented a better mechanism for appeals.

> *I had to file an appeal. I got the appeal, but I spent hours writing a note, and then our office manager was calling and waiting on hold to talk to machines and find the right person. It's a disaster.*—Provider

The experience of implementing EOCs led to a 2015 law addressing provider concerns about financial penalties perceived to be outside of providers' control. Because of the discrepancy in hospital reimbursements that could lead to financial penalties under the EOC payment model, the state passed Act 902 "to limit the use of factors that are not under a physician's control in determining reimbursement in alternative payment systems" (State of Arkansas, 2015a).[38] Although the law covers QHPs, BCBS said that this Act did not apply to self-insured plans, and eventually its opinion prevailed; as of January 1, 2017, this act applies only to fully insured lines of business, and not self-insured lines of business covered under

---

[38] Financial penalties could accrue to providers in an EOC model because of differences in rates negotiated by insurers for hospital reimbursement, which may make the same EOC more or less costly for patients who choose one hospital or another. Act 902 states: "A healthcare payor doing business in this state, when determining any gain-sharing or risk-sharing for a physician, shall not attribute to a physician any costs that are a result of variations in the healthcare payor's freely negotiated contract pricing with other persons or entities outside the physician's practice if including the costs reduces a physician's gain-sharing amount or increases a physician's risk-sharing amount."

ERISA[39] (Arkansas Blue Cross and Blue Shield AHCPII Help Desk, 2017). QualChoice handled this differential reimbursement issue by making EOCs voluntary and by focusing on EOCs that have hospitals as their PAP.

Another cost differential occurred between reimbursement for ambulatory surgical centers and hospital outpatient departments because of an amendment to the law governing Medicaid reimbursement passed by the state legislature. Before the amendment (State of Arkansas, 2015b), ambulatory surgical centers and hospital outpatient surgeries got approximately the same reimbursement. The new law increased Medicaid reimbursement for ambulatory surgical centers so that they were significantly higher than reimbursement for hospital outpatient services. This issue was especially problematic for providers, particularly with regard to the episodes triggered by tonsillectomies and colonoscopies. As one provider noted, the financial risk for these procedures under mandatory EOCs may cause the provider to avoid doing them, especially given that cost can vary by care setting as set by state policy:

> *I'll tell you, there's five ENTs in Conway, and just over the last year, one of them is no longer doing tonsillectomies. I'm sure he's got his own reasons, but I think you're going to see more of that, when you've got a wide spectrum of practice. If you've got one thing that's a hassle factor, that's a low margin surgery, but high phone calls of, "My throat hurts, my kid's sick to their stomach, I'm bleeding in the middle of the night," you're just going to say, "Forget about this. I'm no longer doing this procedure. I'm getting out of your episodes of care business, and I'm going to stick to my other stuff.*—Provider

In the early years of SIM implementation, the state invested SIM funds in a physician outreach specialist to work closely with providers to understand key implementation challenges related to the EOCs and PCMH. The physician outreach specialist identified important provider concerns and changes in provider behavior that led or could lead to unintended consequences of new payment model implementation, such as reduced access to health care services for patients. For example, some providers were becoming wary of treating Medicaid patients, lest they risk financial penalties for doing so:

> *It makes you apprehensive about taking a Medicaid patient who's further along in a pregnancy. My concern …with some of these programs is that I will be financially penalized for this mother's overuse of emergency services and that my only response is going to ultimately be… I'm not going to provide care for this patient.*—Provider

In retrospect, state officials suggested that other states considering an EOC model spend the first full year gathering data, educating providers, and working closely with them to better

---

[39] ERISA refers to the Employee Retirement Income Security Act of 1974, covers self-insured health insurance plans, and pre-empts state health insurance regulations.

understand the vision of where the state wants to go, rather than initiating two-sided risk early on.

Long-term services and supports and behavioral health delivery system reforms

During the SIM Initiative test period, the state did not implement most changes planned for Medicaid LTSS and behavioral health service delivery systems as a result of delays caused by political change and provider resistance. Initially, the focus was implementation of health homes to coordinate care for three populations: older adults and individuals with physical disabilities who use LTSS; individuals with developmental disabilities who use LTSS; and individuals with serious mental illness (SMI). Other planned changes included independent assessments; assessment-based prospective payments for LTSS; an assessment-based tier system for behavioral health services; and adding new community-based services for individuals with SMI. Although most of the planned changes were not implemented during the test period, state agencies resumed work on implementation in 2016.

LTSS stakeholders reported that political uncertainty was a major factor in the lack of progress during the model test period, along with opposition by some provider groups. Following the November 2014 election, which resulted in a shift in the composition of the legislature and a new governor, state agencies stopped work on their initiatives for Medicaid special populations. In February 2015, the Arkansas Health Care Reform Act created the Health Reform Legislative Task Force (Arkansas General Assembly, 2015), charged with recommending ways to modernize Medicaid. The Task Force met for over a year to consider changes in the state's Medicaid expansion program and other Medicaid program changes to transform Medicaid. In October 2015, the Task Force's consultant presented its report, recommending continuation of the Medicaid expansion private option and implementation of reforms for traditional Medicaid—through expanded implementation of PCMHs and EOCs for most beneficiaries, and either health homes or capitated managed care to coordinate care for individuals who use LTSS and for individuals with SMI (The Stephen Group, 2015). The Governor announced his support for capitation, which LTSS, developmental disability, and behavioral health providers opposed. In March 2016, the Task Force voted to continue the Medicaid expansion private option but were split on whether to support Medicaid managed care or an alternative managed FFS model proposed by LTSS providers (Davis, 2016). Provider groups opposed transitioning Arkansas Medicaid to managed care and instead supported continued transformation of payment and delivery system models that operate within the FFS approach (Arkansas General Assembly, 2017). The Governor's office, state Medicaid officials, providers, and other stakeholders continued to discuss whether all Medicaid populations should be served by some form of managed care, and the Task Force reinforced recommendations that the service needs of special populations should be independently assessed and their care should be coordinated.

> *Unfortunately for us it was the change in government that really slowed things down. It was a grinding halt. It was a year. We couldn't do anything.*—State official

Faced with the threat of managed care, some provider groups eventually shifted their positions and supported changes similar to those originally proposed for the state's SIM Initiative. Some provider groups initially opposed health homes and related changes, including nursing facilities, for-profit behavioral health providers, and some developmental disability (DD) providers. State officials said those provider groups were resistant to change because Medicaid is their major payer; they felt the changes jeopardized their primary source of revenue. However, provider opposition softened as a result of findings from the Legislative Task Force, and in May 2016 the Governor and the DHS director signed a Memorandum of Understanding committing LTSS provider groups to develop and implement a plan to save $250 million over 5 years. The nursing facility association is leading the effort and actively collaborating with state officials and HCBS provider groups.

State officials also reported that some for-profit behavioral health providers who initially resisted change became more supportive as a means of staving off Medicaid managed care. After a 2-year delay, officials with the state behavioral health agency said in September 2016 that they were posting for public comment a proposed Medicaid State Plan Amendment (SPA) for a new outpatient behavioral health services program. The proposed changes include many of the SIM-supported changes proposed in 2014: independent assessments to determine level of care; a three-tier system to match services with needs (see ***Section A.3.4***); crisis stabilization services; and recovery-oriented services such as peer supports, supported employment, and supported housing. State officials said they intended to implement the new program on July 1, 2017, contingent on CMS approval of the SPA updates. The new program includes a role for Care Coordination Entities but does not authorize those services. State officials said in September 2016 that care coordination services were still under development.

A.3.2 How did providers respond to the SIM Initiative in Arkansas?

KEY INSIGHTS

- Many physicians were unaware of or unclear about the EOC and PCMH models; those who were aware of the models reported frustration in how EOC risk-sharing was implemented.
- Some LTSS providers were frustrated with the HCBS model changes that were designed but not implemented.

To better understand provider engagement in the EOC and PCMH models, the evaluation team conducted key informant interviews with stakeholders, including those representing behavioral health, DD and LTSS providers, and focus groups with primary care physicians, pediatricians, and specialists who were affected by EOCs and PCMHs. The focus groups were conducted in Little Rock and Pine Bluff, Arkansas, in September 2016. During the focus groups, providers were asked a range of questions about their engagement in the implemented models and their feedback on the models, in addition to the changes that occurred in clinical practice resulting from the implementation of EOCs or PCMHs, which were reported in ***Section A.3.1***. More details about our methods are available in ***Sub-appendix A-1***.

Providers in both rural and urban settings lacked knowledge of EOCs and PCMHs, even after 3 years of implementation. Provider focus group participants in Little Rock were somewhat more aware of the EOC and PCMH models than their rural counterparts in Pine Bluff. Rural providers were aware that rural health clinics, where most practiced, were ineligible for the Medicaid PCMH program. Other rural providers noted that their practices did not have the required panel size of 1,500 Medicaid beneficiaries for the PCMH shared savings program, and pooling patients with other small practices was not an attractive option. Generally, rural providers were not familiar with the EOC model but some may not have seen enough patients to qualify for the episode.

Providers largely reported feeling left out of stakeholder activities despite state officials' attempts to be inclusive. This was particularly true of EOC definition development. The general sentiment was that public meetings regarding quality measures were primarily informational, after the fact, and their input was not incorporated into final implementation.

> *Having town hall meetings is really useless to be quite honest with you, it provides really no input. The only thing it provides is a forum for bickering and arguments.*—Provider

Other providers complained that the timing of these meetings typically overlapped with practice hours, which precluded providers from participating, although state officials tried to accommodate physician schedules as much as possible (see ***Section A.3.3*** for more information about stakeholder engagement activities). This was especially true of solo practitioners.

> *Appropriately, the doctors that [are most impacted by the decisions at the] town hall meeting were busy working and weren't able to attend those meetings.*—Provider

Although contractors working on the development of the EOCs told the evaluation team that physicians who treated patients for the EOC conditions were involved in designing the EOCs, most providers felt that the decision-makers for EOCs and PCMH were not practitioners but were policy makers who were too far removed from daily practice to understand what would work effectively.

> *I tend to have a little problem when somebody that's not actually doing what we're doing decides what we're going to do. That's usually not a good thing.*— Provider

Although some LTSS providers opposed health homes that were ultimately never implemented, HCBS providers expressed frustration that their time had been wasted on designing incremental payment model changes that never took place. Several HCBS providers expressed frustration about the time they spent working with state officials to design and plan changes that did not materialize because of a postponement of the system changes (see ***Section A.3.1*** for more discussion on this topic). One provider noted that DD stakeholders spent 4 years working on an assessment-based tier system for HCBS waiver services that would identify the level and scope of services an individual needed. After spending considerable time reviewing and ranking assessment tools, the state chose a tool that was not favored by the stakeholders. Another HCBS provider expressed similar frustration about the time spent designing health homes for older adults and individuals with physical disabilities, which have not been implemented.

A.3.3 How were stakeholders engaged in Arkansas's SIM Initiative?

KEY INSIGHTS

- Under its SIM Initiative, Arkansas engaged payers in implementing the PCMH and EOC delivery system and payment models and fostered partnerships across state agencies.
- The state plans to continue stakeholder engagement, particularly with private payers, beyond the SIM Initiative period.
- State medical societies felt engaged in SIM planning and implementation; however, individual physicians reported feeling excluded from the development of delivery system and payment models.

Stakeholder engagement was a fundamental piece of the SIM Initiative. Stakeholder engagement took different forms throughout the test period depending on who the state engaged, which delivery model was being developed, and what information was being shared or exchanged. The state stressed, and the evaluation team concurred, that the relationship between the Arkansas Medicaid agency and the state's leading private payers was a partnership that resulted in the payers (public and private) working together throughout the initiative to coordinate on model development. In contrast, provider engagement, which is described further above and below, was more about sharing information; it evolved throughout the initiative, beginning with broad outreach and becoming more targeted with technical assistance. The state established an Executive Committee of state officials representing multiple state agencies and divisions. This Executive Committee discussed topics from early planning though operationalizing the delivery reforms.

The private payers were the most significant nongovernmental stakeholders of the SIM Initiative, particularly the largest insurance carrier in the state. Payer participation was critical because the state's Medicaid expansion population is primarily covered by private payer QHPs, so including them as partners ensured that delivery and payment models developed under the SIM Initiative achieved a statewide reach. Private payers credited the SIM Initiative with giving the state the boost it needed to move its initiative from planning to implementation. It is likely that the active participation of private payers in the SIM Initiative helped to sustain Arkansas's efforts throughout the state's administration change. Payers were active participants in developing and launching the delivery models and in engaging providers to participate in both the EOC and PCMH models. SIM funds supported biweekly payer meetings with two private payers and Medicaid, which were valued by all participants.

Despite attempts to engage them through multiple methods, feedback from providers on the success of that engagement was mixed. Provider engagement began with multiple town hall-style meetings held across the state using SIM funds to share plans and reach providers. As the models progressed, SIM funds supported regular webinars aimed at sharing emerging information or trainings for providers. Town hall meetings were scheduled from 5 to 7 pm, and PCMH webinars were scheduled quarterly on Fridays from 11:30 am to 1:00 pm. For those who could not attend the meetings in person, information was placed on the AHCPII website for later access.

Some providers that participated in focus groups were not aware of the state's engagement efforts, while others were aware of the efforts, but felt spoken to, rather than heard. Several providers interviewed were frustrated with the pace of change, particularly related to long-term care and behavioral health (which is discussed further in ***Section A.3.4***), but were overall positive about the Arkansas state officials' provider engagement efforts. As discussed in ***Section A.3.2***, several physicians noted the meetings were during working hours and did not allow for interactive dialog, so were not a priority for them. Over time, fewer stakeholders participated in town halls, which was perceived by the state and its SIM partners as a signal that those meetings were no longer needed. State officials also engaged provider groups to reach out to their members and keep them informed.

More targeted engagement included a regular weekly call convened by Medicaid at 7 am (before physicians' offices open) with a smaller group of providers meeting at a different time to reveal issues physicians are facing as they participate in PCMH for the state and to help develop policy remedies in a timely way. These calls were popular with Medicaid, other SIM partners, and the participating providers. Stakeholders did not note any similar calls held for physicians participating in the EOC model.

Physicians with smaller practices experience more challenges than larger practices participating in the state's efforts to engage stakeholders and to make delivery system

reforms. Several doctors that operate their own practice cited busy schedules and lack of resources (primarily staff) for not being more engaged or better able to keep up with changing policies. These doctors may have just one office manager charged with multiple duties, including scheduling patient appointments, billing, and managing the computer systems, including the EHR systems, resulting in less time to make practice improvements or provide input to the state. In contrast, a provider with a larger practice shared more positive feedback about engagement with the state, and seemed to better understand the payment reforms and be invested in Arkansas's overall direction.

The initiative had support from the Governor's Office throughout the SIM test period, even though there was an administration change in the middle of the test period. The state tasked a full-time DHS staff person with oversight of the initiative. Interagency partnerships were also critical to the SIM Initiative. Arkansas's Medicaid agency took the lead overseeing the SIM Initiative and partnered closely with the Arkansas Center for Health Improvement (ACHI), an independent health policy center supported by the Arkansas DHS, Arkansas BCBS, and University of Arkansas for Medical Sciences (ACHI, 2007). Executive Committee meetings (noted above) were important opportunities for state agency engagement. Although not part of the Executive Committee, the Divisions of Aging and Adult Services, Behavioral Health Services, and Developmental Disabilities Services were also engaged throughout.

Arkansas attributes three reoccurring meetings with targeted stakeholder groups as critical to the current and future success of their delivery reforms. As cited by both state and non-state stakeholders, the most important communications were the biweekly payer meetings, the Executive Committee meetings, and the weekly call that Medicaid convened with a small group of PCMH providers. Arkansas anticipated that these meetings would continue beyond the SIM Initiative to further discuss issues that relate to health care transformation in the state.

A.3.4 How was behavioral health services integration with primary care tested in Arkansas?

KEY INSIGHTS

- The state's initial plans for establishing Medicaid behavioral health homes were not implemented during the test period, but state agencies resumed their efforts to implement changes to Medicaid behavioral health services by September 2016.
- In addition, the state planned to increase access to behavioral health services by equalizing Medicaid reimbursement rates for counseling services provided by different provider types.
- The rate change would also remove a barrier to co-location of behavioral health services in primary care settings.

Although Arkansas did not complete its original plan for transforming Medicaid behavioral health services during the model test period, state officials said in 2016 that some key components of their initial plan would be implemented in 2017 (see the final paragraph of ***Section A.3.1***) and that plans for care coordination were still being developed.

Proposed tier system for Medicaid behavioral health services

- **Tier 1:** Counseling-level services will be provided by licensed mental health professionals and available to individuals in need of mental health or substance abuse treatment.
- **Tier 2:** Rehabilitative-level services will promote recovery and maintain community integration for individuals with serious mental illness (SMI) or serious emotional disturbance (SED).
- **Tier 3:** Intensive-level services are residential treatment programs for individuals with SMI or SED and intensive functional needs.

In addition to the three tiers, crisis services will be provided in a therapeutic and time-sensitive manner to individuals with behavioral health crises.

Although development of the state's new outpatient behavioral health services program was not supported by the SIM Initiative, the design for changes beginning in 2017 was partially informed by the state's lessons learned and experiences throughout its SIM test period. In late 2016, state officials resumed their efforts to implement a tier system to ensure that Medicaid beneficiaries receive the appropriate level of care and that services are delivered in appropriate settings. Under the proposed three-tier system described below, most Medicaid beneficiaries with behavioral health needs would have access to Tier 1 counseling services. Adults assessed with SMI and children with serious emotional disturbance would have access to a wider array of services. To avoid conflicts of interest, the state plans to require independent assessments by a clinician other than the one providing care, to remove any incentive for determining a higher level or longer duration of services.

Inconsistent leadership and limited provider capacity contributed to Arkansas's failure to implement behavioral health delivery systems reforms during the model test period. In addition to political change and provider opposition, efforts to transform behavioral health services were hindered by two other factors. First, the Division of Behavioral Health Services underwent significant turnover resulting in a lack of consistent leadership. Second, state officials said that existing Medicaid providers did not have the capacity to function as behavioral health homes that coordinate behavioral health services with physical health care. State officials said that a new type of provider would be needed to provide independent care coordination for individuals in tiers 2 and 3.

The SIM Initiative, a statewide initiative with neutral funding, helped Arkansas obtain necessary information, engage stakeholders, and build a foundation for improving behavioral health service delivery. Although the state's renewed behavioral health care coordination efforts were not directly supported by SIM resources, one state official said that stakeholders were not communicating before the state's SIM Initiative and now "the silos are quietly crumbling."

Arkansas encountered barriers to integrating behavioral health into PCMHs and planned to change Medicaid payment rates in response. State officials had hoped that PCMHs would play a role in treating behavioral health conditions, but learned that PCPs preferred to refer patients to behavioral health professionals. In addition, behavioral health services were seldom co-located in primary care settings because Medicaid rates were lower for services provided in primary care settings than in community mental health facilities. In response to this issue, Arkansas planned to equalize Medicaid reimbursement rates for counseling services provided in different settings and by various types of licensed mental health practitioners. The new rate structure was expected to improve access and remove a barrier to co-location.

A.3.5 How were quality measurement and reporting strategies tested in Arkansas?

KEY INSIGHTS

- Arkansas identified process measures for PCMHs that focused on development activities to enhance care coordination such as e-prescribing, access to the state's health information exchange, and 24/7 communication with patients.
- Providers participating in the EOC and PCMH models saw value in receiving quality measure reports that gave them feedback on their own performance.

Arkansas used quality measurement in both of its EOC and PCMH models to motivate improved care delivery. Payers held providers accountable for performance on EOC quality measures, with risk and gain share payments according to payer-determined criteria. For example, to qualify for gain-sharing for the perinatal care episode, the provider was required to screen 80 percent of pregnancies for HIV, Group B streptococcus, and chlamydia. For the PCMH model, Arkansas used process measures to qualify practices for enrollment and receive practice support payments and used outcome measures to track clinical quality. ***Table A-5*** lists many of the metrics Arkansas Medicaid uses for both of its EOC and PCMH models. Providers received quarterly information on their quality measurement performance compared to their peers that was in a consistent format, regardless of payer.

Table A-5. Select performance and outcome quality measures implemented in SIM-related delivery system and payment models in Arkansas, Medicaid only

Measure	Model	Notes
Develop and record strategy to implement care coordination and practice transformation	PCMH	Retired 2017
Provide 24/7 access to care	PCMH	Ongoing
Document approach to expanding access to same-day appointments	PCMH	Ongoing
Capacity to receive direct e-messaging from the patients	PCMH	New in 2017
Join the state HIE (SHARE) or participate in a network that delivers hospital discharge information to practice within 48 hours (2016)	PCMH	Instituted 2014, changed 2016
Percentage of top 10% of patients (high priority) beneficiaries with a care plan in the medical record	PCMH	Ongoing
Percentage of beneficiaries who had an acute inpatient hospital stay who were seen by a health care provider within 10 days of discharge	PCMH	Shared savings began in 2016
Percentage of emergency department visits categorized as non-emergent by the NYU ED algorithm	PCMH	Retired
Percentage of beneficiaries who turned 15 months old during the performance period who receive at least five wellness visits in their first 15 months	PCMH	State is considering a modification to this measure
Percentage of beneficiaries 3–6 years of age who had one or more well-child visits during the measurement year	PCMH	
Percentage of diabetes beneficiaries who complete annual HbA1C, all years of age	PCMH	
Percentage of CHF beneficiaries age 18 and over on beta blockers	PCMH	Retired in 2017
Percentage of women ages 50–69 who have had breast cancer screening in past 24 months*	PCMH	
Percentage of diabetes beneficiaries who complete annual HbA1C, all years of age*	PCMH	
Percentage of beneficiaries 5–64 years of age during the measurement year who were identified as having persistent asthma and were dispensed appropriate medications that they remained on during the treatment period*	PCMH EOCs	
Percentage of beneficiaries 6–12 years of age with an ambulatory prescription dispensed for ADHD medication that was prescribed by their PCMH, who had a follow-up visit within 30 days by any practitioner with prescribing authority*	PCMH EOCs	Potential modification or retirement

ADHD = attention-deficit hyperactivity disorder; CHF = coronary heart failure; EOC = episode of care; HIE = health information exchange; NYU ED = New York University emergency department; PCMH = patient-centered medical home; SHARE = State Health Alliance for Records Exchange.

* Metrics appear in the federal impact evaluation of Arkansas Medicaid PCMH program discussed in ***Section A.4***.

Note: For more information on the NYU ED algorithm, see https://wagner.nyu.edu/faculty/billings/nyued-background

As illustrated by the first few rows of ***Table A-5,*** the state established a sequential set of PCMH practice support metrics intended to focus practices on development activities that would enhance care coordination, such as e-prescribing and ability to connect to the state's health information exchange (HIE), the Arkansas State Health Alliance for Records Exchange (SHARE). Once practices could achieve these metrics, they were retired and new practice support metrics were initiated, such as ability to receive direct e-messaging from patients.

The state saw positive cost and quality indicators from both the PCMH and EOC models. For the two earliest EOCs, the state reported a 27.7 percent reduction in use of one antibiotic for the nonspecific URI episode and a 17.6 percent reduction in Cesarean section rates. The state estimated a 0.4 percent and 2.7 percent decrease in the average adjusted per episode costs for the URI and perinatal EOCs, respectively. For the PCMH quality metrics, the state reported mixed findings. On the positive side, 2 percent more women had a mammography in the prior 24 months, 1.2 percent of those on thyroid medications had a thyroid-stimulating hormone test in the prior 2 years, and 5.5 percent more Medicaid beneficiaries with diabetes were on a statin medication. However, there were small decreases in the percentage of Medicaid beneficiaries with diabetes having an annual HbA1c test (0.4 percent) from calendar year 2014 to 2015 and 1.6 percent fewer Medicaid beneficiaries with asthma being prescribed appropriate medications. Regarding costs, according to the Arkansas's self-evaluation results, comparing calendar year 2014 to 2015, PCMH practices had lower costs for treating their patients than practices that were not a PCMH, which appeared to be because of a reduction in inpatient admissions and ED visits (ACHI, 2017). The independent federal evaluation's findings on the impact of the PCMH program in 2014 on some of these same metrics is detailed in ***Section A.4*** of this report.

SIM leaders indicated that alignment of clinical quality measures across payers was critical for health care reform efforts, although providers had mixed opinions on whether the quality metrics aligned across payers and with other incentive programs. Rather than dictate which measures providers would be evaluated on, the state asked payers to share their quality goals so that core measures could be identified collectively. Besides the core metrics, payers could also choose several additional measures that were appropriate for their covered beneficiaries. Another consideration was the selection of additional measures to align them with CMS reporting requirements. Some providers indicated that quality metrics were not aligned across payers despite the state's intention to do so.

Providers saw value in quality measurement reporting after some of the processes were refined. One of the initial barriers to acceptance was the long lag time for claims adjudication for measure reporting and episode assessment. The state reduced this lag time so that providers were not being penalized months later for not meeting metric benchmarks in prior time periods. Although it took time, providers eventually saw benefits to quality measure reporting, as also discussed in ***Section A.3.1***.

A.3.6 How were health IT and data analytic infrastructure implemented in Arkansas?

KEY INSIGHTS

- Arkansas capitalized on several health IT strategies, including EHRs, the state's HIE, and the Advanced Health Information Network portal. Each of these efforts, however, faced barriers during implementation.

The Arkansas SIM model incorporated health IT and data analytics in several ways. First, PCMH practices were required to have an EHR system capable of receiving hospital discharge information. This requirement was later relaxed to allow secure e-mail also to be a mechanism by which a practice could receive hospital discharge reports electronically. The EHR requirement propelled some practices to adopt an EHR system, however. The state also worked to promote SHARE, the state's HIE, as a means of data aggregation. Finally, BCBS and Medicaid collaborated to form a secure web-based portal, known as the Advanced Health Information Network (AHIN), where multiple payers' data can be combined allowing providers to see their EOC and PCMH performance.

Providers purchased certified EHRs to become a PCMH but reported many implementation challenges along the way. Arkansas's requirement for PCMHs to use a certified EHR meant providers had to become comfortable and proficient with this new technology in a relatively quick fashion. Also, Arkansas providers were concerned that taking the time to do EHR documentation during patient visits resulted in either less time spent directly with patients or fewer patients who could be seen in a day's time.

In addition to the EHR requirement, the requirement of joining the state's HIE was a costly endeavor for practices because their EHR vendors were charging considerable fees for bridging to the state's HIE. Also, despite the promise of more complete data, sharing EHR data across providers was problematic because of interoperability issues.

State officials and other stakeholders thought SHARE, the state HIE, could overcome many of the challenges providers faced; however, in many cases access to health care information across providers was not achieved until the state changed HIE vendors. Because the primary reason for requiring PCMH providers to join SHARE was to facilitate rapid transmittal of their patients' hospitalization information, providers looked for other ways to get this information in a less onerous and costly way. Many PCMHs were affiliated with health systems that could transmit hospitalization information to their affiliates without the need for a SHARE connection, so they were able to convince Medicaid to relax this requirement. While this was occurring, the state decided to change its HIE vendor, which offered only a single approach for transmitting data. The new vendor gave providers a menu of options, which ultimately reduced providers' cost of joining SHARE. SHARE also facilitated secure messaging between providers, but many providers were either not receptive to this functionality or did not understand its usefulness.

Arkansas employed different data analytics platforms to communicate tailored model performance feedback to participating providers. AHIN was used by Medicaid and BCBS throughout the SIM Initiative as a portal through which providers could see their EOC and PCMH metrics and enter accreditation data for these models. The other payers used their own portals for these activities. Originally, providers were only able to see their EOC and PCMH metrics but could not determine how the care they provided resulted in their metrics. To remedy this, the state worked with a contractor to develop a web-based dashboard that allowed providers to better understand how their metrics were calculated, and more importantly, the patients who had the most influence on their metrics and costs. Arkansas's newest data analytics initiative, the Medical Neighborhood Performance Report (Golden & Harris, 2017), integrates and conveys cost and outcome information from the EOCs to PCMH providers. With this new initiative, PCMH providers will be able to see which specialists have good quality and cost performance metrics when needing to refer patients. Specialists can compare their performance to their peers on EOC-specific outcomes and utilization. Although the URI EOC, typically managed by PCPs, was the first report generated from the Medical Neighborhood initiative, similar reports will be developed for all current and future EOCs.

Within the last year, the ACHI was also developing an all-payer claims database (APCD). State officials believe that the APCD may be able to provide a "pseudo" profile of specialists to allow for greater quality and cost transparency in the future.

Health IT uptake was relatively slow by all special population providers except for behavioral health providers. Although behavioral health providers were using industry-standard software, the software systems were not interoperable so sharing data could only be done via fax. Unlike the EHR software used by PCMHs, these software packages do not have patient portals to allow communication between providers and patients or their family members. State officials described a relatively new development for the behavioral health population: that behavioral health providers were using telemedicine to provide care to those in detention centers and the prison system. LTSS and HCBS providers were considering joining the state HIE as a means of transmitting information between providers, but these discussions were in the early stages.

A.3.7 How were workforce development and practice transformation strategies implemented in Arkansas?

KEY INSIGHTS

- Arkansas provided free practice transformation support to providers through vendors who were responsible for practice-level outreach and education.
- Workforce development was not formally addressed through the SIM Initiative, but market factors within the state were transforming the health care landscape.

The SIM Initiative in Arkansas focused on offering outreach to providers participating in the PCMH and EOC models and practice transformation assistance to PCMH providers. Arkansas did not implement specific initiatives to encourage workforce development.

Practice transformation assistance reached a large proportion of PCMH practices, and providers received it positively. Practice transformation vendors provided practice-level outreach and training to assist with implementation of the PCMH and EOC models. The vendors offered support sessions in which they assessed barriers to completing EHR-based metrics, along with assisting practices on understanding the new payment models. The vendors visited practices but also fielded questions through e-mails, with priority issues addressed through weekly telephone calls with state officials and practices. One of the vendors emphasized that its role was to educate practices, often the practice managers, about what was included in the program and how to read reports, but they were not involved directly in practice transformation. One benefit of practice transformation vendors was that they compiled lessons learned and best practices and disseminated that information statewide.

Through SIM funding, Arkansas offered up to 2 years of free support to help practices achieve program requirements. Various stakeholder organizations, especially those representing providers, felt that providing only 2 years of free practice transformation support was not sufficient for helping practices become PCMHs and that practices needed more support. One stakeholder organization indicated that it would continue to advocate for continued practice transformation support, particularly for smaller and independently owned practices that do not have the in-house resources to make the required care improvements that practices affiliated with larger integrated health care systems can readily make. Some provider participants expressed frustration with practice transformation staff who did not know enough about the PCMH program and provided contradictory information to what they already knew about the program.

Despite the absence of SIM-related workforce development, market-driven actions were shaping the health care workforce and delivery systems. These market-level activities were important in understanding the context in which the PCMH and EOC models were operating. First, Arkansas experienced an influx of previously uninsured patients who enrolled in QHPs under the state’s Medicaid expansion. One commercial payer covering QHP beneficiaries noted that the influx caused a short-term provider shortage, and beneficiaries had voiced concerns about delays in seeing PCPs and providers not accepting new patients during this time. The availability of advanced practice practitioners (APPs), such as nurse practitioners and physician assistants, was expected to increase in Arkansas as more medical schools offer APP training programs. These APPs are expected to fill gaps in the health care workforce and are viewed as a cost-effective solution for offering better quality health care while allowing PCPs to manage their workload more efficiently. Two stakeholders noted that Arkansas was experiencing a psychiatrist shortage and that advanced practice registered nurses had attempted to substitute for them. As discussed in ***Section A.3.4***, Arkansas changed Medicaid payment policies to address mental health provider supply issues by changing payment rates and allowing behavioral health providers to receive the same reimbursement regardless of setting.

A.3.8 What approach did Arkansas take to address population health in its SIM Initiative?

KEY INSIGHTS

- Arkansas’s population health plan focused on public health activities outside the scope of the SIM Initiative. However, state officials believed the state’s SIM-supported reforms impacted population health. In particular, PCMHs made PCPs accountable for quality and total cost of care, and PCMH quality metrics addressed diabetes, obesity, hypertension, and other chronic conditions.

Population health initiatives in Arkansas extended beyond the SIM Initiative’s focus on reforms to the health care delivery system. For the Arkansas SIM Initiative, the state submitted a population health plan developed collaboratively by the Department of Health, Department of Human Services, and ACHI. The plan identified seven focus areas: (1) tobacco prevention, (2) diabetes, (3) obesity, (4) hypertension, (5) substance abuse, (6) breastfeeding/ perinatal issues, and (7) health literacy. However, population health was not a primary focus of the state’s SIM Initiative.

Some of the PCMH quality measures supported population health goals. These goals were designed to help keep a focus on patients’ overall health and well-being. As an example, one quality measure captured how often antibiotics were prescribed for a nonspecific upper respiratory infection.

Although population health had broad boundaries, and the SIM Initiative had clearly defined delivery system goals, the two efforts supported each other. For example, an overarching goal of the PCMH model was to provide primary care services and care management more efficiently, which could improve overall population health. Consistent with this thinking, many individuals who participated in consumer focus groups reported that their PCPs had asked about their diets and exercise routines.

A.3.9 How will elements of the SIM Initiative in Arkansas be sustained?

KEY INSIGHTS

- Arkansas ensured that its SIM models were sustainable. Sustainability efforts focused on fully integrating the PCMH and EOC models into state operations, building strong multi-payer relationships, strengthening data infrastructures, and continuing conversations around the development of health homes for physical disabilities, intellectual and developmental disabilities, and behavioral health.

The Arkansas SIM Initiative made significant strides during its 3-year implementation period, where both the PCMH and EOC models became ingrained into the fabric of the state's health care delivery and payment. As reported in ***Figure A-1***, the PCMH program reached a majority of Medicaid beneficiaries. In addition, the state reported that Arkansas BCBS supported PCMHs serving 250,000 Medicaid beneficiaries (ACHI, 2017). As noted in other sections of this appendix, both Medicaid and BCBS found favorable outcomes and process improvements and anticipated maintaining this delivery system model in the future.

The PCMH and EOC models had become an integral part of Arkansas Medicaid such that their operations would continue regardless of SIM funding. State officials and their vendors spent the last year of their SIM Initiative ensuring that both the PCMH and EOC models were fully integrated within DHS operations, and the management structure and budget for the Arkansas Medicaid program included ongoing administration of these payment and delivery system reforms by full-time state employees.

Arkansas worked with its vendors to ensure the sustainability of the data infrastructure needed to support EOC maintenance and development. State employees who understood the intricacies of maintaining the EOC model strategically oversaw contracted staff who worked with the data. Data vendors emphasized the importance of being involved early in the process, noting that early engagement of certified project management professionals could help ensure long-term return on investment.

Multi-payer participation lent additional support to maintaining these efforts. Arkansas had a rich history of health care transformation support through CPC, which commenced in Arkansas in 2012. Commercial payers viewed the SIM Initiative and CPC as one and the same and planned to apply lessons learned from CPC and the SIM Initiative in CPC+, which began in Arkansas in January 2017 (CMS, 2016). Additionally, payers remarked that PCMH participation had been a positive experience and they would be willing to partner with the state and its Medicaid program on other initiatives. Arkansas also hoped to recruit additional self-funded plans to participate in the PCMH model, which should further expand its reach and impact.

State officials believed that hyperinflation of prescription drug costs could potentially disrupt sustainability of the PCMH and EOC models. When asked about which factors could derail Arkansas's delivery reform progress, state officials indicated that controlling prescription drug costs was critical to the success of new payment and delivery models intended to address total cost of care. As one state official observed, the "continued inflated growth on the drug cost side…you can't control that growth in a sustainable way."

Although changes to care delivery and payment models for individuals with physical disabilities, intellectual and developmental disabilities, or behavioral health conditions did not materialize from the SIM Initiative, stakeholder interest continued. Ongoing legislative developments related to health care transformation in Arkansas influenced the landscape within which SIM-supported reforms operated. For example, the Governor's office, state Medicaid officials, providers, and other stakeholders were in discussions in mid to late 2016 on whether some form of managed care would be implemented for some segments of the Medicaid population. The possibility of managed care caused providers to reenter negotiations with the state on delivery reform, which resulted in a memorandum of understanding between LTSS providers and the state. However, state officials viewed capitated managed care for special needs populations as a major disruptor to the state's health care transformation efforts.

A.4 Did the Medicaid PCMH Model Have an Impact on Key Outcomes After 1 Year of Implementation in Arkansas?

As described above, under its SIM Initiative, Arkansas designed a PCMH model that modified practice requirements used under the CPC Initiative. The model achieved multi-payer participation; as mentioned above, commercial payers that offer QHPs are required to follow the requirements of Arkansas's Medicaid PCMH model or model their PCMH program after nationally accepted models. The modifications—and state-specific nature of the model—aimed to better target a wider diversity of practices for participation, especially pediatric practices. Starting January 1, 2014, Medicaid enrolled the first and largest cohort of PCMHs; in parallel, the state continued to develop its EOC model since 2012 (EOC model not evaluated in this report).

By March 2015, practices certified by Medicaid under the PCMH program served more than 300,000 Medicaid beneficiaries, approximately 50 percent of all beneficiaries and 80 percent of those eligible for attribution to a PCMH. The PCMH model aimed to increase patient care coordination across providers. Each practice participating in the PCMH model received $4 PMPM, on average, to engage in practice transformation activities including 24/7 live voice access to a health professional, care plans as necessary, flexible same-day visit scheduling, use of Meaningful Use certified EHRs, and assessment of opportunities for practice improvement. Additionally, practices were eligible for one-sided risk shared savings payments for meeting financial and quality targets (ACHI, 2015, 2017).

With the shared savings program, practices were eligible for shared savings if they met targets on several performance metrics, including breast cancer screening, HbA1c testing for patients with diabetes, appropriately prescribing asthma medications, and appropriate follow-up for children with ADHD (all measures shown in ***Table A-5***, above). Other work has shown that financial support for more comprehensive care coordination services can help improve quality of care for those with diabetes (Friedberg et al., 2014) and screenings for breast cancer (Werner et al., 2013). Previous studies also found that PCMH models serving mostly children were associated with improvements in quality of care for children with asthma (Domino et al., 2009) and ADHD (Toomey et al., 2011).

The enhanced care coordination and access to primary care services was expected to replace avoidable, higher cost utilization such as ED visits and inpatient admissions, and thus control total expenditures. However, the first year of the intervention period may be too early to see impacts. Not all of the PCMH requirements were fully implemented in 2014, but rather the requirements were phased in over time. More than 70 practices enrolled in the PCMH model worked with a practice transformation coach in 2014, and those who did were more likely to meet the full PCMH requirements during the year. Also, as of 2014, only 36 practices enrolled in the PCMH model had a sufficient panel size to qualify for shared savings, so many practices were not as motivated as those that did qualify for shared savings to improve quality of care. Furthermore, in the early years of implementation, providers and stakeholder organizations reported long lags in receiving data reports on quality metrics because of the delays in claims availability, which made it difficult for them to act on the metrics from their Medicaid patient panel. Additionally, other payers did not participate in the PCMH program in 2014, so the incentives and metrics were not aligned across payers yet for participating providers, reducing the likelihood that care delivery changes would have been implemented to such an extent as to impact service use and expenditures. These factors may have reduced the likelihood of observing impacts in the first year of the PCMH model.

KEY INSIGHTS

- Arkansas Medicaid beneficiaries attributed to PCMHs in 2014, relative to a comparison group, showed the following statistically significant changes after 1 year:
    - **Relative improvement in the rate of physician visits**.
    - **Declines in inpatient admissions and inpatient expenditures**.
    - **Greater rates of asthma control medication use**.
- There were no statistically significant differences between the intervention and comparison groups for total expenditures, ED visit rates, and other quality of care measures we examined (e.g., HbA1c, breast cancer screening, and percent of beneficiaries with a follow-up visit after an ADHD prescription)
- Relative improvement in physician visits is consistent with reports from consumers and providers on improved access to same-day appointments. Additionally, improved access to primary care may have played a role in avoiding inpatient admissions. Lastly, the PCMH requirement for care plans may have contributed to relative improvement in asthma control medication use.
- However, we cannot fully attribute results to the PCMH and findings, including the unexpectedly strong effects during this early implementation period, should be interpreted with caution because of study limitations.

To assess the early impact of the Medicaid PCMH program (using data that were only available for 1 year of the test period, 2014), we conducted a D-in-D analysis. The intervention group was composed of beneficiaries assigned to practices that became a PCMH in early 2014 (the intervention group). We used claims and enrollment information during this same time window for beneficiaries who were not yet attributed to a PCMH in 2014 but who would be later assigned to a PCMH practice in the subsequent year (the comparison group). The methods are summarized in the box below and the full methods are detailed in ***Sub-appendix A-2***.

We considered several options for constructing a comparison group for the Medicaid PCMH analyses. One option was to use all practices within the state that never enrolled in the Medicaid PCMH program over the course of SIM Initiative implementation. However, this would include a mix of practices, some of which were already in another CMS intervention (the CPC Initiative) and some that never intended to become a PCMH because they did not want to meet the PCMH requirements such as installing a certified EHR, 24/7 access to care, or other PCMH features. Another option was to use an out-of-state comparison group; however, because of the unique socio-demographic and policy features within the state, and the difficulty in obtaining data to identify whether beneficiaries in other states were enrolled in a PCMH, an in-state comparison group would best approximate the intervention group. The multiple roll-out periods of the Medicaid PCMH program allowed a unique opportunity to harness subsequent program attribution data that indicated another set of providers who would be plausibly more similar to practices that were Medicaid PCMHs during the test period than other practices in the state (i.e., those practices that were interested and able to become Medicaid PCMHs but did not do so at the first opportunity in 2014). Thus, for the comparison group we selected enrollment and claims data for Medicaid beneficiaries who were not in a PCMH during 2014 but would later be assigned to a PCMH in the subsequent year.

Methods Snapshot for Impact Analysis

- **Study design:** D-in-D quasi-experimental design.
- **Population:** The intervention group comprised Medicaid beneficiaries served by practices that became PCMHs in January 2014 (N = 111) compared to beneficiaries served by practices that did not receive PCMH certification until January 2015 (N = 21).
- **Data:** Medicaid data from the CMS Medicaid Analytic eXtract (MAX) and Alpha-MAX to examine baseline (2010–2013) and 1 year after (2014) the start of the SIM Initiative.
- **Sample:** Utilization and expenditures measures included beneficiaries ages 0–64 and excluded Medicare-Medicaid enrollees.
- **Measures:** Quality of care (annual percent), utilization (quarterly rate), and expenditures (quarterly per member per month in dollars).
- **Statistical analysis:** Logistic regression (binary) and ordinary least squares (expenditures) models weighted by the propensity score times the fraction of time the person was enrolled in Medicaid. Standard errors were clustered at the practice level to account for multiple observations per practice. The models adjusted for demographic and health status variables, practice-level variables, and socioeconomic county-level variables.

Even though the intervention and comparison groups had similar person-level characteristics (***Table A-6***), there were some practice-level differences in the sample.[40] Practices in the intervention group were larger and more likely to be multispecialty than practices that achieved certification in subsequent years (***Table A-6***). The differences between intervention and comparison practices could be related to the strict PCMH requirements; providers in small clinics and rural settings noted in focus groups conducted in 2014 that they had difficulty meeting the PCMH requirements, and therefore delayed seeking PCMH certification. As noted in ***Section A.3.2*** above, providers in rural areas were also not aware of the PCMH program as early as providers in more urban areas.

---

[40] There were 111 practices that enrolled in January 2014, but 11 more practices enrolled in July 2014. We did not include practices that enrolled in July in the intervention or comparison group so that we would have a full year of post implementation data.

Table A-6. Weighted baseline characteristics and standardized differences, PCMH and comparison groups, 2013

	PCMH group	Comparison group	Standardized difference[a]	p-value
Beneficiary level characteristics				
N	219,919	166,719		
Sociodemographic characteristics				
Male, %	50.1	49.7	0.9	0.31
Age	10.5	11.1	3.3	<0.001
Race, %				<0.001
White	49.0	53.2	6.1	
Black	28.0	24.2	6.8	
AI/AN	10.7	10.1	0.3	
Asian	0.8	1.1	2.1	
Hispanic	0.2	0.3	1.8	
NH/PI	1.2	1.6	2.5	
Hispanic and Other	10.1	9.5	2.4	
CDPS Risk Score	1.2	1.2	0.6	0.53
Diagnosed with diabetes, %	1.2	1.3	0.8	0.12
Diagnosed with ESRD, %	3.7	3.9	0.6	0.28
Diagnosed with heart disease, %	0.2	0.2	0.2	0.74
Eligibility category, %				0.18
Child/TANF/Income	82.4	82.7	2.3	
Adult/TANF/Income	1.9	2.1	1.1	
Blind/Disabled	15.5	15.1	2.6	
Medically Needy	0.2	0.1	1.3	
Cancer	0.1	0.1	0.8	
Continuously enrolled in Medicaid, %	88.1	88.2	0.0	0.74
Practice-level characteristics				
Number of providers	13.6	7.9	42.0	<0.001
Proportion of primary care providers, %	0.9	1.0	37.2	<0.001
County-level characteristics				
Residing in rural county, %	38.4	39.2	0.7	0.05
Number of enrollees per county	37,721	31,520	14.4	<0.001

(continued)

Table A-6. Weighted baseline characteristics and standardized differences, PCMH and comparison groups, 2013 (continued)

	PCMH group	Comparison group	Standardized difference[a]	p-value
Median income	$41,859	$40,353	17.7	<0.001
Number of primary care providers per county	414.7	314.1	14.7	<0.001
Unemployment rate, %	7.8	7.9	0.6	<0.001

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH = patient-centered medical home; TANF = Temporary Assistance for Needy Families.

[a] Absolute standardized differences (SDs) are expressed as percentages. <10% SD is ideal for inferring balance between groups.

To balance the population characteristics for the claims-based analyses, we estimated propensity scores for all individuals from the comparison group for each year of the analysis. After propensity score weighting, the standardized differences between the weighted comparison group means and intervention group means were all well under the standard 10% threshold for individual-level variables; however, a few practice- and county-level variables exceed the threshold. As noted in the text, these reflect differences in the location and characteristics of providers that became certified under the Medicaid PCMH model at different times.

In addition, it is likely that there are differences associated with both early PCMH assignment and the outcomes of interest that we cannot measure with available data. As such, these differences may introduce a bias that is favorable to the group of beneficiaries that were assigned to PCMHs in 2014. Given the early state of implementation in 2014, any differences we do observe may not be solely attributable to the PCMH model. Differences may in part be the result of differences in characteristics of practices that enrolled in the PCMH program early and those who enrolled later or other unobserved characteristics of the beneficiaries assigned to PCMH practices.

A.4.1 Did utilization change among PCMH Medicaid beneficiaries?

KEY INSIGHTS

- The overall effect of the PCMH model on utilization was consistent with the goals of PCMH implementation where we would expect that with improved care coordination, physician visits would increase and inpatient admissions would decrease.
    - The rate of **physician visits** declined for both the PCMH group and the comparison group in the first year of implementation, but visits **declined 6 percent *less* for beneficiaries** assigned in PCMHs relative to those in the comparison group ($p < 0.05$).
    - The rate of **inpatient admissions declined** substantially more among PCMH beneficiaries relative to the comparison group ($p < 0.001$).
    - There was **no effect of PCMH on ED visits** during the first year of PCMH implementation.
- These findings align with providers' perception that PCMH practices were intervening with their patients at early stages to avoid an ED visit and a potential inpatient stay.
- Even so, it is unlikely that findings after only 1 year of implementation can be solely attributed to the PCMH program, in part because of the early implementation time-span and underlying differences between practices in the intervention and comparison groups.

We present the results of the D-in-D regression analyses for quarterly rates of inpatient admissions, ED visits, and physician visits in ***Table A-7***.

- The number of **physician visits** per 1,000 beneficiaries declined over time in both the PCMH and comparison groups but at a slower rate in the PCMH group, resulting in a statistically significant relative difference of 28.3 more visits ($p < 0.05$). This difference represents a 6.1 percent relative improvement in physician visits for the PCMH group relative to the comparison group in the first year of implementation.
- The number of **inpatient admissions per 1,000 beneficiaries** declined over time in the PCMH group but increased over time in the comparison group, resulting in a statistically significant relative difference of 5.6 fewer admissions per 1,000 beneficiaries ($p < 0.001$). This represents a substantial 34.6 percent decline in inpatient admissions for the PCMH group relative to the comparison group in the first year of implementation.
- The number of **ED visits per 1,000 beneficiaries** declined over time in the PCMH group but increased over time in the comparison group, resulting in a relative difference of 5.4 fewer ED visits per 1,000 beneficiaries However, this outcome did not reach statistical significance ($p = .10$) according to our predetermined threshold.

Table A-7. Difference in the pre-post change in utilization for Arkansas Medicaid beneficiaries enrolled in PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome	Pre-Period Adjusted Mean, PCMH	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCMH	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value
Inpatient admissions per 1,000 beneficiaries	16.14	14.62	11.15	15.62	−5.58	(−6.89, −4.28) (−6.60, −4.56)	−34.6	0.000
Emergency department visits per 1,000 beneficiaries	98.91	111.93	95.26	113.89	−5.35	(−10.74, 0.00) (−9.54, −1.15)	−5.4	0.103
Primary care provider visits per 1,000 beneficiaries	462.18	382.84	455.56	349.77	28.34	(7.00, 49.68) (11.71, 44.97)	6.1	0.029

CG = comparison group; D-in-D = difference-in-differences; PCMH = patient-centered medical home.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in utilization in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in utilization in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression was used to estimate the probability of any use during the quarter. Yearly estimates are a weighted average of the four quarterly estimates. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-Ds are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total weighted N is 6,579,911 person-quarters.

Source: RTI analysis of Chronic Conditions Data Warehouse Medicaid MAX fee-for-service claims for Arkansas, 2010–2014.

A.4.2 Did expenditures change among PCMH Medicaid beneficiaries?

KEY INSIGHTS

- We found varying results on expenditures between the intervention and the comparison group:
  - Those enrolled in PCMH expended **46 percent less in inpatient PMPM payments,** relative to the comparison group (p = 0.001).
  - There were **no significant differences in total PMPM** payments between the intervention and comparison groups.
- These results should be interpreted with caution because they are based on only 1 year of post-PCMH implementation. Given the early program ramp-up period examined, it is likely these results may be attributable to features of the practices that were able to be certified earliest and not necessarily to the PCMH program itself. Additional analyses examining practices that became certified at a later time period may reveal different results.

Table A-8 displays the adjusted means for PMPM payments for both the PCMH and comparison group in the pre- and post-period. D-in-D estimates are displayed with the corresponding relative percent difference and the p-value of the D-in-D- coefficient. ***Figure A-3*** illustrates the quarterly D-in-D estimates for the impact of PCMH on total payments during the post-period (2014).

- There were **no statistically significant differences in total PMPM payments** among Medicaid beneficiaries enrolled in PCMHs relative to the comparison group. Total payments per quarter increased at a similar rate for both those in PCMHs and those in the comparison group from the pre- to post-period.
- Medicaid beneficiaries in PCMHs experienced a marginally statistically significant reduction in total PMPM payments, relative to the comparison group, in the first quarter of 2014 but no statistically significant differences in the second through fourth quarters and no discernable quarterly trends (***Figure A-3***). These quarterly impact estimates resulted in cumulative estimates attenuating over time (***Figure A-4***).
- Despite declines in admission rates after PCMH implementation, **inpatient PMPM payments** remained steady over time at about $46 PMPM for PCMH participants, whereas inpatient payments increased substantially (from $47 to $67 PMPM) among comparison group beneficiaries, resulting in a statistically significant relative difference of $21.07 ($p < 0.01$).
- There were no statistically significant differences in the change in **PMPM payments for other services** (grouped together as “other therapy”; see definition in note to ***Table A-8***) for Medicaid beneficiaries in PCMHs relative to those in the comparison group.

Table A-8. Difference in the pre-post change in PMPM expenditures for Arkansas Medicaid beneficiaries enrolled in PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome	Pre-Period Adjusted Mean, PCMH	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCMH	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value
Total PMPM Payments ($)	360.72	372.34	387.34	410.85	−11.89	(−35.0, 11.21) (−29.86, −6.07)	−3.2	0.16
Other Therapy PMPM Payments ($)	237.94	240.18	258.17	257.02	3.38	(−7.25, 14.03) (−4.89, 11.65)	1.4	0.47
Inpatient PMPM Payments ($)	45.80	46.64	45.59	67.49	−21.07	(−36.40, −5.74) (−33.25, −9.43)	−46.0	0.001

CG = comparison group; D-in-D = difference-in-differences; PCMH = patient-centered medical home; PMPM = per member per month.

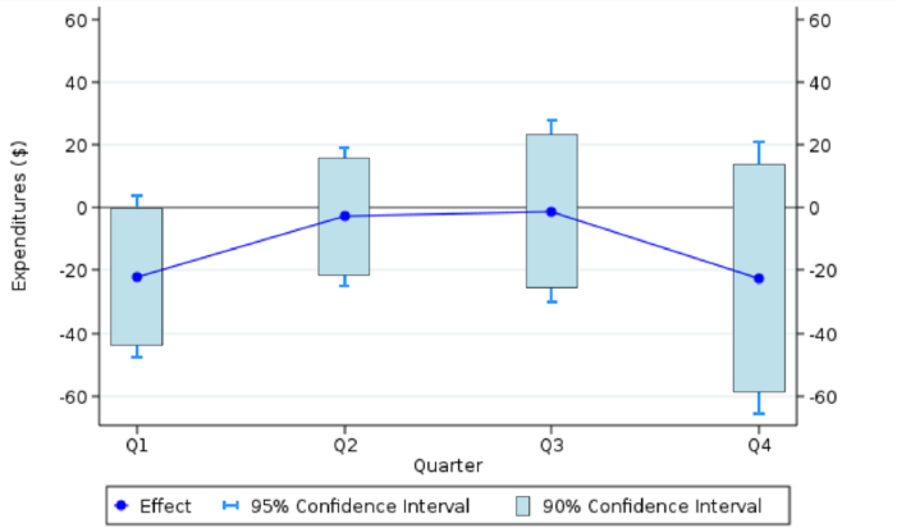
Note: **Other therapy payments** include payments for professional and clinic services, labs/x-rays, ambulance services, durable medical equipment, home health, and other outpatient services. **Total payments** include inpatient, other therapy (fee-for-service and capitated), prescription drugs, and long-term care.

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in expenditures in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in expenditures in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: An ordinary least squares model was used to estimate the impact on expenditures calculated on a quarterly basis. Yearly estimates are a weighted average of the four quarterly estimates for the given year. Each beneficiary's quarterly expenditure values were converted to per beneficiary per month means by dividing by 3 so that the outcome could be interpreted as the estimated impact on monthly expenditures. The regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total weighted N is 6,359,134 person-quarters across the entire study window for both the intervention and comparison group.

SOURCE: RTI analysis of Chronic Conditions Data Warehouse Medicaid Analytic eXtract claims for Arkansas, 2010–2014.

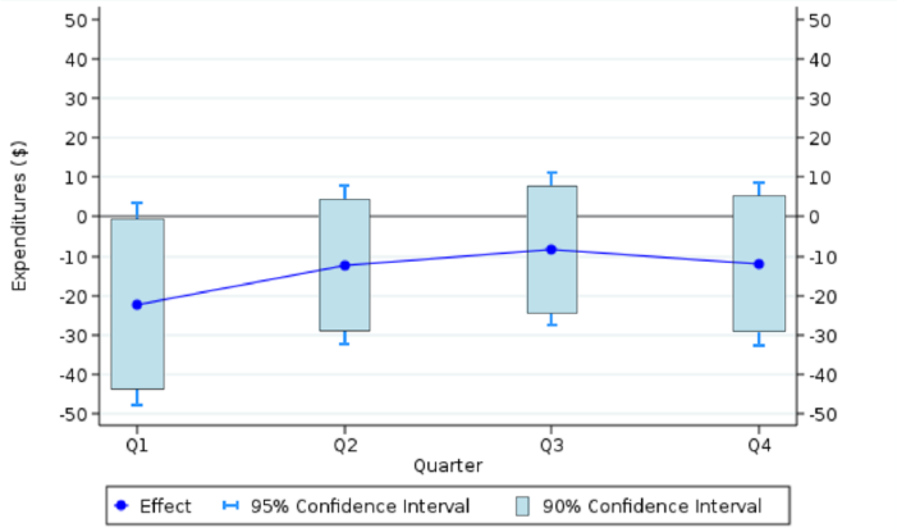
Figure A-3. **Average treatment effect of PCMH on total PMPM payments, first quarter 2014 through fourth quarter 2014**



PCMH = patient-centered medical home; PMPM = per member per month.

Bars indicate 90% confidence intervals (CIs), and lines that extend beyond the bars indicate 95% CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure A-4. **Cumulative treatment effect of PCMH on total PMPM payments, first quarter 2014 through fourth quarter 2014**



PCMH = patient-centered medical home; PMPM = per member per month.

Bars indicate 90% confidence intervals (CIs), and lines that extend beyond the bars indicate 95% CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

A.4.3 Did quality of care change among PCMH Medicaid beneficiaries?

KEY INSIGHTS

- **No significant differences** between the intervention and comparison group **for most quality of care outcomes** (breast cancer screenings, HbA1c testing, follow-up visit after prescribing attention deficit hyperactivity disorder medication) with one exception:
  - There were **greater rates of asthma control medication use** among those with asthma in PCMH (6.8 percent greater), relative to the comparison group (P = 0.003).

Given program ramp-up, it may be too early to see expected changes. Also, because of the long claims data lag that caused quality measurement reports to be delayed, providers were not able to see where to focus their quality of care efforts.

Table A-9 shows the results of the D-in-D regression analyses for the annual quality outcomes.

- Among Medicaid beneficiaries age 5 to 64 years diagnosed with asthma, the adjusted average use of **asthma control medications** did not change for the PCMH group but declined for the comparison group, resulting in a statistically significant 5.1 percentage point difference in the rate of change ($p < 0.01$) in the first year of implementation. Asthma is a chronic condition which requires continual oversight and monitoring. The care coordination and care plans required of PCMHs are likely to benefit those with chronic conditions, which is likely why we saw this difference between the intervention and comparison groups.
- There were no statistically significant impacts on the **rates of breast cancer screening** among women 41–69 years, **HbA1c testing for those with diabetes** ages 18–75, or **follow-up visit within 30 days of a newly prescribed ADHD medication** for Medicaid beneficiaries age 6–12 years in PCMH relative to the comparison group in the first year of implementation.

Table A-9. Difference in the pre-post change in quality of care outcomes for Arkansas Medicaid beneficiaries assigned to PCMHs and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome	Pre-Period Adjusted Mean, PCMH	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCMH	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Breast cancer screening (%), women age 41–69	28.2	34.1	26.5	30.6	1.5	(−2.9, 5.8) (−2.0, 4.9)	5.2	0.58	36,403
HbA1c testing (%) among those with diabetes age 18–75	70.3	65.1	69.5	65.2	−1.0	(−4.5, 2.6) (−3.7, 1.8)	0.4	0.66	118,453
Asthma control medication use (%), age 5–64 years with asthma	84.1	86.3	84.1	81.6	5.1	(2.3, 7.9) (2.9, 7.3)	6.8	0.003	84,200
ADHD: Follow-up visit within 30 days of prescription (%), age 6–12 years	58.1	59.0	57.3	55.1	3.0	(−2.1, 8.2) (−1.0, 7.0)	5.2	0.33	43,752

ADHD = attention-deficit hyperactivity disorder; CG = comparison group; D-in-D = difference-in-differences; PCMH = patient-centered medical home.

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in expenditures in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in expenditures in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of any screening or use during the year. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-Ds are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. We found that the standardized difference was larger than 10% for several measures across the subgroups included in each quality measure. The covariates included in the propensity score model are also included in the regression model, so the results are adjusted for this imbalance. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

Source: RTI analysis of Chronic Conditions Data Warehouse Medicaid Analytic eXtract claims for Arkansas, 2010–2014.

A.4.4 Discussion and limitations

Enhanced care coordination and access to primary care services was expected to increase primary care use, decrease ED visits and hospitalizations, improve quality of care, and control total expenditures for Medicaid beneficiaries seen by practices participating in Arkansas's PCMH model. After 1 year of implementation, we found mixed evidence that the model was associated with improvements in these outcomes. Although we showed improvements in physician visits and hospitalizations, there were few statistically significant differences in expenditures and quality outcomes.

Not surprisingly, we found no statistically significant differences in the change in total payments or other therapy payments after 1 year of PCMH implementation. Although the majority (70 percent) of the practices that enrolled in the PCMH program in 2014 met all the criteria for implementation by the end of the first year, program startup took time at both the practice and state levels. As such, we did not expect to see substantial changes in these outcomes in the first year.

We did see a reduction in the mean rate of ED visits for the PCMH group and an increase in ED visits for the comparison group (P = 0.10) that suggest a growing difference between the two groups. However, we found significantly greater declines in inpatient admissions for the PCMH group relative to the comparison group. The magnitude of the decline in inpatient admissions after only 1 year of implementation is substantial and is consistent with reports from the state, providers, and consumers that the enhanced care coordination services and increased access to primary care offered at the PCMH were driving down avoidable utilization. These findings contrast with a systematic review on the effectiveness of PCMH implementation on clinical and economic outcomes (Jackson et al., 2013) which found evidence that PCMH implementation contributed to a reduction in ED visits but found no evidence on overall cost saving or inpatient admission among older adults. Our sample had a median age of 8, so our findings may be the result of age differences between the samples studied. Indeed, the PCMH model has been found to associated with fewer hospitalizations among children with asthma (Domino, 2009). Differences between practices that voluntarily enrolled early on and those that enrolled later (e.g., affiliation with multispecialty practices, size, location) may also explain some of the findings because of differing capacity to offer more extended hours and readiness to intervene with patients early enough to avoid hospitalizations and increase primary care visits.

For most of the quality of care outcomes we evaluated, we did not find substantial improvements after 1 year of implementation. The sole exception was for use of asthma control medications, where we found no change in medication use for Medicaid beneficiaries in the PCMH group but a reduction for those in the comparison group. This significant finding suggests that PCMHs may be attuned to the needs of patients with chronic conditions. Given that only a small portion of PCMH practices were eligible for shared savings in the first year and quality data reports were not provided in a timely manner, this impact cannot be solely attributed to the PCMH model.

There are a number of limitations to this analysis. First, we compared PCMH enrollees of practices that were early adopters to PCMH enrollees of later adopters. Although we balanced the analytic sample on key individual characteristics, unobserved differences in both the providers and beneficiaries enrolled in each group still existed, which may have biased our results. We expect that practices that enrolled early in the PCMH may have been better positioned for practice transformation, so our results may be biased toward finding improvements associated with the PCMH model. Second, we do not know which Medicaid beneficiaries received care coordination services from the participating practice, which may underestimate the full impact of the PCMH model on beneficiaries served by PCMH practices. Finally, beneficiaries assigned to a comparison practice could have made visits to a participating PCMH practice, causing the comparison group to be contaminated with beneficiaries partially exposed to the PCMH model. As a robustness check, we excluded comparison members (n = 1,443) who had been seen by a PCMH provider in 2014 and reran the utilization and expenditure models and found no difference in the results. However, there may be contamination that we cannot observe: MAX claims are limited in that up 40 percent of claims have missing NPI values, which did not affect our main analysis because information from the state indicated which beneficiaries were in the PCMH group by year, thereby avoiding the need to link beneficiaries to a specific provider.

A.5 References

Arkansas Blue Cross and Blue Shield AHCPII Help Desk. (2017). *Arkansas Payment Improvement Initiative Episodes of Care Principal Accountable Provider Manual*. Available at http://www.arkansasbluecross.com/doclib/documents/providers/Arkansas%20Health%20Care%20Payment%20Improvement%20Initiative%20Program%20Overview_060817_06_30_2017.pdf

Arkansas Center for Health Improvement (ACHI). (2007). *2007 Annual Repor*t. Available at http://www.achi.net/Docs/198/.

Arkansas Center for Health Improvement (ACHI). (2015). *Statewide Tracking Report*. Available at http://www.achi.net/Content/Documents/ResourceRenderer.ashx?ID=276.

Arkansas Center for Health Improvement (ACHI). (2017). *Arkansas Health Care Payment Improvement Initiative, Third Annual Statewide Tracking Report*. Available at http://www.achi.net/Content/Documents/ResourceRenderer.ashx?ID=482.

Arkansas General Assembly. (2015). *Health Reform Legislative Task Force*. Available at http://www.arkleg.state.ar.us/assembly/2015/2015R/Pages/CommitteeDetail.aspx?committeecode=836.

Arkansas General Assembly. (2017). *HB1706—To create the Medicaid Provider-led Organized Care Act; to designate that a risk-based provider organization is an insurance company for certain purposes under Arkansas law; and to declare an emergency*. Available at http://www.arkleg.state.ar.us/assembly/2017/2017R/Pages/BillInformation.aspx?measureno=HB1706.

Arkansas Health Care Payment Improvement Initiative (2017). *About Us*. Available at http://www.paymentinitiative.org/about-us2

Centers for Medicare & Medicaid Services (CMS). (2016). *Arkansas SIM Initiative Final Progress Report, Attachment Volume 1*. Available from CMS.

Chernew, M. E., Golden, W. E., Mathis, C. H., Fendrick, A. M., Motley, M. W., & Thompson, J. W. (2015, June). *The Arkansas Payment Improvement Initiative: Early Perceptions of Multi-Payer Reform in a Fragmented Provider Landscape*. Available at http://www.ajmc.com/journals/ajac/2015/2015-vol3-n2/The-Arkansas-Payment-Improvement-Initiative-Early-Perceptions-of-Multi--Payer-Reform-in-a-Fragmented-Provider-Landscape.

Davis, A. (2016 May 21). Hutchinson, nursing homes vow cost cuts. *Arkansas Democrat-Gazette.*

Domino, M. E., Humble, C., Lawrence, W. W., Jr., & Wegner, S. (2009). Enhancing the medical homes model for children with asthma. *Medical Care*, *47*(11), 1113–1120. http://dx.doi.org/10.1097/MLR.0b013e3181adcc65

Friedberg, M. W., Schneider, E. C., Rosenthal, M. B., Volpp, K. G., & Werner, R. M. (2014). Association between participation in a multipayer medical home intervention and changes in quality, utilization, and costs of care. *Journal of the American Medical Association*, *311*(8), 815–825. http://dx.doi.org/10.1001/jama.2014.353

Golden, W. E., & Harris, M. (2017). *Data Infrastructure to Support APMs*. Available at http://www.ehcca.com/presentations/HDP2/harris_cs2_1.pdf.

Jackson, G. L., Powers, B. J., Chatterjee, R., Bettger, J. P., Kemper, A. R., Hasselblad, V., . . . Williams, J. W. (2013). Improving patient care. The patient centered medical home. A Systematic Review. *Annals of Internal Medicine*, *158*(3), 169–178. http://dx.doi.org/10.7326/0003-4819-158-3-201302050-00579

State of Arkansas. (2015a). *Senate Bill 701. Act 902 of the Regular Session*. Available at ftp://www.arkleg.state.ar.us/acts/2015/Public/ACT902.pdf.

State of Arkansas. (2015b). *Amendment No. 1 to Senate Bill No. 1019*. Available at http://www.arkleg.state.ar.us/assembly/2015/2015R/Amendments/Sb1019-S1.pdf.

State of Arkansas. (2016a). *Memorandum of Understanding: Arkansas Long-Term Services and Supports Reform. Arkansas Department of Human Services and Arkansas Health Care Association*. Available at https://governor.arkansas.gov/press-releases/detail/dhs-health-care-association-commit-to-major-reforms-that-will-make-medicaid.

State of Arkansas. (2016b). *Episode of Care Performance Summary, October 2016*. Provided by the state.

The Stephen Group (2015). *Volume II: Recommendations to the Task Force, Health Care Reform/Medicaid Consulting Services*. Available at http://www.arkleg.state.ar.us/assembly/2015/Meeting%20Attachments/836/I14099/TSG%20Volume%20II%20Recommendations.pdf.

Toomey, S. L., Chan, E., Ratner, J. A., & Schuster, M. A. (2011). The patient-centered medical home, practice patterns, and functional outcomes for children with attention deficit/hyperactivity disorder. *Academic Pediatrics*, *11*(6), 500–507. http://dx.doi.org/10.1016/j.acap.2011.08.010

Werner, R. M., Duggan, M., Duey, K., Zhu, J., & Stuart, E. A. (2013). The patient-centered medical home: An evaluation of a single private payer demonstration in New Jersey. *Medical Care*, *51*(6), 487–493.

Sub-appendix A-1: Methods for Qualitative Data Collection and Analysis

The Arkansas SIM Initiative Round 1 evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. Data sources included interviews with key informants, provider and consumer focus groups, a review of relevant documents, and regular evaluation calls with state officials leading Arkansas's SIM Initiative.

A-1.1 Site visit key informant interviews

The evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Arkansas, usually in person but sometimes by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology (health IT) and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included the state's SIM Initiative teams, other state officials, commercial payers, providers and provider associations, consumer representatives, and health infrastructure personnel. We solicited suggestions of interview candidates from state officials leading the state's SIM Initiative and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with state SIM Initiative teams or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participant; however, in two cases we conducted telephone interviews because of scheduling difficulties. All interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and tailored for each state. The interviews were interactive; participants were encouraged to share feedback most relevant to their particular roles in the Arkansas SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific

comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Arkansas team conducted 20 total interviews in September 2016. ***Table A-1-1*** provides a distribution of the completed interviews by state and by interviewee type.

Table A-1-1. Key informant interviews conducted in Arkansas, September 2016

	Number of interviews
State officials	10
Payers and purchasers	3
Providers and provider associations	3
Consumer advocacy groups	2
Other	2
Total	20

A-1.2 Focus groups

Evaluation team members conducted four consumer and four provider focus group discussions in Arkansas on September 12–15, 2016. These focus groups were the third and final groups conducted for the SIM Round 1 evaluation.

Table A-1-2 provides an overview of the 2016 focus groups. The consumer groups comprised Medicaid beneficiaries, including parents, adult beneficiaries, and Medicaid expansion beneficiaries enrolled in a qualifying health plan. The provider groups comprised primary care providers, including pediatricians and specialists participating in episodes of care.

Recruitment. The Arkansas Foundation for Medical Care (AFMC) created lists of potentially eligible consumer and provider focus group participants. The Henne Group contacted consumers and AFMC contacted providers via phone, screened for eligibility, and scheduled the focus groups. After encountering some recruitment challenges, AFMC also received assistance from The Henne Group in reaching out to providers. We sought to recruit nine participants and two alternates for each group.

Table A-1-2. Overview of focus group participants

Group	Location	No. of participants	Type of participants
1	Little Rock	9	Adult Medicaid beneficiaries
2	Little Rock	8	Parents of Medicaid beneficiaries
3	Little Rock	9	Medicaid expansion beneficiaries (enrolled in a Qualified Health Plan)
4	Pine Bluff	7	Medicaid expansion beneficiaries (enrolled in a Qualified Health Plan)
5	Little Rock	6	Primary care providers (physicians)
6	Pine Bluff	3	Primary care providers (physicians)
7	Little Rock	10	Specialists participating in episodes of care (OB/GYN, gastroenterologists, ENT, general surgery)
8	Little Rock	6	Pediatricians
Total	—	58	—

ENT = ear, nose, and throat; OB/GYN = obstetrics/gynecology.

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion, how the information from the discussion would be used, and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes, and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

A-1.3 Document review

We used Arkansas's quarterly and annual reports, operational plans, and other state documents to obtain updated information on their implementation progress during the current analytic period of April 2016–April 2017. To supplement these documents, we collected relevant news articles on the Arkansas SIM Initiative activities and related initiatives, and we searched reform-oriented websites that the state maintains.

In addition, we obtained numbers of providers and payers participating in and populations reached by the different innovation models from reports Arkansas submits to the

Innovation Center in conjunction with its quarterly reports. We provide Arkansas's reported figures in both ***Chapter 2*** and ***Appendix A***.

The estimated number of providers serving Medicaid beneficiaries under a recognized PCMH is based on Arkansas's Final Progress Report submitted to CMS (CMS, 2016). The number of providers serving commercial individuals under a recognized PCMH is based on data available online (ACHI, 2017). The estimated number of providers participating in the EOC model is based on the number of distinct principal accountable providers (PAPs) reported by the state, although this number includes some facilities (for EOCs in which the PAP is a facility) (State of Arkansas, 2016). To calculate the total percent of providers in the state participating in EOC models, we used the denominator of the number of active physicians in the 2015 State Physician Workforce Data Book (Association of American Medical Colleges, 2015). Active physicians are federal and nonfederal physicians with a Doctor of Medicine (MD) or a Doctor of Osteopathic Medicine (DO) who are licensed by a state and work at least 20 hours per week.

Counts of population reached, used as the numerators for percentages, are state-reported numbers (ACHI, 2017; CMS, 2016). Denominators used to compute the percentage of the population reached are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

Percentages of state population by insurance type are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

A-1.4 State evaluation calls

The evaluation team for Arkansas, the state's SIM Initiative team, and the state's Innovation Center project officer typically attended each state evaluation call. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest for the evaluation. The Arkansas evaluation team held five calls with Arkansas between April 2016 and August 2016, prior to the end of the state's period of performance in September 2016.

For each meeting, the evaluation team prepared a list of state-specific questions, including the status of related policy levers and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to the state ahead of the call and asked the state to have knowledgeable state officials available to answer the questions during the call.

A-1.5 Analysis

The evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visits, focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

A-1.6 References

Arkansas Center for Health Improvement (ACHI). (2017). *Arkansas Health Care Payment Improvement Initiative, Third Annual Statewide Tracking Report*. Available at http://www.achi.net/Content/Documents/ResourceRenderer.ashx?ID=482

Association of American Medical Colleges (2015, November). *2015 State Physician Workforce Data Book*. Available at https://www.aamc.org/data/workforce/reports/442830/statedataandreports.html

Centers for Medicare & Medicaid Services (CMS). (2016). *Arkansas SIM Initiative Final Progress Report, Attachment Volume 1*. Available from CMS.

Kaiser Family Foundation. (2017). *Health insurance coverage of the total population*. Available at http://www.kff.org/other/state-indicator/total-population/

State of Arkansas (2016). *Episode of Care Performance Summary, October 2016*. Provided by the state.

[this page intentionally left blank]

Sub-appendix A-2. Methods and Measures for Interim Impact Analysis

Overview. To estimate the impact of Medicaid patient-centered medical homes (PCMH) in Arkansas, we conducted a difference-in-differences (D-in-D) regression analyses using Medicaid claims (MAX) from 2010 to 2014. We present results of both descriptive trends in D-in-D analysis for (1) service utilization and expenditures and (2) quality of care. This sub-appendix details the methods we used for this analysis.

PCMH in the context of Arkansas Medicaid. Arkansas's Medicaid program, representing about 22 percent of the state's population, has undergone a number of reforms since 2012, in part because of SIM funding, as a way to move beyond a fee-for-service model. The PCMH model that began in 2014 was built off these reforms by replacing primary care management fees with a risk-based per member per month (PMPM) fee to cover care coordination and more intensive case management and extending the PCMH model requirements of Arkansas's Comprehensive Primary Care initiative for Medicare beneficiaries to Medicaid. The PCMH model in Arkansas is a delivery model led by a primary care provider (PCP) who coordinates 24/7 access to patient care. Providers enrolled in Medicaid's PCMH model receive a PMPM fee to cover ongoing transformation costs (costs associated with meeting criteria to become a medical home) and care coordination, in addition to fee-for-service payments.

Arkansas expanded Medicaid in 2014 as part of the Affordable Care Act. Arkansas received a federal waiver to expand Medicaid in January 2014 to individuals at 100 percent or below the federal poverty level (FPL) through products sold on the health insurance marketplace. As part of Arkansas's expansion, income eligibility increased for parents with dependent children from 16 to 138 percent FPL. Arkansas's Medicaid expansion would not impact this analysis. Our analysis focuses on beneficiaries enrolled in traditional Medicaid and does not include the expansion population. In addition, increases in income eligibility for parents with dependent children would likely increase the number of people in this eligibility group for both the intervention and comparison groups alike.

Profiles of PCMH participating providers. Roughly 47.5 percent of eligible provider groups in the state were enrolled in the PCMH program by the initial start date of January 2014. These practices served up to 72 percent of eligible Medicaid beneficiaries in 2014. By 2016, 71.6 percent of practices and 86.9 percent of eligible providers in Arkansas were enrolled in the Medicaid PCMH model. Participating PCMHs were mostly family care practices, and about a third were pediatric practices.

Study design. We used a longitudinal design with an unbalanced panel where the baseline period was 2010 through 2013, and the post period was 2014. We chose this approach to maximize the use of available data; we use available observations for a beneficiary, regardless of whether they were enrolled for the entire analysis year. To account for beneficiaries who were not enrolled the entire time, our analysis uses an eligibility fraction for each individual, defined as the number of months enrolled divided by the total number of months in the study period. The eligibility fraction is used to inflate outcome data if an individual was not enrolled for an entire period and are also used as weights in the regression models. This prevents individuals with limited enrollment but extreme outcomes from strongly influencing the results.

Identifying intervention and comparison groups. We considered several approaches to selecting a comparison group that was similar in both beneficiary and practice characteristics to the intervention group. An out-of-state sample was precluded from consideration because we would not be able to determine the extent to which Medicaid beneficiaries in other states were exposed to a similar PCMH program. However, the PCMH rollout in Arkansas for Medicaid beneficiaries began with the first group of practices starting January 1, 2014, and with subsequent groups of practices starting July 1, 2014 (excluded from the analysis), and January 1, 2015. This staggered rollout created the opportunity to identify in-state beneficiaries who are assigned to PCMHs in the early and later waves of enrollment as the intervention and comparison samples, respectively. In this way, we are, to the best of our ability, comparing similar beneficiaries and similar practices. We excluded individuals dually eligible for Medicare and Medicaid and Medicaid beneficiaries with restricted benefits during the year.

Data limitations in MAX claims preclude us from employing a beneficiary-provider assignment algorithm to construct the intervention and comparison group. In Arkansas, Medicaid enrollees are attributed to a PCMH based on their selection of a PCP once they have enrolled in Medicaid. As such, we used practice and beneficiary enrollment files supplied by Arkansas to identify beneficiaries who were first assigned to a newly enrolled PCMH practice in January 2014. These beneficiaries were included in the intervention group. To identify the comparison group, we selected practices that enrolled in Medicaid's PCMH model in 2015 and selected beneficiaries who were first assigned to those practices in January 2015. Looking at the type of practices, 33 percent of the PCMHs in the intervention group were pediatric practices compared to 23 percent in the comparison group, which was not a statistically significant difference ($p = 0.33$). A similar proportion of intervention and comparison group practices were family medical practices (63 and 77 percent, respectively, $p = 0.20$). We excluded beneficiaries who enrolled in the PCMH model in July 2014 so as to have a full year of post-intervention data.

Balancing intervention and comparison group. To ensure that comparison group beneficiaries are similar to those in the PCMH group, we constructed a person-level propensity score weight. Propensity score weighting rather than matching was used for several reasons, including to avoid dropping any PCMH beneficiaries from the final analysis. With exception to some practice- and area-level characteristics, the propensity weighted sample was under the standard 10 percent threshold across key demographic and health characteristics. More information on propensity score weighting and regression models is available in ***Sections A-2.4*** and ***A-2.5***.

Statistical approach. We conducted D-in-D regression analyses using logistic and ordinary least squares to estimate the effect of Arkansas's Medicaid PCMH on service utilization, expenditures, and quality of care. To adjust for factors that might confound the relationship between PMPM payments and individual-level utilization and expenditures, we controlled for individual demographics, health status characteristics, and practice- and area-level characteristics. We used clustered standard errors at the practice level to account for possible correlation in the error terms among observations with the same NPI, accounting also for repeated beneficiary observations across years.

A-2.1 Data sources

Medicaid MAX data. We used Medicaid data from the CMS Medicaid Analytic eXtract (MAX) and Alpha-MAX research files made available through the CCW enclave. Each state's Medicaid Statistical Information System (MSIS) data are the source of the MAX and Alpha-MAX files. The MAX processing adds enhancements such as claims adjustments, creation of a national type of service field, and state-specific quality issues corrections; Alpha-MAX provides fewer enhancements. The MAX and Alpha-MAX files include a person summary file, with all enrollment information and summary claims information and four claims files: inpatient hospital (IP), long-term care (LT), prescription drugs (RX), and other (OT) claims. The quarterly Alpha-MAX files are generated for a state once all five MSIS file types for a single quarter are approved. The quarterly files are overwritten and updated each time a new quarter of run-out data is added. Quarterly versions of Alpha-MAX are being produced for each state through 7 quarters of run-out data; therefore, the quarterly files are based on 0 to 7 quarters of run-out time. Annual calendar-year MAX files are prepared from data with 7 quarters of run-out time. For simplicity, we refer to the MAX and Alpha-MAX data as simply MAX data for the remainder of this sub-appendix. The analytic sample included beneficiaries ages 0 through 64 and excluded Medicare-Medicaid enrollees.

Provider enrollment file. The Arkansas Department of Human Services (DHS) provided RTI with files containing all the National Provider Identifier (NPI) records and names of practices serving Medicaid members who enrolled in Arkansas's PCMH program in early and mid-2014. A similar file was provided with identifiers for practices that were in enrolled in Arkansas's Medicaid PCMH in 2015. These files also contained the NPI of providers working within those practices. We used these files to identify when the practice began participation in Medicaid PCMH and to acquire provider-level variables, such as the proportion of providers in the practice who are primary care providers and the number of providers working within the practice.

Beneficiary enrollment file. The Arkansas DHS provided a file that contained the Medicaid member identification, the date on which PCMH began receiving monthly payments for each member, and the organizational NPI of the PCMH from 2014 to 2015. We used MAX and Alpha-MAX identification mapping to crosswalk the MSIS identification from the state and the MAX identification in the claims.

Area health resource file. The AHRF comprises data collected by HRSA from more than 50 sources containing more than 6,000 variables related to health care access at the county level. We used information on health professions supply, median income at the county level, unemployment, and rurality for the propensity score weighting and to use as covariates in the analysis.

A-2.2 Outcome measures

A-2.2.1 Utilization

Utilization measures were evaluated quarterly and are reported as rates per 1,000 covered lives. For each measure, we first calculate the probability of any use. To calculate the probability, the numerator was an indicator of having had at least one event (inpatient admission or emergency department (ED) visit that did not lead to a hospitalization), and the denominator is the number of eligible plan members in the state enrolled during the period. We multiplied the probability of use by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the probability by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes that no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because the majority of the population had zero or one ED visit or admission per quarter. Events are included in a period's total if discharge or service date on the claim was during the period.

- **Probability of having any ED visits that did not lead to a hospitalization (outpatient ED) use:** This is an indicator of whether the beneficiary had at least one visit to the ED that did not result in an inpatient hospital admission, divided by the number of beneficiaries in the same period. For all data sources, ED visits (including observation stays) are identified in the outpatient services file as visits with a revenue center line item equal to 045X, 0981 (ED care), 0760 (and CPT code = G0378 and number of times the service was performed ≥ 8), or 0762 (treatment or observation room, thus including observation stays in the overall count). If the procedure code on every line item of the ED claim equaled 70000–89999, or was equal to G0106, G0120, G0122, G0130, G0202, G0204, G0206, G0219, G0235, G0252, G0255, G0288, G0389, S8035, S8037, S8040, S8042, S8080, S8085, S8092, or S9024, and no line items had a revenue center code equal to 0760 or 0762, that claim was excluded (thus excluding claims for which only radiology or pathology/laboratory services were provided unless they were observation stays). Multiple ED visits on a single day were counted as a single visit.

- **Probability of an evaluation and management visit.** We used the OT claims to identify whether the beneficiary had any evaluation & management visit during the quarter. We used the following HCPCS codes:
  - 99201–99205, 99211–99215, 99241–99245, 99304–99310, 99315–99316, 99318, 99324–99328, 99334–99350, 99358–99359, 99366–99368, 99374–99397, 99401–99412, 99420, 99429, 99441–99444, 99495, 99496
- **Probability of any inpatient admission**. We used the IP claims and identified acute care hospitalization admissions by including all admissions with a type of service that indicated admission was to an impatient hospital (type of service = 01) in the quarter. We used the Medicaid payment to capture inpatient payments during the quarter and dichotomized to capture whether there were any inpatient payments during the quarter indicating whether there was any admission during the quarter (1 = Admission, 0 = No Admission).

A-2.2.2 Expenditures

Weighted average expenditures were calculated on a per member per month (PMPM) basis. For each individual, PMPM payments were estimated as one-third of his or her quarterly payments. Expenditures were defined as payments made by Medicaid. Averages included all individuals in the sample, so that the figures also reflected the presence of individuals with zero medical costs. The payments were not risk adjusted[41] or price standardized across geographic areas. Negative payments on claims were set to zero for total expenditures. Depending on the type of claim, claims were included in a period's total if discharge or service date on the claim was during the period.

- **Total:** This represents overall net payment amounts from all inpatient and other therapy (services outside the hospital) claims and RX and LT claims. This includes capitated payments from the OT claims.
- **Inpatient:** This represents the sum of Medicaid payments for hospital-related services during all inpatient admissions for the beneficiary.
- **Other Therapy:** This includes physician and professional services, outpatient and clinic, durable medical equipment, hospice, and home health not occurring during an inpatient stay. Fee-for-service and capitated payments were included.

A-2.2.3 Quality of care

To evaluate the impact of PCMH in Arkansas on quality of care, we report the following measures. The measures were calculated annually for all eligible beneficiaries in the intervention and comparison groups.

---

[41] Although the expenditures were not formally risk adjusted, the comparison groups were weighted by the propensity score (see ***Section A-2.3***), which includes some risk adjustment measures.

- **Percentage of women 41–69 years old who had a mammogram to screen for breast cancer during the measurement year.** This is the percentage of women ages 41–69 years at the start of the measurement year who were screened for breast cancer (procedure code = 8736, 8737, 77055–77057, G0202, G0204, or G0206 or revenue code = 0401 or 0403). Women were excluded from the denominator if they were not enrolled for at least 11 of the 12 months of the year or ever had a bilateral mastectomy or two unilateral mastectomies (procedure code = 8541, 8543, 8545, 8547, or 19303–19307).
- **Percentage of those 18–75 with Type 1 or Type 2 Diabetes who received an HbA1c test during the year (NQF #0057).** To identify those diagnosed with diabetes we followed these steps where we used diagnosis codes 250xx, 357.2x, 362.0x, 366.41, and 648.0x to identify a diabetes diagnosis:
  - ***At least two outpatient visits with a diabetes diagnosis.*** Where procedure codes equal 99201–99205, 99211–99215, 99217–99220, 99241–99245, 99341–99345, 99347–99350, 99381–99387, 99391–99397, 99401–99404, 99411, 99412, 99420, 99429, 99455, 99456, G0402, G0438, G0439 (when PRCRD_CD_SYS = 01, 06) OR UB_92_REV_CD = 510–517, 519–523, 526–529, 982–983.
  - ***Identify at least one ED visit with a diagnosis of diabetes during the year or the year prior.*** Using diagnosis codes 250xx, 357.2x, 362.0x, 366.41, 648.0x AND where procedure code equals 99281–99285 OR UR_92_REV_CD = 0450, 0451, 0452, 0456, 0459, 0981.
  - ***At least one acute inpatient stay with a diagnosis of diabetes during the measurement year or previous year.*** We created a count of inpatient stays where the diagnosis codes equal 250xx, 357.2x, 362.0x, 366.41, or 648.0x and (PRCDR_CD_X = 99221–99223, 99231–99233, 99238, 99239, 99251–99255, 99291, OR UB_92_REV_CD_GP_X = 100, 101,110, 111, 112, 113, 114, 119, 120–124, 129, 130–134, 139, 140–144, 149, 150–154, 159, 160, 167, 169, 200–204, 206–214, 219, 720–724, 729, 987).
  - ***Identify non-acute stays with a diagnosis of diabetes during the year or the previous year.*** Flagged non-acute stays diabetes diagnosis where the procedure code equals 99305–99310, 99315–99318, 99324, 99325, 99326, 99327, 99328, 99334, 99335, 99336, 99337, OR UB_92_REV_CD_GP_X = 118, 128, 138, 148, 158, 190, 191, 192, 193, 194, 199, 524, 525, 550, 551, 552, 559, 660, 661, 662, 663, 669.
  - ***Identify other diabetes diagnosis during the year or the previous year using the RX claims.*** Flag claims where the NCD code equal values in the spreadsheet provided in the NQF 0057 documentation.
  - ***Exclude those with a diagnosis of polycystic ovaries, in any setting, any time in the patient's history through December 31 of the measurement year, or a diagnosis of gestational or steroid-induced diabetes, in any setting, during the measurement year or the year prior to the measurement year.*** Using diagnosis codes 256.4 OR 249, 249.01, 249.11, 249.2, 249.21, 249.3, 249.31, 249.4, 249.41,

249.5, 249.51, 249.6, 249.61, 249.7, 249.71, 249.8, 249.81, 249.9, 249.91, 251.8, 648.8, 648.81, 648.82, 648.83, 648.84, 962 during the year or previous year.

  - ***Among those who met the criteria above, identify those who received an HbA1c test during the year.*** We identified those with OT procedure codes 83036, 83037, when PRCRD_CD_SYS = 01,06. We also checked for potential CPT II codes 3044F, 3045F, or 3046F.

- **Percentage of patients ages 5–64 years with persistent asthma who were appropriately prescribed medication during the year.** This is the percentage of patients identified with persistent asthma who had an asthma medication dispensed to them during the year. To identify patients with persistent asthma, the patient had to be 5–64 years old and have a diagnosis for asthma (ICD-9 diagnosis codes 493.0, 493.1, 493.8, 493.9) that met at least one of the following four criteria:

  - ***At least one ED visit with asthma as the principal diagnosis.*** (CPT code = 99281–99285 or revenue code = 045x, 0981)

  - ***At least one acute inpatient discharge with asthma as the principal diagnosis.*** (CPT code = 99221–99223, 99231–99233, 99238, 99239, 99251–99255, 99291, or revenue code = 010x, 0110–0114, 0119, 0120–0124, 0129, 0130–0134, 0139, 0140–0144, 0149, 0150–0154, 0159, 016x, 020x, 021x, 072x, 0987).

  - ***At least four outpatient visits on different dates of service, with asthma as one of the listed diagnoses and at least two asthma medication dispensing events.*** To identify outpatient visits, CPT code = 99201–99205, 99211–99215, 99217–99220, 99241–99245, 99341–99345, 99347–99350, 99382–99386, 99392–99396, 99401–99404, 99411, 99412, 99420, 99429, and revenue code = 051x, 0520–0523, 0526–0529, 057x- 059x, 0982, 0983. Asthma medication events were identified using the list of asthma medications in ***Table A-2-1***.

  - ***At least four asthma medication dispensing events.*** Asthma medication events were identified using the list of asthma medications in the table below. If all four dispensing events were “leukotriene modifiers,” the individual also needed a diagnosis of asthma for any kind of service.

  - Patients diagnosed with emphysema, COPD, cystic fibrosis, and acute respiratory failure in the prior year were excluded from the denominator (ICD-9 diagnosis codes 492, 518.1, 518.2, 491.2, 493.2, 496, 506.4, 277.0, and 518.81).

For individuals who met the above asthma criteria, we flagged whether they were dispensed at least one prescription for one of the asthma controller medications in ***Table A-2-1*** during the measurement year and calculated the percentage.

Table A-2-1. Asthma medications list

Description	Prescriptions		
Antiasthmatic combinations	• Dyphylline-guaifenesin	• Guaifenesin-theophylline	• Potassium iodide-theophylline
Antibody inhibitor	• Omalizumab		
Inhaled steroid combinations	• Budesonide-formoterol	• Fluticasone-salmeterol	• Mometasone-formoterol
Inhaled corticosteroids	• Beclomethasone • Budesonide • Ciclesonide	• Flunisolide • Fluticasone CFC free • Mometasone	• Triamcinolone
Leukotriene modifiers	• Montelukast	• Zafirlukast	• Zileuton
Long-acting, inhaled beta-2 agonists	• Aformoterol • Indacaterol	• Formoterol • Salmeterol	
Mast cell stabilizers	• Cromolyn	• Nedocromil	
Methylxanthines	• Aminophylline • Dyphylline	• Oxtriphylline • Theophylline	
Short-acting, inhaled beta-2 agonists	• Albuterol • Levalbuterol	• Metaproterenol • Pirbuterol	

- **Percentage of children between 6 and 12 years of age who were newly prescribed ADHD medication who had one follow-up visit with a prescribing practitioner within 30 days.** To identify those with ADHD we used RX claims to find any National Drug Codes that are found in ***Table A-2-2***.
  - ***Test for negative medication history.*** For each member identified in step 1, test each ADHD prescription for a negative medication history. The index prescription start date (IPSD) is the dispensing date of the earliest ADHD prescription in the intake period with a negative medication history.
  - ***Calculate continuous enrollment.*** Members must be continuously enrolled for 120 days prior to the IPSD through 30 days after the IPSD.
  - ***Exclude members*** who had an acute inpatient claim/encounter with a principal diagnosis of mental health (ICD-9-CM diagnosis code: 290.xx–319.xx**)** or substance abuse (***Table A-2-3***) during the 30 days after the IPSD.

Table A-2-2. ADHD medications description

Description	Prescriptions		
CNS stimulants	• amphetamine-dextroamphetamine • atomoxetine • dexmethylphenidate	• dextroamphetamine • lisdexamfetamine • methamphetamine	• methylphenidate

CNS = Central Nervous System.

Table A-2-3. Codes to identify substance abuse

Principal ICD-9-CM Diagnosis		
291–292, 303–305		
Principal ICD-9-CM Diagnosis		**Secondary ICD-9-CM Diagnosis**
960–979	**WITH**	291–292, 303–304, 305.0, 305.2–305.9, 535.3, 571.1

- Among those identified, we selected individuals meeting the criteria for the first part of this measure as:
  - Having an outpatient, intensive outpatient, or partial hospitalization follow-up visit with a practitioner with prescribing authority within 30 days after the earliest prescription dispensing date for a new ADHD medication. Any of the following code combinations billed by a practitioner with prescribing authority meet criteria (***Table A-2-4***).

Table A-2-4. Codes to identify follow-up visits

CPT	HCPCS	UB Revenue
90804–90815, 96150–96154, 98960–98962, 99078, 99201–99205, 99211–99215, 99217–99220, 99241–99245, 99341–99345, 99347–99350, 99383, 99384, 99393, 99394, 99401–99404, 99411, 99412, 99510	G0155, G0176, G0177, H0002, H0004, H0031, H0034-H0037, H0039, H0040, H2000, H2001, H2010-H2020, M0064, S0201, S9480, S9484, S9485	0510, 0513, 0515—517, 0519–0523, 0526–0529, 077x, 0900, 0902–0905, 0907, 0911–0917, 0919, 0982, 0983
CPT		**POS**
90801, 90802, 90816–90819, 90821–90824, 90826–90829, 90845, 90847, 90849, 90853, 90857, 90862, 90875, 90876	***WITH***	03, 05, 07, 09, 11, 12, 13, 14, 15, 20, 22, 33, 49, 50, 52, 53, 71, 72
99221–99223, 99231–99233, 99238, 99239, 99251–99255	***WITH***	52, 53

A-2.3 Comparison group and propensity score weighting

For the impact analysis, we used a pre-post comparison group design in which the comparison group provides an estimate of what would have happened in the PCMH group absent the PCMH's effect. The difference in the changes over time from the pretest to the test period between the PCMH group and comparison group provides an estimate of the impact of the PCMH model in Arkansas. The comparison group should be similar to the intervention group on all relevant dimensions (e.g., demographic, socioeconomic, political, regulatory, and health and health systems) except for the policy change being tested.

In the following section, we detail the procedures we used to select the comparison group.

A-2.3.1 Selection of intervention and comparison groups

PCMH rollout for Medicaid beneficiaries began with the first group of practices starting January 1, 2014, and with subsequent groups of practices starting July 1, 2014, and January 1, 2015. This staggered rollout created an opportunity to identify beneficiaries who were assigned to PCMHs in the early and later waves of enrollment and use them as the intervention and comparison groups, respectively.

One approach to attributing beneficiaries to the intervention and comparison group practices is to assign them based on a plurality of visits. However, the MAX data has up to 40 percent missing values for NPI so we were unable to reliably observe which provider was seen for beneficiary visits. To account for this limitation, Arkansas supplied a beneficiary and practice enrollment file, described above. We used the beneficiary enrollment files to identify beneficiaries who were assigned to a PCMH that newly enrolled in January 2014. These beneficiaries were included in the intervention group. To identify the comparison group beneficiaries, we selected beneficiaries who were assigned to practices that enrolled in the PCMH model in 2015. We used an intent-to-treat approach to beneficiary attribution; that is, any beneficiary assigned to a 2014 PCMH remained assigned to that practice for the duration of the study period, as long as they continued to meet the eligibility criteria (not eligible for Medicare benefits, no restricted benefits).

To ensure that a full year of post data was available, we excluded from the intervention and comparison groups those practices that started in the PCMH model in July 2014, and treatment and comparison Medicaid enrollees assigned to practices at any other point in the year, respectively. We include all Medicaid beneficiaries eligible for full benefits; we exclude Medicaid beneficiaries eligible for only a restricted set of benefits, such as family planning program beneficiaries, who may not be eligible for participation in the model. Medicaid claims present only a partial picture of health care use among beneficiaries dually enrolled in Medicare and Medicaid.

A-2.3.2 Calculation of person-level weights

To balance the population characteristics for the claims-based analyses, we estimated propensity scores for all beneficiaries in the comparison group. A propensity score is the probability that an individual is from the PCMH group rather than the comparison group. The objective of propensity score modeling is to create a weighted comparison group with characteristics equivalent to those of the intervention group. To the extent that these characteristics are correlated with expenditure, utilization, and quality outcomes, propensity weighting also will help balance pre-initiative levels of the outcomes.

Person-level characteristics

The initial step in the process was to select person-level characteristics to be used in each propensity score model. ***Table A-2-5*** shows the characteristics used grouped by whether they control for demographic, health status, practice, or area-level characteristics.

Table A-2-5. Covariates for propensity score logistic regressions

Covariates
Demographic characteristics
Gender
Age
Race category
Health plan characteristics
Medicaid eligibility category (infant, child, nondisabled adult, blind/disabled)
Continuous enrollment indicator (yes/no)
Health status measures
Chronic Illness and Disability Payment score
Diabetes
End-Stage Renal Disease
Heart disease
Practice-level characteristics
Number of providers in the practice
Proportion of providers who are primary care practitioners
Area-level characteristics
Non-Metropolitan County
Number of Medicaid enrollees in the county, 2013
County-level median income, 2013
Number of primary care providers in the county, 2013
County-level unemployment rate, 2013

Estimation and weighting procedures

Medicaid beneficiaries were not randomly assigned to the PCMH or comparison group. As a result, there may be observed sociodemographic, geographic, and practice characteristics that differ between PCMH-attributed beneficiaries and comparison group beneficiaries, and these differences may influence the results. To address this, we used propensity score weighting to statistically adjust the study sample. To apply propensity score weighting, we first used logistic regression to predict a Medicaid beneficiary's likelihood of being attributed to a 2014 PCMH based on select sociodemographic and geographic characteristics (described in ***Section A-2.4***). This predicted likelihood is known as the propensity score. We then took the inverse of the propensity score to create what is known as the inverse probability weight. We then applied each comparison group member's inverse probability weight to our regression models. PCMH-attributed beneficiaries received an inverse probability weight of one. By applying these weights, the comparison group is made to look more like the intervention group. We demonstrate in ***Tables A-2-6*** to ***A-2-10*** that by applying this weight PCMH and comparison group beneficiaries look similar on several selected characteristics.

There are other methods to apply propensity scores to an analysis. Aside from weighting, one frequently used method is matching, whereby a PCMH beneficiary is matched to a comparison group beneficiary who has a similar propensity score. Although we considered this method, we decided not to pursue it for several reasons. Propensity score weighting has been shown to produce less biased estimates, less modeling error (e.g., mean squared error, type 1 error) and more accurate variance estimation and confidence intervals when modeling dichotomous outcomes; this analysis includes many dichotomous utilization and quality of care outcomes. Finally, with matching PCMH beneficiaries and potential comparison group beneficiaries may be excluded from the analysis if a good match cannot be found. Weighting has the advantage of preserving sample size.

Using the characteristics listed in ***Table A-2-5***, we estimated propensity models by logistic regression, in which the outcome was "PCMH = 1," else PCMH = 0 where 0 = late enrollees. Separate models were estimated for each year of the analysis (2010–2014).

We then capped weights at a maximum value of 20 and trimmed the minimum weight to 0.05 to prevent any single individual from having undue influence on the results. This resulted in approximately 1 percent or less of the sample being capped or trimmed each year.

A-2.4 Propensity model evaluation

We evaluated several aspects of the propensity score models. First, we examined plots of predicted probabilities to ensure sufficient overlap in the distributions of the PCMH and comparison groups. This feature, known as common support, is critical because it provides the basis for inferring effects from group comparisons. We found that scores in both groups adequately covered the same ranges.

Second, we compared the logistic results for the PCMH and comparison groups for the four pre-intervention years (2010–2013) to determine whether the same characteristics were influential over time. With a few minor exceptions, we found that the models were similar each year. This is not surprising, because the same individuals frequently appear in the databases for multiple years. The variables with the greatest impact in the propensity score models were the proportion of providers within the practice who were primary care providers and whether the beneficiary met the criteria to be eligible for Arkansas's cancer-related Medicaid program. In each year, each unit increase in the proportion of the practice that are primary care providers was associated between 1.52 and 1.79 decrease in the logged-odds of being assigned to a PCMH ($p < 0.01$), whereas being eligible for Arkansas's cancer-related Medicaid program increased the logged-odds of PCMH assignment by 1.57 and 2.01 ($p < 0.01$) each year except 2014. There were no Medicaid beneficiaries who met the cancer-related eligibility category in 2014.

Finally, we compared unweighted and propensity-weighted means for the characteristics in the model. As expected, we found that, after weighting, the comparison group means were within a few percentage points of the values among those in the PCMH group.

Figures A-2-1 to ***A-2-5*** show the distribution of both the unweighted and weighted propensity scores by intervention and comparison group during the year. In each year, we found a substantial portion of the comparison group have weighted and unweighted propensity weights overlap with the treatment group. However, we see that a greater proportion of the treatment group has values that are closer to 1, relative to the comparison group. For example, the median propensity score for the intervention group in 2010 was 0.95, whereas it was 0.91 for the comparison group. As a way to test whether the intervention and comparison groups have a similar distribution of propensity scores, we conducted a univariate weighted quantile regression to compare the median of the weighted propensity score between the two groups in each year, clustering observations at the NPI level and bootstrapping standard errors. Across any year, we did not detect differences in the median value of the propensity score between the intervention group and the comparison group.

Figure A-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2010

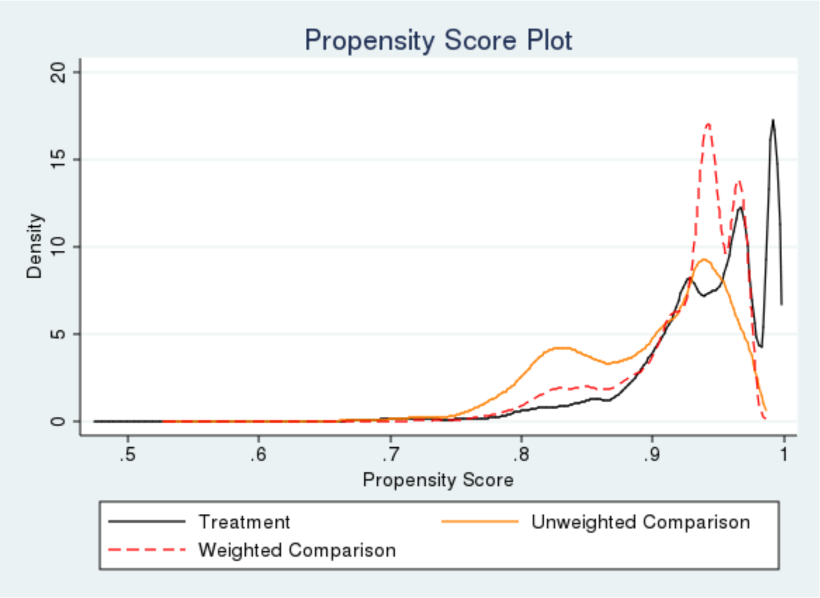


Figure A-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2011

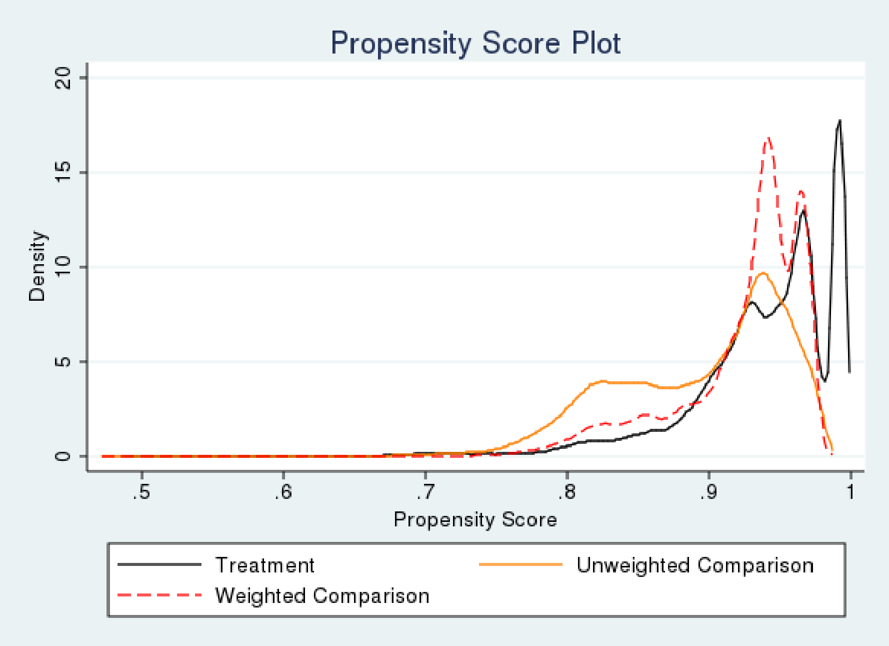


Figure A-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2012

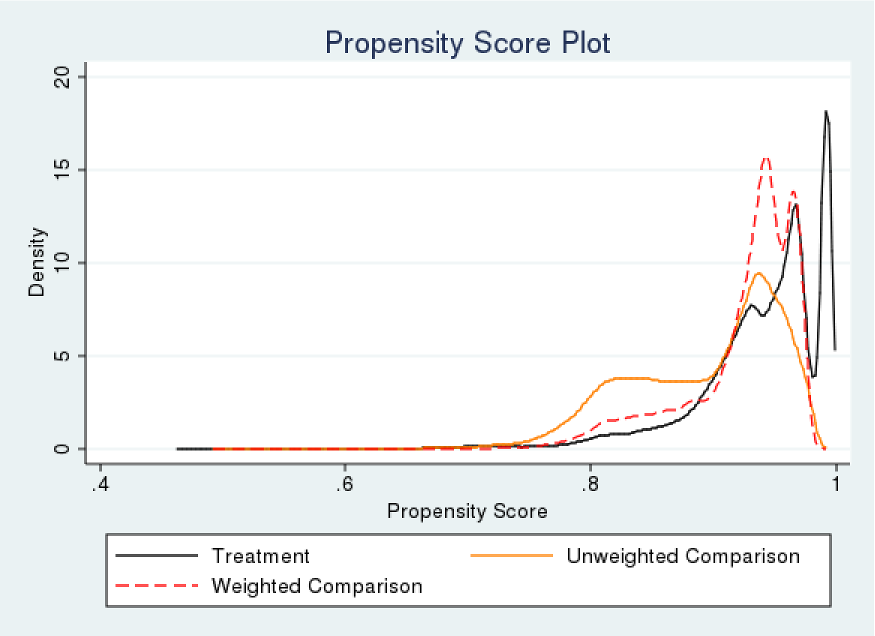


Figure A-2-4. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2013

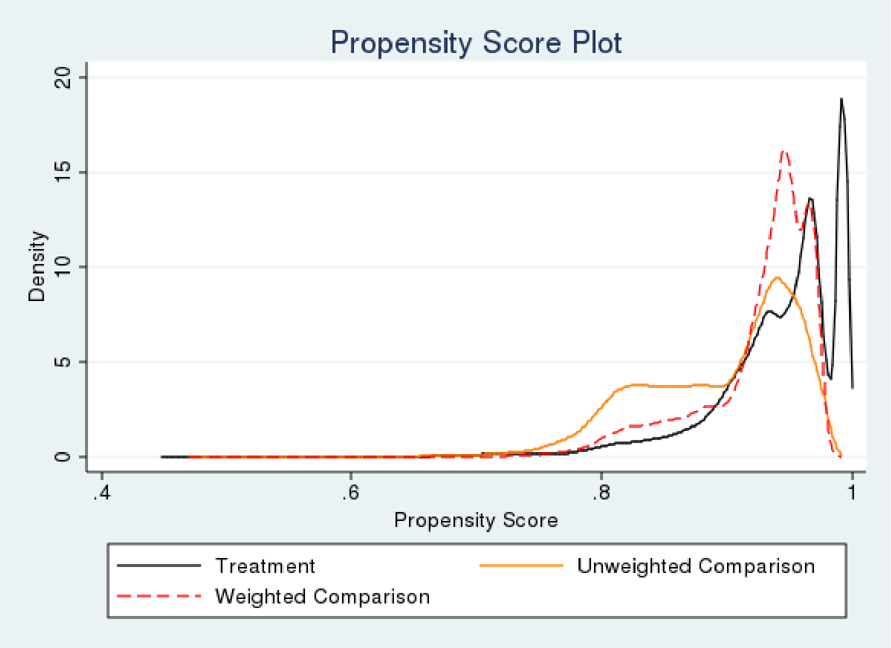
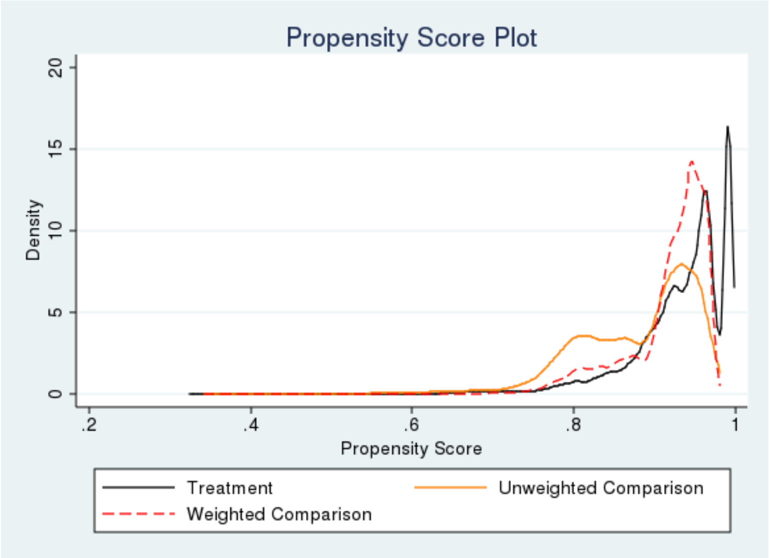


Figure A-2-5. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2014



Tables A-2-6 to ***A-2-10*** show unweighted and (propensity score) weighted means/proportions for those in the PCMH and comparison groups. Individual characteristics such as race and age and provider- and area-level characteristics appear unbalanced in unweighted comparisons. The propensity-score weighted means/proportions substantially mitigate any observed covariate imbalance, with the exception of the number of providers in the practice and the proportion who are primary care practitioners. The standardized differences for these were 40.3 and 37.8 percent, respectively. However, the magnitude of the differences between the groups were small (8 vs. 13 providers per practice, and both groups had average proportion of primary care providers greater than 90 percent). After applying the propensity weights, the standardized differences in the number of Medicaid enrollees was reduced to approximately 13 percent each year, and median income per county was reduced to 15 percent each year. Area-level covariates can often have small standard deviations, so that even small observed differences across groups can exceed the standardized difference imbalance criterion. To improve balance across these variables, we tried interactions and squared-terms but were unable to meet the 10 percent standardized difference threshold. All covariates were also included as control variables in the outcome models so as to account for differences.

We also assessed the balance for the subgroups included for quality measures (adults with diabetes, individuals age 5 to 64 years diagnosed with asthma, women age 41–69 with breast cancer screening, and individuals diagnosed with ADHD). We found that the standardized difference was larger than 10 percent for several measures across the subgroups. All covariates included in the propensity score model are also included in the regression model, so the results are adjusted for this imbalance.

Table A-2-6. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2010

	Unweighted			Weighted		
	PCMH group	Comparison group	Standardized difference[a]	PCMH group	Comparison group	Standardized difference[a]
N	157,386	11,034		157,327	121,291	
Male	49.9	49.6	0.6	49.9	49.5	0.9
Age	9.1	10.5	12.3	9.1	9.7	5.6
White	48.6	58.4	19.8	48.6	53.6	10.0
Black	31.1	20.9	23.6	31.1	25.8	11.8
AI/AN	10.0	10.3	1.0	10.0	9.8	0.9
Asian	0.6	1.2	6.7	0.6	0.9	3.6
Hispanic	0.2	0.5	4.9	0.2	0.3	2.5
NH/PI	0.7	0.7	0.2	0.7	0.9	2.3
Hispanic and other	8.8	8.0	2.9	8.8	8.8	0.0
CDPS Score	1.1	1.1	2.6	1.1	1.1	0.1
Diabetes	1.1	1.3	1.8	1.1	1.2	1.6
ESRD	3.4	4.3	4.7	3.4	3.4	0.1
Heart disease	0.3	0.2	1.8	0.3	0.2	1.0
Child/TANF/income	83.3	83.0	0.8	83.3	83.4	0.2
Adult/TANF/income	1.3	1.6	2.5	1.3	1.4	0.8
Blind/disabled	15.2	15.3	0.2	15.2	15.1	0.3
Medically needy	0.2	0.1	1.4	0.2	0.1	1.1
Cancer	0.0	0.0	2.7	-	-	-
Continuously enrolled	82.5	82.1	1.0	82.5	82.4	0.1
Number of providers	13.3	6.0	67.0	13.3	7.9	42.4
Proportion primary care	0.9	1.0	48.8	0.9	1.0	32.1
Rural	39.4	57.6	37.1	39.4	39.9	0.9
Number of enrollees per county	37,651.7	23,747.3	41.6	37,652.6	31,259.4	18.2
Median Income per county	41,530.4	38,869.4	39.5	41,530.4	40,235.7	18.5
Number of primary care per county	417.2	217.0	37.2	417.2	312.2	18.2
Unemployment rate per county	7.9	7.8	4.4	7.9	8.0	3.8

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH= patient-centered medical home; TANF = Temporary Assistance for Needy Families.

[a] Absolute standardized differences are expressed as percentages.

Table A-2-7. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2011

	Unweighted			Weighted		
	PCMH group	Comparison group	Standardized difference[a]	PCMH group	Comparison group	Standardized difference[a]
N	173,725	12,063		173,725	133,585	
Male	50.0	49.9	0.2	50.0	49.5	0.9
Age	9.6	11.0	12.3	9.6	10.2	5.4
White	48.8	58.6	19.7	48.8	53.6	9.6
Black	30.0	20.4	22.4	30.0	25.2	10.8
AI/AN	10.5	10.6	0.5	10.5	10.2	1.1
Asian	0.6	1.3	6.7	0.6	1.0	3.7
Hispanic	0.2	0.5	4.7	0.2	0.3	2.0
NH/PI	0.9	1.1	1.7	0.9	1.2	2.9
Hispanic and other	8.9	7.5	4.9	8.9	8.5	1.3
CDPS Score	1.2	1.1	2.1	1.2	1.2	0.1
Diabetes	1.1	1.3	1.9	1.1	1.2	1.2
ESRD	3.4	4.2	4.7	3.4	3.5	0.9
Heart disease	0.2	0.2	0.4	0.2	0.2	0.6
Child/TANF/income	82.8	82.8	0.2	82.8	83.1	0.7
Adult/TANF/income	1.3	1.6	2.6	1.3	1.5	1.0
Blind/disabled	15.6	15.5	0.4	15.6	15.3	0.8
Medically needy	0.2	0.1	2.3	0.2	0.1	1.0
Cancer	0.0	0.0	2.2	0.0	0.0	1.7
Continuously enrolled	84.6	83.5	3.0	84.6	840	1.6
Number of providers	13.4	6.0	67.1	13.4	7.9	42.8
Proportion primary care	0.9	1.0	48.1	0.9	1.0	31.8
Rural	39.0	57.4	37.6	39.0	39.8	1.6
Number of enrollees per county	37,656.3	23,784.8	41.6	37,656.3	31,207.0	18.4
Median Income per county	41,660.2	38,838.9	42.2	41,660.2	40,263.5	20.0
Number of primary care per county	415.9	217.4	37.0	415.9	310.6	18.4
Unemployment rate per county	7.9	7.8	2.5	7.9	7.9	5.2

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH = patient-centered medical home; TANF = Temporary Assistance for Needy Families.

[a] Absolute standardized differences are expressed as percentages.

Table A-2-8. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2012

	Unweighted			Weighted		
	PCMH group	Comparison group	Standardized difference[a]	PCMH group	Comparison group	Standardized difference[a]
N	194,647	13,523		194,647	149,096	
Male	50.2	49.8	0.7	50.2	49.7	1.0
Age	10.1	11.5	12.7	10.1	10.7	5.8
White	48.8	58.2	19.0	48.8	53.3	9.2
Black	29.0	19.6	22.0	29.0	24.7	9.7
AI/AN	10.7	10.9	0.6	10.7	10.2	1.5
Asian	0.7	1.5	7.5	0.7	1.0	3.2
Hispanic	0.2	0.4	4.1	0.2	0.3	2.3
NH/PI	1.1	1.4	2.6	1.1	1.4	3.1
Hispanic and other	9.6	8.0	5.5	9.6	9.0	2.0
CDPS Score	1.2	1.1	2.9	1.2	1.2	0.7
Diabetes	1.2	1.4	2.6	1.2	1.3	1.6
ESRD	3.4	4.2	4.0	3.4	3.5	0.2
Heart disease	0.3	0.2	0.4	0.3	0.3	0.2
Child/TANF/income	82.5	82.8	0.8	82.5	82.9	1.0
Adult/TANF/income	1.5	1.8	2.7	1.5	1.7	1.3
Blind/disabled	15.8	15.2	1.6	15.8	15.3	1.3
Medically needy	0.2	0.2	1.1	0.2	0.2	0.7
Cancer	0.1	0.0	1.6	0.1	0.0	1.0
Continuously enrolled	85.0	83.4	4.5	85.0	85.1	0.3
Number of providers	13.5	6.1	67.4	13.5	8.0	43.0
Proportion primary care	0.9	1.0	47.7	0.9	1.0	31.6
Rural	38.6	57.4	38.2	38.6	39.4	1.0
Number of enrollees per county	37,746.7	23,688.1	42.4	37,746.7	31,474.2	18.0
Median Income per county	41,775.8	38,826.0	43.9	41,775.8	40,332.9	20.7
Number primary care per county	416.0	214.9	37.7	416.0	313.4	18.0
Unemployment rate per county	7.8	7.8	1.8	7.8	7.9	5.0

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH = patient-centered medical home; TANF = Temporary Assistance for Needy Families.

[a] Absolute standardized differences are expressed as percentages.

Table A-2-9. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2013

	Unweighted			Weighted		
	PCMH group	Comparison group	Standardized difference[a]	PCMH group	Comparison group	Standardized difference[a]
N	219,919	14,870		219,219	166,719	
Male	50.1	49.8	0.7	50.1	49.7	1.0
Age	10.5	12.2	14.9	10.5	11.1	6.2
White	49.0	58.0	18.0	49.0	53.2	8.5
Black	28.0	18.7	22.1	28.0	24.2	8.6
AI/AN	10.7	11.1	1.4	10.7	10.1	2.1
Asian	0.8	1.7	8.0	0.8	1.1	3.0
Hispanic	0.2	0.4	3.9	0.2	0.3	2.1
NH/PI	1.2	1.7	4.5	1.2	1.6	3.6
Hispanic and other	10.1	8.4	6.0	10.1	9.5	2.1
CDPS Score	1.2	1.1	4.7	1.2	1.2	0.7
Diabetes	1.2	1.5	3.2	1.2	1.3	1.4
ESRD	3.7	4.4	3.3	3.7	3.9	1.0
Heart disease	0.2	0.2	0.1	0.2	0.2	0.3
Child/TANF/income	82.4	82.4	0.1	82.4	82.7	0.8
Adult/TANF/income	1.9	2.3	3.3	1.9	2.1	1.3
Blind/disabled	15.5	15.1	1.0	15.5	15.0	1.1
Medically needy	0.2	0.1	2.5	0.2	0.1	1.6
Cancer	0.1	0.0	2.4	0.1	0.0	1.4
Continuously enrolled	88.1	86.8	3.8	88.1	88.2	0.3
Number of providers	13.6	6.2	67.6	13.6	7.7	45.8
Proportion primary care	0.9	1.0	47.2	0.9	1.0	31.9
Rural	38.4	57.6	39.2	38.4	39.2	1.8
Number of enrollees per county	37,721.8	23,386.6	43.5	37,721.8	31,520.4	17.8
Median Income per county	41,859.4	38,766.8	46.3	41,859.4	40,353.9	21.5
Number primary care per county	414.7	210.0	38.7	414.7	314.5	17.7
Unemployment rate per county	7.8	7.8	0.6	7.8	7.9	5.2

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH = patient-centered medical home; TANF = Temporary Assistance for Needy Families.

[a] Absolute standardized differences are expressed as percentages.

Table A-2-10. Unweighted and weighted means and standardized differences, PCMH and comparison groups, 2014

	Unweighted			Weighted		
	PCMH group	Comparison group	Standardized difference[a]	PCMH group	Comparison group	Standardized difference[a]
N	217,961	17,070		217,961	172,134	
Male	50.0	49.0	2.0	50.0	49.3	1.5
Age	11.4	13.0	14.6	11.4	11.9	4.9
White	48.7	58.5	19.7	48.7	52.9	8.4
Black	27.7	17.6	24.3	27.7	24.4	7.5
AI/AN	10.7	10.6	0.1	10.7	9.8	2.7
Asian	0.8	1.7	8.3	0.8	1.0	2.1
Hispanic	0.2	0.5	4.4	0.2	0.3	1.9
NH/PI	1.3	2.0	5.2	1.3	1.7	3.5
Hispanic and other	10.6	9.2	4.9	10.6	9.8	2.7
CDPS Score	1.0	1.0	1.2	1.0	1.0	0.4
Diabetes	1.3	1.4	1.2	1.3	1.5	1.8
ESRD	4.2	3.9	1.3	4.2	4.2	0.3
Heart disease	0.2	0.1	2.2	0.2	0.2	1.1
Child/TANF/income	82.1	80.9	3.1	82.1	82.7	1.6
Adult/TANF/income	2.1	5.1	15.8	2.1	2.4	1.7
Blind/disabled	15.6	13.9	4.7	15.6	14.8	2.3
Medically needy	0.1	0.1	2.5	0.1	0.1	1.3
Cancer	-	-	-	-	-	-
Continuously enrolled	91.4	88.5	9.8	91.4	91.0	1.7
Number of providers	13.5	6.3	66.5	13.5	8.0	42.8
Proportion primary care	0.9	1.0	45.7	0.9	1.0	31.8
Rural	38.4	58.0	39.9	38.4	38.9	0.9
Number of enrollees per county	37,537.4	22,915.2	44.8	37,537.4	31,775.1	16.4
Median Income per county	41,857.2	38,682.8	47.8	41,857.2	40,406.8	20.6
Number primary care per county	411.7	203.5	39.6	411.7	318.3	16.4
Unemployment rate per county	7.8	7.8	0.6	7.8	7.9	6.4

AI/AN = American Indian / Alaska Native; CDPS = Chronic Illness and Disability Payment System; ESRD = end-stage renal disease; NH/PI = Native Hawaiian/Pacific Islander; PCMH = patient-centered medical home; TANF = Temporary Assistance for Needy Families.

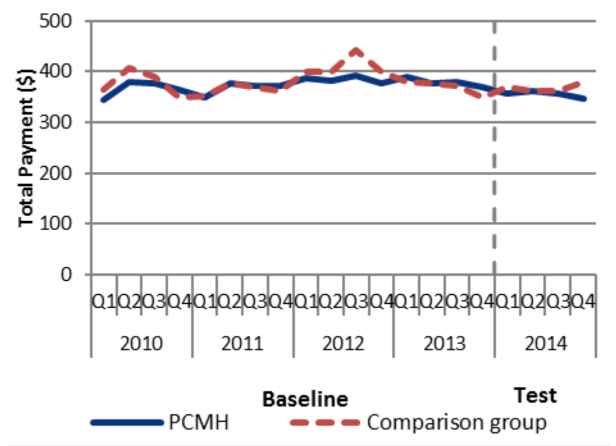
[a] Absolute standardized differences are expressed as percentages.

A-2.5 Statistical analysis

A-2.5.1 Regression model

The underlying assumption in D-in-D models estimating the impact of the SIM Initiative is that trends in the outcomes among individuals in the PCMH group and their respective comparison group would be similar absent the PCMH (i.e., that the two were on “parallel paths” prior to the start of the PCMH program). To illustrate baseline parallel trends of the utilization and expenditures, we present graphs of quarterly, unadjusted averages for PCMH-attributed beneficiaries and the comparison group for the baseline period (2010–2013) and the first year of implementation (2014).[42] ***Figures A-2-6***, ***A-2-7***, and ***A-2-8*** provide quarterly unadjusted averages of total payments, OT payments, and inpatient payments over the baseline and test periods. ***Figures A-2-9***, ***A-2-10***, and ***A-2-11*** provide quarterly unadjusted averages of ED visits, inpatient admissions, and physician visits over the baseline and test periods. ***Figures A-2-12***, ***A-2-13***, and ***A-2-14*** provide annual unadjusted averages of breast cancer screening, HbA1c testing, ADHD follow-up care, and appropriate asthma medication use and over the baseline and test periods.

Figure A-2-6. Total PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group



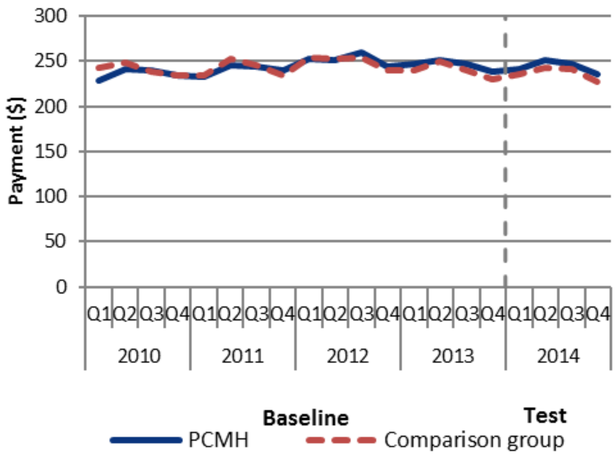
For Medicaid PCMH beneficiaries and the comparison group, **total PMPM[43] payments** were similar and remained fairly constant over the baseline and test periods. There was a small uptick in total PMPM payments among those in the comparison group beneficiaries in third quarter 2014.

---

[42] The quarterly averages were weighted by the product of two factors: (1) the fraction of the quarter during which the beneficiary was eligible for the analyses (the eligibility fraction) and (2) the beneficiary’s propensity score. Because the weighted quarterly averages are not adjusted for the covariates included in the regression model, the magnitude and direction of the trends in the weighted quarterly averages may differ from the regression-adjusted averages shown in the D-in-D tables.

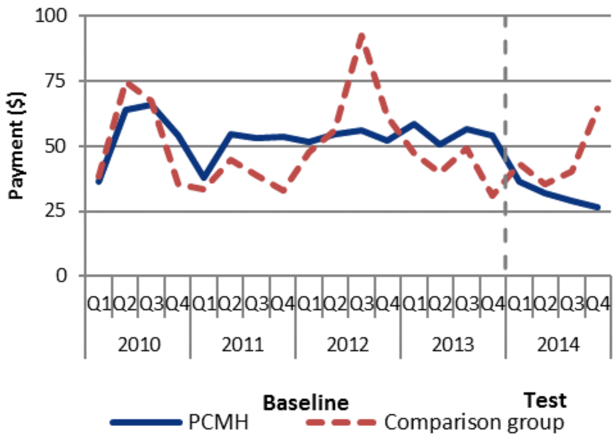
[43] Total payments include all OT, IP RX, and LT payments.

Figure A-2-7. Other therapy PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and comparison group



For Medicaid PCMH beneficiaries and the comparison group, **OT**[44] **PMPM payments** appeared similar and remained fairly constant over the baseline and test periods. There were no observable differences in OT payments over time between the PCMH and comparison groups.

Figure A-2-8. Inpatient PMPM payments, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group

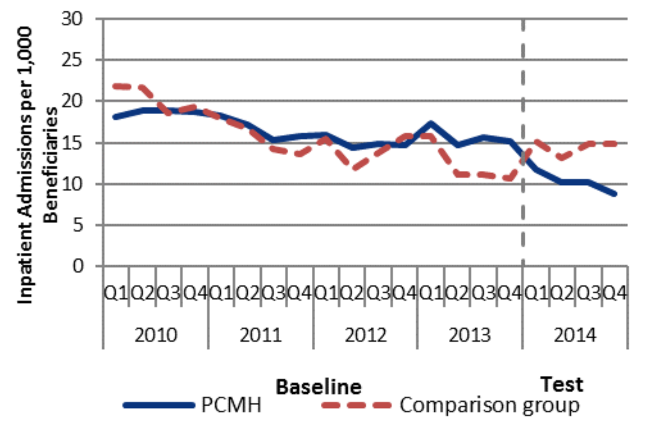


Average **inpatient PMPM payments** were similar for both the PCMH and comparison groups during the baseline and test periods. The comparison group experienced an uptick in spending in third quarter 2012, but then declined again to previous averages in fourth quarter 2012. Average inpatient PMPM payments for those in the PCMH group were consistent over time, with a slight decline from the baseline through the test period.

---

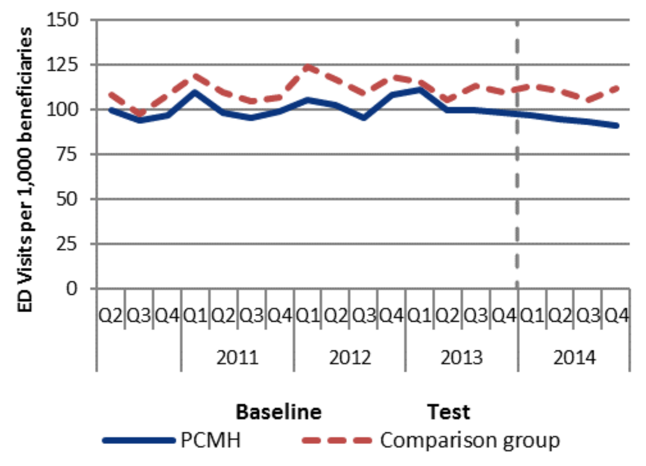
[44] OT payments include payments for professional and clinic services, labs/x-rays, ambulance services, durable medical equipment, home health, and other outpatient services.

Figure A-2-9. Inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group



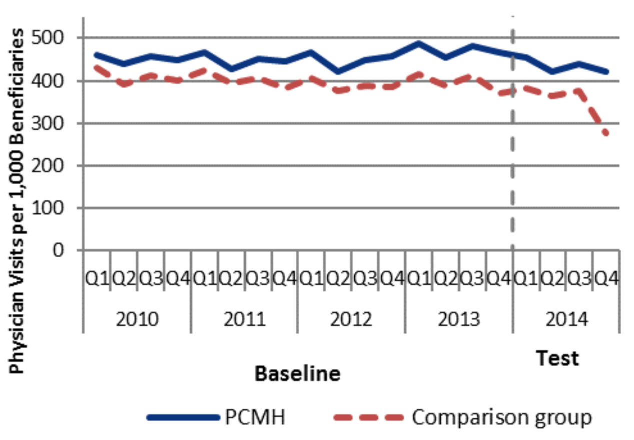
Inpatient admissions declined throughout the baseline and implementation period for Medicaid PCMH beneficiaries. In contrast, inpatient admissions declined during the baseline period then increased during the implementation period for beneficiaries in the comparison group (***Figure A-9***).

Figure A-2-10. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and comparison group



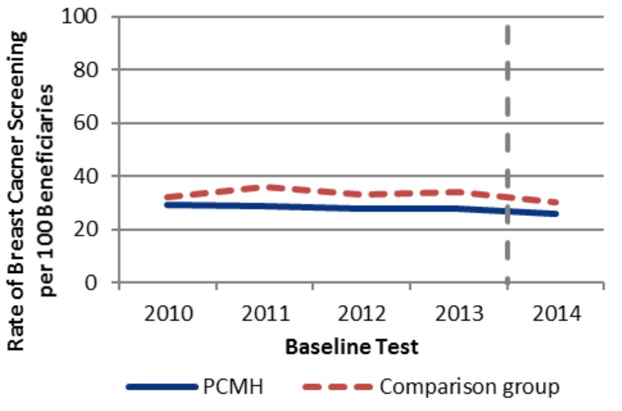
For those in both PCMH and the comparison group, rates of **ED visits** were similar and remained fairly constant over the baseline and test periods (***Figure A-10***). Medicaid beneficiaries in the PCMH group consistently had slightly lower ED visits per 1,000 beneficiaries.

Figure A-2-11. Physician visits per 1,000 Medicaid beneficiaries, first quarter 2010 through fourth quarter 2014, Arkansas Medicaid enrollees in PCMH and the comparison group



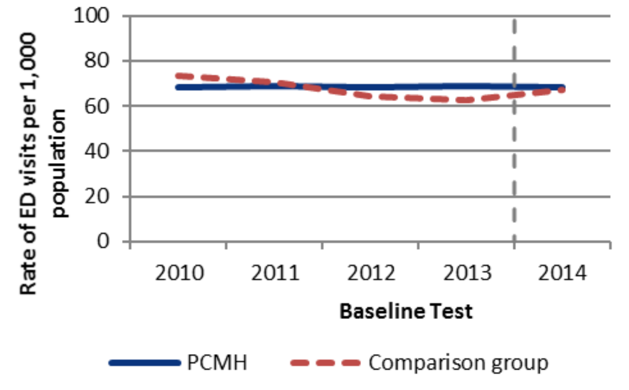
For those in both PCMH and the comparison group, rates of **physician visits** were similar and remained fairly constant over the baseline and test periods (***Figure A-11***). Medicaid beneficiaries in the PCMH group consistently had slightly higher physician visits per 1,000 beneficiaries.

Figure A-2-12. Breast cancer screening rate, Arkansas Medicaid enrollees in PCMH and the comparison group, women ages 41–69



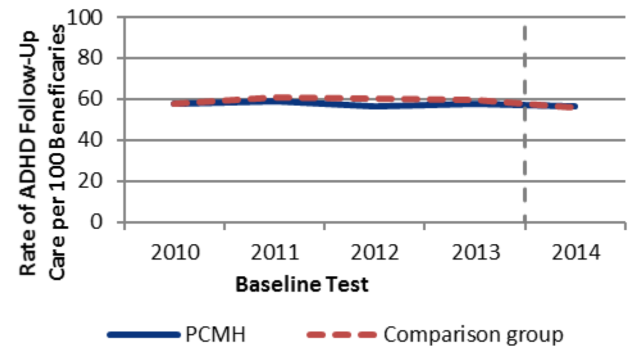
For Medicaid PCMH beneficiaries and the comparison group, **breast cancer screening rates per 100 beneficiaries** remained fairly constant over the baseline and test periods. There was a small decline in Arkansas from 2013 to 2014, whereas the comparison group had steady rates.

Figure A-2-13. HbA1c testing rate, Arkansas Medicaid enrollees in PCMH and the comparison group



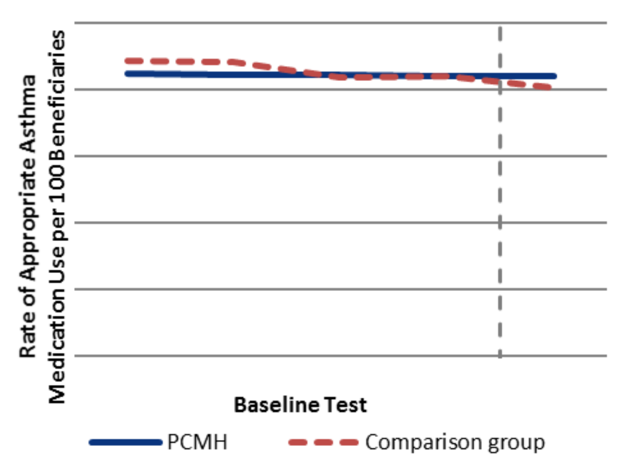
For Medicaid PCMH beneficiaries and the comparison group, **HbA1c testing per 100 beneficiaries** were similar; there was a small decline in the comparison group in 2013, the rate increased to comparable levels with the Arkansas in 2014, appeared similar, and remained fairly constant over the baseline and test periods. There were no observable differences in OT payments over time between the PCMH and comparison groups.

Figure A-2-14. Rate of follow-up after ADHD prescription, Arkansas Medicaid enrollees in PCMH and the comparison group, children ages 6–12



Average **percent of children with follow-up care for ADHD** were similar for both the PCMH and comparison groups during the baseline and test periods. There were no notable differences or trends identified between groups.

Figure A-2-15. Rate of asthma control medication use, Arkansas Medicaid enrollees in PCMH and the comparison group, ages 5–64 with Asthma



The percent of beneficiaries with **appropriate asthma medication use** was slightly higher for those in PCMH from 2010 to 2011, but similar and steady for both groups between 2012 and through 2014.

To assess the parallel assumption's validity, we modeled core expenditure and utilization outcomes during the baseline period with a linear time trend interacted with a dichotomous variable for being assigned to a PCMH. The following section describes the baseline analysis we conducted to inform the D-in-D model.

A quarterly fixed-effects model considered for the evaluation is shown in ***Equation A-2.1***:

$$\gamma = \alpha_0 + \alpha_1 I + \sum \beta_n Q_{n,b} + \sum \phi_t Q_{t,p} \bullet I + \delta X + \mu \qquad \text{(A-2.1)}$$

where

y = a performance measure (e.g., total PMPM cost per quarter) for the i-th beneficiary in the j-th group (test or comparison), in period t (i,j,t subscripts suppressed).

I = a 0,1 indicator (0 = comparison group, 1 = test group).

X = a vector of patient and demographic characteristics.

$Q_{n,b}$, $Q_{t,p}$ = 0,1 indicator of the n-th or t-th calendar quarter in the base (b) or post (p) period (n starts counting at first baseline period, whereas t starts with first SIM model quarter).

μ = error term.

The model in ***Equation A-2.1*** assumes that, except for an intercept difference α_0, the outcomes for beneficiaries in the intervention group and beneficiaries in the comparison groups followed a similar growth trend during the baseline period. We investigated whether the baseline period before the start of SIM activities satisfied the baseline trend assumptions of the D-in-D model in ***Equation A-2.1***—that is, whether the outcome trends for beneficiaries in intervention and in the comparison group were similar during this period. Because we have 16 baseline quarters, it is possible to assess whether baseline outcome trends were, in fact, similar across groups.

One option for testing the assumption that SIM participants and the comparison group had similar baseline trends is to estimate the model in ***Equation A-2.1*** for the baseline period only and expand the model by including a set of interactions between I_j (the Test indicator) and the indicators for the baseline quarters on the right-hand side of the model. Statistically significant interaction coefficients would indicate whether the outcome difference between the PCMH group and the comparison group increased or decreased in particular baseline quarters. However, it is difficult to make a judgment about a trend on the basis of a large number of interaction coefficients because it is not clear how to interpret the many sequences of significant and insignificant coefficients that could arise.[45]

As an alternative, simpler approach to testing the similarity of baseline trends, we used a model with a linear trend during the baseline period. We tested whether this trend differed for PCMH participants relative to comparison group participants. Specifically, the model for the outcomes may be written as follows:

$$y = \alpha_0 + \alpha_1 I + \theta \bullet t + \lambda I \bullet t + \delta X + \mu . \qquad \text{(A-2.2)}$$

---

[45] For example, suppose that the interactions coefficients for quarters 2, 5, and 8 are statistically significant. From such a pattern, it would be difficult to conclude whether outcome trends during the baseline period were similar or not.

In ***Equation A-2.2***, *y, I,* X, and μ are defined as in ***Equation A-2.1***. The variable *t* is linear time ranging from 1 to 16. The linear time trend in the comparison group is θ•*t*, whereas for test group beneficiaries (*I* = 1) it is (θ+λ)*t. Hence, λ measures the difference in linear trends and the *t*-statistic for this coefficient can be used to test the null hypothesis of equal trends (λ = 0). In other words, rejecting the null hypothesis would suggest that the assumption of equal trends underlying our outcome models is not met.

The parameters of ***Equation A-2.2*** were estimated using weighted least-squares regression models for six key outcomes. The weights are a function of the eligibility fraction and propensity scores. For each outcome, we report estimates and standard errors of the difference between the baseline trend in the test and the comparison groups (λ).

Tables A-2-11 and ***A-2-12*** show estimates of the baseline trend differences for the following outcomes:

- Total PMPM payments
- Inpatient PMPM payments
- Other therapy PMPM payments
- Probability of an ED visit
- Probability of an inpatient admission
- Probability of a physician visit

Table A-2-11. Differences in average quarterly PMPM Medicaid payments, Other Therapy Payments, and Inpatient payments during the baseline period, Arkansas SIM test and comparison group beneficiaries

Parameter estimate	Total ($)	Inpatient ($)	Other Therapy ($)
Test–CG trend difference	0.37	0.26	0.53
	(1.22)	(0.90)	(0.49)

CG = comparison group; PMPM = per member per month.

Baseline is the period January 2010–December 2013. The trend (slope) is the quarter-to-quarter change in PMPM expenditures or probability of use. Standard errors are given in parentheses. *p < 0.10; **p < 0.05; ***p < 0.01.

Table A-2-12. Differences in probability of use during the baseline period, PCMH and comparison group beneficiaries

Parameter estimate	Any inpatient admissions	Any ED visit	Any physician visit
Test–CG trend difference	.000404***	−.000040	.00290***
	(.000069)	(.000179)	(.000338)

CG = comparison group; ED = outpatient emergency department; PCMH = patient-centered medical home.

Baseline is the period January 2010–December 2013. The trend (slope) is the quarter-to-quarter change in probability of use. Standard errors are given in parentheses. *p < 0.10; **p < 0.05; ***p < 0.01. Convergence was not achieved in the physician visit model.

Among our utilization and expenditure outcomes, four of six passed the parallel assumptions test. Relative to the comparison group, there was no statistically significant difference in the baseline trend for total payments. Similarly, there were no statistically significant differences in the baseline trend of inpatient and other therapy payments. Relative to the comparison group, there was no statistically significant difference in the change in the probability of having an outpatient ED visit, whereas the probability of having any inpatient admission decreased slightly more slowly for those in the PCMH group (0.04 percentage points slower gain in the probability of an inpatient visit per quarter, $p < 0.01$, ***Table A-2-12***). In addition, over the baseline period, those in the PCMH group had a greater increase in the probability of having a physician visit, relative to the comparison group (0.29 percentage points, $p < 0.01$). These baseline trends may bias the results away from the null hypothesis.

We found that baseline trends did appear similar for expenditures and for ED visits and thus concluded that we can assume that the PCMH group and the comparison group were on a similar utilization and expenditure trajectory before the implementation of the PCMH model.

Difference-in-differences regression model—The D-in-D model is shown in ***Equation A-2.3***. Because there is only 1 year of post-period data in Arkansas, we decided to estimate the period effects as opposed to the quarterly effects. As in ***Equation A-2.1***, Y_{ijt} is the outcome for individual, *i,* in the test or comparison group, *j,* in the pre- or post-period, *t*; I_{ij} (= 0,1) is an indicator equal to 1 if the individual is in the test group and 0 if the individual is in its comparison group; P_{it} is an indicator for whether the observation is in the test period (Post = 1) or the baseline period (Post = 0). The interaction of the test group indicator and P_t ($I_{ij} * P_t$) measures the difference in the pre-post change between the test group and its comparison states.

$$Y_{ijt} = \alpha_0 + \beta_1 I_i + \beta_2 P_t + \gamma I_i * P_t + \lambda X_{ijt} + \varepsilon_{ijt} \tag{A-2.3}$$

Table A-2-13 illustrates the interpretation of the D-in-D estimate from this model. The coefficient β_1 in ***Equation A-2.3*** is the difference in the measure between individuals in PCMH and the comparison group at the start of the baseline period, holding constant other variables in the equation. The β_2 coefficient is the period-year effect that captures the differences between the post and the baseline period for those in the comparison group. The coefficient of the interaction term between P_t and PCMH (I) measures any differences for the test group relative to the comparison group during the post period, relative to the baseline period. Thus, in the post period, the comparison group mean is captured by $\alpha_0 + \beta_2$, whereas the PCMH group mean is captured by $(\alpha_0 + \beta_1) + (\beta_2 + \gamma)$. In other words, the between-group difference changes from β_1 during the baseline years to $\beta_1 + \gamma$ during the post period. The D-in-D parameter, γ, shows whether the between-group difference increased ($\gamma > 0$) or decreased ($\gamma < 0$) after PCMH was implemented.

Table A-2-13. Difference-in-differences estimate

Group	Pre period	Post period	Pre-post difference
Test	$\alpha_0 + \beta_1$	$(\alpha_0 + \beta_1) + (\beta_2 + \gamma)$	$\beta_2 + \gamma$
Comparison	α_0	$\alpha_0 + \beta_2$	β_2
Between group	β_1	$\beta_1 + \gamma$	γ

All of the utilization and expenditure regression models were estimated with the beneficiary quarter as the unit of analysis. For the utilization outcomes, we converted quarterly utilization counts into binary outcomes (1 = any use) and used weighted logistic regression models. Count models are not appropriate because of the low occurrence of multiple hospitalizations and ED visits for individual beneficiaries in any quarter; however, we multiplied the marginal effect from the logistic regression models by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the marginal effect by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because at least 98 percent of the Medicaid population had zero or one ED visit or inpatient admission per quarter. For expenditure outcomes, we used weighted ordinary least squares (OLS). Although this model has strong assumptions of normality of the outcome, the OLS model still produces unbiased estimates even when the normality assumptions is violated as long as errors are uncorrelated and have a constant variance (Gauss-Markov Theorem). Additionally, the model yields estimates that are readily interpretable in dollars and do not require additional transformation. We discuss our method of accounting for clustered standard errors below.

The quality of care outcomes we estimated at a beneficiary-year level. Similar to the utilization and expenditure models, we used a weighted logistic regression where the weights were the product of the propensity weight and the eligibility fraction. Further, we conditioned each model on whether the beneficiary met the criteria to be included in the denominator for the respective outcome. The marginal effects from the logistic regression were multiplied by 100 to approximate the rate of utilization per 100 beneficiaries in the denominator. It should be noted that because these measures are annual, there is only one post-period observation in these models. As such, the D-in-D model for the quality of care outcomes will be less precise and may not as accurately capture the relationship between PCMH on the quality measure relative to having additional years of post-data.

Control variables. Control variables for this analysis included person level such as age, gender, race, indicator for continuous enrollment during the year, Medicaid eligibility category, diabetes diagnosis, heart failure diagnosis, presence of end-stage renal disease, and CDPS scores[46]; practice-level variables such as number of providers in the practice and proportion of the practice that are primary care providers; and county-level variables such as rural-urban status, median income, number of primary care providers, and unemployment rate.

Weighting and clustering. All of the regression models were estimated using weighted least squares and weighted by the propensity score times the eligibility fraction. In addition, standard errors were clustered at the provider level to account for multiple observations per provider. The variation in outcomes is likely smaller for beneficiaries treated by the same provider than for beneficiaries treated by different providers. This potential correlation of outcomes results in a loss of independence of observations. To account for this, we clustered at the individual provider level using the provider-level NPI. Because beneficiaries were coded as belonging to the same provider in all periods, clustering at the provider level produced a nested design. Clustering at the provider level alone in this nested design also implicitly controls for clustering at the lower beneficiary level (reference), so it is unnecessary to cluster at both the provider and beneficiary levels.

Specifications. Multicollinearity across our covariates was tested using the variance inflation factor (VIF) test on the total payments outcome model. We found that the number of Medicaid enrollees per county and the number of primary care physicians per county were highly collinear (VIF scores > 60). To mitigate the negative effects of multicollinearity on estimates and standard errors, we removed physicians per county from the outcome model. This resulted in having no covariates over a VIF score of 2.7, and the model average VIF was 1.5.

---

[46] The CDPS is a diagnostic classification system originally developed for states to use in adjusting capitated payments for TANF and disabled Medicaid beneficiaries and used to predict Medicaid costs. We use the CDPS to measure beneficiary morbidity. The CDPS maps selected diagnoses and prescriptions to numeric weights. Beneficiaries with a CDPS score of 0 have no diagnoses or prescriptions that factor into creating the CDPS score. The more diagnoses a beneficiary has or the greater the severity of a particular diagnosis, the larger the CDPS weight.

Limitations. There are number of limitations to this analysis. First, we compare PCMH enrollees of practices that are early adopters to PCMH enrollees of later adopters. Although we will be able to balance the analytic sample on key individual characteristics, there were some area-level characteristics that did not achieve a standardize difference of 10 percent. It is likely that the comparison population reside in poorer areas with fewer availability of providers, which may bias our results toward more favorable outcomes for the treatment group. It is also likely that because Arkansas only assigns beneficiaries to PCMHs based on their selection of a PCP, there is selection bias associated with selecting PCP. Additionally, there likely will be unobserved differences in both the providers and beneficiaries enrolled in each group, introducing selection bias. Household income, health literacy, and other unobserved individual-level characteristics may predict both assignment to later adopting practices and health service utilization. Standardized differences (not shown) were more pronounced among those who were considered in the denominator for the quality of care measures. Second, we do not know whether any one patient received care-coordination services, only that the practice in which they are assigned received PMPM payments. Finally, contamination of the comparison group may limit the interpretation of these findings. As a robustness check, we identified whether any member of the comparison group saw a PCMH in the intervention group during the post period (n = 1,443) and reran the utilization and expenditure models removing those with any exposure from the analysis. We did not find a difference in the results; however, MAX claims are limited in that up to 40 percent of claims have missing NPI values. Thus, we may be underidentifying the extent of contamination that may be present, which may bias our results away from the null hypothesis.

Appendix B: Maine SIM Initiative Progress and Findings

B.1 Synopsis of the SIM Initiative in 2017

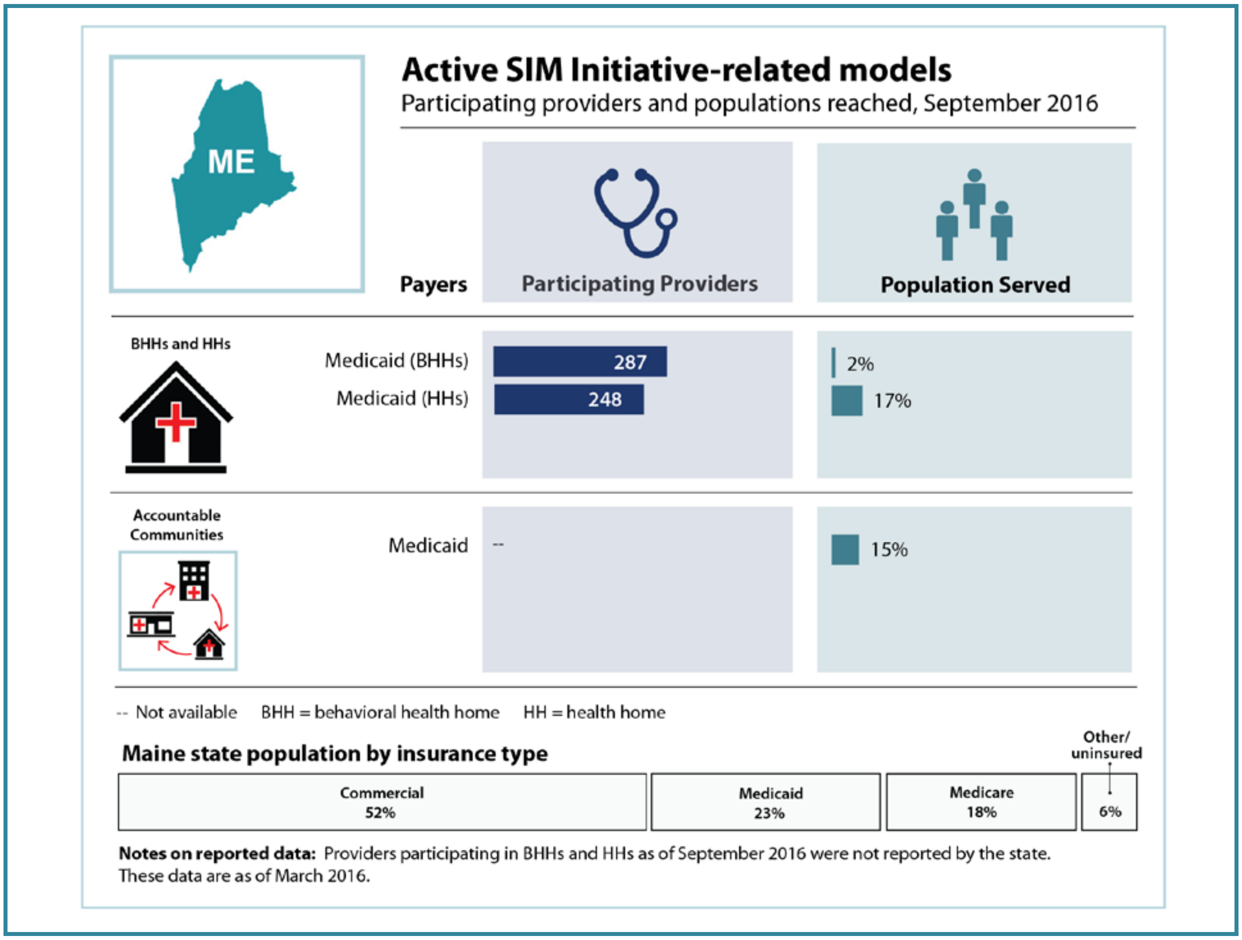
As of March 2017, after approximately 3.5 years of SIM Initiative implementation, Maine, its Medicaid program (MaineCare), and its partners continue to support three delivery system models: behavioral health homes (BHHs), Accountable Communities (ACs), and patient-centered, primary care health homes (hereafter referred to as HHs). Maine supported three delivery system and payment models to improve the value, affordability, and quality of health care services for the state's MaineCare (Medicaid) population. See ***Section B.2*** for an overview of these models and ***Section B.3*** for an analysis of Maine's implementation of the SIM Initiative.

Key Results From Maine's SIM Initiative, March 2017

- As of September 2016, MaineCare has enrolled 6,691 Medicaid beneficiaries (2 percent of Maine's entire Medicaid population) in 24 behavioral health homes (BHHs) and 51,236 Medicaid beneficiaries in 100 health homes (HHs). As of July 2016, MaineCare has enrolled 46,395 Medicaid beneficiaries (15 percent of the Medicaid population) in four Accountable Communities (ACs)—Medicaid Accountable Care Organizations. Since program implementation began in 2014, enrollment has increased significantly.
- ACs were reluctant to accept two-sided risk (i.e., sharing in savings and losses) because they had not yet gained the experience to influence utilization within the Medicaid population.
- The BHH model was viewed as transformational because the model gave behavioral health providers the same supports that primary care providers receive in a patient-centered medical home. BHH providers were given a capitated monthly payment to provide care management services along with health information technology support, practice transformation assistance, and Medicaid claims data to monitor performance.
- Connecting BHHs to the state's health information exchange, HealthInfoNet (HIN), was viewed as a key success by state officials/partners and BHH providers.
- The state curtailed efforts to garner multi-payer alignment on quality measure and payment models to focus on improving diabetes care for Medicaid beneficiaries and identifying high-utilizers for care management services.

Reach of SIM Initiative–related delivery system and payment model among providers and populations. Medicaid provider and Medicaid beneficiary enrollment in these models (BHH, HH, and ACs) has increased over the course of the SIM Initiative, and because these delivery systems will continue after the SIM Initiative, enrollment can be expected to continue to increase. ***Figure B-1*** depicts the scope of participation in Maine's BHHs, HHs, and ACs in terms of individual providers and populations, as of September 2016. The first column presents the absolute number of individual providers participating in each delivery system/payment model, as reported by the participating payer (Medicaid). The next column shows the percentage of the Medicaid population served by participating providers, as reported by the state. Enrollment figures are shown as of March, July, or September 2016, based on data available from the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with commercial, Medicaid, Medicare, or other health insurance coverage, to give some insight into statewide reach of each model. Sources of reported data are available in ***Sub-appendix B-1***.

Figure B-1. Providers and populations reached by Maine's SIM Initiative–related delivery system and payment models



Notes on reported data: Providers participating in BHHs and HHs as of September 2016 were not reported by the state. These data are as of March 2016.

Maine initiated its BHH model in April 2014. BHHs are community mental health organizations that manage the behavioral health needs of MaineCare (Medicaid) adults with serious and persistent mental illness and MaineCare children with serious emotional disturbance. Similar to the primary care–based patient-centered medical home model, BHHs are expected to provide team-based care, enhanced access to care, population risk stratification and management, and patient/family directed care plans. In addition, BHHs integrate physical and behavioral health, include patients and families in decision making, make connections to community resources when necessary, commit to quality improvement, and build capacity in health information technology (health IT) (e.g., adoption of an electronic health record or connection to HealthInfoNet (Maine's health information exchange [HIE]). Under the model, the BHH enlists a team of providers to provide intensive care management; the team consists of a care manager, a nurse, and a peer or family support specialist. BHHs must also have a psychiatric consultant and a medical consultant who can provide expertise on the development of evidence-based practices and protocols and help lead quality improvement initiatives, and the BHH is expected to manage their MaineCare patients in partnership with patients' primary care providers (PCPs).

- As of March 2016, there were 287 providers participating in 24 BHHs.
- As of September 2016, there were 6,691 Medicaid beneficiaries enrolled in 24 BHHs or 2 percent of the total Medicaid population. The 24 BHHs were operating in 102 locations throughout the state. Enrollment fell slightly short (82 percent) of Maine's original goal, which was to serve 8,500 beneficiaries with its BHH model.

HHs are primary care practices that provide coordinated care to MaineCare beneficiaries with at least one chronic condition; HHs are akin to a patient-centered medical home. HHs were authorized in January 2013 by a Medicaid state plan amendment, and thus predated the SIM Initiative.

- As of March 2016, there were 248 providers participating in 100 HHs.
- As of September 2016, there were 51,236 Medicaid beneficiaries enrolled in HHs, or 17 percent of the total Medicaid population.

Maine implemented ACs, which are statewide Medicaid Accountable Care Organizations (ACOs), in August 2014. Each AC includes a lead entity that forms contractual partnerships with other providers, and together, the AC providers can share in savings generated for an assigned population for meeting certain total cost of care and quality benchmarks.

- As of July 2016, four ACs were operating in Maine, with a total of 66 primary care practices participating.
- As of July 2016, there were 46,395 Medicaid beneficiaries enrolled in the four ACs, or 15 percent of the total MaineCare population.

Impact analyses. Impact analyses of two of Maine's SIM-supported delivery system and payment models, BHHs and ACs, are planned for the next federal evaluation annual report; no impact analysis results for either model appears in this report.

B.2 Overview of the Maine SIM Initiative

The SIM Initiative in Maine began implementation on October 1, 2013. Since that time, the state has made progress toward achieving its six strategic goals: (1) strengthening primary care, (2) integrating primary care and behavioral health, (3) developing new workforce models, (4) supporting the development of new payment models, (5) centralizing data analysis, and (6) engaging people and communities. The SIM Initiative originated from the Office of the Commissioner of the Department of Health and Human Services. The Maine SIM Initiative has been working with three non-state partners—Maine Health Management Coalition (MHMC), Maine Quality Counts, and HealthInfoNet (HIN) and one state partner—the Maine Center for Disease Control (CDC)—to implement SIM-supported activities.

During this analysis period (April 2016–March 2017), Maine's SIM Initiative supported three major delivery system reforms—HHs, BHHs and ACs, which are also known as ACOs for the Medicaid population. HHs are patient-centered primary care homes for Medicaid beneficiaries with chronic conditions. Although HHs were implemented prior to the SIM Initiative, they are a critical component of the BHH and AC initiatives and an integral component of Maine's delivery system model for Medicaid. BHHs provide care in conjunction with HHs for MaineCare beneficiaries with behavioral health conditions. With SIM funding, MaineCare supports HHs and BHHs by providing educational opportunities and technical assistance (TA) to transform care delivery and by supplying HHs and BHHs with practice-specific data on quality, utilization, and costs of care. ACs are integrated provider organizations that make available care coordination and administrative support to providers to ensure comprehensive primary, acute, and chronic health care services are available to an attributed population. Each AC includes a lead entity (e.g., a regional health system) that forms contractual partnerships with other providers. ACs must contract with providers in each of the following three service areas: chronic conditions (i.e., an HH), developmental disabilities, and behavioral health. ACs are granted discretion as to how they distribute shared savings or losses among their providers. Furthermore, ACs are provided feedback reports on quality, utilization, and costs that were funded by the SIM Initiative.

The SIM Initiative also directed funds toward enhancing data analytics and infrastructure. MaineCare collaborated with SIM partners HIN and MHMC to bolster the state's health IT capabilities. HIN worked with MaineCare to connect behavioral health organizations to the state's HIE and developed clinical data dashboards for MaineCare care managers. MHMC supported the provision of practice feedback reports and expanded public reporting of quality and cost of care metrics for Maine's health care providers. These activities all supported the state's SIM strategic goals especially enhancing MaineCare's data analytics capacity and integrating physical and behavioral health at the clinical level.

Maine received a no-cost extension to continue its SIM activities through September 2017, and thus, the March 2017 site visit occurred during this extension period. In this last year (April 2016–March 2017), Maine narrowed the scope of its delivery system reform initiatives. With guidance from stakeholders, Maine chose to focus on improving diabetes care based on the effective use of claims-based performance data to guide continuous quality improvement. Maine is also improving care management by piloting an analytic tool (known as the predictive analytics tool) to help practices identify MaineCare patients at risk for extensive use of the hospital or ED or at risk of being a high-cost patient. The state views these activities as having the greatest potential for improving health care cost, quality, and utilization, for MaineCare beneficiaries.

The activities supported with SIM Initiative funding as of March 2017 are shown in ***Table B-1*.**

Table B-1. Summary of SIM Initiative activities in Maine, through Spring 2017

Activity type	Activity[b]	Payers	Provider types	Dates	Supporting Policies (if any)
Delivery / payment system[a]	BHHs	Medicaid	Behavioral health	April 2014 to date	SPA Medicaid regulations
	ACs	Medicaid	Primary care Specialty care Behavioral health DDs	August 2014 to date	SPA Medicaid regulations
	HHs	Medicaid	Primary care	January 2013 to date	SPA Medicaid regulations
Population Health	Expansion of NDPP	N/A	N/A	2015 to date	
	CHW Pilot Project	All payers	CHWs	March 2015 to date	
Practice transformation	Webinars, in-person TA, in-person learning sessions	Medicaid	HHs Behavioral health	October 2014 through 2017 (2017 included the data focused learning collaborative)	
	Data-focused Learning Collaborative for diabetes care	Medicaid	HHs Behavioral health	2017	

(continued)

Table B-1. Summary of SIM Initiative activities in Maine, through Spring 2017 (continued)

Activity type	Activity[b]	Payers	Provider types	Dates	Supporting Policies (if any)
Workforce	Provider education on pain expression in individuals with DD	N/A	All providers	2014 to date	
	Leadership development training	N/A	All providers	2014–September 2016	
Health IT	Predictive Analytics Pilot	Medicaid	Care managers in three HHs	January 2017 to date	
	Connecting behavioral health organizations to the HIE	Medicaid	Behavioral health	2014 to date	
	E-mail notifications to MaineCare care managers	Medicaid	Care managers	June 2015 to date	
	MaineCare clinical dashboard	Medicaid	Care managers	2016 to date	
Data analytics	Primary care practice reports on quality and cost for Medicare, Medicaid and commercial patient panels	N/A	Primary care	January 2014 to date	
	Value-Based Purchasing Management System portal for HHs and BHHs	Medicaid	HHs BHHs	2015 to date	
	Monthly and quarterly utilization and quality reports to ACs	Medicaid	Primary care Emergency Departments	2015 to date	

AC = accountable community; BHH = behavioral health home; CHW = community health worker; DD = developmental disabilities; health IT = health information technology; HH = health home; HIE = health information exchange; N/A = not applicable; NDPP = National Diabetes Prevention Program; SPA = State Plan Amendment.

[a] MaineCare's financial support for HHs (monthly care management payments), BHHs (monthly care management payments), and ACs (shared savings) are not funded through the SIM Initiative. However, SIM funds are used to support HH, BHH, and AC infrastructure by providing training, technical assistance, data analytics, and health IT support.

[b] Many of Maine's SIM activities relate to and support each other. For example, the practice transformation and data analytics activities provide the HH, BHH, and AC delivery system reform providers with technical assistance and data to support the efficient and effective delivery of care.

B.3 Implementation of the SIM Initiative in Maine After 3.5 Years of the Test Period

This section synthesizes findings on SIM Initiative implementation in Maine after 3.5 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix B-1***:

- Stakeholder interviews conducted in Maine March 27–31, 2017. Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.

Stakeholder interviews conducted in Maine, March 2017

	Number of interviews
State officials/partners	6
Payers and purchasers	2
Providers and provider associations	11
Advocacy groups	2
Other	0
Total	21

- Focus groups conducted with providers and consumers involved with some aspect of the SIM Initiative. The providers selected for focus groups were PCPs in HHs that are part of ACs and BHH providers in Portland and Bangor, Maine. A total of 26 providers participated in four focus groups. The consumers were MaineCare beneficiaries attributed to HHs associated with ACs and BHHs in Bangor and Portland; a total of 31 consumers participated in four focus groups. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture these experiences, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.
- Document review, including state-developed reports and local news articles.
- Telephone conversations with state officials/partners used to gather more in-depth information on select topics and to review other evaluation-related news.

For this appendix, state officials and state partners are referred to collectively as "state officials" in the text and as "state official/partner" when attributing quotations to a stakeholder.

B.3.1 What changes to health care have SIM-related delivery system and payment models yielded?

KEY INSIGHTS

- As of September 2016, MaineCare has enrolled 6,691 Medicaid beneficiaries in 24 BHHs, and as of July 2016, MaineCare has enrolled 46,395 Medicaid beneficiaries in four Accountable Communities (ACs)—Medicaid Accountable Care Organizations.
- Shifting behavioral health home (BHH) reimbursement from fee for service to capitated payment was well received by BHHs because it gave providers flexibility to provide necessary care management services; however, there was some confusion among providers over how to bill under the new payment model.
- Payment and delivery system reform continues to focus on MaineCare, and involvement by commercial payers was limited.
- ACs were learning how to manage risk and were reluctant to accept additional financial risk through the model.

This section provides an overview of Maine's delivery system and payment models and a detailed discussion of key findings. The major delivery system and payment model reforms supported by the SIM Initiative were MaineCare's BHHs and ACs. To a lesser extent, MaineCare's HHs were also supported by the SIM Initiative and remain an integral component of Maine's delivery system model for Medicaid. From April 2016 to March 2017, Maine supported these initiatives by financing strategic investments in its health information and analytics capabilities to support BHHs and HHs. These investments included connecting BHHs to the HIE, piloting the use of predictive modeling with care managers in primary care practices to identify patients at risk for frequent use of the hospital or ED, and preparing feedback reports on cost, utilization and quality for PCPs and ACs. All activities were intended to help clinicians better coordinate and manage care for their patients.

In collaboration with its partner, Maine Quality Counts, Maine also facilitated data-focused learning collaboratives to help HHs improve HbA1c monitoring for patients with diabetes and BHHs to improve their HbA1c screening rates for BHH members on certain antipsychotic medications. The state used these collaboratives to bolster accountability and give HHs and BHHs the opportunity to share best practices, engage in peer-to-peer learning, and improve health care outcomes.

The BHH model is generally well received by providers and is viewed as transformational to Maine's behavioral health delivery system by state officials. BHHs receive a capitated monthly payment of $394.20 from MaineCare to provide care management for their MaineCare patients enrolled in the BHH.[47] Of note, this payment is not paid for with SIM funding. Several state officials noted that moving to a capitated payment model was a significant departure from the MaineCare fee-for-service (FFS) reimbursement model for medical and behavioral health care. The MaineCare payment model, coupled with the SIM-funded health IT support, practice transformation assistance, and performance data reported in quarterly feedback reports, was considered effective because these supports brought behavioral health providers more in line with primary care, which has had significantly more experience in monitoring a specific population to better manage their care under the HH model. Many stakeholders attested to the value of the SIM Initiative because SIM funding allowed Maine to bolster the capacity of BHHs to improve care management and coordination.

> *[Prior to the SIM Initiative and implementation of the BHH model] That [behavioral health organizations] is a group that has been unnoticed, unworked, undervalued, and underfunded. The fact that SIM got to shine a spotlight on these organizations [behavioral health organizations] was really, really valuable.*—State official/partner

This approach to behavioral health transformation was generally viewed among BHH providers as a step in the "right direction."

> *We are all very invested in this model of care. The billing piece I think conceptually makes a whole lot of sense. FFS was never a good match for your traditional case management. I'm glad to see it go back to something more simplified.*—BHH provider
>
> *We are moving more towards the BHH model. It seems to be what is working best for a lot of people. Also, the model in itself, we really believe in. We really believe in the holistic approach and bringing the team together.*—BHH provider

However, some providers continued to perceive the BHH model as a less-robust version of service integration under Section 17 of the MaineCare benefits manual on Community Support Services (Department of the Secretary of State of Maine, n.d.) (see ***Section A.2.2.2*** of the SIM Initiative Round 1 Evaluation Annual Report 3 for a more detailed discussion).

---

[47] When the BHH program was first implemented, BHHs were paid $330 per member per month (PMPM) for adults and $290 PMPM for children to provide care management services to MaineCare patients enrolled in the BHH. Over the SIM testing period, the rate increased two times. First, the payment rate was increased to $365.00 PMPM for adults and $322.00 PMPM for children and then increased again to $394.20 PMPM for both adults and children in response to BHH feedback that the original PMPM was not adequate. Behavioral health providers working in BHHs bill MaineCare on a FFS basis for non–care management services provided to a MaineCare patient (e.g., psychotherapy services). Furthermore, MaineCare pays HHs $15 PMPM to work with the BHHs providing behavioral health care to HHs' MaineCare patients. Providers working in HHs also continue to bill MaineCare on a FFS basis for clinical services provided to their patients who are also enrolled in a BHH.

BHH providers and consumers reported confusion about the level of service that should be provided to obtain the capitated PMPM payment, suggesting opportunities to improve communication between MaineCare and BHH providers regarding BHH model design. Providers are currently required to bill at least 1 hour PMPM to receive the $394.20 PMPM for care management. Some BHH providers thought this meant they could only provide 1 hour of care management per month to their assigned BHH members and that any additional care management services provided beyond 1 hour would be viewed as uncompensated care. Other providers thought that the 1-hour minimum was a time constraint because in some months, a patient may need less support. Providers' varied interpretations aligned with those of BHH service recipients participating in consumer focus groups, who also reported varying levels of service (i.e., some BHH service recipients received unlimited care management services whereas others reported receiving less than 1 hour of care management assistance).

Without accurate and timely performance data and without experience managing care for the MaineCare population, ACs were less likely to accept additional risk. Of the four ACs participating in the model, none opted to take on two-sided risk (see ***Table B-2*** for a definition of two-sided risk). In a one-sided risk arrangement ACs only share in savings, which is contingent on meeting benchmarks for quality care. However, ACs do not pay back losses to MaineCare if their spending exceeds a financial benchmark. ACs reported that they did not yet have enough experience managing the care of MaineCare beneficiaries to accept two-sided risk. A lack of willingness to take on risk may have lowered the ACs' incentive to reduce expenditures relative to the benchmark. In addition, the ACs reported that they required more timely and accurate performance and expenditure data to help manage risk. One AC provider described lags in receiving quarterly performance reports from the state. ACs also reported errors in reports from the state detailing their cost trends and financial performance relative to benchmarks; these errors led to the state recalculating the reports. Without more timely and accurate information on their performance, ACs will not have the confidence needed to take on two-sided risk.

Certain ACs generally considered their model separate from the SIM Initiative and did not associate their performance or delivery structure with the goals of the SIM Initiative. ACs held regularly scheduled calls to discuss operations, and MaineCare provided feedback reports on quality, utilization, and costs. However, Maine did not use SIM funding to provide the same level of TA or data infrastructure assistance to the ACs as they did to the BHHs and HHs. As a result, some PCPs attributed to an AC that participated in focus groups were unaware that they were part of a MaineCare ACO, and some AC representatives reported that they generally do not consider ACs part of the SIM Initiative.

Table B-2. SIM Initiative-related delivery system and payment models in Maine

Delivery system model	Payment model	Participating payers	Retrospective or prospective	Payments based on whom?	Risk	Financial target yes/no	Quality target yes/no	Implementation progress
HHs	FFS + $12.00 PMPM to HH practice for care coordination + $129.50 PMPM for CCTs + $15 PMPM to HH practices to coordinate physical health care for BHH members	Medicaid	Retrospective	HH practices receive PMPM for all enrolled patients who meet chronic condition criteria; CCTs receive PMPM in months when services are provided	N/A	No	Yes, but payment is not contingent on meeting quality targets 21 quality measures including NCQA and HEDIS	Operational
BHHs	$394.20 PMPM to BHHs for care management for children and adults	Medicaid	Retrospective	BHHs receive PMPM for all enrolled patients who receive at least one service that month; HH practices receive payment for all enrolled patients	N/A	No	Yes, but payment is not contingent on meeting quality targets 13 quality measures in Year 1 for BHHs and three additional measures in Year 2	Operational
ACs (Medicaid ACO)	FFS + shared savings	Medicaid	Retrospective	Assignment based on HH enrollment, plurality of primary care services (for members not in an HH), or plurality of ED visits (for members without a primary care visit in the last 12 months)	Model I: one-sided only—50% of shared savings up to 10% of benchmark expenditure; Model II: two-sided—60% of shared savings up to 15% of benchmark expenditure	Yes	Yes, shared savings based on meeting quality targets 14 core quality measures and a choice of three of seven elective measures	Operational, with none of the four ACs participating in two-sided risk

AC = Accountability Community; ACO = accountable care organization; BHH = behavioral health home; CCT = community care team; ED = emergency department; FFS = fee for service; HEDIS = Healthcare Effectiveness Data and Information Set; HH = health home; N/A = not applicable; NCQA = National Committee for Quality Assurance; PMPM = per member per month.

Providers participating in focus groups reported changing their practices and how they deliver care. HH providers described how they were working in teams to coordinate care and identify and manage high-risk patients. BHH providers reported working in teams of case managers, nurses, clinical team leaders, and peer support specialists, among other professionals, to manage patient care in a holistic fashion.

> *I would say that we really have recognized, as an organization, that this [is] not the old model, where providers see patient [after patient]. You really need a team of support to do this well for people.*—HH provider focus group in Portland
>
> *I would say patients love it from my experience. What I'm seeing a little bit, which I think is super, [is] I'm now starting to see that these [patients] are developing relationships with the nurses as well [as physicians]…*—HH provider focus group in Bangor
>
> *I think our families really like it, we don't have a lot of turnover. I think the care that we give our families is more meaningful also, we're not just out there for billable time.*—BHH provider

HH and BHH consumers in focus groups had mixed reactions to care coordination and access to care. Some patients thought their care was well coordinated between different doctors and that there was optimal communication between them. As focus group participants articulated:

> *Yes, my care is coordinated. I know that when I go to one doctor, my paperwork is immediately at the other doctor. I have like a baseball team of 9 and I am the manager. My doctor is up to date. I'll go to Acadia and they will say, 'Did you know that your [blank] levels are high.' They all communicate.*—HH consumer focus group in Bangor
>
> *They talk about different things about preventative medicine. We are experimenting with new drugs, he checks in with my PCP. My PCP told me to increase my medicine. My therapist asks about this and my medications. They work as a team.*—BHH consumer focus group in Portland

However, many felt that their PCPs and other providers (e.g., case managers, psychologists, and specialists) did not necessarily work together as a team.

> *I don't think they have much contact. He takes care of my blood pressure medications and my therapist deals with the behavioral side of it.*—BHH consumer focus group in Portland

Perceptions of access to care under the new models were also mixed. There was significant turnover in primary care practices belonging to ACs, which affected both patient access and the patient-provider relationship. Provider turnover was particularly acute in the Bangor area. Consumers reported being unable to see their specific doctor in a practice within a specific time frame and experiencing limited access to specialty care, including behavioral health; indeed, for these consumers, the wait period could last from 3 to 6 months. Patients seeing behavioral health providers also expressed challenges with timely access to counselors and other behavioral health providers.

> *You can get referred (to see a specialist), but the referral will sit on someone's desk for weeks. By that time, you are in total stress or you figured out how to get through it.*—HH consumer focus group in Portland

Payment and delivery system reform under the SIM Initiative centered on MaineCare, and involvement by commercial payers continues to be limited. As described in the SIM Initiative Round 1 Evaluation Annual Report 3, Maine's SIM Initiative made efforts to support commercial payers by developing tools and resources related to value-based insurance design and a voluntary total costs of care growth cap for commercial ACOs. Based on the recommendations of the Strategic Objective Review Team (SORT) process, much of the work to support commercial payers was discontinued for the third year of the Maine SIM Initiative, and according to site visit interviewee there was no substantial commercial payer uptake of these tools. As indicated by several state officials, a key reason for lack of uptake of recommendations related to value-based insurance design was that commercial insurers in Maine are also in other states, and state officials believed that these insurers were unwilling to make changes to accommodate recommendations of an individual state. Without commercial payer involvement, Maine's SIM Initiative is expected to have the greatest impact on how MaineCare services are organized and delivered to MaineCare beneficiaries because Maine's SIM-related delivery system models were developed for MaineCare.

After the SIM Initiative ends, the state will continue to provide financial and TA to HHs, BHHs, and ACs. The state will also continue to accept primary care practices that want to become HHs and community mental health centers or agencies that want to become BHHs. If ACs seek to expand their networks of providers, Maine will support those expansions.

B.3.2 How did providers respond to the SIM Initiative in Maine?

KEY INSIGHTS

- Health home and behavioral health home providers reported that patient care is improving through a greater emphasis on teamwork, care coordination, and better integration of physical and behavioral health needs.
- Providers expressed engagement fatigue because of the large number of meetings associated with Maine's SIM Initiative and a need for greater clarity in the state's communication with providers.

This section provides an overview of HH and BHH response to Maine's delivery system models and a detailed discussion of key findings. Site visit interviews and HH and BHH provider focus groups were used to assess the provider response to Maine's SIM Initiative. Providers were generally positive about the impact of HHs and BHHs. The 2015 BHH provider PMPM rate increase allowed the state to engage more providers and ultimately expand the number of BHHs and to incentivize teamwork between behavioral health and medical care providers. Providers reported several challenges relating to BHH implementation, such as incorporating health IT into their current workflow. Providers also reported engagement fatigue because of the large number of meetings associated with the SIM Initiative and some communication issues among the state, SIM partners, and providers.

Many providers reported an impact from the SIM Initiative on their practice; however, some providers were less familiar with the models. HH and BHH providers expressed positive feedback regarding the impact of those two delivery system and payment reform models. Examples of changes in their practice cited by provider focus group participants included the following:

- a greater emphasis on teamwork,
- improved care coordination,
- increased quality of care, and
- a greater ability to provide whole-patient care incorporating both physical and mental health needs.

The TA provided by Maine Quality Counts, a SIM Initiative partner, was seen as instrumental in achieving these practice improvements among many HH and BHH providers. One HH provider also noted that the Maine SIM Initiative helped to improve their relationship with MaineCare, the state Medicaid program.

> *(It) gave us a partnership in MaineCare for the first time. We really struggled for years with having a clear, good partnership.*—HH provider

However, not all HH and BHH providers felt an impact from these two models. Some providers indicated being aware of but detached from the routine aspects of HHs or BHHs.

> *As a provider I don't really know a whole lot about that. It seems to be managed—I hear about health homes lists and per member per month, and that's all managed by our office staff. I don't know much more about it than that.*—HH provider focus group

Other providers indicated a similar detachment from the AC model and its impact, as discussed in ***Section B.3.1***.

The capitated BHH payment allows BHH providers flexibility in the frequency and types of services provided to BHH members, and the payment incentivizes BHH providers to coordinate care with PCPs. Most BHHs confirmed that the BHH monthly capitation payment of $394.20 PMPM for both adults and children was sufficient to cover the provision of care coordination and care management services. The monthly payment enabled them to finance group education classes for members, hire peer supports and care managers, and provide more care management services to high-needs members.

> *It's the first time we've been able to have some measurable income based on quality and population health. There is a big value there.*—BHH provider
>
> *…the BHH can be more of a wellness model… you are not chasing a productivity model so you can do a lot more programming and communication and coordination of services.*—BHH provider

Although many providers responded positively to the SIM Initiative, some providers expressed frustration with the lack of alignment between the BHH model and payment models adopted by commercial payers. Some participants reported that commercial payers were not providing "good incentives" compared to those offered under the MaineCare BHH payment capitated payment model.

The Maine SIM Initiative increased BHH access to data; however, new health IT tools were challenging to incorporate into provider workflows. BHHs noted that to obtain both individual and aggregate data, providers had to use two separate systems: HIN (i.e., the state HIE) for individual-level data and the MaineCare Value Based Purchasing Management System (VMS) portal for practice-level aggregate data on cost, utilization, and quality. BHH providers found the process of using two systems "clunky."

> *What happens is we get aggregate data out of the [VMS] portal but sometimes it's hard to know what they're measuring and if we want to drill down to an individual person, we usually go into [HIN] because that will show us details of discharge plans.*—BHH provider

Many providers interviewed during focus groups noted that they did not directly use the VMS portal to view aggregate data. However, they often noted that another individual in the practice (e.g., a quality improvement manager, care coordinator, or administrator) may have been using the portal to view data.

B.3.3 How were stakeholders engaged in Maine's SIM Initiative?

KEY INSIGHTS

- Stakeholders were called on repeatedly to help refine and guide Maine's SIM efforts, but engagement fatigue occurred when too many work groups and meetings are held.
- Consumer engagement was difficult to attract and sustain.
- Commercial payers were not as connected or involved with the SIM Initiative as was MaineCare, and some commercial payers reported not having enough opportunity to provide feedback to the state on how the SIM Initiative could meet the needs of commercial payers.

This section provides an overview of SIM Initiative stakeholder engagement in Maine and a detailed discussion of key findings. Since the beginning of the SIM Initiative, Maine's approach to stakeholder engagement has relied on committee participation. SIM funding supported the formation of these committees at the beginning of the SIM Initiative, and support has continued for each year since. The Steering Committee (SC) is composed of representatives from providers, payers, patient advocates, state officials, and SIM Initiative partners; collectively the SC was tasked with overseeing the execution of SIM activities and helping to align SIM activities toward the fulfillment of SIM objectives. Four subcommittees supported the SC by reporting on the progress of key activities and providing recommendations regarding the direction of future activities and the sustainability of proposed activities. The four subcommittees are (1) payment reform, (2) delivery system reform, (3) data infrastructure, and (4) evaluation. The subcommittees were chaired by representatives from SIM partners (i.e., MHMC, Maine Quality Counts, and HIN) and the state, respectively. Each subcommittee invited state officials from several state government agencies; providers, payers, and purchasers of health care; and community representatives to participate. There was a general impression among various stakeholders that the subcommittees "hit the ground running" and that their level of engagement was high throughout the SIM Initiative; however, during Maine's no-cost extension period, the subcommittees stopped meeting.

Subcommittees support implementation by highlighting risks associated with SIM Initiative activities. According to state officials, one success of the subcommittees was their ability to convene stakeholders on the front lines of health care reforms to discuss what they perceived as risks associated with proposed SIM activities and to plan mitigation strategies. State officials reported that they found this process very valuable and that they actively considered the risks and mitigation plans throughout the initiative.

> *I think the risks may have been a carrot. People don't often get to say this could be a problem to the state. I think it gave people a structured platform to engage with the state. That's another huge success of SIM, actually. Often people feel that no one listens to us at DHHS [Department of Health and Human Services]. Through SIM, people have an avenue to be heard.*—State official/partner

State officials and partners agree that consumer engagement is difficult to attract and sustain. Throughout the SIM Initiative, the Maine leadership team tried to find ways to engage consumers, but ongoing challenges were noted by several state officials. Consumers invited to participate in subcommittee and steering committee meetings did participate, but engagement was not consistent. Interviewees noted that consumers were not necessarily interested in the level of detail discussed in subcommittee meetings or were not familiar with the concepts under discussion, so attracting the right individual willing to attend these meetings was challenging. However, some subcommittees, such as the evaluation subcommittee and the delivery system reform subcommittee, did have active consumer participation. SIM Initiative leadership also attempted to focus on the importance of consumer engagement by inviting a consumer to present at the Maine SIM Initiative March 2015 annual meeting on approaches to meaningfully engaging consumers in delivery system redesign.

Maine narrowed its focus at the end of the SIM Initiative test period, but stakeholders had mixed reactions regarding how they would continue to engage in the SIM Initiative with the new focus. As previously discussed in SIM Initiative Round 1 Evaluation Annual Report 3, in the summer of 2015, members of the SIM Steering Committee formed the SIM partner-led SORT to review progress in meeting SIM objectives and develop recommendations regarding which SIM activities would be continued, modified, or discontinued for Year 3 and during the no-cost extension period for the initiative. Many state officials and partners agreed that the process was necessary to ensure that SIM funding was allocated to the most promising activities that would help Maine meet its SIM objectives and achieve a good return on the investment of SIM funds. However, some stakeholders described the state as not being as receptive as in the past to feedback and partnership with key stakeholders; others felt that the SORT process led to the state being more directive regarding certain activities. Additionally, several site visit interviewees reported that as priorities shifted throughout the SORT process, some stakeholders, such as commercial payers and other key partners, became less involved or connected to SIM activities.

Stakeholders were called on to help devise a plan for Medicare participation in Maine's delivery reform efforts. Recognizing that Medicare is a key participant in delivery system reform, Maine's SIM leadership team began the SIM Medicare Proposal Oversight Committee (MPOC) in April 2016, which was charged with developing a proposal to CMS for Medicare participation in delivery system reform within the state. Committee members included representatives from numerous state agencies, providers, consumers, employers/purchasers, and health insurers. With support from the SIM Initiative, MPOC met monthly during the spring of 2016 to prepare a proposal summarizing potential paths to Medicare participation in Maine's delivery system reform. In the summer of 2017, the proposal was submitted to CMS for review. State officials ultimately discontinued pursuit of Medicare participation and the MPOC after receiving guidance from CMS outlining the parameters under which Medicare might consider participation. Maine determined that it could not meet the parameters at that time. In addition to the MPOC activity, in 2016 several commercial payers in Maine pursued Medicare as a partner in their own delivery system reforms by applying for a CMMI Comprehensive Primary Care Plus[48] (CPC+) award. However, the commercial payers were not selected by CMS to participate.

Some commercial payers said that there were not enough opportunities to provide input in SIM Initiative SC meetings, resulting in a disconnect between SIM Initiative-produced products and what insurers need. One payer gave the value-based insurance design work as an example. The state's partner, MHMC, led work groups examining value-based insurance design proposals around the country and identifying best practices. However, the payer observed that commercial insurers often design products to meet their clients' needs nationwide and do not want to structure products to meet a single state's preferred design. In addition, the voluntary growth cap for annual risk-adjusted PMPM payments for commercial ACOs appeared to have limited effectiveness. Per a commercial payer, the cap may have been more successful if it were not voluntary and were, instead, enforced by the state through rate reductions, regulations, or price controls. Moreover, Maine has not been able to impose limits on the total cost of care statewide. The Health Care Cost Work Group, which was initiated under the SIM Initiative to facilitate agreement between public and commercial payers and providers on how to moderate growth in total cost of care (the voluntary growth cap was one of a number of recommendation from the Work Group to moderate cost growth), was discontinued as part of the SORT process.[49]

Repeated engagement can lead to fatigue. Many subcommittees had work groups, and key SIM partners held numerous work groups in the process of implementing workplan activities. State officials and partners reported that meetings were held every 2 months or monthly for some work groups. Meeting fatigue was cited by numerous state officials as a challenge to keeping stakeholders continuously engaged in SIM activities, and some interviewees suggested that fewer meetings or work groups would have been better.

> *I believe that in retrospect, the amount of meetings was tough on a lot of our stakeholders that wanted to participate in a lot of these activities. Trying to make that more convenient and not as time consuming as it was a good take-away.*—State official/partner

Engagement fatigue was also noted among providers. Initial provider participation in the stakeholder meetings of the SIM Leadership Team, the SIM SC, and the four subcommittees and work groups operated by the state was robust. However, over time, some state officials and providers reported that the number of meetings became burdensome for many providers.

---

[48] CPC+ is a CMMI-funded advanced primary care model that aims to increase access to primary care and to improve the quality, cost, and efficiency of primary care delivery.

[49] See SORT Final Objective Review Recommendations.

Providers reported that communication among the state, the Maine SIM Initiative partners, and providers was not always clear. Some providers noted that there was confusion about when critical decisions impacting providers would be discussed and feedback would be solicited. Although a calendar of all meetings was available on the SIM website, one BHH provider indicated that keeping track of upcoming meetings was difficult because there was no aggregate list of scheduled meetings. The same provider also noted confusion around when meeting attendance was more or less critical.

> *…confusing who is telling me to go to the meeting (i.e., the state, or a SIM partner, or a SIM partner acting on behalf of the state) or if it is for general education. But then you'll find out this big decision was made and you get confused why the decision was made there and who is making that decision.*—BHH provider

This confusion hampered collaboration and resulted in disagreement among some providers regarding decisions made during stakeholder meetings. As an example given by a BHH provider, at one meeting, there was discussion that BHH providers would be asked to share their patient care plans with HIN; this decision raised privacy concerns among some BHH providers and representatives from Maine's Department of Health and Human Services.

B.3.4 How was behavioral health services integration with primary care tested in Maine?

KEY INSIGHTS

- Technical assistance to implement the BHH model and integrate BHHs with primary care was viewed as critical to the success of the BHH model.
- Requirements for BHHs to coordinate care with HHs have evolved, and providers reported improvements in behavioral health-primary care provider relationships. However, but the two systems are still not fully integrated under the BHH model.
- Effective health information exchange between primary care and BHHs is still developing.

This section provides an overview of Maine's approach to integrating behavioral health with physical health and a detailed discussion of key findings. Maine's BHHs built on Medicaid HH, which began in 2013. BHHs are community mental health providers who manage the behavioral health needs of a very targeted population—MaineCare adults with serious and persistent mental illness and MaineCare children with serious emotional disturbance. BHHs are expected to manage their attributed MaineCare patients in partnership with the patients' PCPs. These BHHs are Maine's approach to integrating physical and behavioral health, and the model has been well received by BHH providers and state officials alike. Through the SIM Initiative, Maine has supported the BHHs with practice transformation TA and connections to Maine's HIE.

Maine's requirements for BHHs to partner with primary care have evolved during implementation. Maine's original BHH regulations required that all BHHs enter into a memorandum of understanding with an HH provider and enroll BHH members into that HH. However, BHH providers found little overlap between BHH members and their required HH partners and noted that moving BHH members into the HH could "force a disruption in the patient's regular primary care provider." In January 2015, the state issued a rule eliminating the requirement for BHH members to be enrolled in an HH within 12 months of starting the program but kept in place the requirement for BHHs to partner with an HH. Members who elect not to join an HH remain eligible to participate in a BHH (Department of Health and Human Services, MaineCare Services, 2015).

Relationships between BHHs and HHs depended largely on the efforts of the BHH, according to BHH providers. Many of the BHHs interviewed conducted outreach to their HH partners to educate them about their role in patient medical care. As of March 2017, one BHH provider in a large health system was holding bimonthly multidisciplinary case presentations with its primary HH partner to review patient priorities. The BHH provider said of the relationship, "…we don't have that many clients in common with our primary health home, but we do a lot of learning together and we have similar philosophies so we are a good match in that way."

Effective health information exchange between medical and behavioral health providers is still developing. Connection to the HIE was limited to 20 behavioral health organizations, 18 of which became BHHs. These organizations all had established electronic health records (EHRs) and were identified by HIN through a competitive request for proposals. The state envisioned that the integration of behavioral and physical health data would have a large impact on improving physical health care because connection to the HIE gave some BHHs more access to an individual's medical information. However, the bidirectional exchange of information between BHHs and PCPs through the HIE has remained somewhat limited. One BHH indicated that "primary care providers are still on faxes so we have to fax information to them, which is cumbersome… even if you are in HIN [the HIE], this (i.e., faxing) is more efficient. It is just (the) way they have been practicing." BHH providers who participated in focus groups reported using the HIE to communicate with patient's physicians and check medications and lab results more often than HH providers. One HH provider expressed concerns about data sharing with BHH providers, noting that although data were shared from primary care to BHHs there was difficulty in receiving information in return from BHH providers. BHH patients must complete an opt-in form to share mental health data through the HIE. The "opt-in" process, required by state law to protect patient privacy, can hinder exchange of mental health data if patients do not agree to having their mental health data shared between providers. Limited bidirectional information sharing was also evident in consumer focus groups where many consumers reported that there was little to no care coordination between their behavioral health providers and PCPs.

Based on reports from site visit interviews, the exchange of information between BHHs and HHs helped BHHs better understand their patients' physical health treatment plans. Furthermore, both state officials and BHH providers emphasized the importance of having access to medical data (e.g., hospital record and lab reports) through the HIE connection. One BHH provider noted that connections to the HIE was "helpful in getting a more comprehensive picture of what is happening to individuals and getting us to formulate what support and services will be required for them to be successful."

Overall, the Maine SIM Initiative improved both behavioral health-PCP relationships and the patient-provider relationship. PCPs indicated that attitudes toward behavioral health providers—specifically, care coordinators and peer supports—are changing. HH providers have started to recognize the need for team-based care.

> *It [team-based care] decreases the no-show rate for mental health patients but also decreases the stress of the medical physician.*—HH provider

BHHs also noted that PCPs began to shift their perceptions of behavioral health providers because of BHH outreach to PCPs educating them on their role. There was a general perception among site visit interviewees and provider focus group participants that the relationships between behavioral health providers, including peer support specialists and care managers, and PCPs was improving because behavioral health providers and PCPs were communicating more often about shared patients. However, there was more work to be done to better align behavioral health and primary care workflows.

Both consumers and providers reported that there were improvements to the patient-provider relationship. BHH providers noticed changes in patient engagement and believed that they were able to give more person-focused care, particularly for higher-need consumers. Although the majority of BHH consumers were happy with their patient-provider relationship, some patients reported concerns related to staff turnover in BHHs. Consumers indicated that the high turnover rate impacted their ability to grow strong provider relationships.

> *Once you start to get comfortable with them you are back to starting over.*—BHH consumer focus group participant

> *My biggest issue is the revolving door of doctors. That's why I stopped with the psychiatrist because it was so hard to make a plan with someone and to have them know you and to build something, and then for them to go, it started over again and again and again. It was just exhausting.*—BHH consumer focus group in Portland

Turnover was also an issue for some BHH providers, who noted that they had trouble filling BHH care team positions, especially in rural areas. In general, clinician turnover was a recurring theme expressed by both providers and patients in Maine, and BHH provider turnover was no exception.

Reflecting back on the rollout of BHHs, providers emphasized the importance of a clearly defined vision for the BHH model *before* implementation. According to providers, BHHs may initially have had more success in integrating with physical health if the state had provided “a plug and play plan”; for example, “have some of the workflows, standardized training and curriculums, some things better designed for a more efficient and optimal roll out.” One provider described setting up a BHH as “trying to build the airplane while we were taking off and flying at the same time.”

Although the respective roles of the required BHH clinical care team—clinical team leader, HH coordinator, peer support specialist, nurse care manager, primary care consultation, and psychiatric consultation—were clearly delineated in state policy, some BHH providers expressed confusion about team member roles.

In site visit interviews and focus groups, providers mentioned the lack of a clear locus of responsibility for each patient and confusion about how that translated into work flows between providers. For example, one BHH provider felt that her role was “engaging a team around the client and it’s the primary care physician’s responsibility to give the data from any testing or treatment or discharge planning.” However, the BHH provider also indicated if there was something missing in a care plan or medical record, she was able to communicate with the PCP to coordinate the needed care; so responsibility for sharing clinical data did not rest solely with the PCP. Ultimately, “the workflow process was worked out agency by agency and not statewide.”

TA was instrumental in supporting the BHH model and was well received by BHH providers. As detailed in ***Section B.3.7***, with SIM support, MaineCare facilitated practice-level change through learning opportunities for HHs and BHHs. HIN required the behavioral health organizations connecting to the HIE to attend monthly webinars, and Maine Quality Counts held monthly webinars for both HHs and BHHs on a wide variety of topics ranging from using consultants as part of the behavioral health team to learning collaborative review. According to one state official, the Maine Quality Counts learning sessions were “really important to get them (the BHHs) on the same playing field as the other HHs, collaborate with the other HHs and make those connections…they were undervalued.” Maine Quality Counts also conducted initial site visits to BHHs to help them identify key areas for practice improvement. Both HH and BHH providers in individual site visit interviews and in focus groups responded positively to the TA provided by Maine Quality Counts.

> *[Quality Counts] has been a really good organization to work with. They’ve done nice stuff—posted learning collaboratives and forums.*—BHH provider

One BHH provider attributed an increasing awareness of the value of BHH providers to participation in Maine Quality Counts learning collaboratives.

> *…some of these Quality Counts learning collaboratives where they are stressing, at least 60 percent of health care is part of social determinants of health and wellness comes from that… Some providers are realizing that if [BHHs] are seeing a person weekly, [BHH providers] probably have a bigger impact.*—BHH provider

B.3.5 How were quality measurement and reporting strategies tested in Maine?

KEY INSIGHTS

- Although state officials viewed quality measurement alignment to arrive at a core measure set as useful, uptake of the core measure set by purchasers, payers, and providers was not extensive because it was voluntary.
- Maine narrowed its quality measurement strategies from alignment around a core measure set across commercial and public payers to a focus on providing HHs and BHHs technical assistance to improve diabetes care.

This section provides an overview of Maine's approach to quality measure alignment and reporting and a detailed discussion of key findings. Since the start of the SIM Initiative, Maine has focused on two key goals related to quality measurement and reporting: (1) aligning quality measures across public and commercial payers and (2) publicly reporting health care cost and quality information. Through the SORT process to choose priorities for the last year of SIM Initiative implementation, Maine rolled out a new learning collaborative in January 2017 as part of its no cost extension activities to focus on hemoglobin A1c (HbA1c)[50] monitoring and testing, a clinical focus area selected by the state and stakeholders. Specifically, this learning collaborative was intended to help HHs and BHHs improve performance on HbA1c monitoring for MaineCare enrollees with diabetes and HbA1c screening for MaineCare enrollees on certain antipsychotic medications.

Quality measurement alignment took a significant amount of time and effort. As described in the SIM Initiative Round 1 Evaluation Annual Report 3, the MHMC convened a work group to facilitate alignment around a core set of quality measures across payers and providers and identified 27 measures related to payment and 17 related to monitoring performance. There was some reported uptake of measures from this core set of measures by payers and purchasers in ACO arrangements. Several state officials interviewed during the site visit noted that the alignment work group put a significant amount of time and effort into developing the core set, and its work represented a significant investment of SIM funds. Some state official interviewees observed that the measure alignment work was valued by payers,

---

[50] The HbA1c test is blood test that gives a good indication of how well an individual's diabetes is being controlled.

purchasers, and providers. Others noted that no regulations or policies are in place requiring that payers or purchasers adopt the core measure set, and thus, although the core set was perceived as useful, some stakeholders thought that the return on investment for the alignment activities may have been greater if more “teeth” had supported the work.

Under the SIM Initiative, the MHMC also expanded the work of its public reporting work group (for additional detail on this work group, known as the Pathways to Excellence Steering Committee, see SIM Initiative Round 1 Evaluation Annual Report 3). Using SIM funding, the work group selected and vetted quality measures, which are posted on GetbetterMaine.org—a public website that compares Maine’s hospitals, providers, and medical practice groups in terms of cost and quality metrics. The work group reached consensus on metrics for women’s health, oncology, orthopedics, and total cost of care, and GetbetterMaine.org began reporting on those metrics in April 2016. In alignment with Maine’s focus on behavioral health, four quality measures for behavioral health providers were also released on the website as of January 2017: (1) working to measure person-centered care, (2) measuring client functioning and well-being, (3) coordinating client care across providers, and (4) using tools to identify and treat depression or attention-deficit hyperactivity disorder.

Between April 2016 and March 2017, Maine extended its work with quality measurement to focus on improving outcomes based on effective data use and the implementation of quality improvement activities, and BHH providers had mixed reactions to this change in focus. The SORT process recommended key adjustments to areas expected to provide good return on SIM investments, including a stronger focus on improving diabetes care based on the effective use of claims-based data. To meet this new goal, Maine rolled out a data-focused learning collaborative for HHs and BHHs to share best practices for using claims-based quality measures, HIN, or EHR data to improve diabetes care. The learning collaborative kickoff meeting, held in February 2017, had more than 100 participants. Several BHHs expressed confusion over the purpose of the data-focused learning collaborative, with a few providers questioning whether HbA1c testing was the most important measure for the BHH members.

> *I wonder where this push really came from, that this is what needs to be tracked…. It’s just interesting, I’m sure there’s a reason. It’s just, there’s probably some other things that we as an agency we really could be pushing and focusing on with our clients that may benefit them as well.*—BHH provider

However, one BHH provider noted that the agency was already seeing changes in HbA1c testing rates because of this focus by the state to improve the rates.

> *We can see the shift already. It’s not a huge state, so the physicians are calling for that testing without us. Now that people know that’s the expectation and the recommendation, and they know that the case manager’s going to ask about it anyways, they try to help make it happen.*—BHH provider

MaineCare (Medicaid) has done some work to link payment to quality. MaineCare tied quality metrics to shared savings for the ACs. In accepting one-sided risk, ACs may share in savings if they meet select quality targets. ACs were measured against performance in 16 core measures and three optional measures of their choosing. These core and optional measures are summarized in ***Table B-3***. The state also tracks 19 quality measures for BHHs and 16 measures for HHs and reports on them in quarterly reports uploaded to the MaineCare Value Based Purchasing Management System portal; these measures are also summarized in ***Table B-3***. However, payment to BHHs and HHs is not dependent on progress meeting quality targets.

Table B-3. Quality measures implemented in SIM Initiative-related delivery system and payment models for MaineCare beneficiaries in Maine

Measure	BHH	AC	HH
Diabetes—HbA1c Testing*		✓	✓
Diabetes—Nephropathy Screening*	✓	✓	✓
Diabetes—Retinal Eye Exam	✓	✓	✓
Diabetes—Lipid Control			✓
Follow-Up After Hospitalization for Mental Illness	✓**	✓	✓
Initiation and Engagement of Alcohol and Other Drug Dependence Treatment		✓	✓
Asthma-Medication Management		✓	✓
Asthma-Use of Appropriate Medication ages 5–11 years	✓		
Asthma-Use of Appropriate Medication ages 12–50 years	✓		
Non-Evidence-Based Antipsychotic Prescribing	✓		✓
Cardio-Metabolic Screening for Adults and Children Prescribed Antipsychotic Medications	✓		
Cholesterol Management for Patients with Cardiovascular Conditions	✓		✓
Prevention Quality Indicator	✓	✓	
Pediatric Quality Chronic Composite	✓	✓	
Non-emergent ED use	✓	✓	
Percent of PCPs who successfully qualify for a Health IT EHR Program Incentive Payment		✓	
All Cause Readmission	✓	✓	
CAHPS Patient Experience		✓	
Adolescent Well-Care Visit	✓	✓	✓
Developmental Screening		✓	✓
Well-Child Visits ages 0–15 months		✓	✓
Well-Child Visits ages 3–6 years	✓	✓	✓

(continued)

Table B-3. Quality measures implemented in SIM Initiative-related delivery system and payment models for MaineCare beneficiaries in Maine (continued)

Measure	BHH	AC	HH
Well-Child Visits ages 7–11 years	✓	✓	✓
Use of High-Risk Medications in the Elderly*		✓	✓
Breast Cancer Screening*	✓	✓	
Use of Spirometry Testing in the Assessment and Diagnosis of COPD*	✓	✓	✓

* = Optional Measure for ACs

** = BHHs have two measures for follow-up after Hospitalization for Mental Illness: a 7-Day Follow-Up and a 30-Day Follow-Up

AC = Accountable Community; BHH = behavioral health home; CAHPS = Consumer Assessment of Healthcare Providers and Systems; COPD = chronic obstructive pulmonary disease; EHR = electronic health record; ED = emergency department; HbA1c = hemoglobin A1c; health IT = health information technology; HH = health home; PCP = primary care provider.

B.3.6 How were health IT and data analytic infrastructure implemented in Maine?

KEY INSIGHTS

- The connection of 20 behavioral health organizations to the health information exchange (HIE) was viewed as a great success by state officials, behavioral health providers, and advocates alike.
- Deploying a health information technology (health IT) or data analytics tool is not sufficient; providing technical assistance (TA) in how to use the tool is critical to provider uptake of that tool.
- Health IT and data analytics activities implemented in the past year reflect Maine's shift from model implementation to providing tools and TA to providers on how to use health care utilization data to more effectively manage the health of a population.
- Data from electronic health records and the HIE are timely, and thus, providers relied more heavily on those data to coordinate and manage care.

This section provides an overview of Maine's health IT and data analytics activities and a detailed discussion of key findings. Health IT and data analytics were viewed as critical components of Maine's SIM Initiative and a real SIM Initiative success story by many state officials interviewed during the site visit. The strategies Maine implemented complement and support each aspect of Maine's SIM delivery system and payment reform initiatives and help providers leverage data in managing patient care. As one state official noted, "if you can't measure it, you can't manage it," so the health IT and data analytics were viewed as priority investments under the SIM Initiative.

Over the course of the SIM Initiative, Maine implemented numerous strategies related to health IT and data analytics, which are summarized below.

Maine's Health IT and Data Analytics Strategies

Health IT

- Connecting 20 behavioral health organizations to the state's designated health information exchange (HIE).
- Incorporating MaineCare's prior authorization data for behavioral health services in the HIE so that HIE-connected providers can view more behavioral health data for MaineCare beneficiaries (began during Maine's no cost extension period).
- Sending electronic notifications to MaineCare care managers when MaineCare patients are admitted and discharged from the emergency department (ED) or the hospital; these care managers are employed by MaineCare to provide care management to targeted MaineCare beneficiaries.
- Augmenting the electronic notifications tool to create a dashboard (the MaineCare Clinical Dashboard) that merges Medicaid claims data and clinical HIE data to support MaineCare care managers in population monitoring, care management, and care coordination; MaineCare's care management staff are the intended users of this tool (began during Maine's no cost extension period).
- Piloting a program to connect patients to their medical information in the HIE.

Data Analytics

- Combining MaineCare claims data with HIE clinical data to improve risk stratification and population management of patients at risk of being high cost or significant users of the hospital or ED (began during Maine's no cost extension period).
- Implementing data-focused learning collaboratives to teach health homes (HHs) and BHHs how to use data to monitor a population and implement quality improvement activities to effect change in diabetes health outcomes (began during Maine's no cost extension period).
- Developing data feedback reports on utilization, quality, and costs to HHs, BHHs, and Accountable Communities.
- Public reporting on quality, patient experience, and cost measurements for primary care, specialty care, and behavioral health care on the GetBetterMaine website.
- Developing a Healthcare Databook that compiles information on demographics, health coverage, health status, utilization, quality, and costs at the county, state, and national levels.

With several exceptions, most strategies were continuations of strategies implemented from the outset of the SIM Initiative, under the direction of key SIM partners—HIN and MHMC—with whom Maine contracted to conduct this work. The pilot to connect patients to their HIE data ended in May 2015, and a decision was made under the SORT process not to continue because the work was deemed duplicative. Many of the health systems in Maine already had portals that allowed patients access to their medical data. Through the SORT process, the Healthcare Databook was also discontinued in December 2015; the immediate value to purchasers of health care in the state was not clear because the information provided in the Databook is not as up to date as stakeholders desired.

Over the course of the SIM Initiative, Maine has shifted from focusing on model implementation to providing tools and TA to providers to use health care utilization data to more effectively manage the health of a population, and their data analytics activities implemented in the past year (April 2016–March 2017) reflect this shift. First, the state tasked its partner, HIN, with augmenting the electronic notifications system (developed in the early years of the SIM test period for use by MaineCare care managers) by combining MaineCare claims data with HIE clinical data to give MaineCare care managers more clinical information that can be used to improve population monitoring, care management, and care coordination for MaineCare beneficiaries. This tool is now known as the MaineCare Clinical Dashboard. Second, the state provided HIN with the funding to incorporate MaineCare claims data into HIN's existing predictive analytics platform (a data product that generates patient risk stratification information and supports population management) to improve the risk predictions generated from this platform. Then, in January 2017, the state rolled out an initiative for HIN to work with three primary care sites to implement HIN's improved prediction models to identify beneficiaries likely to become high-cost, high-use patients. This initiative was known as the predictive analytics pilot. As of the summer of 2017, eight care managers at the three sites were providing care management services to almost 6,000 MaineCare beneficiaries based on the prediction model tool.

> *[Discussing the predictive analytics tool] Every month we have a meeting [about] our patients who are higher risk; we categorize them into different risk groups; we are look at people who need follow-ups; the providers, the nurse navigator, and BH provider also participates in these monthly meetings.*—Provider attending a provider focus group

The predictive analytics pilot and the development of the MaineCare Clinical Dashboard was viewed by site visit interviewees as a good example of how the work under the SIM Initiative shifted to accommodate new perspectives and needs. The development of analytics tools is an iterative process because the end use of a data analytics tool can change. The data-focused learning collaborative was also a new development that complemented the state's shift in focus to supporting practices in monitoring outcomes and implementing quality improvement initiatives (more detail regarding the data-focused learning collaborative can be found in ***Section B.3.7***). State officials expect that the predictive analytics pilot and the data-focused learning collaboratives will realize demonstrable changes in outcomes. However, the initiatives were ongoing at the end of this reporting period (March 2017), and evaluations had not yet been completed.

The connection of 20 behavioral health organizations to the HIE was viewed as a great success by state officials, behavioral health providers, and advocates alike. Maine recognized a critical gap in its health infrastructure: its behavioral health providers lagged behind PCPs in having access to and using data to better manage their patients. Therefore, they contracted with HIN to provide financial support to selected behavioral health organizations, 18 of which went on to become BHHs, to pay for subscription fees to the HIE and to deliver TA to the behavioral health organizations in how to provide information to, and receive information from, the HIE and use the data to inform care management and quality improvement. All 20 behavioral health organizations were connected to the HIE, and as of September 2016, 13 were able to share mental health records with the HIE, to the benefit of PCPs, specialists, and hospitals hoping to find patients' mental health information in the HIE. At the time of the 2017 site visit, HIN was in the process of uploading the prior authorization for behavioral health services data to the HIE. The prior authorization data were expected to give primary care or other providers information about the types of behavioral health services a MaineCare enrollee could be receiving. Because the data were in the process of being included in the HIE, interviewed providers could not comment on the utility of those data.

Through the HIE, any provider connected to the HIE can receive notification when their patients are admitted to the ED or hospital. BHH interviewees gave numerous examples of how they have developed work flows to respond to notifications of ED or hospital admissions and how access to a patient's medical records in the HIE has helped them develop and modify care behavioral health care plans and improve care coordination with PCPs. The TA provided by HIN and Maine Quality Counts in how to leverage the HIE for patient care and develop workflows to use the data was uniformly praised by providers. That the BHHs found connection to the HIE to be so valuable was something of a surprise to state officials, who thought that the primary benefit would accrue to PCPs who could now view their patients' mental health records.

> *I just love HealthInfoNet. I can tell if my client has been to the emergency room or admitted.*—BHH provider attending a provider focus group

Notably, PCP interviewees and focus group attendees rarely mentioned connection to the HIE as an integral component to their work.

The utility of data feedback reports and provider portals was more mixed. Maine provided portals through which HHs, BHHs, and ACs could access quarterly claims data reports detailing trends in utilization, cost, and quality for MaineCare beneficiaries enrolled in an HH, BHH, or AC. In addition, Maine had an all-payer claims database, so the state was also well positioned to leverage those data to create feedback reports for primary care practices. These reports also compare the primary care practice's outcomes to statewide benchmarks. Although primary care and behavioral health providers interviewed during site visits generally seemed to be aware of the provider portals and practice feedback reports, some indicated that data from EHRs and HIE are much more timely and were, thus, more useful in care coordination and management. However, several of the primary care and behavioral health providers did note that they had their care managers or nurses use the provider portal to examine utilization and quality data over time.

> *I actually manage the portal. So, I'm responsible for going in and looking at our performance and other measures with the portal. Then reporting back every other week to our providers at our quality meetings to look at those metrics and see opportunities [for improvement].*—Care manager attending a provider focus group

Providing access to data is not sufficient. TA in how to best use the health IT or data analytics is necessary. State officials and providers described several notable challenges over the past year, including the readiness to use data and optimize work flows around data, costs to maintain EHRs and connections to the HIE, a lack of timely data in quarterly claims data feedback reports, the inability to see mental health record information in the HIE without patient consent, the inability to share substance use related data between providers, and organizing work around multiple touch points for information, including the EHR, feedback reports, and the HIE.

> *You can have a great new tool and nothing happens with it because there aren't resources to figure out how to integrate it within the current workflow.*—State official/state partner

The state addressed many of these challenges with focused TA. HIN provided extensive TA on how to leverage the EHR and HIE into BHH provider workflows, and it worked with BHH providers when they had questions about obtaining patient consent to upload mental health records to the HIE. HIN also hired a contractor to help MaineCare care managers learn to incorporate notifications and other data from the new MaineCare Clinical Dashboard into their workflows. The implementation of the data-focused learning collaborative was also a means of providing HHs and BHHs with additional learning opportunities for how to leverage data for actionable quality improvement. Several providers noted Maine Quality Counts TA efforts in helping them sort through how to use all the data available to them (i.e., EHR, HIE, and data feedback reports) to coordinate and manage care; this TA was positively received.

Some behavioral health home providers are concerned about their ability to maintain gains in using health IT. The capital investments Maine made in health IT and data analytics were significant, and the state or its SIM partners plan to continue many activities in some form, including the MaineCare Clinical Dashboard tool, the practice feedback reports, and public reporting on GetBetterMaine.org. Without the SIM Initiative-funded subsidies to connect to the HIE, some BHHs were concerned about their ability to maintain the subscription fees. The state has been researching the feasibility of applying for CMS-funded 90/10 matching under the Health Information Technology for Economic and Clinical Health Act as a possible means of continuing to assist providers who cannot afford the subscription fees.

B.3.7 How were workforce development and practice transformation strategies implemented in Maine?

KEY INSIGHTS

- Maine funded trainings for health care leaders ***to lead practices through change*** and for providers to improve their treatment of individuals with developmental disabilities. The impact of these activities may have had limited reach because the activities were not specifically targeted to health home (HH), behavioral health home (BHH), or Accountable Community providers.
- In-person and telephonic practice technical assistance (TA) was well received by HHs and BHHs.
- TA shifted in the last year of the SIM Initiative to reflect Maine's goal to assist HHs and BHHs in improving diabetes care.

This section provides an overview of Maine's workforce development and practice transformation activities and a detailed discussion of key findings. Maine undertook three distinct workforce development projects at the start of its SIM Initiative: leadership development training through the Hanley Center, provider training for serving those with developmental disabilities (DD), and community health worker (CHW) pilot projects. In the last year (April 2016–March 2017), Maine's approach to workforce development did not change, but some changes were made to specific project activities. HH, BHH, and AC participation in workforce projects, such as the leadership training and provider training for working with individuals with DD, was voluntary. Here, the leadership development training and training for providers who treat individuals with DD are discussed. A discussion of the CHW pilot can be found in ***Section B.3.8***.

Since the start of the SIM Initiative, Maine has used the SIM Initiative to fund a key partner—Maine Quality Counts—to provide HHs and BHHs practice transformation assistance through shared learning opportunities (known as learning collaboratives), in-person site visits to provide TA, and telephonic TA. Maine also funded another key partner, HealthInfoNet, to provide TA to BHHs connecting to the HIE. After Maine proceeded into its no-cost extension period with a narrowed focus on improving diabetes care based on the effective use of claims-based data to guide continuous quality improvement, Maine Quality Counts was asked to develop and facilitate data-focused learning collaboratives to assist HHs and BHHs in improving HbA1c screening rates for MaineCare beneficiaries. HHs and BHHs located in the same geographic regions were brought together for this collaborative, and beginning in March 2017, eight collaboratives were held, one within each predetermined geographic region based on public health districts. Learning collaborative activities concluded in May 2017.

Although stakeholders are uncertain of its impact, Maine invested SIM Initiative resources in health leadership training for 22 teams and the development of a Leadership Development Plan. The Hanley Center for Health Leadership contracted with MaineCare to facilitate change management statewide through leadership training and the creation of a Leadership Development Plan. By September 2016, the Hanley Center had trained 22 teams statewide through two in-person meetings, launched a webinar series focused on leadership skills and change management, and worked with organizations on individual team projects (Daniel Hanley Center for Health Leadership, 2016). Site visit interviewees reported that the statewide impact on leadership development could have been improved if more SIM Initiative funding had been used to conduct additional trainings and outreach in lieu of creating the Leadership Development Plan, which had not yet been implemented throughout the state at the time of the site visit. Although one BHH provider expressed a desire for change management training, she was not aware of available change management training, indicating that this training program had not reached all potential participants statewide.

The Leadership Development Plan was a document that organizations signed on a voluntary basis to express their commitment to leadership development. The Hanley Center presented the Leadership Development Plan and future recommendations to the state in August 2016. Partly because of the voluntary nature of committing to the plan, there was some uncertainty regarding how the Leadership Development Plan will be used in future initiatives.

According to some stakeholders, the Maine Developmental Disabilities Council project was successful in reaching out to and changing the behaviors of trained providers. Maine contracted with the Maine Developmental Disabilities Council (MDDC) to educate providers on pain expression in individuals with DD, including how pain expression in the DD population may present as a behavioral health issue. MDDC conducted trainings with 729 medical providers, case managers, direct support staff, guardians, family, and support staff who work with individuals with DD (Maine Developmental Disabilities Council, 2016). Based on follow-up surveys, MDDC reported that 90 percent of attendees agreed that the training would change the way they provided care (Maine.gov, 2016). However, providers also expressed their perception that the project was “an afterthought and siloed” and that the project may have been more successful if it were better integrated into the larger SIM Initiative. Through the SORT process, MDDC received additional SIM funding in September 2016 to create two additional deliverables during the Maine SIM Initiative no-cost extension period. The first deliverable is an online provider training specific to the DD population and diabetes; the focus on diabetes aligns with Maine’s narrowed focus during the no-cost extension period to improve care for individuals with diabetes. The second deliverable is the development of a medical home concept that will serve the DD population.

The sustainability of the workforce initiatives was uncertain. Although the contracted organizations—the Hanley Center for Health Leadership and the MDDC—reported plans to continue some aspects of their SIM projects with their own resources, the state officials did not indicate that the state would continue to provide support for these workforce initiatives.

TA provided by Maine Quality Counts and HealthInfoNet continued to be well received by HH and BHH providers. Site visit interviewees and provider focus group participants—particularly staff from BHHs—had very positive experiences with the TA they received from Maine Quality Counts and HIN.

> *Quality Counts [staff] came on site twice or three times and sat around with us and were interested in what we were doing, [they] were easy to talk to, found strengths, offering some suggestions. They did a good job of inspiring us a bit more. I think it would be [a] terrible loss to lose them [Quality Counts].*—BHH provider focus group attendee
>
> *Yeah, we had a lot of help, they [HealthInfoNet] were very, very supportive. I'm thinking of two people in particular that were very helpful, always positive.*—BHH provider

The in-person TA provided by Maine Quality Counts was noted more often than the learning collaborative events, although some BHH providers indicated that the learning collaboratives were helpful in designing and tailoring their BHH model. Maine Quality Counts reported that the learning collaboratives were quite popular among BHH providers. Learning collaboratives focused on care management/care coordination, BHH-HH integration, quality improvement, and population health were particularly well received. However, some state officials did not view the learning collaboratives as a success because they were too didactic and were lacking in true peer-to-peer learning opportunities.

Because of the concern over learning collaborative format, SIM leadership asked Maine Quality Counts to take a peer-to-peer learning approach for the data-focused learning collaborative. In this new approach, HHs and BHHs were divided into beginners, improvers, achievers, and innovators based on baseline HbA1c screening rates. The HHs and BHHs within each group received targeted TA and shared best practices to improve HbA1c monitoring for Medicaid beneficiaries with diabetes and HbA1c screening for Medicaid beneficiaries on certain antipsychotic medications.

Discussions with stakeholders revealed challenges associated with the implementation of data-focused learning collaboratives. HH and BHH providers reported that time lags were associated with MaineCare's release of baseline data on the if and how often Medicaid beneficiaries were having their HbA1c levels tested. Additionally, the measure was not consistent with National Committee for Quality Assurance standards, which specify two HbA1C measures annually. Furthermore, some practices were confused regarding how the collaborative was structured and the divide between achievers and improvers, and other practices believed that they were doing better at HbA1c tracking than their claims-based data suggested. State officials reported that they were committed to improving future data-focused learning collaboratives based on provider feedback.

State officials recognize the value of TA, and the state is exploring ways to provide practice transformation support after the SIM Initiative ends.

B.3.8 What approach did Maine take to address population health in its SIM Initiative?

KEY INSIGHTS

- Expansion of the National Diabetes Prevention Program (NDPP) continued under the SIM Initiative, with 133 NDPP coaches trained with SIM funding as of September 2016. However, evolving demands on coaches' time and lack of reimbursement for teaching classes continue to be barriers to the widespread rollout of the NDPP program.
- The role of community health workers (CHWs) continues to be poorly understood by primary care practices, but through a pilot at four sites and convening activities to define the role and core competencies of CHWs, awareness of the CHW role is expected to increase.
- The sustainability of the CHW workforce remains uncertain without reimbursement for CHW services.

This section provides an overview of Maine's population health activities and a detailed discussion of key findings. Since the start of the SIM Initiative, to improve population health throughout the state, Maine has prioritized diabetes prevention by promoting and expanding the National Diabetes Prevention Program (NDPP). At the start of the SIM Initiative, Maine provided SIM funding to its partner, Maine Center for Disease Control & Prevention (Maine CDC), to expand the NDPP. NDPP is an evidence-based, 16-week education program designed by the U.S. Centers for Disease Control and Prevention to help patients at risk for diabetes make lifestyle changes to avoid or delay progression to the disease (CDC, 2017). The Maine NDPP program trained individuals as lifestyle coaches, who then taught the 16-week class to patients. Maine CDC has also adopted the "train the trainer" model, in which the state trains master trainers who then train others within the community to teach the program. Through the SIM Initiative, Maine CDC also provided TA to employers and commercial insurers interested in providing the NDPP benefit to their respective employees and members. As described in greater detail in the SIM Initiative Round 1 Evaluation Annual Report 3, through SIM funding, Maine CDC also supported the Maine NDPP Data Dashboard, an online platform for the real-time tracking of NDPP participant class attendance and participant progress in meeting certain health outcome goals.

Maine also piloted CHWs as part of its population health approach. The CHW pilot project was a SIM-supported effort that began in October 2013 to test the value of embedding CHWs into primary care practices and health systems to help address chronic disease management, increase preventive screenings, improve patient experiences, and promote the appropriate use of health care resources. Maine's SIM Initiative funded four pilot projects.

Both of these activities complemented and supported Maine’s State Health Improvement Plan (Maine Center for Disease Control and Prevention, 2013). Over the last year (April 2016–March 2017), there were no changes to Maine’s population health strategy.

Maine continued to train individuals to teach diabetes prevention classes, but trainer turnover and the lack of financial incentives to teach or take the class continue to be notable challenges. NDPP existed in Maine prior to the SIM Initiative but was expanded with SIM funding to support the training of additional lifestyle coaches throughout the state (CDC, 2016). The TA and support provided by Maine CDC to the trainers was well received, with one interviewee noting that the state has been responsive to questions and has served as a well-informed and helpful resource. After the SORT process in 2015, the allocation of SIM funding for NDPP expansion was continued through Maine’s no-cost extension period. SIM funding has supported the training of 133 trained lifestyle coaches as of September 2016 (CMS, 2016), and 1,104 prediabetic participants have completed the program. Although trained coaches sign a letter of understanding with Maine CDC that they will teach a class within 1 year of completing their training, classes are not being taught. According to site visit interviewees, many coaches were not actively leading NDPP classes because the coaches moved on to other positions within their clinics or health systems or their job duties changed, and thus, they could no longer offer the NDPP class. Per several SIM partners, there was a general perception that because trained coaches do not teach classes, program implementation was not as robust as it could be.

> *The coaches are supported to lead at least one group through the program starting within one year of training, but that has not happened all around.*—SIM state official/partner

The lack of reimbursement was cited by site visit interviewees as another critical reason that coaches are not teaching classes. Maine currently reimburses eligible state employees and non-Medicare retirees who take the class, and CMS will start reimbursing NDPP classes for Medicare beneficiaries in January 2018 (CMS, 2017), but as of March 2017, no other insurer in Maine reimbursed for the program. Some site visit interviewees observed that if coaches were reimbursed for teaching the class, motivation to hold classes would increase.

Finally, the NDPP initiative did not appear to be well integrated into Maine’s other major SIM initiatives: HHs, BHHs, and ACs. Although one AC did note that its health system funded diabetes prevention classes, the interviewee was unsure whether the classes were supported by the SIM Initiative or the health system. Maine CDC will continue to provide TA as needed to current NDPP coaches and NDPP sites after the SIM Initiative.

The role of the CHW must be flexible to meet the needs of primary care practices. As of September 2016, nine full time equivalent CHWs were hired by the four project sites to provide over 4,900 client encounters involving 1,930 clients (CMS, 2016). In addition, over the course of the SIM Initiative, the CHW Initiative (a CHW Stakeholder Group convened under the

SIM Delivery System Reform subcommittee) spent time defining the CHW roles, responsibilities, and core competencies and training 37 CHW and 19 CHW supervisors on these core competencies.

CHWs identified several lessons learned over the course of the four pilot projects. Defining the CHW's role within a practice or health system took time. One CHW site visit interviewee said that it was helpful to meet with each primary care practice before integrating the CHW to determine what activities the CHW would undertake to help support the practice. The CHW role varied across practices. For example, CHWs helped primary care practices identify and reach out to individuals in need of cancer screenings, whereas in other practices, the CHW's role was to accompany patients to doctor's appointments, help them find needed social or community services, or follow up with patients after hospital discharge or ED visits. Furthermore, meetings for all participating CHWs together to discuss program activities proved useful. CHWs participating in the pilot had the opportunity to meet regularly and discuss their respective roles, assigned activities, and best practices, and this collaboration was well received.

The location of the CHW affected access to needed data and referrals. CHWs that were not embedded in practices reported being unable to access medical records independently and having to request meetings with the medical provider to receive necessary patient records or to include information into a patient's EHR. CHWs that were successfully embedded in practices also reported data challenges. Although these CHWs were able to communicate with providers through the EHR, they were unable to introduce documents into patient records. Limited CHW access to patient records and the inability to include updated information created an administrative burden for CHWs and providers. CHWs embedded within health systems had no trouble receiving referrals for assistance from primary care practices within the health system, but these CHWs noted that obtaining referrals for CHW services—when the CHW was based in a community organization—may be more challenging because primary care practices may be less aware of community-based CHW services.

The sustainability of the CHW workforce remained uncertain without reimbursement. According to stakeholders, one of the major barriers to sustainability was obtaining payment for CHW services. One provider saw CHWs as a "good value" because of their ability to bridge communication and services between providers and patients but felt that CHWs would be not be sustainable until encounters with CHWs become a billable service.

B.3.9 How will elements of the SIM Initiative in Maine be sustained?

KEY INSIGHTS

- MaineCare (Medicaid) is planning to support the delivery system reforms (health homes, behavioral health homes, and Accountable Communities), alternative payment methods (per member per month payments to providers), and data analytics (feedback reports, care manager notification systems, and clinical analytics dashboard) developed with SIM Initiative support.
- The state and its partners will continue to support workforce training for the community health worker and National Diabetes Prevention Program initiatives.

Since the beginning of the SIM Initiative, Maine has tested numerous activities to support delivery system reform, and many state officials and partners have acknowledged that not all activities would yield a significant return on investment. The SORT process was an interim step in deciding which activities did not hold promise and would be terminated for the remainder of the SIM test period. As of the site visit in March 2017, Maine was still in a no-cost extension period, but state officials had ideas as to which activities would continue after the test period. As of March 2017, the state's reported plans for sustainability were focused on areas where MaineCare or key partners could continue to support the day-to-day operations of specific activities, and the state was less focused on pursuing legislation or Medicaid state plan amendments or waivers to sustain progress.

For example, MaineCare was planning to provide operational support to support the delivery system reforms, alternative payment methods, and data analytics developed with SIM support. State officials generally viewed the process of implementing the delivery system models a success, and thus, MaineCare will continue to support primary care practices that want to apply to become HHs and behavioral health organizations that want to become BHHs. MaineCare will also work with providers who want to join the AC model. MaineCare will maintain the payment model it has with contracted HHs, BHHs, and ACs using the payment structure outlined in ***Table B-2***. Because state officials strongly supported the use of data to guide quality improvement and to reduce costs, practice/provider cost, quality, and utilization feedback reports will continue to be provided to HHs, BHHs, and ACs, and MaineCare's electronic notification system for care managers and the Clinical Analytics Dashboard will remain in place. Maine is still awaiting results from the predictive analytics pilot to determine whether that tool will be promoted for use by other health systems moving forward.

MaineCare and its partners are exploring ways to sustain the other activities that were viewed as value-added in some form. Several state officials reported that MaineCare was exploring whether in-house staff could provide some of the practice transformation TA that is currently being delivered by Maine Quality Counts and whether there were opportunities for MaineCare to support the NDPP and CHW workforce in some way (e.g., a reimbursement model). As of summer 2017, Maine CDC plans to continue providing data analytics supports and general TA to NDPP provider, and they will continue to train CHWs. Furthermore, the state reported that some private health systems are investigating opportunities to support CHWs with their own funding. HIN and MaineCare are investigating alternative funding sources to assist BHHs with subscription fees for BHHs that cannot continue to pay the fees without SIM-funded subsidies, and HIN and MaineCare are also discussing submission of a Medicaid Implementation Advance Planning Document Update to access federal funding to further health information exchange among Medicaid providers. The MDDC will continue to update and promote the toolkits developed under the SIM Initiative using its own resources. Finally, because Maine DHHS discontinued the MPOC work in the summer of 2017, the state decided not to pursue Medicare involvement in Maine's health reform activities.

B.4 References

Centers for Disease Control and Prevention (CDC). (2016). *CDC End of SIM Presentation*. Available at http://www.maine.gov/dhhs/sim/resources/steering-committee.shtml

Centers for Disease Control and Prevention (CDC). (2017). *National Diabetes Prevention Program*. Available at https://www.cdc.gov/diabetes/prevention/index.html

Centers for Medicare & Medicaid Services (CMS). (2016). *State Innovation Model Progress Report*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2017). *Medicare Diabetes Prevention Program (MDPP) Expanded Model*. Available at https://innovation.cms.gov/initiatives/medicare-diabetes-prevention-program/

Daniel Hanley Center for Health Leadership. (2016). *State Innovation Model End of Project Summary*. Available at http://www.maine.gov/dhhs/sim/documents/SIM%20docs/meeting%20materials/SIM%20Steering/September%2028,%202016/Hanley_SIM%20Final%20Project%20Summary%20Steering%20Committee%209%202016.pdf

Department of Health and Human Services, MaineCare Services. (2015). *Memo to MaineCare Behavioral Health Home Organizations: Important Changes to the Behavioral Health Home (BHH) Program*. Available at http://www.maine.gov/dhhs/oms/pdfs_doc/vbp/HH/BHH%20rule%20changes%20final_Jan2015.pdf

Department of the Secretary of State (Maine). (n.d.). *MaineCare Benefits Manual, Chapter 101*. Available at https://www1.maine.gov/sos/cec/rules/10/ch101.htm

HealthInfoNet. (2016). *Project Summary, Conclusions and Next Steps: Maine State Innovation Model Test Grant*. Available at http://www.maine.gov/dhhs/sim/documents/SIM%20docs/meeting%20materials/SIM%20Steering/September%2028,%202016/HINSIM9%2028%2016%20Finalv2.pptx

Maine Center for Disease Control & Prevention (2013). *State Health Improvement Plan 2013–2017*. Available at http://www.maine.gov/dhhs/mecdc/ship/

Maine DHHS. (2016). *Maine's State Innovation Model (SIM) Accomplishments*. Supplied by CMS.

Maine.gov. (2012). *SIM Steering Committee Meeting Materials*. Available at http://www.maine.gov/dhhs/sim/resources/steering-committee.shtml

Maine.gov. (2016). *State Innovation Model (SIM) I/DD Provider Workforce Development*. Available at http://www.maine.gov/dhhs/sim/documents/SIM%20docs/meeting%20materials/2015%20Annual%20Meeting/MaineCare_final.pptx

Maine Developmental Disabilities Council. (2016). *End of Project Summary*. Available at http://www.maine.gov/dhhs/sim/documents/SIM%20docs/meeting%20materials/SIM%20Steering/September%2028,%202016/MDDC_SIMS%20Final.pptx.

Maine Health Management Coalition. (2017, January). *Behavioral Health Rating Methodology*. Available at http://www.getbettermaine.org/sites/default/files/behavioral_health_rating_methodology_january_2017_v2_2017_01_01.pdf.

RTI International. (2017, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Three Annual Report.* Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

[this page intentionally left blank]

Sub-appendix B-1. Methods for Qualitative Data Collection and Analysis

The Maine SIM Initiative Round 1 Evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. These sources include information obtained on in-person site visits, during which the team conducted interviews with key informants and conducted provider and consumer focus groups. The team also reviewed relevant documents and held regular evaluation calls with state officials in Maine.

B-1.1 Site visit key informant interviews

The RTI/NASHP evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Maine both in person and by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology (health IT) and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included state officials, contractors (known as SIM partners) who worked on the SIM Initiative and received SIM grant funding, commercial payers, providers and provider associations, consumer representatives, and advocates. We solicited suggestions from the state officials for interview candidates and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with state SIM Initiative teams or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participants. All interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and tailored for each state. The interviews were interactive; participants were encouraged to share feedback most relevant to their specific roles in Maine's SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific

comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Maine team conducted 21 total interviews in March and April 2017. ***Table B-1-1*** provides a distribution of the completed interviews by state and by interviewee type.

Table B-1-1. Key informant interviews conducted in Maine, March-April 2017

	Number of Interviews
State officials/partners	6
Payers and purchasers	2
Providers and provider associations	11
Advocacy groups	2
Other	0
Total	21

B-1.2 Focus groups

Evaluation team members conducted four consumer and four provider focus group discussions in Maine March 29 through March 30, 2017. These focus groups were the third and final groups conducted for the SIM Round 1 evaluation.

Table B-1-2 provides an overview of the 2017 site visit focus groups. The consumer groups comprised a total of 31 MaineCare (Maine Medicaid) members living in Bangor and Portland. These members were attributed to Health Homes (HHs) if they had multiple chronic conditions or Behavioral Health Homes (BHHs) if they had a serious mental illness. The provider groups comprised 26 providers working in BHHs or HHs in Portland or Bangor. HHs were selected if they were also part of an Accountable Community (AC).

Recruitment. The state of Maine provided lists of MaineCare members and HH and BHH providers potentially eligible for focus group participants. Lists were restricted to Medicaid enrollees and providers in Portland and Bangor. The Henne Group contacted consumers and providers via phone, screened for eligibility, and scheduled them for the focus groups.

Table B-1-2. Overview of focus group

Group	Location	No. of Participants	Type of participants
1	Portland	8	MaineCare Members Attributed to Behavioral Health Homes
2	Portland	8	MaineCare Members Attributed to Behavioral Health Homes
3	Portland	6	Health Home/Accountable Community Providers
4	Portland	6	Behavioral Health Home Providers
5	Portland	6	MaineCare Members Attributed to Health Homes
6	Bangor	9	MaineCare Members Attributed to Health Homes
7	Bangor	5	Health Home/Accountable Community Providers
8	Bangor	9	Behavioral Health Home Providers
Total	—	57	

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion, and how the information from the discussion would be used, and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of focus groups was to understand consumers' and providers' current and prior experiences of care delivery during the SIM Initiative and changes they have observed over time. To capture these sentiments, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

B-1.3 Document review

We used Maine's quarterly and annual reports, operational plans, SIM partner presentations, and other state documents to obtain updated information on the state's implementation progress during the current analytic period of April 2016–April 2017. To supplement these documents, we collected relevant articles, briefs, and reviews of Maine's SIM Initiative activities and related initiatives. We also used sites that the state maintains on the initiative, such as the Maine SIM Steering Committee site, which includes end-of-project summaries for each of the Maine SIM partners.

In addition, we obtained numbers of providers participating in and populations served by the different innovation models from Maine's quarterly reports submitted to CMS and from personal communications with state officials. We provide Maine's reported figures in both ***Chapter 2*** and ***Appendix B***. The specific data sources for these provider and population data are detailed below.

Counts of practices are discussed in ***Appendix B***. Counts of BHHs and HHs are state-reported numbers obtained via personal communication (July 18, 2017). Counts of ACs are state-reported numbers (CMS, 2016b).

Counts of providers are state-reported numbers that were last reported in the March 2016 SIM progress report submitted by Maine to CMS. Counts of individual physicians were not reported as of September 2016 and thus are not included (CMS, 2016a).

Counts of population reached, used as the numerators for percentages, are state-reported numbers obtained via personal communication; the data are reported as of July 2016 for AC enrollment and as of September 2016 for BHH and HH enrollment (personal communication, July 18, 2017). Denominators used to compute the percentage of the population reached are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

Percentages of state population by insurance type are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

B-1.4 State evaluation calls

The RTI/NASHP evaluation team for Maine, the state's SIM Initiative team, and the state's Innovation Center project officer typically attended each state evaluation call. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest from state officials leading the SIM Initiative in Maine. The Maine evaluation team held eight calls with Maine between April 2016 and April 2017, the analytic period of this report.

For each meeting, the evaluation team prepared a list of state-specific questions, including the status of related policy levers and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to Maine ahead of the call and asked the state to have knowledgeable state officials available to answer the questions during the call.

B-1.5 Analysis

The RTI/NASHP evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visits, focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

B-1.6 References

Centers for Medicare & Medicaid Services (CMS). (2016a). *Maine State Innovation Model Progress Report, Quarter 1 2016*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2016b). *Maine State Innovation Model Progress Report, Quarter 3 2016*. Supplied by CMS.

Kaiser Family Foundation. (2017). *Health insurance coverage of the total population*. Available at http://kff.org/other/state-indicator/total-population/

[this page intentionally left blank]

Appendix C: Massachusetts SIM Initiative Progress and Findings

C.1 Synopsis of the SIM Initiative in 2017

As of March 2017, 2 years after the SIM Initiative test period began in Massachusetts, the state has made significant progress in the development and implementation of a Medicaid Accountable Care Strategy (ACS), including the initiation of a pilot accountable care organization (ACO) model. The state applied lessons learned from Medicaid's earlier Primary Care Payment Reform Initiative (PCPRI), which ended in 2016, to allow for more flexibility in model design and to clarify the shared savings methodology used in contracting with ACOs in this pilot. Finally, Massachusetts made progress in its effort to expand the use of health information technology (health IT) through the state's health information exchange (HIE). See ***Section C.2*** for an overview of these initiatives and ***Section C.3*** for the evaluation team's qualitative analysis on impact of the SIM Initiative work.

Key Results From Massachusetts's SIM Initiative, April 2016–March 2017

- Massachusetts designed and received Medicaid Section 1115 waiver approvals to implement accountable care organizations (ACOs) and use Delivery System Reform Incentive Payment funding to support the development of Community Partners (i.e., behavioral health and long-term services and supports organizations).
- Massachusetts continued its efforts to expand the use of health information technology to support communication among health care provider organizations and between clinicians and community resources.
- As of March 2017, six pilot ACOs enrolled 160,000 Medicaid beneficiaries, or 10 percent of the total Medicaid population in Massachusetts.
- Despite achieving low provider participation in PCPRI, providers in focus groups praised the co-location of behavioral health providers as a practice that facilitated timely access to behavioral health care services.
- PCPRI did not lead to reductions in spending or utilization for participating members during the first 7 quarters of the model. This may be the result of the generous primary care capitation payments or the lack of clarity around the shared savings methodology. Additionally, there were no statistically significant changes in measures of care coordination or quality of care.

Reach of SIM Initiative-related delivery system and payment model among providers and population. As of March 2017, Massachusetts' ACS pilot reached 160,000 Medicaid beneficiaries, or 10 percent of the total Medicaid population in Massachusetts, through six ACOs. PCPRI covered approximately 90,000 Medicaid beneficiaries in the Primary Care Clinician (PCC) Plan, a plan administered by Medicaid. At its peak, PCPRI covered approximately 24 percent of the eligible Medicaid PCC population or 6 percent of the overall

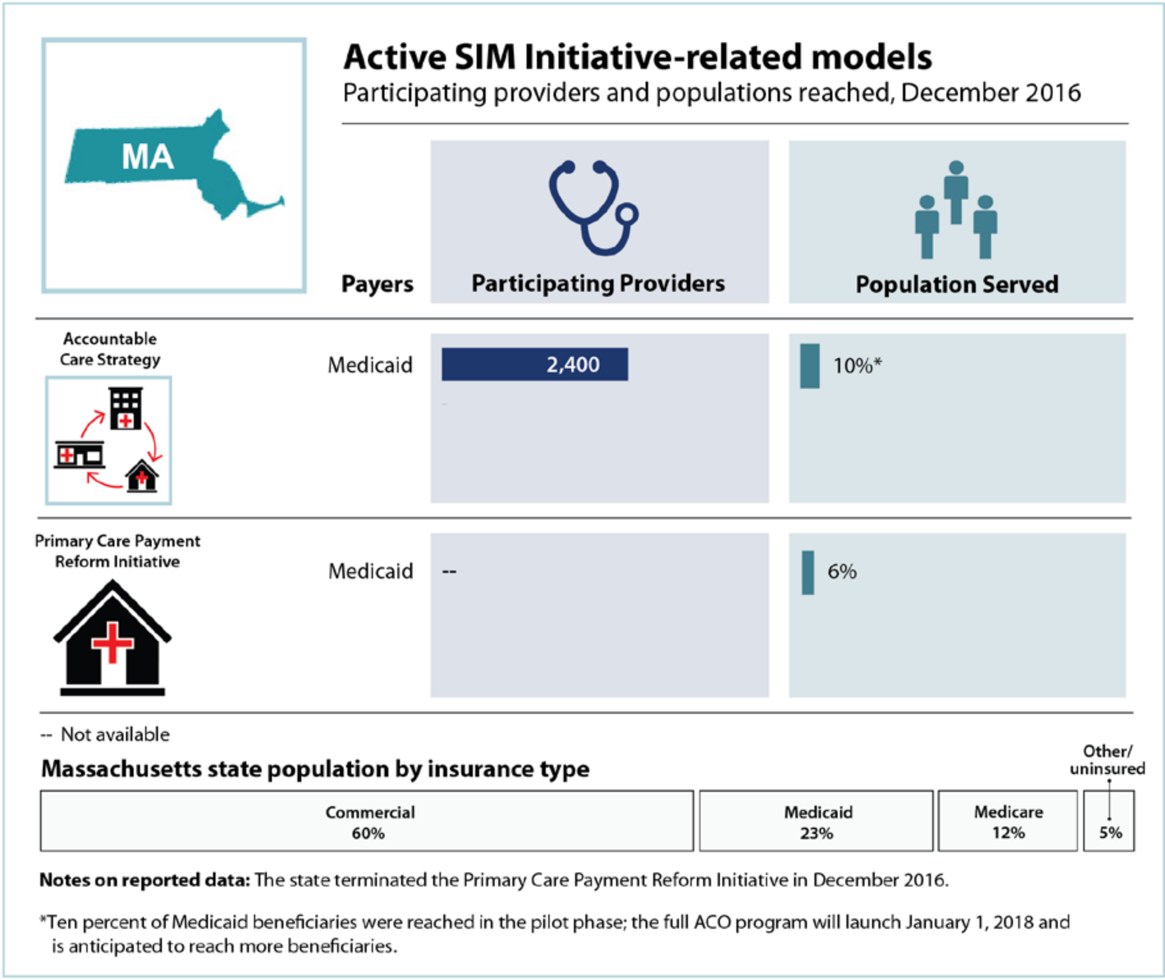
Medicaid population. ***Figure C-1*** depicts the scope of participation in Massachusetts' ACS pilot and PCPRI in terms of individual providers and populations, as of December 2016. The first column presents the absolute number of individual providers participating in each delivery system/payment model, as reported by each participating payer. The next column shows the percentage of each program's population served by participating providers, as reported by the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with commercial, Medicaid, Medicare, or other health insurance coverage, to give some insight into statewide reach of each model. Sources of reported data are available in ***Sub-appendix C-1.***

- As of March 2017, 21 ACOs had submitted letters of intent or applications to participate in the full launch in 2018 (CMS, 2017).
- MassHealth anticipates that the full ACO will cover between 780,000 and 950,000 beneficiaries by early 2018, bringing its reach up to 50 to 60 percent of the eligible Medicaid population (Massachusetts Executive Office of Health and Human Services, 2017).
- PCPRI covered 6 percent of the overall Medicaid population at the end of the program, December 2016.

The methods for qualitative data collection and analysis for this appendix, including document review that produced ***Figure C-1***, are available in ***Sub-appendix C-1.***

Impact of Medicaid PCPRI after 7 quarters (July 2014–March 2016). In March 2014, Massachusetts implemented PCPRI as a voluntary part of its Medicaid program. That initiative sought to hold primary care providers (PCPs) accountable for the total cost of care (TCOC) while offering a care management fee and the potential for quality bonuses and shared savings or losses. The goal is to support primary care delivery by giving providers greater flexibility and resources to deliver care in a primary care setting while avoiding high-cost care settings. To assess the impact of PCPRI, we conducted a difference-in-differences, within-state regression analysis, comparing Massachusetts Medicaid beneficiaries attributed to a PCPRI practice with those who were eligible but not attributed to a PCPRI practice. We evaluated the impact of the first 7 post-period quarters of PCPRI on care coordination, health care utilization, health care expenditures, and quality of care. No significant reductions in spending or utilization were found for most measures, although the rate of primary care visits showed a relative improvement, and total expenditures increased. All data and a brief discussion of these results appear in ***Section C.4*** of this appendix, with full methods available in ***Sub-appendix C-2***. ***Figure C-2*** depicts the time periods covered by different analyses in this report, with implementation analysis reported in ***Section C.3*** and interim impact analysis reported in ***Section C.4***.

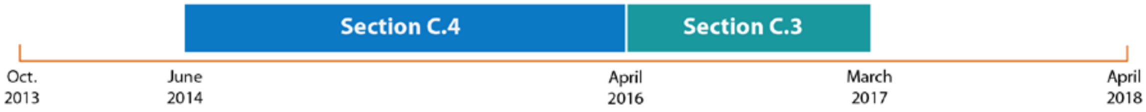
Figure C-1. Providers and populations reached by Massachusetts' SIM Initiative-related delivery system and payment models



Notes on reported data: The state terminated the Primary Care Payment Reform Initiative in December 2016.

*Ten percent of Medicaid beneficiaries were reached in the pilot phase; the full ACO program will launch January 1, 2018 and is anticipated to reach more beneficiaries.

Figure C-2. Time periods covered by different analyses in this report



C.2 Overview of the Massachusetts SIM Initiative

During 2016, MassHealth, the Massachusetts Medicaid agency, shifted from its initial payment and delivery reform initiative, PCPRI, to a new initiative, the ACS. After launching its pilot ACO model in December 2016, MassHealth continued developing the infrastructure necessary for the full-scale launch through 2017, including the development of Community Partners (CPs) for ACOs. The Massachusetts SIM Initiative also supports additional investments designed to complement the ACS, including an initiative to increase the use of the state's HIE for sharing records between providers; organizing behavioral health CPs to further the integration of behavioral health with primary care; expanding the Massachusetts Child Access and Psychiatry Project (MCPAP) to encompass MCPAP for Moms; and implementing a bidirectional, open source electronic referral system that allows PCCs and staff to exchange electronic referrals and feedback reports with local, community-based providers. The activities supported with SIM Initiative funding as of March 2017 are shown in ***Table C-1.***

As of March 2017, Massachusetts was actively planning how to support the newly developed ACS after the SIM Initiative period of performance ends in April 2018. The state negotiated and amended its Medicaid Section 1115 waiver to authorize Medicaid ACOs and Delivery System Reform Incentive Payment (DSRIP) program funding to support the development and implementation of ACOs and CPs, in addition to other changes unrelated to the ACS. The state is preparing to procure providers for the CP program.

Use of DSRIP funding in Massachusetts

The Massachusetts Executive Office of Health and Human Services received approval on November 4, 2016, from CMS to amend and extend its Medicaid Section 1115 Demonstration. The new waiver, which became effective July 2017, authorizes $1.8 billion over 5 years of new Delivery System Reform Incentive Payment (DSRIP) program funding to support the move to ACOs, invest in CPs for behavioral health and long-term services and supports, and allow for innovative ways of addressing social determinants of health through spending on flexible services. DSRIP funds will also provide statewide infrastructure and workforce capacity investments to support the ACO and CP programs. Over the 5-year period, DSRIP funding will phase down as programs become sustainable. The state's DSRIP expenditure authority is partially at risk based on the state's performance on a range of metrics, including metrics related to reduction in the growth rate of costs of care, quality, and ACO implementation.

Table C-1. Summary of SIM Initiative activities in Massachusetts, through Spring 2017

Activity type	Activity	Payers	Provider types	Dates	Supporting policies
Delivery/payment system	PCPRI	Medicaid	Primary care (CHCs, group practices, hospital licensed health centers)	March 2014–December 2016	Section 1115 waiver State law[a] Contract provisions
	ACS	Medicaid	Integrated health systems, hospitals, primary care organizations with required partnerships with community providers	Pilot: December 2016–March 2018 ACO: contracting in August 2017; TCOC performance period March 2018 to date	Section 1115 waiver (DSRIP) ICB grant State law[b] Contract provisions
Behavioral health integration	MCPAP	Multi-payer	Primary care	Launched in 2014; SIM Initiative support: March 2014–April 2016[c]	Legislation appropriation Surcharge on commercial health plans
	MCPAP for Moms	Multi-payer	Primary care	April 2015–April 2017	Legislation appropriation Surcharge on commercial health plans
Population health	e-Referral	N/A	Primary care, community organizations	Summer 2014–April 2017	Prevention and Wellness Trust Fund grant requirements
Health IT	eHealth Plan	N/A	All provider types	June 2015–April 2017	Section 1115 waiver Chapter 118i

ACO = accountable care organization; ACS = Accountable Care Strategy; CHC = community health center; DSRIP = Delivery System Reform Incentive Payment; ICB = Infrastructure and Capacity Building; MCPAP = Massachusetts Child Psychiatry Access Project; N/A = not applicable; PCPRI = Primary Care Payment Reform; Prevention and Wellness Trust Fund = Massachusetts Legislature-established fund to reduce health care costs by preventing chronic conditions; TCOC = total cost of care.

[a] Chapter 224 directs Medicaid and other public payers to increase the use of state-defined alternative payment methods.

[b] Chapter 224 also directs Medicaid to develop standards for “model ACOs.”

[c] The SIM Initiative will support MCPAP in the fourth performance year, but to a lesser extent than in years prior. It will pay for staffing to do continued analytics on prescribing patterns.

C.3 Implementation of the SIM Initiative in Massachusetts After 2 Years of the Test Period

This section synthesizes findings on SIM Initiative implementation in Massachusetts after 2 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix C-1***:

- Stakeholder interviews conducted in Boston November 7 to 11, 2016 (see ***Table C-2***). Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.
- Focus groups conducted with providers and consumers involved with some aspect of the SIM Initiative. The providers selected for focus groups were primary care providers in PCPRI practices; a total of 16 participated in two focus groups. The consumers were beneficiaries attributed to PCPRI practices in Boston and Springfield; a total of 17 participated in two focus groups. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance [TA]) related to the state's SIM Initiative.
- Document review, including state-developed reports and local news articles.
- Telephone conversations with state officials used to gather more in-depth information on select topics and to review other evaluation-related news.

Table C-2. Key informant interviews conducted in Massachusetts, November 2016

	Number of interviews
State officials	8
Payers and purchasers	1
Providers	7
Consumer advocacy groups	1
Other	0
Total	17

C.3.1 What changes to health care have SIM-related delivery system and payment models yielded?

KEY INSIGHTS

- Massachusetts shifted its overall delivery system and payment model from PCPRI to Medicaid ACOs to expand reach of value-based health care delivery across the state.
- Lessons learned from PCPRI were incorporated into the design, planning, and implementation of Medicaid ACOs to enhance provider participation and cover greater numbers of Medicaid beneficiaries.
- After months of stakeholder engagement, planning, and contracting, Medicaid launched a 1-year ACO pilot with six organizations, covering 160,000 Medicaid beneficiaries across the state. For comparison, the full PCPRI program covered approximately 90,000 beneficiaries at its peak enrollment.

Massachusetts shifted its overall strategy to further payment reform in Medicaid mid-course during the SIM Initiative performance period. The state used SIM Initiative funds to design a Medicaid ACO, which state officials considered a better path for widely implementing value-based payments and achieving closer alignment with other payers' delivery models. The initial strategy, PCPRI, engaged primary care practices whose clinicians were held responsible for the TCOC for their attributed members. Participants included 28 PCC practices at 62 sites. The first part of this section describes state officials', providers', and consumers' perceptions of PCPRI's impact. Behavioral health integration was a key focus of PCPRI and is discussed in more detail in ***Section C.3.4***.

The second part of this section describes planning and launching the Medicaid ACS. Between April 2016 and March 2017, the state applied for and received approval for its Section 1115 waiver to introduce a Medicaid ACS. This initiative focuses on controlling the TCOC but includes a wider array of providers outside of primary care. ***Table C-3*** presents the different financing elements of PCPRI and ACS pilot.

Primary care payment reform

At the end of 2016, as PCPRI was ending, state officials, provider organization leadership, and PCCs identified distinct strengths and weaknesses of the initiative and its legacy that will be carried forward in the form of the ACS. These individuals perceived several successes, namely that it prepared primary care practices to participate in ACOs and advanced the integration of behavioral health providers within the primary care setting. The state faced challenges to implementing PCPRI, including limited provider participation. Thus, in developing the ACS, state officials and stakeholders worked together to address factors that would enhance provider enrollment.

Table C-3. Components of Primary Care Payment Reform Initiative and Accountable Care Strategy pilot financing

Payment model	Payment type	Payments	Risk[a]	Payment targets	Quality targets	Implementation progress
PCPRI						
Comprehensive Primary Care Payments	Risk-adjusted capitated payments for primary care services and option to include outpatient behavioral health services	For all attributed members: covered 100% of primary care expenditure Amount varied based on patient attributes	N/A	N/A	N/A	Implemented in March 2014; ended December 2016
Shared Savings	Retrospective	For all attributed members	Two-sided risk applies only to non–primary care spending	Financial and quality	Total performance in three metrics modified amount of shared savings earned	Implemented in March 2014
Quality Incentives	Retrospective	For all attributed members	Quality Payment modified by total quality performance score	Quality only	22 metrics based on primary care performance, including population health metrics	Pay for reporting in 2014 and 2015, pay for performance in 2016
ACS: Pilot ACO						
Shared Savings	Retrospective	For all attributed members	Two-sided risk for TCOC, excluding LTSS and high-cost prescriptions	Financial and quality	Must report on two clinical quality measures Medicaid collects 13 claims-based measures and the CAHPS survey	Implemented during the 2017 pilot period

ACO = accountable care organization; ACS = Accountable Care Strategy; CAHPS = Consumer Assessment of Healthcare Providers and Systems; LTSS = long-term services and supports; N/A = not applicable; PCPRI = Primary Care Payment Reform; TCOC = total cost of care.

[a] One-sided risk means that providers are eligible to earn shared savings for meeting lower total cost target based on baseline spending but are not subject to penalties for higher-than-expected costs; two-sided risk means that providers are eligible to earn shared savings (the percentage earned is usually higher than one-sided risk options) for meeting lower total cost target and are expected to pay back money if costs are higher than expected.

PCPRI practices were well prepared to participate in the ACO pilot. PCPRI provided smaller practices the chance to build capacity to engage with broader health reforms. As one state official said: "PCPRI provided a way for providers to dip their toes into alternative payment models." One tangible example is that the majority of PCPRI practices (61 percent) joined the ACO pilot. Another example is that providers who participated in PCPRI now have some of the experience necessary to meet data reporting requirements and be successful under pay-for-performance metrics. Additional details are provided in ***Section C.3.5***.

PCPRI used a combination of contract requirements and a payment model to promote the integration of behavioral and physical health care. PCPRI required structural changes at the provider delivery sites. At the care delivery model level, all providers were required to provide both care coordination and care management to their members with behavioral health conditions. At the payment level, some providers opted for a higher per member per month (PMPM) rate but were required to have at least one master's- or doctoral-level behavioral health provider on site for 40 hours per week and a psychiatrist 8 hours a week as part of the multidisciplinary team. In addition, providers had to demonstrate the capability to schedule an appointment for a patient with a behavioral health provider within 14 days from the time of the request.

PCPRI providers were enthusiastic about co-locating care coordination staff on site. PCPRI funded a care management (medical home risk adjusted payment) fee that some providers used to hire patient navigators and other care coordination staff at their practices. Providers in focus groups mentioned that patient navigators supported clinicians by completing administrative tasks and helping patients with their care coordination/care management needs. In addition, providers noted the important role care coordinators play in communicating with high-risk patients with multiple health care needs.

> *Coaches, navigators, CHWs [community health workers], all these different words we use to describe the same thing. When those people are co-located with us at the center in the community, I find so much more value rather than some nurse sitting in some office somewhere in Seaport calling my patient occasionally.*—Provider focus group

PCPRI faced various challenges recruiting providers to participate because of the initiative's complicated model design and problems with the data reporting infrastructure. One of the major shortcomings of PCPRI was the lack of participation from MCOs in the state. If MCOs had participated, providers would have received incentive payments for Medicaid beneficiaries enrolled in MCOs in addition to PCC plan participants. It is likely this extra payment would have increased the number of providers willing to join PCPRI. Given the lack of participation from both MCOs and providers, PCPRI's reach was limited to 90,000 Medicaid beneficiaries in the state. MCOs cited several reasons for not participating in PCPRI. First, the state implemented PCPRI at the same time it was procuring MCO contracts, which stretched the

MCOs' resources and ability to respond to the PCPRI opportunity in a timely manner. Second, external factors, such as the emergence of expensive prescription drugs and operational problems with the Massachusetts Health Connector, the state's Health Insurance Marketplace, distracted MCOs from considering the initiative.

State officials, MCOs, and providers all viewed the design of PCPRI as too prescriptive for providers and financially unsustainable. For example, providers that did not serve a large proportion of Medicaid FFS beneficiaries did not believe that the incentive payments would have been adequate to cover the costs associated with meeting the requirements for participation.

> *The program was too prescriptive. This makes sense from an evaluation standpoint, but was paralyzing for health centers.*—PCPRI provider

Finally, state officials and providers mentioned challenges with the data reporting system used to support providers' management of their patient panels. The providers involved in the focus groups felt that the data were delayed, they did not understand the attribution process, and believed it was an inaccurate reflection of their patient panels.

Uncertainty about the PCPRI payment model caused concern for providers. After the program started, the state revised its TCOC targets because the original methodology did not control for shifts in patient population demographics and acuity. As the initiative ended, providers were still unsure if they had achieved savings or losses. One provider mentioned that it was still holding funds in reserve for this possibility.

Consumers served by PCPRI providers in Boston felt that their care had either improved or not changed, whereas consumers served by PCPRI providers in Springfield thought their care had worsened in the last 2–3 years. More than half of the consumers participating in the Boston focus group had the same primary care doctor for more than a year. Everyone in this group felt that their doctor knew them and responded to their needs. In contrast, few consumers in Springfield felt that their doctors knew them.

> *I like my doctor. She is there when I need her or she has a replacement.*—Boston consumer focus group

> *Sometimes when it's about 6 months since she (physician) saw me, she calls me to see how well I was doing with my new medication.*—Springfield consumer focus group

Consumers in Boston had good access to their doctors. Most consumers in Boston said they felt that their doctor is available to them when they have a medical need. Approximately half of the consumers said that they believe they can get an appointment with their PCP the same day they call the doctor's office. This may be in part because of the extended hours offered under PCPRI. Several consumers from Boston noted that if they do not get an appointment with their regular doctor, they can easily see the doctor on call within a reasonable amount of time. They seemed comfortable with the option to see the doctor on call. Most consumers in Boston reported that their PCPs were in communication with their specialists and that they could get an appointment with a specialist if needed.

Consumers in Springfield were frustrated with their level of access to their doctors. Most consumers in Springfield said it took months to get an appointment with their PCP and that they would instead see the nurse at their doctor's practice. Many consumers in the Springfield focus group were frustrated about having to wait 2–3 days for an appointment with a nurse and a week or more for an appointment with a specialist. Several consumers from Springfield did not know who their current doctor was because they had been reassigned to a different physician by the clinic. Over half of the consumers in Springfield felt that the situation was worse now than it was 3 years ago. They said that they could not obtain pain medications, schedule an appointment, or access walk-in appointments or extended clinic hours. It is not immediately clear why access appeared to be less available in Springfield.

> *Every 6 months, I got a new one (doctor), so I couldn't tell you which one it is.*—Springfield consumer focus group
>
> *In the 4 years that I've been going to [name of provider], I've only seen her a handful of times. I usually see a PA; you know a physician's assistant or a nurse practitioner. I really would like to see my own doctor.*—Springfield consumer focus group
>
> *They give you an appointment, but you won't see the doctor, you'll see somebody else.*—Springfield consumer focus group

Many of the consumer focus group participants in Springfield said they had to go the emergency department (ED) to get the treatment they needed. Several consumers in Springfield said they were scheduled to see their PCP only after going to the ED.

> *Now if you get sick, you literally have to go to the emergency room.*—Springfield consumer focus group
>
> *… you still will have to go to the emergency room to see somebody because they [PCPs] just don't have the right equipment and stuff to deal with some problems that people have sometimes.*—Springfield consumer focus group
>
> *It pushes you up. They'll push it [the appointment with the PCP] because of the emergency room visit.*—Springfield consumer focus group

Participants in Boston and Springfield consumer focus groups reported that they had conversations about their health goals with their doctors. Although not an explicit goal or mandate of PCPRI, many consumers in Boston received referrals to nutritionists, exercise classes, cooking classes, or specialists.

> *Yes [working on goals with doctor]. I have to lose 15 pounds before December 1st [by surgery].*—Springfield consumer focus group

> *She gave me a referral to a company so I can go to a gym. I was having pain in my hip, and all she wanted me to do is stretch, so it worked.*—Boston consumer focus group

> *No, I didn't go [smoking cessation classes], but she gave me like, she gave me the patches and all that.*—Springfield consumer focus group

Consumers reported limited access to behavioral health specialists that accept their insurance. A few consumers participating in the focus groups said that they needed a referral from their PCP to see a behavioral health specialist that would take Medicaid. These consumers were frustrated about the limited options. None of the consumers in Springfield had seen a behavioral health expert co-located at their centers. These consumers' experiences do not appear to be consistent with the intended aims of PCPRI with regard to behavioral health services.

Some consumers in Boston reported having a case manager who helped coordinate social services. Several consumers in Boston said they had a case manager/case worker to help them find housing or jobs or get their prescriptions.

> *Yeah, they just come and ask me is there anything I need help with like home health aide, a ride or anything, food…*—Boston consumer focus group

Accountable care strategy

MassHealth's development of the ACS involved months of stakeholder engagement, planning, and contracting. The ACS builds on lessons learned from PCPRI and involves a broader range of providers than PCPRI. Providers have greater certainty about the ACS payment methodology than they did under PCPRI; however, they continue to express concerns about the costs for which they will be held accountable now and in the future.

The ACS aims to enroll 65–80 percent of the eligible Medicaid population in one of three possible types of ACOs to control the TCOC in the Medicaid population. The full-scale ACS will include three distinct ACO models, but the initial pilot includes only the provider-led, primary care-based ACO:

1. **Vertically integrated model (Accountable Care Partnership Plan).** An integrated ACO/MCO model in which Medicaid pays the MCO a prospective capitation rate, and the MCO holds the ACO financially accountable.
2. **Provider-led, primary care-based model (Primary Care ACO).** This model requires providers to contract directly with Medicaid under its PCC plan, with retrospective shared savings/losses based on the TCOC. This model is most similar to the Medicare Shared Savings Program.

3. **MCO-administered model (MCO-Administered ACO).** In this plan, ACO members may only use the network of the MCO that they are enrolled in, and a member can only be enrolled in one ACO+MCO combination. These ACOs may contract with multiple MCOs and thus have access to the networks of those multiple MCOs. Retrospective shared savings/losses are based on the TCOC.

Massachusetts Medicaid is taking a different approach to the structure of the ACS program than was used for PCPRI. First, the state is using its contracts with Medicaid MCOs to require them to participate in all MCO-administered models in their geographic area in Years 1 through 5. The MCOs were involved in conversations for over a year and were part of an extensive work groups and stakeholder engagement process conducted by Medicaid. Medicaid is also changing the way beneficiaries are attributed to the new model. In the ACS, beneficiaries either choose a PCP first, or MassHealth assigns beneficiaries to a PCP, and the arrangement that the PCP has with an ACO/MCO partnership or an ACO determines whether a beneficiary is enrolled in an MCO or not. By linking beneficiary enrollment in an MCO to the beneficiary's ACO provider, the model encourages MCOs to contract with ACOs. If an MCO does not contract with multiple ACOs, it will lose volume because enrollment is now tied to a beneficiary's selection of an ACO (via selection of a PCP, if the PCP is involved in an ACO) rather than an MCO. As one state official said: "They (MCOs) cannot carte blanche take 800,000 patients out of the program by not participating."

Second, the ACS is less prescriptive. Under the ACS, provider groups may receive financial incentives without adhering to a specific practice structure. For example, PCPRI had an option to require on-site behavioral health providers, whereas the ACS does not.

Integrating CPs for behavioral health and long-term services and supports (LTSS) is still in the planning phase. The state has had productive conversations relating to identifying the structure of the payment model and the target populations for CPs. However, the CPs are not part of the pilot, and this component is still under development. Stakeholders expressed concerns about the CP component and were waiting to hear back on the Request for Response (RFR) Question and Answer document for more clarification. Medicaid procurement for CPs with whom the ACOs will partner began in spring 2017.

Some providers expressed concerns about their accountability for the TCOC. Although ACOs will not initially be held accountable for LTSS, Medicaid plans to add it in the future, and several stakeholders expressed concern about being held accountable for those costs. The same stakeholders also mentioned that they were not confident in the state's TCOC methodology but did not give additional details.

C.3.2 How did providers respond to the SIM Initiative in Massachusetts?

KEY INSIGHTS

- Financial incentives and data reports from PCPRI were not directly related to changes in practice behavior.
- However, providers were very positive about the additional behavioral health resources and patient navigators added as a result of PCPRI.

We conducted provider focus groups with PCPs serving Medicaid beneficiaries at PCPRI-participating practices. Overall, it did not appear that financial incentives or data reports offered under PCPRI influenced physician behavior. On the other hand, providers were very complimentary of the additional behavioral health resources and support they received from participating. Providers also used PCPRI payments to fund patient navigators, which enhanced practice's ability to provide more coordinated care to complex patients. PCPRI enhanced the capacity of PCPs and other new professionals through contractual milestones, the payment model structure, and practice transformation TA.

Providers were not aware of financial incentives intended to change their behavior. Focus group participants reported that they were still largely evaluated in terms of their level of productivity and the volume of patients seen. They expressed clearly that from their perspective, the business model was still based in a fee-for-service model where their incentive structure was to see more volume of patients.

> *I believe I was hired under a grant for PCMH [patient-centered medical home], but really my day-to-day life it's see patients and bill. It's this dichotomy that I feel probably won't be reconciled until there's actually a reform.*—Provider focus group

Most providers did not find the performance reports provided by the state to be reliable. PCPs did not understand how to use the performance data provided in the patient-level reports from the state, and many did not understand the methodology used by the state to report statistics or assign Medicaid beneficiaries to their practice. Several people noted mismatches between the reports provided by the state, the health center, and the MCOs. Providers felt that they were not able to provide care to some of their assigned patients who they had never seen in their practice.

> *Until you have an accurate static panel, it really is hard to really trust the quality measures that are coming our way.*—Provider focus group

Providers stated that the additional co-located patient navigation and behavioral health staff were very valuable. One provider in Boston mentioned that in the last year the practice had hired a patient navigator and two on-site behaviorists. At least two providers in Boston mentioned having patient navigators available to help to ease the burden of paperwork and their patients' social needs.

> *…this idea [care coordination] that now I have sort of people that I can go to when I'm not physically there or if there's somebody who's really in crisis, that's very helpful.*—Provider focus group

However, at least two providers mentioned challenges in communicating across the different care coordination teams for high utilizers.

> *There are just so many organizations care managing that one patient, and so you get a lot of redundancies in tests, a lot of redundancies in services… Because of that, patients get very confused as who is really coordinating their care.*—Provider focus group

Many providers believe that having the care coordinators (e.g., CHWs, patient navigators, and coaches) co-located at the health centers is particularly valuable. Co-location allowed these care coordinators to be on site and establish face-to-face connections with their patients. Several providers said their practices hired additional on-site nurse practitioners or navigators dedicated to case management with PCRPI funding.

> *We started having PCMH teams …. each team has physicians and nurse practitioner nurses and PAs and a patient navigator, and that's probably the equivalent of a care coordinator.*—Provider focus group

C.3.3 How were stakeholders engaged in Massachusetts' SIM Initiative?

KEY INSIGHTS

- Although Massachusetts actively engaged stakeholders for PCPRI, state officials and stakeholders said the ACS design process was even more extensive in terms of the number and range of stakeholders and the duration of the process.
- Eight large stakeholder work groups met monthly for more than 6 months to provide input into design of various components of the ACS, in addition to listening sessions and public meetings.
- The state is using a competitive procurement to select 20–25 stakeholder representatives to serve on a new Delivery System Reform Implementation Advisory Council (DSRIC) that will meet every other month over the next 5 years to provide input on the implementation of Medicaid ACOs.

Massachusetts engaged a wide range of stakeholders in an extensive design process for the ACS. Stakeholders interviewed said that both the number of groups engaged in the process and the scope of engagement were greater than they had experienced in the past. Eight work groups met regularly for 6 months and, in some cases, much longer. State officials said that

SIM funding was critical for providing MassHealth staff support for the stakeholder engagement process: “We could not have done it without SIM funding.”

> *We have many stakeholders that say to us every week this has never been done before, the degree to which you have engaged with us, listened to us, reached out to us has really never been done at Medicaid before. And they feel very involved, knowledgeable, respected, heard, and it was all because of SIM.*—State official

One official said that although stakeholder engagement in the design of the PCPRI was extensive and statewide, that process was not as long and in-depth as the ACS design process. State officials said that **Massachusetts payers and providers had considerable experience with alternative payment methods, and thus, it was important to obtain their input in the design process to align Medicaid with existing efforts**.

In the fall of 2014, even before the state reset its SIM Initiative to focus on ACOs instead of the PCPRI, the state was actively engaging stakeholders for the initial stage of Medicaid ACO design through a request for information and a technical advisory group. After the decision was made to focus on an ACO approach, the design process began with listening sessions in the spring of 2015 to collect feedback on the ACS concept, followed by the formation of eight large stakeholder design work groups.

Each of the design work groups addressed a different aspect of ACS design: (1) strategic design, (2) payment model design, (3) member attribution, (4) quality, (5) behavioral health, (6) LTSS, (7) health homes, and (8) ACO certification. A wide range of stakeholders was selected for the work groups, including various types of Medicaid providers and trade associations, MCOs, state agencies, consumer advocates, and beneficiaries. Work group composition varied by topic, with health systems, PCPs, other medical providers, and payers dominating many of the groups. LTSS and behavioral health providers, beneficiaries, and advocates were most actively involved in the design of the CP components of the ACS. In addition to the work groups and listening sessions, state officials said that they held four public meetings to obtain input on the request for proposal for CPs, with separate meetings on LTSS and behavioral health in two locations: Boston and Springfield.

The work groups began meeting in late summer 2015 and completed their ACS design work by mid-2016; their work informed the ACO RFR. A state official described supporting the behavioral health work group, which consisted of approximately 25 members, met monthly, and even took “field trips” to different provider organizations to gain their perspectives. After the design work was completed, the state convened technical advisory groups on LTSS, behavioral health, and quality that met during the second half of 2016, completing their work in February 2017.

The state will continue to engage stakeholders during model implementation through advisory councils. State officials said they were using a competitive procurement to select 20–25 stakeholder representatives to serve on a new Delivery System Reform Implementation Advisory Council (DSRIC) that will meet every other month over the next 5 years to provide input on the implementation of Medicaid ACOs and other components of the ACS. A separate procurement will be conducted for another group, the DSRIP Advisory Council for Quality, which is required by the Section 1115 waiver terms and conditions and will provide feedback regarding the clinical performance of the DSRIP program (Massachusetts Executive Office of Health and Human Services [EOHHS], 2017).

In response to stakeholder concerns, procurement for the DSRIC offered applicants the option of applying as either an individual or an organization (EOHHS, n.d.). A provider stated that procuring individuals rather than organizations for ACS design work groups caused some problems for ongoing representation, because when its work group representative changed positions Medicaid would not allow a substitute to replace him. State officials said that was a lesson learned and that in the future, individuals would be able to apply as representatives of organizations and that, if needed, their organizations could propose a replacement with an equivalent background and experience for EOHHS approval.

C.3.4 How was behavioral health and long-term services integration with primary care tested in Massachusetts?

KEY INSIGHTS

- Behavioral health co-location requirements in PCPRI were described as a success by multiple stakeholders. However, the new ACS is less prescriptive for how to coordinate behavioral health care, although it explicitly requires community resources to meet this need.

The Massachusetts SIM Initiative financially supported and contractually required several strategies designed to encourage the integration of primary care and behavioral health: (1) awarding funds to continue a telephone consultation initiative to help pediatricians address children's behavioral health needs that is available to all providers in the state (MCPAP), (2) instituting a set of contractual requirements and funding for PCPRI Medicaid providers to integrate behavioral health into their primary care practice, and (3) with the launch of the Medicaid ACS, requiring ACOs to formalize relationships with state-procured CPs specializing in behavioral health and LTSS.

The Massachusetts Child Access and Psychiatry Project

Regional MCPAP teams consist of child psychiatrists, licensed therapists, resource and referral specialists, and program coordinators. MCPAP teams respond to inquiries from PCPs or on-site behavioral health clinicians within 30 minutes.

MCPAP expanded the capacity of pediatric providers by offering child psychiatry consultation services. MCPAP delivers child psychiatry consultation services via telephone to approximately 63 percent of practicing pediatricians in the state (as of the end of Quarter 4 2016). The SIM Initiative has made it possible to develop MCPAP as a population health model that is available for any child, regardless of their insurance or network affiliation. In addition, the state expanded MCPAP for Moms, a prenatal and postpartum psychiatric consultation and care coordination support for managing postpartum depression and other perinatal mental health issues. According to the state's third quarterly report in 2016, although MCPAP for Moms did not meet its target for provider utilization (54 percent), 38 percent of enrolled providers used it at least once during this past year, and the steady enrollment of obstetric practices and providers continues statewide (Massachusetts EOHHS, 2016). Several providers in the focus groups mentioned using MCPAP to obtain additional resources for their patients, with one reporting using the program "all the time." As of November 2016, MCPAP was in the process of consolidating and reprocuring its regional teams. The reprocurement involved the consolidation of six MCPAP regional teams into three. This new organizational model allows MCPAP to increase its outreach work while continuing to answer a high volume of calls from PCPs in the state.

The behavioral health co-location option facilitated compliance with the PCPRI requirement for access to behavioral health services and improved providers' satisfaction. In the provider focus groups, some providers expressed a desire for less prescriptive requirements and more flexibility in meeting state standards for behavioral health access. One physician said that the mandate for patients to see a mental health specialist within 14 days of a request was not always realistic given the patient's condition and availability of timely behavioral health care. This requirement was less burdensome for providers in practices with on-site behavioral health services. The majority of providers that participated in the focus groups found that having a behavioral health specialist co-located in their practice was extremely helpful.

> *…in just the last year, we've added a patient navigator, two integrative behavioral health people, and a nurse practitioner.*—Provider focus group

However, several physicians in the focus groups noted that behaviorists do not have enough time for unscheduled appointments because of the high demand for their services, and thus patients are scheduled for a later date. In contrast, other participants explained that some co-located behaviorists block part of their schedules to allow for same-day consultations. Several community health center (CHC) directors interviewed said they had expanded their behavioral health teams in the last year to accommodate the increased demand and interest in behavioral health services.

In addition to the contractual requirements in PCPRI, the state encourages behavioral health and primary care integration through payment reform. Until December 2016, the state paid 10 out of 30 PCPRI practices a combined behavioral health and primary care capitation payment to spur further coordination and integration. However, some stakeholder interviewees noted that the costs of integration can be significant and that the state's extra add-on payment was not enough to cover these expenses.

The ACS encourages ACOs to use the expertise of community-based organizations (CBOs) in behavioral health and LTSS. CBOs interested in partnering with ACOs and receiving DSRIP funding will have to be state-certified as CPs and demonstrate that they have the capacity to manage care for patients with serious mental illnesses and significant LTSS needs. According to the ACS design, ACOs would make the referral to the CPs, and the care manager from the CP would be responsible for coordinating care and communicating with the patients. ACOs and CPs will be required to formalize these partnerships to receive DSRIP funding. In addition, a portion of DSRIP funds will be designated for "flexible services" that address social determinants of health (e.g., air conditioners for children with asthma and housing supports). The PMPM amount for flexible services decreases over the 5-year DSRIP period and is the same for every ACO. The CP component aims to increase behavioral health and LTSS integration within a more flexible framework that allows ACOs to take advantage of existing external expertise.

C.3.5 How were quality measurement and reporting strategies tested in Massachusetts?

KEY INSIGHTS

- PCPRI quality reporting built provider capacity to test and improve reporting, helping participating providers prepare for participation in ACOs. Some internal challenges were identified by providers, which may have resulted in underreporting.
- Provider focus group participants expressed fatigue with reporting requirements and processes. The state planned to convene a stakeholder taskforce on quality measure alignment in 2017. The need for less complex reporting requirements was also noted by the state.

PCPRI paid providers for reporting various quality measures, with a shift to paying for outcomes in the final year of the initiative. PCPRI providers could earn quality incentive payments up to 5 percent of their total PCPR bundled payment. ***Table C-4*** shows the number of quality measures, by domain, across the SIM Initiative–related delivery system and payment models in Massachusetts. In addition, MassHealth is working with other state agencies and stakeholders to align measures across payers.

Table C-4. Number of quality measures by domain implemented or planned for SIM Initiative–related delivery system and payment models in Massachusetts

Domain	PCPRI	ACOs	Behavioral Health CPs	LTSS CPs
Prevention and Wellness	16	10	2	3
Chronic Disease Management	7	5	3	N/A
Behavioral Health & Substance Abuse	10	9	4	N/A
LTSS	N/A	1	N/A	N/A
Integration/Care Coordination	2	11	3	3
Avoidable Utilization	2	3	2	2
Member Experience	3	TBD	TBD	TBD
Engagement	N/A	N/A	2	2

ACO = accountable care organization; CP = Community Partner; LTSS = long-term services and supports; N/A = not applicable; PCPRI = Primary Care Payment Reform; TBD = to be determined.

Note: Twelve of the PCPRI measures were used for both adult and pediatric populations. Each of those measures was counted twice, so there is some duplication.

Sources: MassHealth. PCPR Quality Benchmarks 2016 (personal communication with state official, May 12, 2017); MassHealth. Draft Appendix D: Measure Tables (personal communication with state official, April 14, 2017).

PCPRI required providers to report on a slate of clinical quality measures, providing an opportunity for providers to build their reporting capacity and identify and address reporting challenges. PCPRI providers submitted quality data to the state and received feedback reports to use for quality improvement. This process gave them the opportunity to gain experience with quality reporting and for both provider organizations and the state to identify and resolve challenges.

Most provider focus group participants said the reports they received from the state did not seem to accurately reflect their sites' performance. Provider organizations and focus group participants mentioned several internal electronic health record (EHR) challenges that may have contributed to underreporting. Most PCPs in the focus groups said that their organizations were not able to report quality data directly from their EHR systems. A provider organization said that clinicians may be providing screenings, immunizations, and treatments but not documenting them in the proper fields of their EHRs.

Finally, a state official and an MCO said that the PCPRI quality measures were overly complicated. To ensure that future metrics accurately capture specific outcomes during the ACO pilot and full-scale launch in 2017, the state was considering revisiting its methods of quality measurement and reporting to address the challenges identified during reporting for PCPRI.

Provider focus group participants expressed fatigue with quality measurement and reporting, and state agencies planned to convene a stakeholder taskforce on multi-payer alignment of quality measures. PCPs in the focus groups expressed their concerns about reporting in several ways:

> *Measurement fatigue, I think is a big issue.*—Provider focus group

Recognizing the reporting burden on providers, the state issued a notice of opportunity in March 2017 to procure stakeholders for a taskforce on multi-payer alignment. State officials noted that few quality metrics exist for vulnerable populations; thus, it may be necessary to supplement multi-payer measures with measures specific to the Medicaid population.

C.3.6 How were health IT and data analytic infrastructure implemented in Massachusetts?

KEY INSIGHTS

- Massachusetts is using state legislation, regulations, and procurement requirements to support providers' increased collaboration and use of the state's HIE.
- The e-Referral initiative has been successful at facilitating referrals from PCPs to community resources, but providers said that the process of adding new resources into the electronic system is burdensome.

During the first 2 years of the Massachusetts SIM Initiative, multiple health IT initiatives were supported with SIM funding. Several of those were completed by mid-2015, and others were cancelled when the state reset the SIM Initiative in 2015. Since the reset, the state has focused its SIM Initiative funds for health IT efforts on expanding provider use of the Massachusetts Health Information Highway (Mass HIway), the state's HIE, to support coordination of care among providers, particularly among acute care hospitals, ambulatory medical practices, and CHCs. These efforts have ranged from streamlining the connection process to new state regulations and Medicaid contractual requirements for ACOs and CPs. The state also continued SIM Initiative support for the electronic referral program known as e-Referral to facilitate referrals from PCPs to community resources.

The state promulgated regulations to support increased use of the Mass HIway. The regulations were promulgated in February 2017, after a public comment period in November 2016. One issue addressed by the regulations is patient consent for electronic record sharing. A state law requiring providers to obtain patients' consent to electronic record sharing created a significant barrier to use of the Mass HIway, because provider organizations interpreted the law as requiring patients to sign a consent form authorizing electronic transmission of their medical records. A work group developed an approach to clarify and streamline the opt-in and opt-out requirements under Chapter 118i. Under the final rules, the direct messaging component of the Mass HIway will be aligned with standard Health Insurance Portability and Accountability Act (HIPAA) requirements so that authorization for electronic record sharing can be incorporated into providers' consent for medical treatment forms or HIPAA release forms. Mass HIway–sponsored services, such as the Event Notification System, which is still in development, will require an explicit opt-in because patient information is stored. The state plans to manage the opt-in system but is still developing the exact architecture.

The regulations also establish a timetable for acute care hospitals, CHCs, and ambulatory medical practices to connect to the Mass HIway and to send and receive Mass HIway direct messages. EOHHS may issue administrative guidance in the future that establish Mass HIway connection dates for additional provider organizations and guarantee at least 1 year for affected providers to connect. If a provider organization does not connect to the Mass HIway by the required date, then it may be subject to a monetary penalty.

In addition to the Mass HIway regulations, Medicaid is using procurement as a lever to increase utilization by ACOs, MCOs, and CPs. The state has incorporated provider connection requirements into Medicaid managed care contracts. Pilot ACOs in the ACS are encouraged, but not required, to be interoperably connected to allow them to share data across EHRs. Full-scale ACOs, by contrast, will be required to increase Mass HIway use, although the specifics of these requirements have not yet been established. The state also plans to use state Infrastructure and Capacity Building Grants as an incentive to ensure that ACOs and CPs are using the Mass HIway.

The e-Referral initiative successfully connected PCPs with community resources. SIM funding was used to develop the bidirectional e-Referral system and to pilot the technology in select CHC and community organizations. Although some CHCs participated in both e-Referral and PCPRI, the two programs are separate. Providers participating in e-Referral reported increased referrals to CBOs in 2016 for programs such as diabetes prevention, asthma care, fall prevention, and home-delivered meal programs. Overall, the state reported that 2,200 electronic referrals have been made since the inception of the program in 2014.

Providers reported challenges in expanding the number of community resources and the usability of e-Referral feedback reports. CHCs are responsible for conducting their own outreach to find suitable CPs. The types of CBOs they target to form partnerships depend on the needs of their patient population. CHCs typically had partnerships with two to five community organizations. However, the process of on-boarding community resources proved difficult. Obtaining buy-in from community organization leaders, ensuring HIPAA compliance, and training staff to use the online portal posed barriers to adding new partners, such as homeless shelters. Additionally, every time a CHC recruits a new partner, its EHR or other third-party vendor must make the change, which can take up to 3 months. One CHC provider remarked, "We think it is a good investment, but we didn't expect how complicated it was."

CHCs noted that feedback reports from community organizations are often quite incomplete. CHCs do not receive feedback reports for all patients, and when they do, they cannot always tell whether the patient actually completed the program. One provider said that the feedback reports are integrated into the patient EHR but that the provider is not notified when feedback arrives and often does not see it.

C.3.7 How were workforce development and practice transformation strategies implemented in Massachusetts?

KEY INSIGHTS

- Under PCPRI, practice transformation was driven by contractual milestones, the monitoring of milestones, and TA. However, feedback from providers drove the state to use a less prescriptive approach for ACS.
- PCPRI financing allowed flexibility with the capitation payments, providing revenue to fund additional staff to expand the use of a team approach.

During the 3 years of PCPRI (i.e., 2014–2016), practice transformation was a priority for the SIM Initiative. State staff and the PCPRI TA vendor, funded by the SIM Initiative, worked closely with providers to achieve compliance with contractual milestones. However, providers found the PCPRI approach to practice transformation to be too prescriptive (see ***Sections C.3.1*** and ***C.3.4***) and under the ACS, the state is using a less prescriptive approach while continuing to support transformation through programmatic support, TA, and data reporting.

PCPRI used multiple levers to support practice transformation. These levers included the payment structure, contractual milestones, monitoring of progress on the milestones, requiring corrective action plans for noncompliance with milestones, and targeting TA to providers experiencing difficulty achieving key milestones. In addition to contract TA, the state's PCPRI team provided extensive programmatic support to providers. The state's approach, which focused on supporting behavioral health integration, is described in the Massachusetts appendix of the SIM Initiative Round 1 Evaluation Year 3 Annual Report 3.

Technical assistance helped PCPRI providers achieve behavioral health milestones. The PCPRI contract set milestones for participating providers, including 10 behavioral health milestones. The variation in practices' capabilities and needs caused the state to shift its technical assistance approach from webinars to one-on-one technical assistance for providers having difficulty achieving key practice transformation milestones. A PCMH consultant and a practicing behavioral health clinician worked with practices on their key milestones. This approach helped increase overall compliance with meaningful behavioral health integration milestones to 93 percent (Commonwealth of Massachusetts, 2016, p.3).

Some PCPRI providers expanded their care teams by adding nurses, care coordinators, patient navigators, and CHWs while this initiative was in effect. Both provider interviewees and provider focus group participants said that their organizations were expanding the use of a team approach to primary care by adding new types of staff. These changes were attributed to the PCPRI revenue stream; PCPRI did not require practices to add all of these new roles.

> *…in just the last year (2016) we've added a patient navigator, two integrative behavioral health people, and a nurse practitioner.*—Provider focus group

State officials said that lessons learned from PCPRI and the ACO pilot will inform their approach to TA and program support for ACOs and CPs. Program support and TA for pilot ACOs includes monthly meetings of the ACOs with the Massachusetts Medicaid team to discuss implementation issues and share best practices and opportunities for individualized support, such as "office hours" appointments with their contract manager and a dedicated e-mail box. The ACO pilot will inform TA and support for the full ACO program. PCPs participating in the full ACO program will receive TA from the ACOs. TA support for CPs will be financed through DSRIP (Massachusetts Executive Office of Health and Human Services, 2017).

C.3.8 What approach did Massachusetts take to address population health in its SIM Initiative?

KEY INSIGHTS

- Massachusetts is focusing population health efforts on four initiatives targeting prevention and wellness, community-based interventions, and flexible services.
- Massachusetts intends to allocate a portion of the ACO DSRIP funding toward “flexible services,” contingent upon CMS approval. Flexible services are services not covered under Medicaid that address social determinants of health, such as services to maintain a safe and healthy living environment, services for individuals transitioning from institutional care, physical activity and nutrition, and sexual assault and domestic violence supports.

Massachusetts is using SIM funding to support four initiatives aimed at improving population health: the ACS, e-Referral, MCPAP, and MCPAP for Moms (Medicaid EOHHS, Population Health Strategy, August 1, 2016). The e-Referral system aims to improve population health by facilitating referrals to CBOs that can provide care management for health conditions and help individuals address social determinants of health. MCPAP and MCPAP for Moms provide a resource to support population health in Massachusetts by integrating behavioral health with primary care to help detect and treat mental illnesses with the goal of improving long-term health.

MCPAP, MCPAP for Moms, and the e-Referral initiative are underway and were previously described in ***Section C.3.4***. This section will focus on the ACS model and will describe the proposed population health plans.

ACOs will be held accountable for the TCOC and prevention and wellness quality metrics for their attributed members. Accountability will provide ACOs with the necessary incentives to improve population health by increasing overall quality of care and reducing avoidable hospital utilization. ACOs will also be evaluated on their performance on a set of prevention and wellness quality metrics proven to be linked to improving population health over time, such as well-child visits, immunizations, and body mass index assessments.

ACOs will have contractual requirements to meet population health goals. ACOs will be required to undergo an ACO certification process, which will detail its approach to risk stratification of its attributed membership and how it will use the stratification to implement one or more programs targeted at improving health outcomes for its patient population. At least one of these programs will need to address mental health, addiction, or social determinants of health. ACOs will also be expected to screen their members for social service needs, establish care plans to address those needs, make referrals to social services organizations, and provide navigational assistance for accessing social services.

ACOs will provide flexible services to their members. Population health is addressed in the ACO model through an emphasis on "flexible services," or nonreimbursed services that address social determinants of health, such as housing stabilization and support, utility assistance, physical activity and nutrition, and sexual assault and domestic violence supports. Massachusetts intends to allocate a portion of the ACO DSRIP funding toward flexible services, contingent upon CMS approval.

C.3.9 How will elements of the SIM Initiative in Massachusetts be sustained?

KEY INSIGHTS

- State officials expect the ACS to continue beyond the SIM Initiative award period through DSRIP program funding.
- MassHealth will distribute the shared savings payments to PCPRI participants upon CMS approval of the methodology.
- Strong partnerships and communication between health care providers and community-based service providers is necessary to successfully implement and sustain the e-Referral program.

Massachusetts anticipates a seamless transition from supporting delivery system reform using SIM funding to supporting it using DSRIP program funding. CMS approved Massachusetts's Medicaid Section 1115 waiver and provided $1.8 billion in DSRIP program funding. The state's Medicaid Section 1115 waiver amendment, which authorizes the ACO pilot, was approved effective November 4, 2016, through June 30, 2017. CMS also approved an extension of the Medicaid Section 1115 waiver, effective July 1, 2017, through June 30, 2022. The waiver extension authorizes $1.8 billion of DSRIP funding over 5 years to support the ACOs and CPs. DSRIP overlaps with SIM funding for approximately 10 months. After the completion of SIM funding, DSRIP will support the continuation of the ACS.

Over $1 billion of the DSRIP funds will be available to the ACOs to support implementation and ongoing costs of transitioning to the accountable care models, such as infrastructure and care coordination activities. Additionally, a portion of the ACO DSRIP funding will be allocated toward flexible services. Nearly $550 million will be dedicated to behavioral health and LTSS CPs. CPs may use funds to provide care coordination, care management, and implement other activities that promote the integration of physical health, behavioral health, and LTSS-related needs. DSRIP funds may also be used by CPs for infrastructure and capacity building (Medicaid Waiver Summary, November 2016).

Massachusetts continued certain operational aspects of PCPRI while it worked on the closeout process and contracting arrangements for PCPRI participating providers. Through December 2016, the end of PCPRI, MassHealth continued providing operational support for PCPRI participants, such as performance monitoring, monthly progress reports, monthly program steering committee meetings, and topic-specific webinars. MassHealth also worked with PCPRI participating providers to establish necessary contracting arrangements to shift them either back to FFS payments or into the Pilot ACO program.

At the end of SIM Year 2, MassHealth was in active discussions with CMS regarding approval of the shared savings methodology for PCPRI participants. Payments planned for January 2017 were not distributed by the end of SIM Year 2 because of the ongoing negotiations. MassHealth has finalized its assessment of PCPRI participants' quality performance for 2015 and shared savings performance for 2014 and is working to complete analysis and verification of the final year of PCPRI performance. Following CMS approval of the methodology, MassHealth will distribute shared savings payments to PCPRI participants.

Strong partnerships between health care providers and community-based service providers is key to successfully implementing and sustaining the e-Referral program. SIM funds were used to evaluate the public health value of referrals to community-based service providers to help make a business case for new providers and ACOs to adopt the e-Referral program. DPH is evaluating whether patients referred through e-Referrals have lower hemoglobin A1c scores, and whether they lose weight. Massachusetts realizes that sustainability hinges on provider organizations using the program regularly (Massachusetts Health Policy Commission, 2017).

Table C-5 provides a summary of the SIM Initiative activities that the state plans to sustain.

Table C-5. Summary of the SIM Initiative activities in Massachusetts and sustainability plans

SIM activity	Activity type	Payers	Provider types	Dates (implementation status)	Supporting policies (if any)	Plans to sustain activity
ACO	Delivery/ payment system	Medicaid	Integrated health systems, hospitals, primary care organizations with required partnerships with community providers	Pilot: December 2016–March 2018 ACO: Contracting in August 2017; TCOC performance begins March 2018–ongoing	1115 waiver (DSRIP) ICB Grant State law[a] Contract provisions	1115 waiver (DSRIP) funding used for 5 years; then, ACOs are expected to absorb incremental costs associated with expectations under TCOC management
MCPAP	Behavioral health integration	Multi-payer	Primary care	Launched in 2014; SIM supported March 2014–April 2018	Legislation appropriation Surcharge on commercial health plans	Already sustainable through the Department of Mental Health and Massachusetts Behavioral Health Partnership
MCPAP for Moms	Behavioral health integration	Multi-payer	Primary care	April 2015–April 2017	Legislation appropriation Surcharge on commercial health plans	Will eventually be sustained under MCPAP
CP Program	Population health	Medicaid	Primary care, Community organizations	Contracting to begin in November 2017; implementation to begin in Spring 2018	1115 waiver (DSRIP) Contract provisions	1115 waiver (DSRIP) funding used for 5 years; then, effective CPs will attract ACO funding
e-Referral	Population health	N/A	Primary care, Community organizations	Summer 2014–April 2017	Prevention and Wellness Trust Fund grant requirements	Prevention and Wellness Trust Fund grant

ACO = accountable care organization; CP = Community Partner; DSRIP = Delivery System Reform Incentive Payment; ICB = Infrastructure and Capacity Building; MCPAP = Massachusetts Child Psychiatry Access Project; N/A = not applicable; TCOC = total cost of care.

[a] Chapter 224 directs MassHealth to develop standards for “model ACOs.”

C.4 Did the Primary Care Payment Reform Initiative Have an Impact on Key Outcomes After 7 Quarters of Implementation in Massachusetts?

As described in the preceding sections, the SIM Initiative in Massachusetts began to transition from a primary care-based payment model with a focus on TCOC (PCPRI) to a wider range of responsibility for TCOC shared among the providers of an ACO. This section focuses on the results of the PCPRI model among Massachusetts' Medicaid beneficiaries in the first 7 quarters of the initiative. Participating PCPRI practices were expected to provide patients with care management and coordination services and behavioral health integration. These services were expected to result in lower TCOCs by shifting care from inappropriate settings, such as EDs, to lower-cost settings, such as primary care facilities. Participating practices received a monthly capitation payment that covered two items: (1) the risk-adjusted expected primary care spending for the attributed beneficiary and (2) an additional amount to cover care coordination and behavioral integration (for some practices only). In addition, practices had quality incentives, and they could share savings or losses based on their attributed beneficiaries' TCOC, excluding primary care.

KEY INSIGHTS

- For Massachusetts Medicaid beneficiaries attributed to PCPRI, relative to a comparison group, we found the following statistically significant changes after 7 quarters:
    - increased total expenditures
    - increased primary care utilization
    - increased ED visits
    - increased inpatient admissions
- Some of the relative increases in utilization could be the result of deferred care identified because of the outreach of care coordination staff or the difficulty of changing care-seeking behavior.
- However, caution should be used in attributing these findings solely to PCPRI. The findings could also be partially attributed to underlying differences between the health centers that volunteered to participate in the PCPRI program and those that did not. Many of the participating health centers were level III PCMH certified and may have encouraged additional utilization.

In March 2014, Massachusetts launched the Medicaid PCPRI, an alternative payment model designed to improve access to primary care; enhance patient experience, quality, and efficiency through care management and coordination; and integrate behavioral health care with primary care (EOHHS, 2017a). Many of the beneficiaries became newly eligible for Medicaid at the same time they were attributed to PCPRI, but this was also true for the comparison group. As expected, we observed a spike in utilization among the newly enrolled in both the PCPRI group and the comparison group. Therefore, we analyzed outcomes related to the intervention beginning in June 2014 to disentangle any utilization and expenditures related to pent-up demand for health insurance coverage from outcomes impacted by the model itself. The model was intended to control the TCOC through a shared savings/risk arrangement with quality incentives. The participating practices were similar to PCMHs and had an enhanced focus on behavioral health integration.

The shared savings methodology, however, was not approved by the end of 2015 (the end of our reported data); thus, providers were still uncertain of their performance. Therefore, it is not likely that they aggressively managed their patients' TCOC without understanding which specific areas of care they were poorly performing on. Therefore, we expect to see less of an impact on TCOC during the time frame described in this report.

As practices respond to the incentives of the PCPRI payment system, we expect that attributed beneficiary utilization and expenditures should change in response. In particular, as the model provides coordinated care, avoidable utilization and expenditures, such as outpatient ED utilization and spending, are expected to decrease. Conversely, primary care utilization is expected to increase because of the enhanced focus on primary care. Some patients who have had very little utilization in the past may be encouraged to use additional services through the outreach of the participating practices. We expect that this phenomenon would mostly be reflected in primary care utilization but may also appear as increased inpatient and ED utilization for deferred care prior to model attribution.

To assess the consequences of PCPRI for utilization and expenditures, we evaluate the following research questions:

- How did trends in utilization for hospital inpatient, outpatient ED, and primary care visits change in the treatment group after the implementation of PCPRI relative to the comparison group?

- How did trends in expenditures for hospital inpatient, outpatient ED, primary care, and overall change in the treatment group after the implementation of PCPRI relative to the comparison group?

- How did trends in quality of care and care coordination change in the treatment group after the implementation of PCPRI relative to the comparison group?

To address the research questions, we used a D-in-D quasi-experimental design, incorporating a comparison group to control for underlying changes in the health care environment in Massachusetts. To derive outcomes for Medicaid beneficiaries in our analytic sample, we used Medicaid data provided by MassHealth. In this report, we use data from 2011 to 2015, covering a 3-year baseline period and the first 7 post-period quarters of PCPRI implementation. At its peak, during the 7-quarter post-period, the model covered 90,000 Medicaid beneficiaries in the PCC plan, a plan administered by Medicaid. In July 2015, it was estimated that there were 380,000 beneficiaries of the PCC plan (University of Massachusetts Medical School, 2015). Overall, Medicaid covers approximately 1.6 million beneficiaries in Massachusetts (University of Massachusetts Medical School, 2015). Therefore, at its peak, PCPRI covered roughly 24 percent of the PCC population or 6 percent of the overall Medicaid population. Because only PCC plan beneficiaries are enrolled in PCPRI, we selected a comparison group of non–PCPRI-attributed beneficiaries who were also PCC plan beneficiaries. Following comparison group selection, we constructed annual person-level propensity score weights to balance the PCPRI group and comparison group on individual, baseline outcome, and county characteristics. Practice-level characteristics were not available. The intervention group and weighted comparison group were similar at baseline on key demographic characteristics (***Table C-6***). A summary of the analytic methods is included below, and the methods are detailed in ***Sub-appendix C-2***.

Methods Snapshot for Impact Analysis

- **Study design:** Difference-in-differences quasi-experimental design.
- **Population**: The intervention group comprised Medicaid PCC plan beneficiaries attributed to MassHealth's PCPRI in the first 7 post-implementation quarters (third quarter 2014–first quarter 2016) compared to PCC plan Medicaid beneficiaries who were not attributed to PCPRI.
- **Data:** Medicaid claims data provided by MassHealth from 2011 to first quarter 2016, covering a 3-year baseline period and the first 7 quarters of PCPRI implementation.[51]
- **Sample:** Beneficiaries ages 0 through 64.
- **Measures:** Utilization (quarterly rate) and expenditures (quarterly per beneficiary per month in dollars).
- **Statistical analysis:** Logistic regression (binary) and ordinary least-squares (expenditures) models weighted by the propensity score times the fraction of time the person was enrolled in Medicaid. Standard errors were clustered at the beneficiary level to account for multiple observations per person. The models adjusted for demographic and health status variables, practice-level variables, and socioeconomic county-level variables.

---

[51] We used third quarter 2014 as the start of the model period. Additional details are provided in ***Appendix C-2.1.1***.

Table C-6. Average characteristics of Massachusetts Medicaid Primary Care Payment Reform Initiative and comparison groups after propensity score weights were applied, baseline period

	PCPRI	Comparison group	Standardized difference[a]	p-value
N	109,405	110,809		
Zero months of enrollment in year before attribution (%)	13.30	13.60	1.0	0.03
1–3 months of enrollment in year before attribution (%)	11.80	11.30	1.5	<0.001
4–8 months of enrollment in year before attribution (%)	24.00	23.80	0.5	0.22
9–12 months of enrollment in year before attribution (%)	50.90	51.30	0.7	0.08
Continuously enrolled (%)	7.3	7.6	1.1	0.02
Total months enrolled	39.1	39.4	1.7	<0.001
Female (%)	56.1	56.4	0.6	0.13
White (%)	20.6	21.2	1.6	<0.001
Nonwhite, known race (%)	33.5	33.8	0.6	0.14
Unknown Race (%)	45.90	45.00	1.9	<0.001
Disabled (%)	9.00	9.20	0.9	0.04
Age 0 (%)	6.40	6.10	1.3	0.002
Age 1–10 (%)	26.90	26.50	0.9	0.03
Age 11–20 (%)	23.00	22.30	1.7	<0.001
Age 21–30 (%)	12.70	13.10	1.2	0.007
Age 31–40 (%)	11.50	11.80	1.1	0.01
Age 41–50 (%)	10.10	10.30	0.7	0.11
Age 51–60 (%)	7.80	8.20	1.4	<0.001
Age 61+ (%)	1.70	1.80	0.5	0.20
Boston (%)	76.50	75.10	3.3	<0.001
Worcester (%)	12.10	12.20	0.2	0.57
Springfield (%)	3.90	3.90	0.1	0.69
Providence (%)	6.10	6.00	0.5	0.17
Other MSA (%)	1.40	2.80	10.1	<0.001
CDPS	2.10	2.10	0.1	0.88
Total cost in year prior to attribution	1,824.70	1,941.90	1.9	<0.001
Inpatient visits in year prior to attribution	0.10	0.10	0.8	0.17
Zero ED visits in year prior to attribution (%)	71.30	70.40	2	<0.001
Single ED visit in year prior to attribution (%)	12.50	12.80	1	<0.001
Multiple ED visits in year prior to attribution (%)	16.20	16.80	1.5	<0.001
Percent persons in poverty, 2011 (%)	13.90	14.00	2.1	<0.001
Percent persons 25+ with less than high school diploma (%)	11.80	11.90	1.9	<0.001
Percent persons 25+ with 4+ years college (%)	38.80	38.80	0.8	0.05

(continued)

Table C-6. Average characteristics of Massachusetts Medicaid Primary Care Payment Reform Initiative and comparison groups after propensity score weights were applied, baseline period (continued)

	PCPRI	Comparison group	Standardized difference[a]	p-value
Unemployment rate, 16+, 2014 (%)	5.70	5.70	1.8	0.003
Population density per square mile	4,526.30	4,607.50	1.6	<0.001
Hospital beds per person, 2012	2.70	2.80	1.2	0.005
PCPs per 1,000, 2013	1.10	1.10	1.3	0.002
Population in 1,000s	860.90	879.80	3.5	<0.001

CDPS = Chronic Illness and Disability Payment System; ED = emergency department; MSA = metropolitan statistical area; PCP = primary care provider; PCPRI = Primary Care Payment Reform Initiative.

[a] Absolute standardized differences are expressed as percentages.

C.4.1 Did care coordination change among Massachusetts Medicaid PCPRI participants?

KEY INSIGHTS

- Overall, the rate of **any follow-up visit within 14 days of inpatient discharge did not significantly change for PCPRI beneficiaries** relative to the comparison group.
- This is surprising because of the additional care management put in place under PCPRI and the lower baseline rates of follow-up after hospitalization.

We present the results of the D-in-D logistic regression analyses for the annual rates of hospital discharges with a follow-up visit within 14 days after discharge in ***Table C-7***. We report the D-in-D estimate for each year since the implementation of PCPRI, along with an overall estimate for the first 7 quarters combined.

- Overall, the annual rate of any **follow-up visit within 14 days of inpatient discharge** did not significantly change for PCPRI beneficiaries relative to the comparison group.
- Overall, the follow-up rate for the PCPRI population during the baseline period was 34 percent, compared to 41 percent in the comparison group. During the test period, that rate stayed constant at 34 percent among PCPRI beneficiaries and 41 percent among the comparison group population.
- These findings indicate that there was not significant progress in either group during the test period. One would have expected the PCPRI beneficiaries to receive additional follow-up from care managers after the initiation of the initiative, but this did not lead to follow-up visits within 14 days of hospital discharge.

Table C-7. Difference in the pre-post change in care coordination outcomes for Medicaid beneficiaries enrolled in the Primary Care Payment Reform Initiative in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014–March 2016)

Outcome (per 100 beneficiaries)	Pre-Period Adjusted Mean, PCPRI	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCPRI	Test-Period Adjusted Mean, CG	Regression-adjusted D-in-D (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value
Annual rates of 14-day follow-up post inpatient discharge							
Year 1	33.93	41.32	34.35	41.18	1.18 (−2.13, 4.50) (−1.40, 3.76)	3.4	0.557
Year 2	33.93	41.32	34.22	42.62	−0.93 (−5.60, 3.74) (−4.57, 2.71)	−2.7	0.743
Overall	33.93	41.32	34.31	41.18	0.50 (−2.20, 3.20) (−1.61, 2.61)	1.5	0.761

CG = comparison group; D-in-D = difference-in-differences; PCPRI = Primary Care Payment Reform Initiative.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payments in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payments in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain estimates of the differences in probability of any utilization. The probability estimates are multiplied by 100 to obtain an approximate rate per 100 beneficiaries/discharges. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-Ds are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total number of weighted person-years for the 14-day follow-up models is 56,617.

Data source: RTI analysis of Massachusetts Medicaid claims (2011–2016)

C.4.2 Did trends in expenditures change among Massachusetts Medicaid PCPRI participants?

KEY INSIGHTS

- **Total expenditures increased by $79 more** for PCPRI participants relative to the comparison group in the first 7 quarters of PCPRI implementation ($p < 0.001$).
- **The relative increase in inpatient, ED, and primary care costs**, while significant, only accounted for 30 percent of the overall difference in total expenditures.
- Primary care costs were included in a capitation payment to participating PCPRI practices for care coordination, primary care, and behavioral health care. On average, **capitation payments intended to cover primary care and behavioral health exceeded the FFS equivalent by 133 percent.** State officials were not surprised at the generosity of the payment, and this was also confirmed by providers who stated that the payment was more than it would have been under the previous payment methodology. However, it is not clear if this was the intention of the payment or if this was an unintended consequence.

Table C-8 presents the results of the D-in-D regression analyses for total, inpatient facility, ED, and primary care per beneficiary per month (PBPM) expenditures.

- **Total PBPM expenditures increased significantly more** for PCPRI participants than for the comparison group in **the first and second years of PCPRI implementation**. Results were similar and statistically significant for each of the 7 post-period quarters (***Figure C-3***). Overall, total expenditures significantly increased by $78.81 PBPM more among PCPRI participants relative to the comparison group ($p < 0.001$).

- The difference in the change in total expenditures was driven only partially by relative increases in inpatient, ED, and primary care expenditures. Over the first 7 quarters, **inpatient expenditures increased by $13.08 PBPM more** in PCPRI relative to the comparison group ($p = 0.005$). **ED spending increased by $7.39 PBPM ($p < .001$) more** and **primary care spending** increased by **$2.94 PBPM ($p < .001$)** for the PCPRI group relative to the comparison group.

- The increases in total, inpatient, ED, and primary care PBPM spending relative to the comparison group are substantial but only accounted for 30 percent of the increase in total expenditures over the first 7 quarters of implementation.

Table C-8. Differences in the pre-post change in PBPM expenditures for Massachusetts Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group through the seventh full quarter of implementation (July 2014–March 2016)

Outcome ($)	Pre-Period Adjusted Mean, PCPRI	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCPRI	Test-Period Adjusted Mean, CG	Regression-adjusted D-in-D (90% CI) (80% CI)		Relative difference (%)	p-value
Total								
Year One	639.65	647.14	799.59	734.99	72.11	(62.39, 83.83) (60.98, 81.25)	11.3	0.000
Year Two	639.65	647.14	834.62	749.67	92.44	(72.22, 112.66) (76.68, 108.19)	14.5	0.000
Overall	639.65	647.14	811.13	739.87	78.81	(68.50, 89.11) (70.78, 86.83)	12.3	0.000
Inpatient								
Year One	109.84	120.13	129.71	130.72	9.27	(−0.12, 18.66) (1.96, 16.59)	8.4	0.104
Year Two	109.84	120.13	134.16	123.63	20.83	(7.47, 34.20) (10.42, 31.25)	19.0	0.010
Overall	109.84	120.13	131.18	128.36	13.08	(5.40, 20.76) (7.09, 19.07)	11.9	0.005
ED								
Year One	50.41	46.83	61.01	50.20	7.23	(5.67, 8.79) (6.02, 8.45)	14.3	0.000
Year Two	50.41	46.83	61.01	49.73	7.70	(5.36, 10.03) (5.87, 9.52)	15.3	0.000
Overall	50.41	46.83	61.01	50.04	7.39	(6.09, 8.68) (6.37, 8.40)	14.7	0.000
Primary care								
Year One	13.83	23.91	16.42	24.87	1.62	(1.03, 2.21) (1.16, 2.08)	11.7	0.000
Year Two	13.83	23.91	17.70	22.15	5.63	(4.64, 6.61) (4.86, 6.39)	40.7	0.000
Overall	13.83	23.91	16.84	23.97	2.94	(2.32, 3.45) (2.54, 3.34)	21.2	0.000

CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM= per beneficiary per month; PCPRI = Primary Care Payment Reform Initiative.

Note: Total payments include all paid claims plus the capitation payments received by PCPRI practices.

How to interpret the findings: For expenditures in the intervention group relative to the comparison group, a *positive* value corresponds to a *greater increase* or a *smaller decrease* in expenditures in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

(continued)

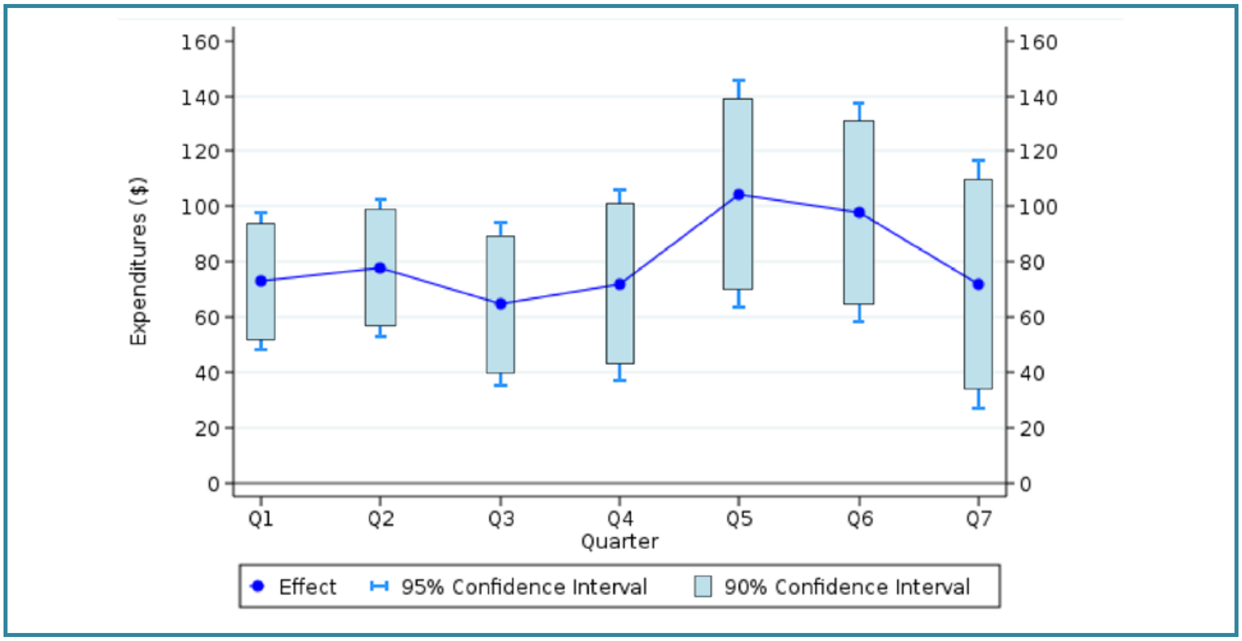
Table C-8. Differences in the pre-post change in PBPM expenditures for Massachusetts Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group through the seventh full quarter of implementation (July 2014–March 2016) (continued)

Methods: An ordinary least squares model was used to estimate the impact on expenditures calculated on a quarterly basis. Yearly estimates are a weighted average of the four quarterly estimates for the given year. Each beneficiary's quarterly expenditure values were converted to PBPM means by dividing by 3 so that the outcome could be interpreted as the estimated impact on monthly expenditures. The regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Standard statistical practice is to use CIs of 90% or higher. Eighty percent CIs are provided here for comparison purposes only. The total number of weighted person-quarters included in the regression model for the entire study period is 2,832,025.

Data source: RTI analysis of Massachusetts Medicaid claims (2011–2016).

Sensitivity analysis: We excluded all person-quarters where a beneficiary was less than or equal to 12 months of age to test the sensitivity of the analyses based on the way newborns are enrolled in Medicaid in Massachusetts. The conclusions did not change, in that all results were still significant, and there were slight changes in the magnitude of the estimates: change in total spending remained at \$78 ($p < .001$); change in inpatient spending was higher at \$19 ($p < .001$); change in ED spending remained at \$7 ($p < .001$); change in primary care spending was lower at \$1.20 ($p < .001$).

Figure C-3. Differences in the pre-post change in total per beneficiary per month expenditures for Massachusetts Medicaid beneficiaries in the Primary Care Payment Reform Initiative and comparison groups, first 7 quarters of implementation



PCPRI = Primary Care Payment Reform Initiative.

Bars indicate 90% confidence intervals (CIs), and lines that extend beyond the bars indicate 95% CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Potential impact of capitation payments

We explored the structure of the capitation payments that PCPRI practices received to understand if this payment amount was overcompensating them for primary care services. During our site visits, several providers mentioned that the capitation payments more than covered the amount that would have been paid under FFS, though additional cash flow was not the intended purpose of this payment.

To quantitatively explore this issue, we compared the PCPRI capitation payments (care coordination, primary care, and behavioral health care) and the FFS equivalent payments that would have been paid in the absence of capitation (***Table C-9***). This allowed us to assess any over- or underpayment associated with the capitation.[52] We decomposed the care coordination component of the payment and allocated the remainder of the capitation to primary care spending. Using all claims that were zero paid because of the capitation payment, we calculated the FFS equivalent using the prepopulated field on the claim. We subtracted the PCPRI primary care/behavioral health capitation payment from the FFS equivalent payment to estimate any potential over/underpayment to the practices.

Table C-9. Examination of the differences between the PCPRI capitation payment and fee-for-service equivalent payments for beneficiaries enrolled in the PCPRI in Massachusetts, through the seventh full quarter of initiative implementation (July 2014–March 2016)

			PCPRI capitated payment per month		Overpayment per month	
Year, Quarter	PCPRI beneficiary months	FFS equivalent per month	Care coordination	Primary care-behavioral health	Primary care-behavioral health	Total including care coordination
2014,Q1	216,733	$10.42	$12.50	$4.58	−$5.84	$6.66
2014,Q2	222,429	$27.06	$12.50	$38.29	$11.23	$23.73
2014,Q3	223,750	$24.71	$12.50	$38.36	$13.65	$26.15
2014,Q4	226,377	$25.46	$12.50	$38.56	$13.10	$25.60
2015,Q1	241,814	$23.02	$12.50	$33.25	$10.24	$22.74
2015,Q2	250,674	$24.53	$12.50	$33.02	$8.49	$20.99
2015,Q3	259,959	$22.93	$12.50	$33.88	$10.95	$23.45
2015,Q4	263,287	$24.63	$12.50	$34.84	$10.21	$22.71
2016,Q1	251,053	$26.42	$11.61	$35.83	$9.41	$21.02

FFS = fee-for-service; PCPRI = Primary Care Payment Reform Initiative.

Lower FFS equivalent payment in 2014 Q1 reflects that the initiative began in the final month of that quarter.

---

[52] FFS equivalent payment was provided in zero paid claims that were paid instead using capitation.

In all quarters except for the first, the primary care/behavioral health capitation more than offset the amount that would have been paid under FFS. For example, in first quarter 2016, the capitation payment exceeded the equivalent FFS payment by $9.41 per month ($35.83–$26.42). The capitation payment has two components: (1) an amount to cover the cost of primary care/behavioral health utilization and (2) an amount to cover the additional cost of care coordination. On average, the primary care/behavioral health capitation payment exceeded the FFS equivalent by 133 percent. Furthermore, the capitation for care coordination adds an additional $12.50 per month[53] of payment. Accounting for both the primary care-behavioral health overpayment and the care coordination capitation payment, the total overpayment was $21.02 in first quarter 2016, corresponding to an average of $21.45 per month over the year/quarters examined.

C.4.3 Did trends in service utilization change among Massachusetts Medicaid PCPRI participants?

KEY INSIGHTS

- **Primary care visit rates declined for both the PCPRI and comparison groups. However, these visits decreased by 5.47 fewer visits** per 1,000 Medicaid beneficiaries for PCPRI relative to the comparison group in **the first 7 quarters of the Initiative** (p < 0.001).
- There was a slight increase in the quarterly **ED visit rate** in PCPRI, while there was a substantial decrease in the comparison group. There was a **relative increase of 16.55 ED visits per 1,000 Medicaid beneficiaries** in PCPRI relative to the comparison group after PCPRI implementation (p < 0.000).
- In addition, the quarterly **inpatient admission rate decreased from the baseline period in both PCPRI and the comparison group** during the first 7 quarters of the initiative, but it **decreased significantly less (4.14 visits per Medicaid beneficiary) for PCPRI participants.**

We present the results of the D-in-D regression analyses for quarterly rates of inpatient admissions, ED visits, and primary care visits in ***Table C-10***. We report the D-in-D estimate for each year since the implementation of PCPRI, along with an overall estimate for the first 7 quarters combined.

- Primary care visit rates declined for both the PCPRI and comparison group. However, **these visits decreased by 5.47 fewer visits per 1,000 Medicaid beneficiaries for PCPRI relative to the comparison group** (p < 0.001). This represents a small (1.4 percent) but statistically significant increase, which could reflect more access to primary care among PCPRI participants relative to the comparison group.

---

[53] The base care coordination capitated per month payment was $12.50 in all year/quarters other than first quarter 2016, when it was $11.61.

Table C-10. Differences in the pre-post change in utilization for Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014–March 2016)

Outcome (per 1,000 beneficiaries)	Pre-period adjusted mean, PCPRI	Pre-period adjusted mean, CG	Test-period adjusted mean, PCPRI	Test-period adjusted mean, CG	Regression-adjusted D-in-D (90% CI) (80% CI)	Relative difference (%)	p-value
Primary care visits per 1,000 beneficiaries							
Year One	388.41	484.19	365.25	453.75	7.30 (5.29, 9.30) (5.73, 8.86)	1.9	0.000
Year Two	388.41	484.19	366.11	460.13	1.76 (−1.42, 4.93) (−0.72, 4.23)	0.5	0.363
Overall	388.41	484.19	365.54	455.87	5.47 (3.77, 7.18) (4.14, 6.80)	1.4	0.000
ED visits that did not lead to hospitalization per 1,000 beneficiaries							
Year One	184.02	174.33	182.36	157.78	14.90 (13.28, 16.52) (13.64, 16.17)	8.1	0.000
Year Two	184.02	174.33	192.59	162.98	19.92 (17.42, 22.42) (17.97, 21.87)	10.8	0.000
Overall	184.02	174.33	185.73	159.51	16.55 (15.19, 17.92) (15.49, 17.62)	9.0	0.000
All-cause acute inpatient admissions per 1,000 beneficiaries							
Year One	26.70	27.57	24.22	21.04	4.05 (3.49, 4.62) (3.33, 4.78)	15.2	0.000
Year Two	26.70	27.57	22.12	18.69	4.31 (3.26, 5.36) (3.49, 5.12)	16.1	0.000
Overall	26.70	27.57	23.53	20.26	4.14 (3.54, 4.73) (3.67, 4.60)	15.5	0.000

CG = comparison group; CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PCPRI = Primary Care Payment Reform Initiative.

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payments in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payments in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain estimates of the differences in the probability of any utilization per quarter. Yearly estimates were obtained by taking the weighted average of the four quarterly estimates for the year. The probability estimates are multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries/discharges. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-Ds are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use CIs of 90% or higher. Eighty percent CIs are provided here for comparison purposes only. The total number of weighted person-quarters included in the regression model for the entire study period is 2,832,025.

Data source: RTI analysis of Massachusetts Medicaid claims (2011–2016).

Sensitivity analysis: We excluded all person-quarters where a beneficiary was less than or equal to 12 months of age to test the sensitivity of the analyses based on the way newborns are enrolled in Medicaid in Massachusetts. The estimated change in primary care utilization is lower after the newborns are removed and is no longer statistically significant (1.10, p = .317); the change in ED visits is slightly higher (17.70, p < .001); and there is almost no difference in the change in inpatient admissions (4.23, p < .001).

- There was a slight increase in the quarterly **ED visit rate** in PCPRI while there was a substantial decrease in the comparison group. Overall, there was an **increase of 16.55 ED visits per 1,000 Medicaid beneficiaries** in PCPRI in relation to the comparison group after PCPRI implementation ($p < 0.001$). This represents a 9 percent relative increase. Although we would expect to see declines in ED visits, it may be too early to see results during from this early implementation window. It likely requires more time to change patient behavior and utilization patterns, particularly if many of the patients may have been used to seeking primary care in the ED prior to the start of PCPRI.
- Although inpatient admission decreased for both PCPRI and the comparison group during the first 7 quarters of the initiative, it decreased less for PCPRI participants relative to the comparison group. This resulted in a relative increase of 15.5 percent inpatient admissions for PCPRI participants (4.14 admissions per 1,000 beneficiaries, $p < 0.001$).
- The relative increases in inpatient and ED utilization were substantial, ranging from 8 to 16 percent over the first 7 quarters of implementation. Although the PCPRI program aimed to reduce utilization (e.g., ED visits and inpatient stays), it appears that there is still room for improvement. Additionally, some of these outcomes may be impacted over a longer time horizon.

C.4.4 Did quality of care change among Massachusetts Medicaid PCPRI participants?

KEY INSIGHTS

- The rate of **adolescent well-child visits did not significantly change for PCPRI beneficiaries** relative to the comparison group.
- Similarly, the rate of **hospitalizations for ambulatory care sensitive conditions did not significantly change for PCPRI beneficiaries** relative to the comparison group.

We present the results of the D-in-D logistic regression analyses for the annual percentage of 12- to 21-year-olds with a well-child visit and the annual percentage of adults with an inpatient admission for an ambulatory care sensitive condition in ***Table C-11***. We report the D-in-D estimate for each year since the implementation of PCPRI, along with an overall estimate for the first 7 quarters combined.

- During the baseline period, approximately 59 percent of eligible 12- to 21-year-olds attributed to PCPRI received an **annual well-child visit**; during the test period, the average declined to 54 percent. The estimates for the comparison group averages during these two time points, before and during the test period, also show a slight decrease from 66 to 63 percent. Overall, there is not a significant difference between the two groups.

Table C-11. Difference in the pre-post change in quality of care outcomes for Medicaid beneficiaries enrolled in the PCPRI in Massachusetts and the comparison group, through the seventh full quarter of initiative implementation (July 2014-March 2016)

Outcome (per 100 beneficiaries)	Pre-Period Adjusted Mean, PCPRI	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, PCPRI	Test-Period Adjusted Mean, CG	Regression-adjusted D-in-D (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Adolescent well-child visit (%)									113,250
Year One	59.16	66.38	54.12	62.05	−0.43	(−3.05, 2.20) (−2.47, 1.62)	−0.7	0.789	
Year Two	59.16	66.38	54.93	64.49	−2.17	(−5.48, 1.15) (−4.75, 0.42)	−3.7	0.789	
Overall	59.16	66.38	54.41	62.97	−1.06	(−3.12, 1.00) (−2.67, 0.54)	−1.8	0.397	
Hospitalization for ambulatory care sensitive conditions (%)									332,570
Year One	1.14	1.13	1.26	1.15	0.11	(−0.11, 0.34) (−0.06, 0.29)	9.6	0.418	
Year Two	1.14	1.13	0.98	1.08	−0.09	(−0.42, 0.24) (−0.35, 0.17)	−7.8	0.655	
Overall	1.14	1.13	1.15	1.10	0.04	(−0.15, 0.22) (−0.11, 0.18)	3.5	0.759	

CG = comparison group; D-in-D = difference-in-differences; PCPRI = Primary Care Payment Reform Initiative.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of any quality of care event. The estimates are multiplied by 100 to obtain percentage probabilities. The regression-D-in-Ds are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total number of weighted person-years for the adolescent (age 12–21) well-child visit model is 113,250 and for the ambulatory care sensitive conditions model (age 18–64) is 332,570.

Data source: RTI analysis of Massachusetts Medicaid claims (2011–2016).

- During the baseline period, 1.14 percent of adults had a hospitalization for an **ambulatory care sensitive condition each year**; during the test period, the average annual rate increased to 1.15 percent among the PCPRI participants. The estimates for the comparison group averages declined from 1.13 percent in the baseline period to 1.10 percent in the test period. However, these results are not significantly different.

Potential impact of health center selection

Providers and practices voluntarily entered the PCPRI program; thus, differences between PCPRI practices and non-PCPRI practices may have influenced our findings. Although this analysis accounted for patient demographics, data limitations did not allow for consideration of provider- or practice-level characteristics; indeed, we did not have a way to attribute patients to PCPs in the comparison group or to match providers to specific sites of care. Voluntary participation among provider organizations could reflect different capabilities, attitudes toward payment reform, or other characteristics that would correlate with program impact. The D-in-D analysis accounts for unchanging underlying characteristics, but any characteristics that could lead to a change in behavior simultaneous with program implementation would affect impact estimates. Because many of the PCPRI sites (39 percent of sites, representing 45 percent of PCPRI beneficiaries) were CHCs, we analyzed the characteristics of nonparticipating health centers in Massachusetts to understand any potential differences between the two groups, as presented in ***Table C-12***.

Table C-12. Differences between health centers that participated or did not participate in the Massachusetts Medicaid PCPRI and that likely served patients in the comparison group

	Participating health centers	Nonparticipating health centers
	24	44
Provider type		
FQHC	67%	75%
CHC	33%	23%
RHC	0%	2%
PCMH designation		
Level I*	8%	0%
Level II**	4%	25%
Level III**	67%	30%
N/A**	21%	45%
Boston Metro		
Yes	25%	27%
No	75%	73%

CHC = community health center; FQHC = federally qualified health center; N/A = not applicable; PCMH = patient-centered medical home; PCPRI = Primary Care Payment Reform Initiative; RHC = rural health center.

* = p < .10, ** = p < .05, *** = p < .01

Source: http://www.massleague.org/About/MemberList.php, https://npidb.org/organizations/ambulatory_health_care/federally-qualified-health-center-fqhc_261qf0400x/ma/

A lower proportion of the health centers that participated in PCPRI were federally qualified health centers (67 percent) than the nonparticipating health centers (75 percent). However, the health centers that participated in PCPRI were much more likely to have Level III PCMH designation (67 percent) than the nonparticipants (30 percent), which likely indicates that these were relatively advanced practices with more care coordination staff in place at the onset of the model. The health centers that participated in PCPRI were slightly less likely to be in Boston (25 percent) than nonparticipants (27 percent), but this difference was not significant. Overall, some differences appear to exist between the health centers serving FFS Medicaid patients that may not be controlled for in this analysis. More sophisticated health centers (Level III) may have better patient-tracking systems and outreach capabilities, which may, in turn, differentially lead to increased utilization. As such, our results should be interpreted with caution.

C.4.5 Discussion and limitations

PCPRI is associated with statistically significant increases in spending and utilization relative to the comparison group; however, there were no statistically significant changes in care coordination or quality of care measures for the PCPRI beneficiaries relative to the comparison group. Part of the difference in the change in overall spending can be accounted for by the generosity of the PCPRI payments. This finding is corroborated by provider reports that they profited from the capitated payment. The difference in the change in total expenditures was also the result of relative increases in inpatient, ED, and primary care spending.

Under PCPRI, practices that chose to participate received a capitated primary care payment plus a capitation payment for care coordination with responsibility for non-primary care TCOC for each PCC plan beneficiary in their care. The capitated payments for primary care and care coordination were expected to lead to initial increases in primary care utilization and decreases in ED and inpatient utilization. Although primary care visits declined for PCPRI participants, they declined less relative to the comparison group. Additionally, this did not result in fewer ED visits or inpatient stays for PCPRI participants relative to the comparison group. The slower decline in primary care utilization could be reflective of additional care coordination that led to additional primary care utilization by PCPRI participants, relative to larger declines in use for other Medicaid beneficiaries within the state. Even so, there were no statistically significant differences in follow-up visits after hospitalizations or quality of care metrics in the first 7 quarters of implementation.

The relative increases in inpatient admissions and ED visits are likely the result of deferred care that was identified because of the outreach of the care coordination staff present at PCPRI-participating practices in the test period. For example, the increased exposure to the health system through these care coordinators may have led to additional utilization for previously undiagnosed chronic conditions. Additionally, many of these patients, like the comparison group, face no cost sharing to visit the ED and likely used the ED for primary care issues. Changing these patterns can take significant time and effort on the part of care coordination staff. Both of these factors may have contributed to increased ED utilization and, in turn, hospital admissions, which are almost always through the ED. This increased utilization may also be reflected in the fact that many of the participating practices were Level III PCMH certified (the highest level of certification); the comparison group differed in this regard. Level III PCMH centers are more likely to have robust patient-tracking and follow-up services, which may have successfully identified previously undiagnosed conditions requiring treatment. The higher intensity of care in the 7 quarters after the program started may lead to reductions in utilization over the long term, but this point cannot be assessed at this time.

Our analysis differs from the calculation of shared savings, which was a part of the state's intended payment model for practices participating in PCPRI (see ***Section C.3.1***). Calculating shared savings may take a trended baseline approach, which uses the treatment group spending in the baseline with a forward trend to determine shared savings. First, our analysis uses a pre-post design with a comparison group to determine any differences between the groups over time. Our approach aims to isolate outcomes that happened differentially among PCPRI participants relative to the comparison group in the post (intervention) period, which could plausibly be the result of PCPRI participation; in a shared savings calculation, the comparison of actual versus predicted spending looks only at PCPRI participants relative to their own predicted cost. Second, our approach takes into account the overall impact to the payer by calculating total expenditures, including costs for primary care, behavioral health, and care coordination, whereas the shared savings analysis may only account for the costs of services other than primary or behavioral health. This approach avoids penalizing providers for increased expenditures in these categories while incentivizing the reduction of more costly non–primary care and behavioral health services. The implication is that our expenditures outcome is measured net of costs for care coordination and any potential overpayment of primary care or behavioral health, to understand the overall investment in relation to the program's overall savings. Finally, the shared savings approach may exclude costly drugs or extreme values, so as to not penalize providers for unexpectedly rapid growth in these types of costs in the post period; however, it is unlikely that this would impact our results, because we would expect the beneficiaries attributed to PCPRI and the comparison group to incur these unexpected costs at equal rates (i.e., have no information indicating that growth in these costs is differentially higher in one group or another, because both serve a similar set of beneficiaries enrolled in the PCC plan).

There are several limitations to our analysis. Most notably, participating practices voluntarily entered the PCPRI program, and thus, the results may be influenced by selection bias. For example, the Level III PCMH practices may have been more successful in encouraging additional utilization among their patient panel. This may have been in the form of more aggressive outreach to PCPRI participants to encourage them to access the health system appropriately for their given health needs. Indeed, we found differences between PCPRI practices and non-PCPRI practices that may have accounted for some of the estimated impact.

Although our study used propensity scores to balance the intervention and comparison groups in terms of their observed characteristics, bias may exist because of unobserved differences between the two groups. Furthermore, our study only includes 7 quarters of post-period data, and the shared savings methodology was not finalized until the end of our study period. Therefore, we may not have enough post-period data to estimate the full impact of the PCPRI program.

C.5 References

Kaiser Family Foundation. (2017). *Health insurance coverage of the total population*. Available at http://kff.org/other/state-indicator/total-population/

Centers for Medicare & Medicaid Services (CMS). (2016). *State Innovation Model Progress Report*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2017). *Massachusetts State Innovation Model Progress Report, Quarter 1 2017*. Supplied by CMS.

EOHHS. (n.d.). *Frequently Asked Questions about the Delivery System Reform Implementation Advisory Council*. Available at http://www.mass.gov/eohhs/docs/eohhs/healthcare-reform/state-fed-comm/implementation-council-faq.pdf

EOHHS. (2017a). *Primary Care Payment Reform Initiative*. Available at http://www.mass.gov/eohhs/gov/newsroom/masshealth/providers/primary-care-payment-reform-initiative.html

EOHHS (2017b). *Massachusetts State Innovation Model Operational Plan: Model Test Year 3*. Supplied by CMS.

EEOS (2016). *Medicaid Waiver Summary*. Available at http://www.mass.gov/eohhs/docs/eohhs/healthcare-reform/masshealth-innovations/ma-1115-waiver-summary.pdf

Massachusetts Executive Office of Health and Human Services (February 1, 2017). *Massachusetts State Innovation Model Operational Plan: Model Test Year 3*. Supplied by CMS.

Massachusetts Health Policy Commission. July 14, 2017. *Massachusetts State Innovation Model Test Year 2 Annual Report.*

Medicaid EOHHS (August 1, 2016). *Population Health Strategy*. Supplied by CMS.

University of Massachusetts Medical School. (July, 2015). *MassHealth: The Basics*.

Sub-appendix C-1. Methods for Qualitative Data Collection and Analysis

The Massachusetts SIM Initiative Round 1 Evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. These sources include information obtained during in-person site visits during which we conducted interviews with key informants and gathered data in provider and consumer focus groups; from a review of relevant documents; and from regular evaluation calls with the state officials leading the state's SIM Initiative.

C-1.1 Site visit key informant interviews

The RTI/NASHP evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Massachusetts, usually in person but sometimes by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included the states' SIM Initiative teams, other state officials, Primary Care Payment Reform Initiative (PCPRI) providers, managed care organizations, accountable care organizations, consumer advocates, and health infrastructure personnel. We solicited suggestions from the state SIM teams for interview candidates and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with state SIM Initiative teams or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participants. All interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and tailored for each state. The interviews were interactive; participants were encouraged to share feedback most relevant to their particular roles in the Massachusetts SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Massachusetts team conducted 17 total interviews in November 2016. ***Table C-1-1*** provides a distribution of the completed interviews by state and by interviewee type.

Table C-1-1. Key informant interviews conducted in Massachusetts, November 2016

	Number of interviews
State officials	8
Payers and purchasers	1
Providers	7
Consumer advocacy groups	1
Other	0
Total	17

C-1.2 Focus groups

Evaluation team members conducted two consumer and two provider focus group discussions in Massachusetts on November 8–9, 2016. These focus groups were the third and final groups conducted for the SIM Round 1 evaluation.

Table C-1-2 provides an overview of the 2016 focus groups. The consumer groups comprised Medicaid (MassHealth) beneficiaries enrolled in a PCPRI Medicaid Plan. The provider groups comprised MassHealth primary care providers participating in a PCPRI plan.

Table C-1-2. Overview of focus group participants

Group	Location	No. of Participants	Type of participants
1	Boston	7	Providers
2	Boston	7	MassHealth Beneficiaries
3	Boston	9	Providers
4	Springfield	10	MassHealth Beneficiaries
Total	—	33	—

Recruitment. At the request of the evaluation team, Massachusetts created lists of potentially eligible consumer and provider focus group participants. The state sent a letter to the targeted population asking them to call The Henne Group if they were interested in participating. The Henne Group screened participants by phone based on the eligibility criteria developed by the evaluation team. If participants were eligible and interested, The Henne Group scheduled them for a focus group. We sought to recruit nine participants and two alternates for each group.

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion and how the information from the discussion would be used and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes, and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health information technology, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

C-1.3 Document review

We used Massachusetts' quarterly and annual reports, operational plans, self-evaluation reports, and other state documents to obtain updated information on their implementation progress during the current analytic period of April 2016–March 2017. To supplement these documents, we collected relevant news articles on Massachusetts' SIM Initiative activities and related initiatives, and we searched reform-oriented websites that the state maintains.

In addition, we obtained numbers of providers and payers participating in and populations served by the different innovation models from reports Massachusetts submits to the Innovation Center in conjunction with its quarterly reports. We provide Massachusetts' reported figures in both ***Chapter 2*** and ***Appendix C***.

The estimated number of providers serving Medicaid beneficiaries under the Accountable Care Strategy is a state-reported number (Massachusetts Health Policy Commission, 2017). The count of population reached under the Accountable Care Strategy, used as the numerator for the percentage, is a state-reported number (Massachusetts Executive Office of Health and Human Services, 2017). The count of population reached under the PCPRI, used as the numerator for the percentage, is based on personal communications with the state (Personal communication, October 17, 2017). The denominators used to compute the percentage of the population reached is the Kaiser Family Foundation population estimate of total count of Massachusetts residents covered by Medicaid, based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

Percentages of state population by insurance type are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

C-1.4 State evaluation calls

The RTI/NASHP evaluation team for Massachusetts, the state's SIM Initiative team, and the state's Innovation Center project officer typically attended each state evaluation call. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest for the evaluation. The Massachusetts evaluation team held eight calls with Massachusetts between April 2016 and March 2017, the analytic period of this report.

For each meeting used to collect additional information and perspective from state officials leading the SIM Initiative in Massachusetts, the evaluation team prepared a list of state-specific questions—including the status of related policy levers and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to the state ahead of the call and asked the state to have knowledgeable state officials available to answer the questions during the call.

C-1.5 Analysis

The RTI/NASHP evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visits, focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

C-1.6 References

Kaiser Family Foundation. (2017). *Health insurance coverage of the total population*. Available at http://kff.org/other/state-indicator/total-population/

Massachusetts Executive Office of Health and Human Services (February 1, 2017). *Massachusetts State Innovation Model Operational Plan: Model Test Year 3*. Supplied by CMS.

Massachusetts Health Policy Commission. July 14, 2017. *Massachusetts State Innovation Model Test Year 2 Annual Report.*

[this page intentionally left blank]

Sub-appendix C-2. Methods and Measures for Interim Impact Analysis

Overview. To estimate the impact of the Primary Care Payment Reform Initiative (PCPRI) in Massachusetts, we conducted difference-in-differences (D-in-D) regression analyses using Massachusetts state Medicaid data provided by MassHealth. We present the results of both descriptive trends and D-in-D analyses for service utilization and expenditure outcomes. This appendix details the methods we used for this analysis.

PCPRI in the context of Massachusetts Medicaid. Medicaid in Massachusetts is called MassHealth. MassHealth beneficiaries enroll in either the Primary Care Clinician (PCC) plan administered by MassHealth or with one of six managed care organizations (MCOs); of the population under age 65, approximately 31 percent are in the PCC plan, and 69 percent are in MCO plans. The remaining population (Medicare-Medicaid eligible, older adults with significant disabilities, undocumented non-citizens, and people with other coverage as primary) are covered outside the PCC and MCO plans. The care delivery and payment model that MassHealth implemented with SIM Initiative support, and which we evaluate in this report, was PCPRI. PCPRI launched in March 2014. Under PCPRI, practices that chose to participate received a capitated primary care payment plus a capitation payment for care coordination with responsibility for total cost of care for each PCC plan beneficiary in their care; MCO enrollees were excluded from PCPRI and, thus, this analysis.

Massachusetts expanded Medicaid to the non-disabled, non-aged adult population with income under 138 percent of the federal poverty line on January 1, 2014. A significant portion of PCPRI participants and comparison group beneficiaries began a new period of Medicaid enrollment during the intervention period. Because of the spike in utilization after gaining coverage, we lagged the intervention period by one quarter after their enrollment to capture this spike during the baseline period. That is, we set the intervention period to begin in July 2014 to disentangle any utilization changes stemming from pent-up demand from the model itself. Although Medicaid expansion changed the composition of PCC plan beneficiaries during the study period, we have no reason to believe that it affected the intervention and comparison groups differentially. More information on sample construction is available in ***Section C-2.1.1***.

Profile of PCPRI-participating providers. PCPRI-participating providers were mostly primary care practices and community health centers (CHCs). They served 6 percent of the total Medicaid population and 24 percent of the PCC population. We have limited information to help compare providers who participate in PCPRI versus those who serve PCC plan beneficiaries but chose not to participate in PCPRI; we received a list of PCPRI-participating providers but do not have a comparable list of providers who serve the remainder of PCC plan beneficiaries. Because many PCPRI-participating providers were CHCs, and some information about all CHCs is publicly available in Massachusetts, we compared PCPRI-participating CHCs to nonparticipating CHCs and found that PCPRI-participating CHCs were more likely to be Level III patient-centered medical homes, the highest level of certification. More information on the characteristics of PCPRI-participating and nonparticipating CHCs is available in the Massachusetts state chapter appendix, ***Section C.4.***

Study design. This study constructed the comparison of pre- and post-period trends of the intervention and non-intervention groups using a repeated cross-sectional design to account for our unbalanced panel data; that is, we used all available data for beneficiaries attributed to the intervention and comparison groups in any given quarter and did not restrict our analysis to beneficiaries who had continuous enrollment in Medicaid nor continuous attribution to the intervention group over the entire post-period. The study period covers 2011 through first quarter 2016 with 3 years of baseline data and 7 quarters after the start of the intervention.

Identifying intervention and comparison groups. The state provided us beneficiary-level information on enrollment and attribution to PCPRI but not information about attribution to any single provider. Therefore, we have no data to control for provider characteristics among the intervention and comparison groups. The list of PCPRI-attributed beneficiaries by month formed our intervention group. Because providers could choose to join PCPRI after the program initiated, and beneficiaries could be attributed at any time after program initiation, the intervention group had rolling entry, and as a result, each attributed beneficiary had a different length of exposure to treatment. Beneficiaries are given the option of choosing their primary care provider (PCP) when they join MassHealth and can change at any time, but if they do not choose one, they are automatically assigned to a PCP. The PCP is the basis on which a beneficiary is attributed to PCPRI.

We used a customized baseline period of 3 years prior to the first quarter of attribution for each PCPRI beneficiary because they could become attributed to the intervention group over the 7 quarters we analyzed. Therefore, each PCPRI beneficiary had their own unique baseline period based on when they were attributed to PCPRI. The comparison group includes Medicaid beneficiaries who were eligible for PCPRI by being in the PCC plan and who were never attributed to a PCPRI provider. All comparison group beneficiaries were assigned a baseline period of 3 years prior to the earliest PCPRI enrollment quarter. More information on sample construction is available in ***Section C-2.3***.

Balancing intervention and comparison groups. Following the comparison group selection, we constructed a person-level propensity score weight to balance the PCPRI group and comparison group on individual, baseline utilization, and county-level characteristics. Propensity score weighting was used to avoid dropping any PCPRI beneficiaries from the final analysis. After propensity score weighting, the standardized differences between the weighted comparison group means and intervention group means were all well under the standard 10 percent threshold. More information on propensity score weighting is available in ***Sections C-2.3*** and ***C-2.4.***

Statistical approach. Analyses used ordinary least squares for spending outcomes and logistic regression for binary outcomes. All analyses used clustered standard errors to account for repeated observations from the same beneficiaries over time. The outcome models controlled for age, gender, race, disability status, metropolitan statistical area (MSA), health status, county-level characteristics, and characteristics of length of enrollment. More information on outcomes is available in ***Section C-2.2***. More information on the regression model is available in ***Section C-2.5***.

C-2.1 Data sources

Massachusetts Medicaid data. We used Medicaid claims data provided by Massachusetts' MassHealth Medicaid program to derive expenditure and utilization outcomes for Medicaid beneficiaries in Massachusetts' PCPRI intervention and comparison groups. The Medicaid data include enrollment information indicating enrollment in Medicaid and PCPRI during each month and beneficiary claims, including inpatient, hospital outpatient, physician, and other claims. The analytic sample included beneficiaries ages 0 through 64 and excluded Medicare-Medicaid enrollees because they were not eligible for PCPRI.

The comparison group includes Medicaid beneficiaries who were eligible for PCPRI by being in the PCC plan and who were never attributed to a PCPRI provider. Following the comparison group selection, we constructed a person-level propensity score weight to balance the PCPRI group and comparison group on individual, baseline utilization, and county-level characteristics. Propensity score weighting was used to avoid dropping any PCPRI beneficiaries from the final analysis. We used a standard baseline period of 3 years prior to attribution for each PCPRI beneficiary because they could enroll over the 7 quarters we analyzed. All comparison beneficiaries were assigned a baseline period of 3 years prior to the first possible PCPRI enrollment quarter. After propensity score weighting, the standardized differences between the weighted comparison group means and intervention group means were all well under the standard 10 percent threshold.

C-2.1.1 Sample period and selection

For this report, we began with all Medicaid data from 2011 through first quarter 2016 After determining the first quarter of PCPRI enrollment, we kept 3 years of pre-intervention data for each beneficiary. Because the initiative was unlikely to have a measurable effect on outcomes in the first month of operation (March 2014) given the need to ramp up and roll out changes at the participating practices, we planned to use second quarter 2014 as the initial quarter for PCPRI. However, a significant portion of PCPRI participants and comparison group beneficiaries began a period of Medicaid enrollment in the intervention period. Medicaid enrollment is often initiated after an encounter with the health care system; therefore, the first quarter of Medicaid enrollment is typically associated with high utilization and expenditures. We observed a spike in cost for both the comparison and PCPRI samples in the April–June 2014 quarter. To adjust for this spike in the propensity score model, we chose the subsequent quarter (July–September 2014) as the first quarter of the intervention. This pushed the utilization spike quarter out of the intervention period and allowed us to control for it in the comparison group modeling process. Thus, the first possible intervention quarter was third quarter 2014, and consequently, the first quarter of baseline data used was from third quarter 2011.

Our model design uses an unbalanced longitudinal panel to maximize the use of available data. This design uses all available observations for a beneficiary, regardless of whether they were enrolled for the entire analysis year. To account for beneficiaries who were not enrolled the entire time, our analysis uses an eligibility fraction for each individual. The eligibility fraction is defined as the total number of months the individual was enrolled in a given period divided by total number of months in that period. For example, an individual who was enrolled in PCPRI for 2 months of a quarter has an eligibility fraction of 0.67 for that 3-month period. The eligibility fraction is used to inflate outcome data if an individual was not enrolled for an entire period. The eligibility fractions are also used as weights in the regression models. This prevents individuals with limited enrollment but extreme outcomes from strongly influencing the results.

We include all Medicaid beneficiaries eligible for full benefits in the PCC plan; we exclude Medicaid beneficiaries eligible for only a restricted set of benefits, such as family planning program beneficiaries, who may not be eligible for participation in the model. Because Medicare-Medicaid beneficiaries were not eligible for the model, we exclude beneficiaries enrolled in both Medicare and Medicaid.

Area Health Resource File. The Area Health Resource File comprises data collected by the Health Resources and Services Administration from more than 50 sources containing more than 6,000 variables related to health care access at the county level. We used information on health professions supply, hospital bed supply, and population characteristics and economic data to select the comparison group and to use as covariates in the analysis.

C-2.2 Outcome measures

C-2.2.1 Utilization

Utilization measures are reported as rates per 1,000 covered lives (or discharges for readmissions). For each measure, we first calculate the probability of any use. To calculate this probability, the numerator was an indicator of having had at least one event (inpatient admission or emergency department [ED] visit that did not lead to a hospitalization), and the denominator was the number of eligible plan beneficiaries (or discharges) in the state enrolled during the period. We multiplied the probability of use by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the probability by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes that no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because the majority of the population had zero or one ED visit or admission per quarter. Events are included in a period's total if the discharge or service date on the claim fell within the period.

- **Probability of having any inpatient use:** This is an indicator of whether the beneficiary had at least one admission to an acute-care hospital reported in the inpatient file for the quarter, divided by the number of beneficiaries in the same quarter. We identified all hospital admissions with an inpatient claim type, which is equivalent to the claim having a bill type code beginning with 11 or 12. For all data sources, some records in the inpatient claims files may appear to be multiple admissions but are, in fact, transfers between facilities; these records were counted as a single admission. To combine transfers into one acute admission, we identified claims that had no more than 1 elapsed day between the discharge date of the index claim and the admission date of the subsequent claim. We combined the claims into one record by taking the earliest admission date and latest discharge date and summing all payment amounts.

- **Probability of having any ED visit:** This is an indicator of whether the beneficiary had at least one visit to the ED, divided by the number of beneficiaries in the same period. ED visits are identified as visits with an outpatient or inpatient claim type, a place of service code 23, and a relevant procedure code (99281, 99282, 99283, 99284, or 99285). If the procedure code on every line item of the ED claim equaled 70000–89999 or was equal to G0106, G0120, G0122, G0130, G0202, G0204, G0206, G0219, G0235, G0252, G0255, G0288, G0389, S8035, S8037, S8040, S8042, S8080, S8085, S8092, or S9024 and if no line items had a revenue center code equal to 0760 or 0762, that claim was excluded (thus, claims for which only radiology or pathology/laboratory services were provided were excluded). Multiple ED visits on a single day were counted as a single visit.

- **Probability of having any primary care visit:** This is an indicator of whether the beneficiary had at least one primary care visit, divided by the number of beneficiaries in the same period. Primary care visits are identified as office visits with a PCP. Office visits are identified with the standard set of evaluation and management codes (99201–99205, 99211–99215, 99241–99245, 99304–99310, 99315–99316, 99318, 99324–99328, 99334–99337, 99339–99345, 99347–99350, 99358–99359, 99366–99368, 99374–99387, 99391–99397, 99401– 99404, 99406–99409, 99411–99412, 99420, 99429, 99441–99444, and 99496). PCPs were identified as any providers receiving capitation payments under PCPRI. PCPRI capitation payments were only made to PCPs. The list of specialty codes associated with providers receiving PCPRI payments is as follows: (1) certified for all testing; (2) federally qualified health centers; (3) physician; (4) nurse practitioner; (5) family/general practice; (6) gynecology; (7) internal medicine; (8) pediatrics; (9) nurse practitioner, physician; (10) CHC; (11) Part B crossover; and (12) group practice.

- **Probability of having at least one comprehensive well-care visit for individuals 12–21 years old:** This is an indicator of whether the beneficiary had at least one well-care visit in the given year. Well-care visits were identified using the HEDIS 2016 value set database for well-care. CPT codes included 99381–99385, 99391–99395, and 99461, HCPCS codes include G0438 and G0439, ICD-10 codes include Z00.00, Z00.01, Z00.110, Z00.111, Z00.121, Z00.129, Z00.5, Z00.8, Z02.0-Z02.6, Z02.71, Z02.79, Z02.81, Z02.82, Z02.83, Z02.89, Z02.9 and ICD-9 codes including V20.2, V20.31, V20.32, V70.0, V70.3, V70.5, V70.6, V70.8, V70.9. The list of specialty codes associated with providers receiving PCPRI payments is as follows: (1) certified for all testing; (2) federally qualified health centers; (3) physician; (4) nurse practitioner; (5) family/general practice; (6) gynecology; (7) internal medicine; (8) pediatrics; (9) nurse practitioner, physician; (10) CHC; (11) Part B crossover; and (12) group practice.[54]

- **Probability of having a follow-up visit within 14 days of hospital discharge:** This is an indicator of whether the beneficiary had an evaluation and management (E&M) visit within 14 days of hospital discharge. Patients who died or were readmitted before 14 days were excluded from the denominator. E&M visits are identified with a standard set of evaluation and management codes (99201–99205, 99211–99215, 99241–99245, 99341–99350, 99381–99387, 99391–99397, 99401–99412, 99420–99429, and G0402, G0438, G0439, and G0463).
- **Probability of having an admission for an Ambulatory Care Sensitive Condition (Agency for Healthcare Research and Quality, 2016):** The denominator includes the Medicaid population who are 18 years or older and are residents of Massachusetts. The numerator is discharges, for patients 18 and older who met the inclusion and exclusion rules for the numerator in any of the following prevention quality indicators (PQIs) (Agency for Healthcare Research and Quality, 2016).

The ***Overall Composite (PQI #90)*** includes admissions for one of the following 11 conditions:

- PQI #01 Diabetes Short-Term Complications Admission Rate
- PQI #11 Bacterial Pneumonia Admission Rate
- PQI #03 Diabetes Long-Term Complications Admission Rate
- PQI #12 Urinary Tract Infection Admission Rate
- PQI #05 Chronic Obstructive Pulmonary Disease or Asthma in Older Adults Admission Rate
- PQI #07 Hypertension Admission Rate
- PQI #14 Uncontrolled Diabetes Admission Rate
- PQI #08 Heart Failure Admission Rate
- PQI #15 Asthma in Younger Adults Admission Rate

---

[54] We did not run this measure for infants because infants enrolled in the PCC plan were first placed into the Medicaid FFS plan prior to being placed into the PCC plan, thus masking some of their actual utilization.

- PQI #10 Dehydration Admission Rate
- PQI #16 Rate of Lower-Extremity Amputation among Patients with Diabetes

C-2.2.2 Expenditures

Weighted average expenditures were calculated on a per beneficiary per month (PBPM) basis. For each individual, PBPM payments were estimated as one-third of his or her quarterly payments. Expenditures were defined as payments made by MassHealth. Averages include all individuals enrolled during the period, and thus, the figures also reflect the presence of individuals with zero medical costs. The payments were not risk adjusted[55] or price standardized across geographic areas. Claims were included in a period's total if the discharge or service end date on the claim fell within the period in the following categories:

- **Total:** This represents overall net payment amounts from all inpatient and outpatient (facility and professional) claims and capitation payments.
- **Inpatient facility:** This represents the sum of net facility payments to a hospital for covered services provided during all inpatient admissions.
- **Primary Care:** This is the overall net payment amount from all inpatient and outpatient professional claims.
- **ED:** This represents the sum of net payments for covered services provided in an ED setting.
- **Fee-for-service (FFS) Equivalent:** This was an amount on claims for primary care services that were capitated under PCPRI. This amount approximates what would have been paid had the claims been paid under FFS.

C-2.3 Comparison group and propensity score weighting

For the impact analysis, we use a pre-post comparison group design, in which the comparison group provides an estimate of what would have happened in the PCPRI treatment group absent the PCPRI's effect on the intervention. The difference in the changes over time from the pretest to the test period between PCPRI and the comparison group provides an estimate of the impact of PCPRI. The comparison group should be similar to the intervention group on all relevant dimensions (e.g., demographic, socioeconomic, political, regulatory, and health and health systems) except for the policy change being tested.

---

[55] Although the expenditures were not formally risk adjusted, the comparison groups were weighted by the propensity score (see ***Section C-2.3***), which includes some risk adjustment measures.

PCPRI beneficiaries were identified using a monthly flag provided by the state for the months they were attributed to a PCPRI practice. We dropped beneficiaries who did not have enrollment in the post period, who only had PCPRI enrollment in March 2014, who were more than 110 years old, or who had a PCPRI eligibility date prior to their date of birth.

In the following section, we detail the procedures we used to select the comparison group for PCPRI in Massachusetts.

C-2.3.1 Selection of comparison group

Because PCPRI was a subset of the PCC program administered by MassHealth, we restricted the sample to fully eligible Medicaid recipients not also eligible for Medicare in the four largest MassHealth PCC programs (MassHealth Standard, MassHealth Family Assistance, CarePlus, and CommonHealth), the only programs with significant PCPRI participation. PCPRI began in March 2014. We excluded beneficiaries over age 110 and those who were not enrolled after PCPRI began. We did not have sufficient information on the practices/providers to incorporate this aspect into the comparison group selection process.

C-2.3.2 Calculation of person-level weights

To balance the population characteristics for the claims-based analyses, we estimated propensity scores for all individuals from the comparison group. A propensity score is the probability that an individual is from the PCPRI group rather than the comparison group.

The objective of propensity score modeling is to create a weighted comparison group with characteristics equivalent to those of the PCPRI population. To the extent that these characteristics are correlated with expenditure, utilization, and quality outcomes, propensity weighting will also help balance the pre-initiative levels of the outcomes.

C-2.3.3 Person-level characteristics

The initial step in the process was to select the person-level characteristics to be used in each propensity score model. It should be noted that we broke age into separate categories to ensure adequate balance across the different age cells (e.g., age 0 and age 1–10) and not the mean age in the group. ***Table C-2-1*** shows the characteristics used grouped by whether they control for demographic, health plan, or health status characteristics.

Table C-2-1. Covariates for propensity score logistic regressions

Covariates
Demographic characteristics
Gender
Age (categorical: 0, 1–10, 11–20, 21–30, 31–40, 41–50, 51–60, 60+)
Disabled (yes/no)
White race (yes/no)
Unknown race (yes/no)
Indicators for beneficiary living in each of four largest MSAs (Boston, Worcester, Providence, and Springfield)
Health plan characteristics
Continuous enrollment indicator (yes/no)
Total number of months enrolled in pre-attribution year (categorical: 0, 1–3, 4–8, 9–12)
Health status measures
Chronic Illness and Disability Payment score
Baseline utilization measures
Total expenditure for pre-attribution year
Number of inpatient visits for pre-attribution year
Single ED visit for pre-attribution year (yes/no)
Multiple ED visits for pre-attribution year (yes/no)
Area Health Resource File Measures (by MSA)
Percent in poverty (2013)
Population (in 1,000s)
Population density
Percent unemployed (2014)
Percent with less than a high school degree (2010)
Percent with a college degree (2010)
Percent with a high school diploma (2010)
Hospital beds per 1,000 (2012)
PCPs per 1,000 (2013)

ED = emergency department; MSA = metropolitan statistical area; PCP = primary care provider.

The chronic illness and disability payment score (CDPS) is a diagnostic classification system originally developed for states to use in adjusting capitated payments for Medicaid beneficiaries enrolled because of disability or low income and used to predict Medicaid costs. We use the CDPS to measure beneficiary morbidity. The CDPS maps selected diagnoses and prescriptions to numeric weights. Beneficiaries with a CDPS score of 0 have no diagnoses or prescriptions that factor into creating the CDPS score. The more diagnoses a beneficiary has or the greater the severity of a particular diagnosis, the larger the CDPS score.

C-2.3.4 Estimation and weighting procedures

Medicaid beneficiaries were not randomly assigned to PCPRI or the comparison group. As a result, observed sociodemographic and geographic characteristics may differ between PCPRI-attributed beneficiaries and comparison group beneficiaries, and these differences may influence the results. To address this issue, we used propensity score weighting to statistically adjust the study sample to remove these differences. To apply propensity score weighting, we first used logistic regression to predict a Medicaid beneficiary's likelihood of being in PCPRI based on select sociodemographic, baseline utilization, and county-level characteristics (***Table C-2-1***). This predicted likelihood is known as the propensity score. We then took the inverse of the propensity score using the formula (1/(1-propensity score)) to create what is known as the inverse probability weight. We then applied each comparison group beneficiary's inverse probability weight to our regression models. PCPRI-attributed beneficiaries receive an inverse probability weight of one (Austin and Stuart, 2015). By applying these weights, comparison group beneficiaries are made to look more similar to the PCPRI beneficiaries. ***Table C-2-2*** demonstrates that by applying this weight, PCPRI and comparison group beneficiaries look similar on selected characteristics.

Other methods can be used to apply propensity scores to an analysis. One frequently used method is matching, whereby a PCPRI beneficiary is matched to a comparison group beneficiary with a similar propensity score (Stuart and Rubin, 2007). Although we considered this method, we decided not to pursue matching for several reasons. First, propensity score weighting has been shown to produce less-biased estimates, less modeling error (e.g., mean squared error and type 1 error), and more-accurate variance estimation and confidence intervals when modeling dichotomous outcomes. These features are important because this analysis includes many dichotomous utilization and quality of care outcomes (Austin, 2010; Forbes and Shortreed, 2008). In addition, with matching, PCPRI beneficiaries and potential comparison group beneficiaries may be excluded from the analysis if a good match cannot be found. This is particularly relevant to Medicaid where beneficiary churn may limit the sample size. Weighting has the advantage of preserving sample size.

Using the characteristics listed in ***Table C-2-1***, we estimated a propensity model by logistic regression, in which the outcome was 1 = ever a PCPRI participant and 0 = never a PCPRI participant.

We set analysis weights to 1 for all individuals in a Test state. The weight for a comparison state individual was initially a function of his or her predicted propensity score: weight = $p/(1–p)$, where p is the predicted propensity. We then capped weights at a maximum value of 20.0 and a minimum value of 0.05 to prevent any single individual from having undue influence on the results.

Table C-2-2. Unweighted and weighted means and standardized differences, PCPRI and comparison groups, baseline period (2011–2014)

	Unweighted				Weighted			
	PCPRI group	Comparison group	Standardized difference[a]	p-value	PCPRI group	Comparison group	Standardized difference[a]	p-value
N	109,405	270,903			109,405	110,809		
Sociodemographic characteristics								
Zero months of enrollment in year before attribution, %	13.3	7.9	17.4	<0.001	13.3	13.6	1.0	0.03
1–3 months of enrollment in year before attribution, %	11.8	10.7	3.7	<0.001	11.8	11.3	1.5	<0.001
4–8 months of enrollment in year before attribution, %	24	20.5	8.4	<0.001	24	23.8	0.5	0.22
9–12 months of enrollment in year before attribution, %	50.9	60.9	20.2	<0.001	50.9	51.3	0.7	0.08
Continuously enrolled, %	7.3	4.2	13.3	<0.001	7.3	7.6	1.1	0.02
Total months enrolled	39.1	44.9	34.5	<0.001	39.1	39.4	1.7	<0.001
Female, %	56.1	54.2	3.9	<0.001	56.1	56.4	0.6	0.13
White, %	20.6	39.6	42.4	<0.001	20.6	21.2	1.6	<0.001
Nonwhite (known race), %	33.5	24.5	19.9	<0.001	33.5	33.8	0.6	0.14
Unknown race, %	45.9	35.9	20.5	<0.001	45.9	45	1.9	<0.001
Disabled, %	9	9	0.2	0.54	9	9.2	0.9	0.04
Age 0, %	6.4	4.3	9.2	<0.001	6.4	6.1	1.3	0.002
Age 1–10, %	26.9	31.5	10.1	<0.001	26.9	26.5	0.9	0.03
Age 11–20, %	23	26.1	7.3	<0.001	23	22.3	1.7	<0.001
Age 21–30, %	12.7	10.3	7.4	<0.001	12.7	13.1	1.2	0.007
Age 31–40, %	11.5	10	4.8	<0.001	11.5	11.8	1.1	0.01
Age 41–50, %	10.1	9.2	3.1	<0.001	10.1	10.3	0.7	0.11
Age 51–60, %	7.8	7.1	2.7	<0.001	7.8	8.2	1.4	<0.001
Age 61+, %	1.7	1.5	1.4	<0.001	1.7	1.8	0.5	0.20

(continued)

Table C-2-2. Unweighted and weighted means and standardized differences, PCPRI and comparison groups, baseline period (continued)

	Unweighted				Weighted			
	PCPRI group	Comparison group	Standardized difference[a]	p-value	PCPRI group	Comparison group	Standardized difference[a]	p-value
CDPS Risk Score	2.1	2.2	8.1	<0.001	2.1	2.1	0.1	0.88
Total cost in year prior to attribution	1824.7	1690.7	2.6	<0.001	1824.7	1941.9	1.9	<0.001
Inpatient visits in year prior to attribution per 1,000 population	0.1	0.1	6.4	<0.001	0.1	0.1	0.8	0.17
Zero ED visits in year prior to attribution, %	71.3	72.6	3	<0.001	71.3	70.4	2	<0.001
Single ED visit in year prior to attribution, %	12.5	13.4	2.7	<0.001	12.5	12.8	1	<0.001
Multiple ED visits in year prior to attribution, %	16.2	14	6.2	<0.001	16.2	16.8	1.5	<0.001
County-level characteristics								
Boston MSA, %	76.5	53.6	49.5	<0.001	76.5	75.1	3.3	<0.001
Worcester MSA, %	12.1	15.2	9	<0.001	12.1	12.2	0.2	0.57
Springfield MSA, %	3.9	12.4	32.2	<0.001	3.9	3.9	0.1	0.69
Providence MSA, %	6.1	10.6	16.2	<0.001	6.1	6	0.5	0.17
Other MSA, %	1.4	8.2	32.4	<0.001	1.4	2.8	10.1	<0.001
Poverty rate in 2011, %	13.9	12.8	24	<0.001	13.9	14	2.1	<0.001
< High-school education (age 25+), %	11.8	11	19.1	<0.001	11.8	11.9	1.9	<0.001
College education (age 25+), %	38.8	36.5	27.6	<0.001	38.8	38.8	0.8	0.05
Unemployment rate in 2014 (age 16+), %	5.7	6	31.2	<0.001	5.7	5.7	1.8	0.003
Population density per square mile	4526.3	2469.8	45.5	<0.001	4526.3	4607.5	1.6	<0.001
Hospital beds per 1,000 population in 2012	2.7	2.2	36.9	<0.001	2.7	2.8	1.2	0.005
PCPs per 1,000 population in 2013	1.1	1	33.2	<0.001	1.1	1.1	1.3	0.002
Population in 1,000s	860.9	744.4	30.7	<0.001	860.9	879.8	3.5	<0.001

CDPS = Chronic Illness and Disability Payment System; ED = emergency department; MSA = metropolitan statistical area; PCP = primary care provider; PCPRI = Primary Care Payment Reform Initiative.

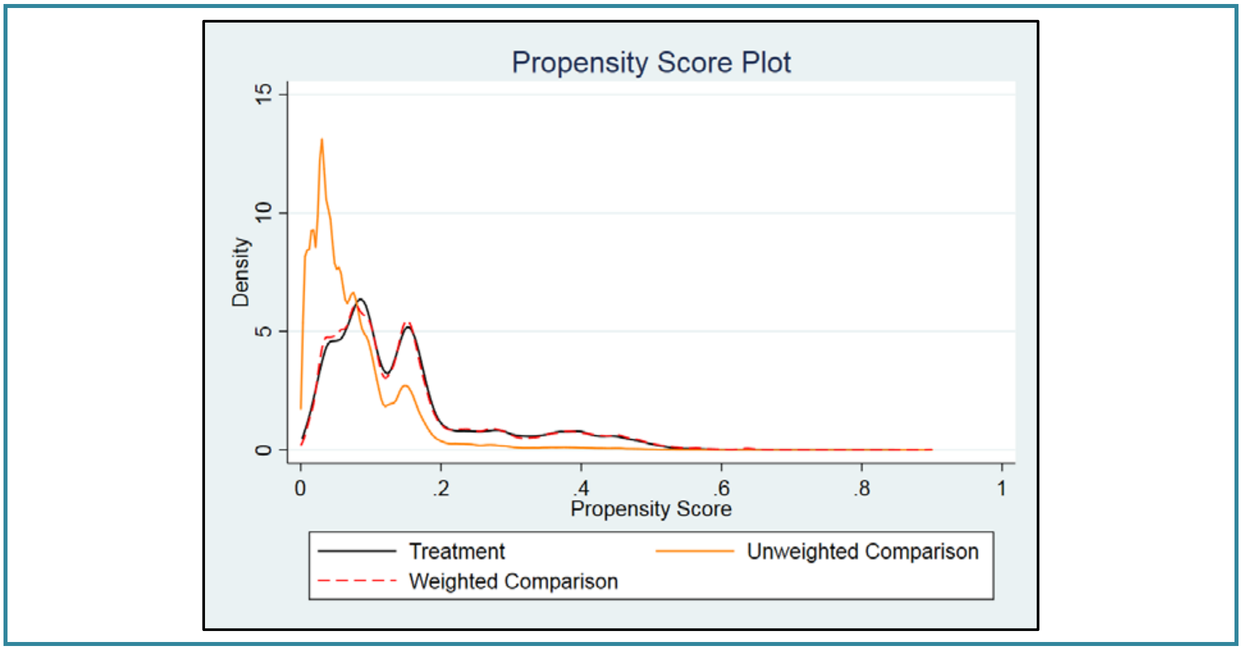
[a] Absolute standardized differences are expressed as percentages.

The baseline period varied for PCPRI beneficiaries based on their date of attribution into the program. Their baseline was calculated as 3 years prior to attribution.

C-2.4 Propensity model evaluation

We evaluated several aspects of the propensity score models. First, we examined plots of predicted probabilities to ensure sufficient overlap in the distributions of the test and the combined comparison states (***Figure C-2-1***). The figure shows both the unweighted and weighted propensity scores by treatment and comparison group during the baseline period. This feature, known as common support, is critical because it provides the basis for inferring effects from group comparisons. We found that scores in both groups had significant overlap across the full range of propensity scores.

Figure C-2-1. Weighted and unweighted propensity score density plots for the PCPRI and comparison groups, baseline period (2011–2014)



The variables with the greatest impact in the propensity score models were the white race indicator, the Boston MSA indicator, and the indicator for no enrollment in the year prior to attribution. Thus, major geographic and demographic differences were found between the PCPRI and comparison groups. The comparison group had a higher proportion with no enrollment in the year prior to attribution.

Finally, we compared unweighted and propensity-weighted means for the characteristics in the model. As expected, we found that, after weighting, the comparison group means were within a few percentage points of the values for the PCPRI population.

Table C-2-2 shows unweighted and (propensity score) weighted means/proportions for PCPRI and its pooled comparison group for the study population. The unweighted means/proportions are not well balanced prior to propensity score weighting. Fourteen covariates are above the typical 10 percent threshold for assuming covariate balance (i.e., comparability) between the test and comparison groups. The propensity score weighted means/proportions substantially mitigate any observed covariate imbalance with all weighted standardized differences falling well under the 10 percent threshold.

Newborns were covered under FFS from birth until they were enrolled in a PCC plan. Because PCPRI is limited to PCC plan members, the initial spending and utilization were not captured for these beneficiaries until they were enrolled in the PCC plan. To ensure that there was not a differential change in expenditures because of this enrollment decision, we analyzed the cohort of beneficiaries who were greater than 12 months old to see if there was a differential response. The unweighted and (propensity score) weighted means/proportions for PCPRI and its pooled comparison group are shown in ***Table C-2-3***. We also analyzed the balance for the propensity scores for the age 12–21 cohort which were used for the adolescent well-child measure and the cohort of those who were hospitalized for the 14-day follow-up measure. The standardized difference was below the standard 10 percent threshold for all covariates across all models with one exception. The only variable exceeding the threshold was one of the county-level variables in the overall model. This is not surprising because the county-level variables have a large standard deviation because of the small number of counties and, therefore, the small effective sample size.

C-2.5 Statistical analysis

C-2.5.1 Regression model

The underlying assumption in D-in-D models estimating the impact of the SIM Initiative is that trends in the outcomes among individuals in test groups and their respective comparison groups would be similar absent PCPRI (i.e., that the two were on “parallel paths” prior to the start of PCPRI). To assess the parallel assumption’s validity visually, we produced descriptive graphs to assess the trends during the baseline period.

Table C-2-3. Unweighted and weighted means and standardized differences, PCPRI and comparison groups aged 1 year or older, baseline period (2011–2014)

	Unweighted				Weighted			
	PCPRI group	Comparison group	Standardized difference[a]	p-value	PCPRI group	Comparison group	Standardized difference[a]	p-value
N	109,405	254,728			109,405	107,948		
Sociodemographic characteristics								
Zero months of enrollment in year before attribution, %	11.6	1.8	39.9	<0.001	11.6	10.8	2.5	0.003
1–3 months of enrollment in year before attribution, %	11.4	11.3	0.3	0.36	11.4	11.4	0.1	0.85
4–8 months of enrollment in year before attribution, %	24.4	21.7	6.3	<0.001	24.4	23.9	1.1	0.01
9–12 months of enrollment in year before attribution, %	52.6	65.2	25.7	<0.001	52.6	53.9	2.6	<0.001
Continuously enrolled, %	6.2	3	15.5	<0.001	6.2	6	0.5	0.48
Total months enrolled	40.1	46.8	42.8	<0.001	40.1	40.8	4	<0.001
Female, %	56.4	54.2	4.3	<0.001	56.4	56.5	0.2	0.64
White, %	20.9	40.1	42.5	<0.001	20.9	21.9	2.3	<0.001
Nonwhite (known race), %	33.9	24.7	20.4	<0.001	33.9	34.3	0.8	0.1
Unknown race, %	45.1	35.2	20.3	<0.001	45.1	43.8	2.7	<0.001
Disabled, %	9.3	9.4	0.6	0.08	9.3	9.7	1.5	<0.001
Age 0, %	3.3	2.5	4.5	<0.001	3.3	2.8	3	<0.001
Age 1–10, %	27.7	32.2	9.9	<0.001	27.7	26.9	1.7	<0.001
Age 11–20, %	23.8	26.5	6.3	<0.001	23.8	22.9	2	<0.001
Age 21–30, %	13.1	10.3	8.8	<0.001	13.1	13.8	2	<0.001
Age 31–40, %	11.9	10	5.9	<0.001	11.9	12.2	1	0.05
Age 41–50, %	10.4	9.4	3.5	<0.001	10.4	10.7	0.9	0.07
Age 51–60, %	8.1	7.4	2.6	<0.001	8.1	8.8	2.4	<0.001
Age 61+, %	1.8	1.6	1.2	0.001	1.8	1.9	1.1	0.03

(continued)

Table C-2-3. Unweighted and weighted means and standardized differences, PCPRI and comparison groups aged 1 year or older, baseline period (2011–2014) (continued)

	Unweighted				Weighted			
	PCPRI group	Comparison group	Standardized difference[a]	p-value	PCPRI group	Comparison group	Standardized difference[a]	p-value
CDPS Risk Score	2.1	2.2	8.4	<0.001	2.1	2.1	0	0.94
Total cost in year prior to attribution	1838.8	1768.1	1.4	<0.001	1838.8	1998.6	2.6	<0.001
Inpatient visits in year prior to attribution per 1,000 population	0.1	0.1	5.3	<0.001	0.1	0.1	1	0.08
Zero ED visits in year prior to attribution, %	70.7	71.2	1.1	0.003	70.7	69.7	2.3	<0.001
Single ED visit in year prior to attribution, %	12.8	14.2	3.9	<0.001	12.8	13.3	1.2	0.003
Multiple ED visits in year prior to attribution, %	16.4	14.6	5	<0.001	16.4	17.1	1.7	<0.001
County-level characteristics								
Boston MSA, %	76.5	53.8	49.1	<0.001	76.5	75.5	2.3	<0.001
Worcester MSA, %	12.2	15.1	8.5	<0.001	12.2	12.5	1.2	0.007
Springfield MSA, %	3.9	12.3	31.4	<0.001	3.9	4.1	1	0.008
Providence MSA, %	6.1	10.6	16.3	<0.001	6.1	6.1	0.2	0.59
Other MSA, %	1.4	8.2	32.4	<0.001	1.4	1.8	3.7	<0.001
Poverty rate in 2011, %	13.8	12.8	23.6	<0.001	13.8	13.9	1.7	0.001
< High-school education (age 25+), %	11.8	11	18.6	<0.001	11.8	11.9	0.9	0.08
College education (age 25+), %	38.8	36.5	27.5	<0.001	38.8	38.8	0.2	0.58
Unemployment rate in 2014 (age 16+), %	5.7	6	31.1	<0.001	5.7	5.7	0.2	0.6
Population density per square mile	4510	2481.4	44.9	<0.001	4510	4570.6	1.2	0.02
Hospital beds per 1,000 population in 2012	2.7	2.2	36.3	<0.001	2.7	2.8	1.1	0.03
PCPs per 1,000 population in 2013	1.1	1	32.9	<0.001	1.1	1.1	1.7	<0.001
Population in 1,000s	860.1	743.6	30.7	<0.001	860.1	864.7	1.1	0.06

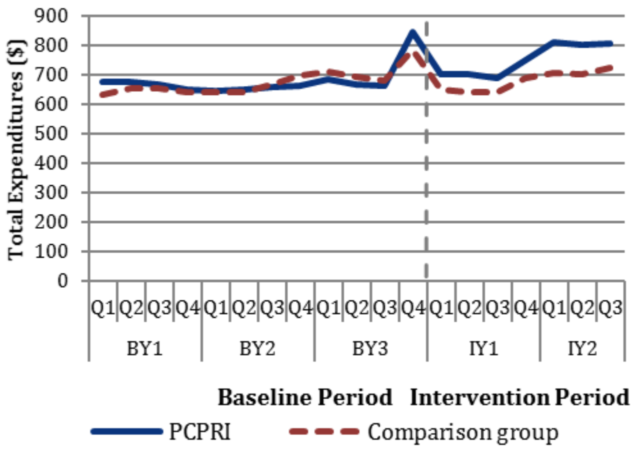
CDPS = Chronic Illness and Disability Payment System; ED = emergency department; MSA = metropolitan statistical area; PCP = primary care provider; PCPRI = Primary Care Payment Reform Initiative.

[a] Absolute standardized differences are expressed as percentages.

Each beneficiaries' age zero person year observation was removed from the data set. However, because the modeling is at the beneficiary level and we used age at baseline period, there are beneficiaries whose age is zero at baseline, based on their birthdate. These are not used in the regression sensitivity analyses. The baseline period varied for PCPRI beneficiaries based on their date of attribution into the program. Their baseline was calculated as 3 years prior to attribution.

Figures C-2-2, C-2-3, C-2-4, and ***C-2-5*** present graphs of the unadjusted quarterly averages for **total, inpatient, ED, and primary care PBPM expenditures** for PCPRI-attributed beneficiaries and the comparison group for the baseline period (third quarter 2011–second quarter 2014) and the first 7 quarters of implementation (third quarter 2014–first quarter 2016).[56] ***Figures C-2-6, C-2-7*** and ***C-2-8*** present the unadjusted quarterly averages for **primary care, ED and inpatient utilization.** Inpatient PBPM includes payments for inpatient facility services. ED PBPM includes payments for outpatient ED visits. Primary care PBPM includes payments for primary care office visits with a PCP. ***Figures C-2-9, C-2-10,*** and ***C-2-11*** present the unadjusted quarterly averages for 14-day follow-up after hospitalization, adolescent well-child visits, and ambulatory care sensitive conditions.

Figure C-2-2. Average total per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group

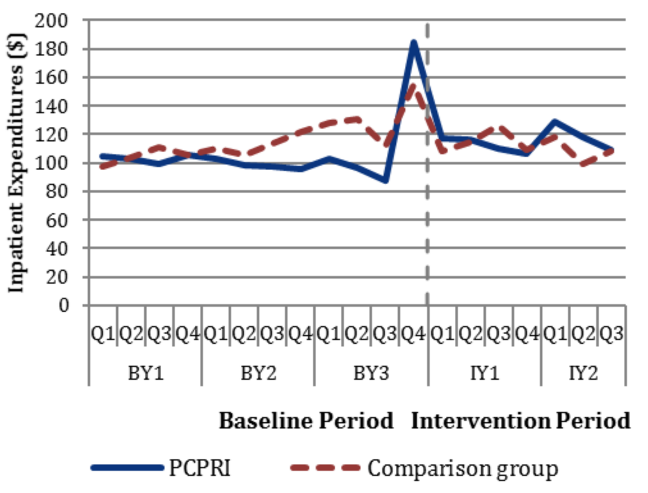


For Medicaid beneficiaries, average **total PBPM expenditures** were similar and remained so over the baseline period for PCPRI participants and the comparison group (***Figure C-2-2***). Higher spending associated with new enrollment in Medicaid explains the small spike in costs for both groups at the start of the program. After the intervention started, spending in the PCPRI group was higher.

---

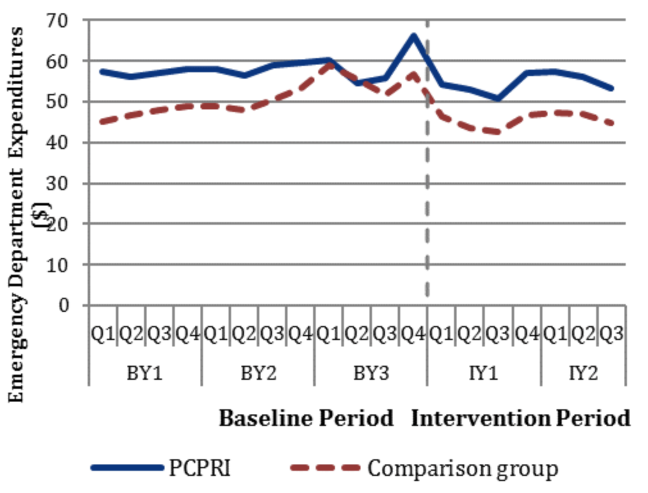
[56] The quarterly averages were weighted by the product of two factors: (1) the fraction of the quarter during which the beneficiary was eligible for the analyses (the eligibility fraction) and (2) the beneficiary's propensity score, which adjusts for various individual, baseline utilization, and county-level characteristics. Because the weighted quarterly averages are not adjusted for the covariates included in the regression model, the magnitude and direction of the trends in the weighted quarterly averages may differ from the regression-adjusted averages shown in the D-in-D tables.

Figure C-2-3. Average total inpatient per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group



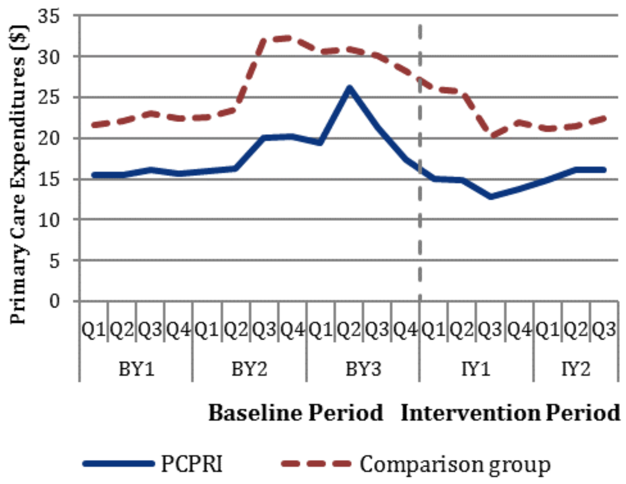
Average inpatient PBPM expenditures were higher for the comparison group during the baseline period (***Figure C-2-3***). Inpatient stays associated with enrollment in Medicaid explain the spike in hospital costs for both groups at the start of the program, although both groups show an overall decline and leveling off in expenditures relative to the pre-period increase at the end of 2013. They end the intervention period at levels similar to the pre-period levels.

Figure C-2-4. Average emergency department per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group



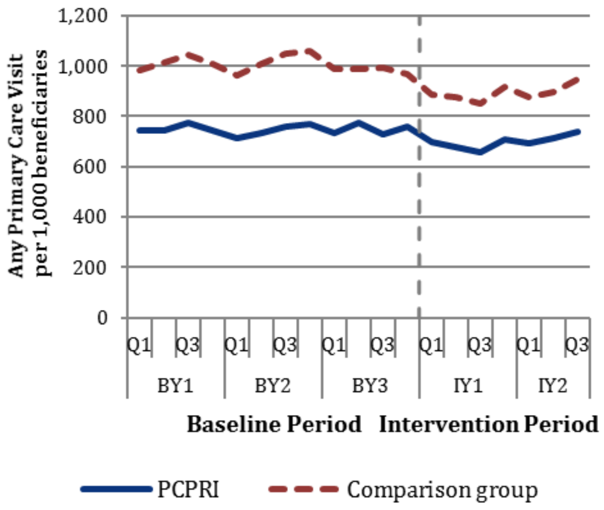
Average ED PBPM expenditures were consistently higher for PCPRI participants throughout the baseline and intervention periods (***Figure C-2-4***). ED visits associated with enrollment in Medicaid explain the spike in related costs for both groups at the start of the program.

Figure C-2-5. Average total primary care per beneficiary per month expenditures from July 2011 through March 2016 for Massachusetts Medicaid beneficiaries, PCPRI and comparison group



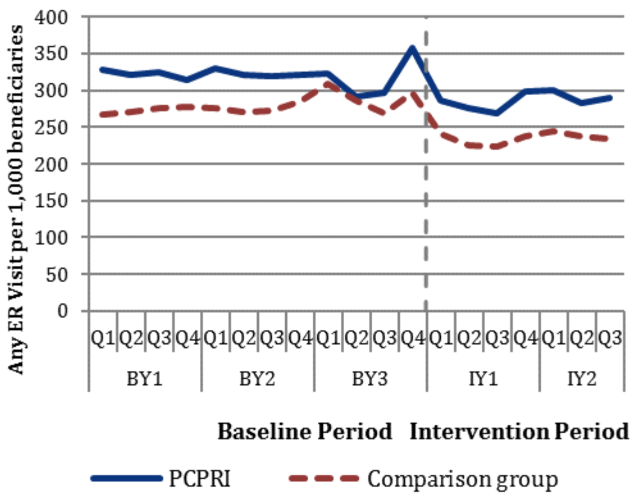
Average total primary care PBPM expenditures were consistently and substantially higher for the comparison group in both the baseline and intervention periods (***Figure C-2-5***). Total primary care expenditures followed a similar pattern for both groups over time.

Figure C-2-6. Primary care visits per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group



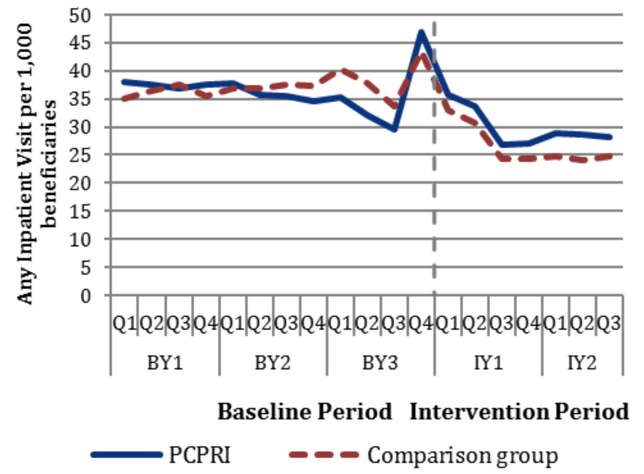
Primary care visits per 1,000 Massachusetts Medicaid beneficiaries were consistently and substantially higher for the comparison group in both the baseline and intervention periods (***Figure C-2-6***). Primary care utilization followed a similar pattern for both groups over time.

Figure C-2-7. Emergency department visits per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group



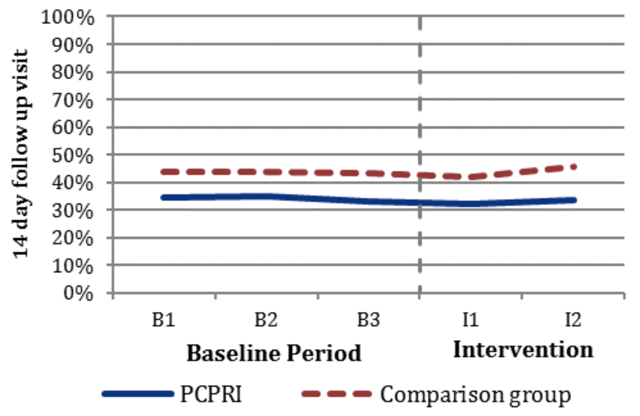
ED visits per 1,000 Massachusetts Medicaid beneficiaries were lower for the comparison group in both the baseline and intervention periods (***Figure C-2-7***). ED utilization declined among the PCPRI group in the baseline, but then followed a similar pattern in the intervention period.

Figure C-2-8. All-cause inpatient admissions per 1,000 Massachusetts Medicaid beneficiaries, from July 2011 through March 2016, PCPRI and comparison group



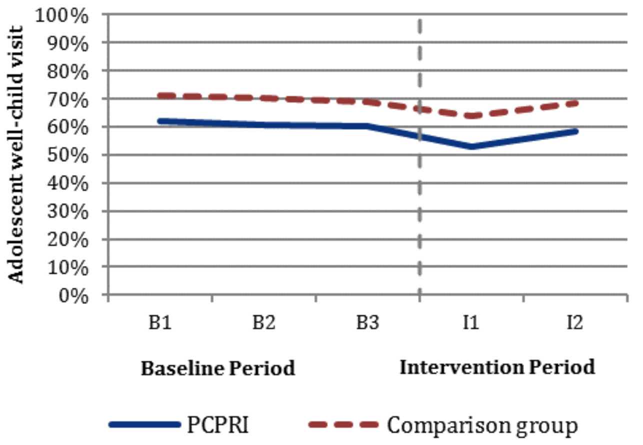
All-cause inpatient admissions per 1,000 Massachusetts Medicaid beneficiaries were in both the baseline and intervention periods (***Figure C-2-8***). Inpatient utilization followed a similar pattern for both groups over time with a slight increase for the PCPRI group toward the end of the intervention period.

Figure C-2-9. Probability of Massachusetts Medicaid beneficiary having a follow-up visit within 14 days of hospital discharge from July 2011 through March 2016, PCPRI and comparison group



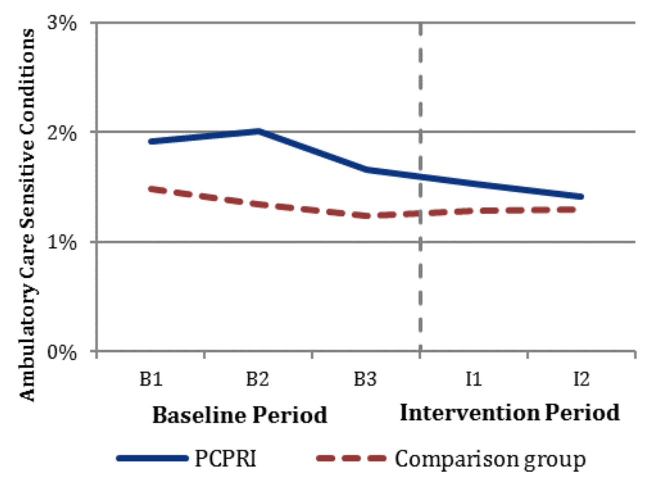
For Medicaid beneficiaries, the probability of having a **follow-up visit within 14 days of hospital discharge** was higher in the comparison group and remained so throughout the baseline period for PCPRI participants and the comparison group (***Figure C-2-9***). After the intervention started, the trends remained similar to the baseline period.

Figure C-2-10. Probability of Massachusetts Medicaid beneficiary having at least one comprehensive well-care visit for individuals 12–21 years old, from July 2011 through March 2016, PCPRI and comparison group



For Medicaid beneficiaries, the probability of having an **adolescent well-child visit** was higher in the comparison group and remained so over the baseline period for PCPRI participants and the comparison group (***Figure C-2-10***). After the intervention started, the rate in both groups dipped in the first year and then increased in the second year.

Figure C-2-11. Probability of Massachusetts Medicaid beneficiary having an admission for an Ambulatory Care Sensitive Condition Hospitalization, from July 2011 through March 2016, PCPRI and comparison group



For Medicaid beneficiaries, the probability of having an **ambulatory care sensitive condition hospitalization** was higher among the PCPRI group in the baseline period than the comparison group (***Figure C-2-11***). After the intervention started, the overall rate fell among the PCPRI group to a level similar to the comparison group in year 2.

To assess the baseline trends more empirically, we modeled core expenditure and utilization outcomes during the baseline period with a linear time trend interacted with a dichotomous variable for PCPRI. The following section describes the baseline analysis we conducted to inform the D-in-D model.

A quarterly fixed-effects model considered for the evaluation is shown in ***Equation C-2.1***:

$$\gamma = \alpha_0 + \alpha_1 I + \sum \beta_n Q_{n,b} + \sum \phi_t Q_{t,p} \bullet I + \delta X + \mu \qquad \text{(C-2.1)}$$

where

y	equals a performance measure (e.g., total PBPM cost per quarter) for the *i*-th beneficiary in the *j*-th group (test or comparison) in period t (i,j,t subscripts suppressed).
I	equals a 0,1 indicator (0 = comparison group, 1 = test group).
X	equals a vector of patient and demographic characteristics.
$Q_{n,b}$, $Q_{t,d}$	equals a 0,1 indicator of the *n*-th or *t*-th calendar quarter in the base (*b*) or post (*p*) period (*n* starts counting at the first baseline period, whereas *t* starts with first SIM model quarter).
μ	equals the error term.

The model in ***Equation C-2.1*** assumes that, except for an intercept difference α_0, the outcomes for beneficiaries in the intervention group and comparison group followed a similar growth trend during the baseline period. We investigated whether the baseline period before the start of SIM activities satisfied the baseline trend assumptions of the D-in-D model in

Equation C-2.1: that is, whether the outcome trends for beneficiaries in intervention and comparison groups were similar during this period.

Because we have 12 baseline quarters, it is possible to assess whether baseline outcome trends were, in fact, similar across groups.

One option for testing the assumption that SIM participants and the comparison group had similar baseline trends is to estimate the model in ***Equation C-2.1*** for the baseline period only and expand the model by including a set of interactions between I_j (the test indicator) and the indicators for the baseline quarters on the right-hand side of the model. Statistically significant interaction coefficients would indicate whether the outcome difference between the test and comparison groups increased or decreased in particular baseline quarters. However, it is difficult to make a judgment about a trend based on a large number of interaction coefficients because how to interpret the many sequences of significant and insignificant coefficients that could arise is unclear.[57]

As an alternative, simpler approach to testing the similarity of baseline trends, we used a model with a linear trend during the baseline period. We tested whether this trend differed for SIM participants relative to comparison group participants. Specifically, the model for the outcomes may be written as follows:

$$y = \alpha_0 + \alpha_1 I + \theta \bullet t + \lambda I \bullet t + \delta X + \mu. \qquad \text{(C-2.2)}$$

In ***Equation C-2.2***, *y, I,* X, and μ are defined as in ***Equation C-2.1***. The variable *t* is linear time ranging from 1 to 12. The linear time trend in the comparison group is θ•*t*, whereas for test group beneficiaries (*I*=1), it is (θ+λ)*t. Hence, λ measures the difference in linear trends, and the *t*-statistic for this coefficient can be used to test the null hypothesis of equal trends (λ = 0). In other words, rejecting the null hypothesis would suggest that the assumption of equal trends underlying our outcome models is not met.

The parameters of ***Equation C-2.2*** were estimated using weighted least-squares regression models for seven key outcomes. The weights are a function of the eligibility fraction and propensity scores. For each outcome, we report estimates and standard errors of the difference between the baseline trend in the test and the comparison groups (λ).

---

[57] For example, suppose that the interactions coefficients for quarters 2, 5, and 8 are statistically significant. Based on such a pattern, it would be difficult to conclude whether outcome trends during the baseline period were similar or not.

Tables C-2-4,***C-2-5,*** and ***C-2-6*** show estimates of the baseline trend differences for the following outcomes:

- Total Medicaid expenditures
- Expenditures for acute-care hospitalizations
- Expenditures for ED visits
- Expenditures for primary care visit
- Probability of any acute inpatient stay
- Probability of any ED visit
- Probability of any primary care visit
- Probability of 14-day follow-up visit following inpatient hospitalization
- Probability of adolescent well-child visit
- Probability of an ambulatory care sensitive condition hospitalization

Table C-2-4. Differences in average quarterly per beneficiary per month (PBPM) Medicaid expenditures and expenditures per admission and per emergency department visit and per primary care visit during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries

Parameter estimate	Total ($)	Inpatient ($)	ED ($)	Primary Care ($)
Test–CG trend difference	−0.52	−0.37	−0.50***	−0.27***
	(1.11)	(0.66)	(0.14)	(0.05)

CG = comparison group; ED = emergency department.

The trend (slope) is the quarter-to-quarter change in PBPM expenditures or probability of use. Standard errors are given in parentheses. ***p < 0.01.

Table C-2-5. Differences in the probability of inpatient, emergency department, and primary care visits during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries

Parameter estimate	Any inpatient	Any ED visit	Any primary care visit
Test–CG trend difference	−0.00010	−0.00046***	0.00046**
	(0.00007)	(0.00016)	(0.00020)

CG = comparison group; ED = emergency department.

The trend (slope) is the quarter-to-quarter change in the probability of use. Standard errors are given in parentheses. **p < 0.05; ***p < 0.01.

Table C-2-6. Differences in the probability of 14-day follow-up after hospitalization, adolescent well-child visits, and ambulatory care sensitive conditions during the baseline period, Primary Care Payment Reform Initiative and comparison group beneficiaries

Parameter estimate	14-day follow-up	AWCV	ACSC
Test–CG trend difference	−0.003040	−0.0018851	−0.000083
	(0.0066807)	(0.0047761)	(0.0005702)

AWCV = adolescent well-child visit; ACS C= ambulatory care sensitive condition; CG = comparison group;.

The trend (slope) is the quarter-to-quarter change in the probability of use. Standard errors are given in parentheses. **p < 0.05; ***p < 0.01.

Relative to the comparison group, there was no statistically significant difference in the baseline trend for total expenditures at the 5 percent level. This overall result masks differences in the subcategories. ED and primary care costs decreased in the baseline period for the intervention group relative to the comparison group, while the probability of a primary care visit increased relative to the comparison group. The quality measures and care coordination measure baseline trends were not significantly different in the baseline period.

We found that baseline trends did appear similar and, thus, concluded that we can assume that the PCPRI population and comparison group were on a similar trajectory before the implementation of PCPRI.

D-in-D regression model. The D-in-D model is shown in ***Equation C-2.3***. This model is a quarterly fixed-effects model, as shown in ***Equation C-2.1.*** As in ***Equation C-2.1***, Y_{ijt} is the outcome for individual i in PCPRI or comparison group j in quarter t; I_{ij} (= 0,1) is an indicator that is equal to 1 if the individual is in the PCPRI group and 0 if the individual is in its comparison group; Qn is a series of quarter dummies for the baseline period (quarters 1–12); and Q_t is a series of quarter dummies for the post quarters (quarters 13–17). The interaction of the test group indicator and Q_t ($I_{ij} * Q_t$) measures the difference in the pre-post change between the test group and its comparison states.

$$Y_{ijt} = \alpha_0 + \beta_1 I_{ij} + \sum \beta_2 Q_n + \sum \alpha_2 Q_t + \sum \gamma I_{ij} * Q_t + \lambda X_{ijt} + \varepsilon_{ijt} \qquad \text{(C-2.3)}$$

Table C-2-7 illustrates the interpretation of the D-in-D estimate from this model. The coefficient β_1 in ***Equation C-2.3*** is the difference in the measure between individuals in the test and comparison groups at the start of the baseline period, holding all other variables in the equation constant. The β_2 and α_2 coefficients are for the quarterly fixed effects and capture differences over time for each baseline and post quarter, respectively. The coefficient of the interaction term between Q_t and test (I) measures any differences for the test group relative to the comparison group in the post quarters relative to baseline quarters. Thus, in the post period, the comparison group mean is captured by $\alpha_0 + \alpha_2$, whereas the test group mean is captured by $(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$. In other words, the between-group difference changes from β_1 during the baseline years to $\beta_1 + \gamma$ during the post period. The D-in-D parameter, γ, indicates whether the between-group difference increased ($\gamma > 0$) or decreased ($\gamma < 0$) after PCPRI was implemented. Using the quarterly fixed-effects model, we calculated yearly and overall estimates by taking linear combinations of the quarterly estimates.

Table C-2-7. Difference-in-differences estimate

Group	Pre period	Post period	Pre-post difference
Test	$\alpha_0 + \beta_1 + \beta_2$	$(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$	$\alpha_2 + \gamma$
Comparison	$\alpha_0 + \beta_2$	$\alpha_0 + \alpha_2$	α_2
Between group	β_1	$\beta_1 + \gamma$	γ

All of the population-based regression models were estimated with the beneficiary quarter as the unit of analysis. All admission- or visit-level outcomes used the admission or visit as the unit of analysis, with observations assigned to a quarter based on the date of service. For the utilization outcomes, we converted quarterly utilization counts into binary outcomes (1 = any use) and used weighted logistic regression models. Count models are not appropriate because of the low occurrence of multiple hospitalizations and ED visits for individual beneficiaries in any quarter; however, we multiplied the marginal effect from the logistic regression models by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the marginal effect by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes that no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because nearly all the Medicaid population had zero or one ED visit or admission per quarter. For expenditure outcomes, we used weighted generalized linear models with a normal distribution and identity link.

To show the adjusted means in the pre- and post-periods for the intervention and comparison groups, we used a linear model that allows for the calculation of means that will sum to the D-in-D estimate. Although this model has strong assumptions of the normality of the outcome, the ordinary least squares model still produces unbiased estimates, even when the normality assumption is violated as long as errors are uncorrelated and have a constant variance

(Gauss-Markov Theorem). However, we can and do control for the correlation and variance in errors with clustered standard errors. Additionally, the model yields estimates that are readily interpretable in dollars and do not require additional transformation.

Control variables. Control variables for models involving the PCPRI population include person-level variables (age, gender, race, disability, location, and Chronic Illness and Disability Payment System risk score) and county-level variables (percentage with high school and college educations, percentage in poverty, supply of hospitals beds and PCPs, and unemployment rate).

Weighting and clustering. Although outcomes for beneficiaries treated by the same provider may not be independent of one another, we did not have provider-level identification information available in the data to cluster at the provider level. Because repeated observations for the same beneficiary are likely correlated, we accounted for beneficiary-level clustering. Because we performed clustering at the beneficiary level rather than the provider level, our standard errors are relatively small and may be more likely to produce a Type I error (i.e., finding a statistically significant difference where there is none).

C-2.6 References

Agency for Healthcare Research and Quality. (2016). *Prevention Quality Indicators Overview*. Available at https://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx

Austin, P. C. (2010), The performance of different propensity-score methods for estimating differences in proportions (risk differences or absolute risk reductions) in observational studies. *Statistics in Medicine, 29*: 2137–2148. doi:10.1002/sim.3854

Austin, P. C., and Stuart, E. A. (2015) Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Statistics in Medicine, 34*: 3661–3679. doi: 10.1002/sim.6607

Forbes, A. and Shortreed, S. (2008), Inverse probability weighted estimation of the marginal odds ratio: Correspondence regarding 'The performance of different propensity score methods for estimating marginal odds ratios' by P. Austin, Statistics in Medicine, 2007; 26:3078–3094. *Statistics in Medicine, 27*: 5556–5559. doi:10.1002/sim.3362

Stuart, E.A. and Rubin, D.B. (2007). Best Practices in Quasi-Experimental Designs: Matching methods for causal inference. Chapter 11 (pp. 155–176) in *Best Practices in Quantitative Social Science*. J. Osborne (Ed.). Thousand Oaks, CA: Sage Publications.

[this page intentionally left blank]

Appendix D: Minnesota SIM Initiative Progress and Findings

D.1 Synopsis of the SIM Initiative in 2017

As of April 2017, 3.5 years after the SIM Initiative began, Minnesota's SIM Initiative continued to support a range of resources to facilitate providers' ability to meaningfully participate in an "accountable health model" for "integration of medical care, behavioral health, and long-term care and community prevention services" (Minnesota Accountable Health Model Webpage, 2016). As its main focus, Minnesota expanded and accelerated an accountable care organization (ACO) model for Medicaid beneficiaries under age 65 called the Integrated Health Partnerships, or IHPs. Minnesota's SIM Initiative awarded grants to support Accountable Communities for Health (ACHs), which are partnerships between IHPs or other ACO-like entities and community-based service providers, and to facilitate health information exchange and data analytics, practice transformation,[58] and integration of emerging professionals into the health care workforce. Minnesota also invested in developing resources for the provider community at large, such as the eHealth roadmap, emerging professions toolkits, a health information privacy and security toolkit, and a series of Learning Communities and Storytelling Projects. See ***Section D.2*** for an overview of these models and activities. Much of this work was explicitly intended to (1) accelerate development of the state's major delivery and payment reform initiative, IHPs; and (2) encourage clinical and service delivery integration between primary care and what Minnesota refers to as the "priority settings": behavioral health, local public health, social services, and long-term and post-acute care providers. See ***Section D.3*** for the evaluation team's qualitative analysis on impact of the SIM Initiative work.

The reach of SIM-supported models is high and increasing among the Medicaid population. Minnesota used SIM funding to support providers in successful participation in the state's three main payment and delivery system reforms (IHPs, Health Care Homes [HCHs], Behavioral Health Homes [BHHs]). ***Figure D-1*** depicts the scope of participation in these three models in terms of individual providers and populations as of March 2017. The figure presents the absolute number of individual providers in each delivery system/payment model, as reported by each participating payer, in the first column. The next column shows the percentage of each payer's population served by participating providers, as reported by the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with commercial, Medicare, Medicaid, or other health insurance coverage, to provide some insight into statewide reach of each model. Sources of reported data are available in ***Sub-appendix D-1***.

---

[58] Minnesota offered providers both practice transformation grants, which helped practices implement existing transformation plans, and practice facilitation grants, which helped practices develop transformation plans.

Key Results From Minnesota's SIM Initiative, April 2016–April 2017

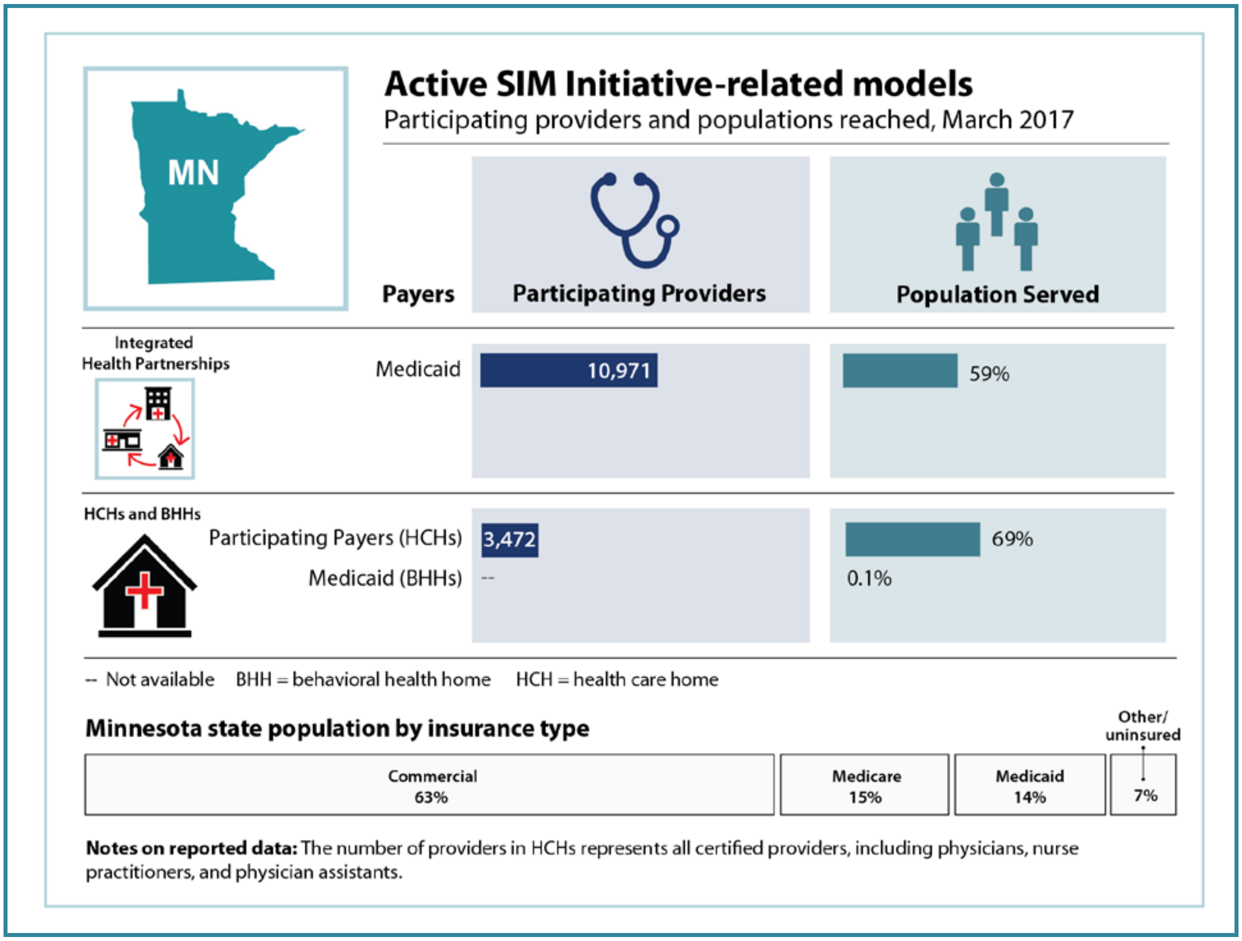
- The SIM Initiative funded a broad range of grants and other activities to support locally defined relationships between health care providers and the Minnesota-defined "priority settings."
- The primary focus of the SIM Initiative was to move providers into Integrated Health Partnerships (IHPs). The reach of the IHPs is high and increasing among the Medicaid population.
- Despite statewide engagement of different types of providers, engagement of payers was less successful. Minnesota Medicaid's unilateral approach to implementing IHPs caused some tension with Medicaid managed care organizations.
- Minnesota continued to provide robust support to the SIM Initiative grantees and IHPs with respect to data analytics; still, health information exchange and interoperability outside of health systems continued to pose challenges.
- Analysis of the IHP model showed improvements in care coordination and quality of care measures, with increased follow-ups and screenings, but had little impact on utilization measures.
- Minnesota developed tools and resources to disseminate the lessons learned from SIM activities, but the onus of maintaining the SIM-facilitated relationships will shift to the health care provider community.

- As of March 2017, Minnesota had contracts with a total of 21 IHPs, two of which began participating in January 2017.
- The number of individual physicians participating in these 21 IHPs reached 10,971, and the number of participating practices totaled 580, which exceeded the state's original goals of soliciting participation from 10,350 physicians and 450 practices, respectively.
- The number of Medicaid beneficiaries served by IHPs was 460,548 (59 percent of the statewide Medicaid population), which was more than double the number of beneficiaries the state expected to reach (200,000) through its IHP initiative.

Minnesota's SIM funds also expanded participation in Health Care Homes, a model that predates the SIM Initiative and is supported by multiple payers. The HCH model focuses on enhancing primary care access through HCH certification for clinics and health systems (Year 2 and 3 Annual Reports).

- As of March 2017, the number of individual physicians, nurse practitioners, and physician assistants participating in HCHs was 3,472, and the number of participating practices reached the state's original goal of 420.
- Between more individual clinicians and practices participating, HCHs served 3,747,261 patients, which accounts for 69 percent of the statewide population. This surpassed the state's original goal of reaching 3,712,747 patients.

Figure D-1. Providers and populations reached by Minnesota's SIM Initiative–related delivery system and payment models, as of March 2017



Notes on reported data: The number of providers in HCHs represents all certified providers, including physicians, nurse practitioners, and physician assistants.

Lastly, BHHs in Minnesota reached 482 Medicaid beneficiaries or 0.1 percent of the statewide Medicaid population, as of March 2017.[59] BHHs integrate behavioral and primary care health services to serve Medicaid beneficiaries with serious mental health needs.

Impact of Medicaid IHPs after 1 year (2014). The main payment reform in Minnesota is the IHP model, which the state developed prior to and then accelerated and expanded throughout the SIM Initiative. The IHP model is also the SIM-related activity most centralized within the state, whereas most of the other SIM-funded activities are led and overseen by local communities. To measure the interim effects of IHPs, we asked: "Do Minnesota Medicaid beneficiaries receiving care in IHPs exhibit greater improvement in quality of care and health service use as compared to Minnesota Medicaid beneficiaries who were never enrolled in IHPs?"

---

[59] State goals with respect to BHHs are not stated because the model was not an initial component of the SIM Initiative.

Although the initiative is in its third year, our analyses use the most recent test period data available, which reflects only the first year after Minnesota began SIM Initiative implementation (January 2014 to December 2014). We conducted a difference-in-differences (D-in-D) regression analysis comparing Minnesota Medicaid beneficiaries attributed to an IHP to non–IHP attributed Minnesota Medicaid beneficiaries. We found statistically significant differences between IHP and non–IHP attributed beneficiaries in two measures of outcomes that may plausibly respond to changes in the short term. Specifically, IHPs seem to be exhibiting small but significant gains in rates of breast cancer screening and 14-day follow-up post-hospital discharge. We did not detect differences between IHP- and non–IHP attributed beneficiaries in measures that are expected to materialize over a longer time horizon, such as measures of hospital inpatient or emergency department (ED) utilization (we did not have access to reliable expenditure data for this report). All data and a brief discussion of these results appears in ***Section D.4*** of this appendix, with full methods available in ***Sub-appendix D-2***. ***Figure D-2*** depicts the time periods covered by different analyses in this report, with implementation analysis reported in ***Section D.3*** and interim impact analysis reported in ***Section D.4***.

Figure D-2. Time periods covered by different analyses in this report

D.2 Overview of the Minnesota SIM Initiative

The Minnesota SIM Initiative, also referred to as the Minnesota Accountable Health Model, seeks to improve health in communities and provide better health care at lower costs. At the start of the initiative, the state's focus was to expand ACOs under a multi-payer approach to achieve value-based care and the "Triple Aim" (as the state identifies below) of improved population health, improved patient experience, and lower costs. Throughout the SIM Initiative, the goal remained to transform the state's health care system by 2017 into one in which:

- "The majority of patients receive care that is patient-centered and coordinated across settings;
- The majority of providers are participating in Accountable Care Organizations (ACOs) or similar models that hold them accountable for costs and quality of care;
- Financial incentives for providers are aligned across payers and promote the Triple Aim goals; and
- Communities, providers, and payers have begun to implement new collaborative approaches to setting and achieving clinical and population health improvement." (State of Minnesota, Year 3 Operational Plan)

A multi-payer approach under the SIM Initiative ultimately did not materialize. Private payers and Medicare continued to progress with their own delivery and payment models, implementing quality-based payment, value-based purchasing, and further development of ACOs. The Minnesota SIM Initiative generally supported these efforts through a wide range of technical assistance grants that were directed at providers regardless of their payer mix. Minnesota allocated SIM funding to providers in ways that aim to enable them to participate successfully in new delivery and payment models, regardless of payer. As a payer itself, Minnesota had specific models it wanted to expand: HCHs, a model that predates the SIM Initiative and is supported by multiple payers, and Medicaid-specific IHPs and BHHs. Note that implementation of the state's payment and delivery system reforms is not directly supported by SIM funds, but SIM funds were key to providers being able to meaningfully participate in those models. As of April 2017, the state achieved its goal of having 67 percent of primary care clinics delivering patient-centered and coordinated care through either an IHP, HCH, BHH, or similar model. Minnesota surpassed the target of 200,000 Medicaid enrollees in an IHP and also met its target for having 15 communities establish provider/community partnerships through an ACH by 2017. ACHs test how IHPs, or other ACO-like models, and community-based service providers can integrate health care and community services. ACHs focus on specific populations and communities and are tailored to a defined population's needs.

The state implemented activities within five primary areas to achieve the overarching goals established at the beginning of the SIM Initiative. Minnesota funded SIM-based grants in each of these areas to support the goal of increasing provider participation in accountable care models. The goals are:

1. Providers have the ability to exchange clinical data for treatment, care coordination, and quality improvement between providers.
2. Providers have analytic tools to manage cost/risk and improve quality.
3. Expanded numbers of patients served by team-based integrated/coordinated care.
4. Provider organizations partner with communities and engage consumers to identify health and cost goals and take on accountability for population health.
5. ACO performance measurement, competencies, and payment methodologies are standardized and focus on complex populations.

In addition, the state used SIM funding to support provider learning collaboratives, which bring together stakeholders with similar goals to learn best practices from experts and one another. Minnesota's SIM Initiative–related activities are summarized in ***Table D-1***. The Minnesota Accountable Health Model built on existing health reform activities in Minnesota, including the Minnesota e-Health Initiative, Statewide Quality Reporting and Measurement System (SQRMS), HCH program, Community Care Teams, and Statewide Health Improvement Program.

Table D-1. Summary of SIM Initiative activities in Minnesota, through Spring 2017

Activity Type	Activity	Payers	Provider Types	Dates	Supporting Policies (if any)
Payment System	Integrated Health Partnerships	Medicaid	Primary care Specialty care Prevention Priority settings[a]	2013 to date	Legislation[b] Managed care contract provisions[c]
Delivery / Payment System	Health Care Homes	Multi-payer	Primary care Prevention	2010 to date	Legislation[d] Medicaid state plan amendment
	Behavioral Health Homes	Medicaid	Primary care Behavioral health Priority settings	2016 to date	Medicaid state plan amendment
Delivery System	Accountable Communities for Health	N/A	Prevention ACO/ACO-like models Priority settings	2014–2016	
	Learning Community	N/A	Primary care Specialty care Prevention Priority settings	2015–2017	
Practice Transformation and Behavioral Health Integration	Practice Transformation and Practice Facilitation	N/A	Primary care Specialty care Prevention Priority settings	2015–2017	
Health IT	Privacy, Security, and Consent Management for Health Information Exchange grant program	N/A	Primary care Specialty care Prevention Integrated health systems Priority settings	2015–2017	Legislation[e]
	e-Health Roadmap	N/A	Priority settings	2015–2016	Legislation[e]
	E-Health grant program	N/A	Primary care Specialty care Prevention Integrated health systems Priority settings ACO/ACO-like models	2015–2016	Legislation[e]

(continued)

Table D-1. Summary of SIM Initiative activities in Minnesota, through Spring 2017 (continued)

Activity Type	Activity	Payers	Provider Types	Dates	Supporting Policies (if any)
Data analytics	IHP provider grant program	Medicaid	IHPs	2015–2016	
	Data Analytics Vendor contract (3M)	Medicaid	IHPs	2015–2016	
Workforce Development	Emerging Professionals		Dental prevention Public health	2014–2016	Legislation[f]
Other	Storytelling Engagement Project	N/A	N/A	2015–2017	

ACO = accountable care organization; IHP = Integrated Health Partnership; IT = information technology; N/A = not applicable.

[a] Priority settings refers to behavioral health, local public health, social services, and long-term and post-acute care.

[b] Legislation passed in 2010 mandated that the Minnesota Department of Human Services develop and implement a demonstration "testing alternative and innovative health care delivery systems, including accountable care organizations" (Minnesota 2010 Legislative session, 256B.0755).

[c] Minnesota's Department of Human Services (DHS) includes a provision in all Medicaid managed care organization (MCO) contracts requiring MCOs to participate in the IHP program. Additionally, DHS contracts directly with each IHP.

[d] Minnesota Health Care Homes (Minnesota Statute §256B.0751, available at this link: https://www.revisor.mn.gov/statutes/?id=256B.0751).

[e] Minnesota Interoperable Electronic Health Record Mandate (Minnesota Statute §62J.495 (Electronic Health Record Technology)) supports these activities, available at this link: https://www.revisor.mn.gov/statutes/?id=62J.495. For more information: http://www.health.state.mn.us/e-health/hitimp/ and http://www.health.state.mn.us/e-health/laws/state.html.

[f] Minnesota Statute 256B.0625, Subdivision 49 (Community Health Workers); Minnesota Statute 256B.0625, Subdivision 60 (Community Paramedics); Minnesota Statutes Section 150A.105, Subdivisions 2 and 3 (dental therapists).

D.3 Implementation of the SIM Initiative in Minnesota After 3.5 Years of the Test Period

This section synthesizes findings on SIM Initiative implementation in Minnesota after 3.5 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix D-1***:

- Stakeholder interviews conducted in Minnesota between April 18, 2017, and May 3, 2017. Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.
- Focus groups conducted with providers and consumers involved with some aspect of the SIM Initiative. The providers selected for focus groups were primary care providers, specialists, and registered nurses in two locations; a total of 27 participated in four focus groups. The consumers were Medicaid beneficiaries, including Medicare-Medicaid enrollees, in two locations; a total of 28 participated in four focus groups overall. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health information technology (health IT), and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.
- Document review, including state-developed reports and local news articles.
- Telephone conversations with state officials used to gather more in-depth information on select topics and to review other evaluation-related news.

Key informant interviews conducted in Minnesota, April 2017

	Number of interviews
State officials	8
Payers and purchasers	3
Providers and provider associations	9
Consumer advocacy groups	1
Other	1
Total	22

D.3.1 What changes to health care have SIM-related delivery system and payment models yielded?

KEY INSIGHTS

- IHPs found it challenging to invest in patient-centered, coordinated care because of the delay between performance periods (when care is delivered) and the financial incentive payment (when shared savings are paid). In addition, social service organizations integrated with IHPs did not always see financial rewards.
- Minnesota Medicaid's accommodation of a wide range of provider participation, incorporation of provider feedback, and close ties with MCOs helped the IHP Model expand and accelerate. However, this approach also created tension between longstanding MCOs and Medicaid.
- Multi-payer alignment around a single delivery system and payment model did not occur under the SIM Initiative, despite establishment of a Multi-Payer Task Force.
- The SIM Initiative funded activities designed to support patient centered, coordinated care that were consistent with the needs of specific communities. Minnesota awarded grants to a diverse group of providers, facilitating increased provider participation in new payment models, most notably IHPs.

This section contains main findings on changes to health care with respect to the IHP delivery system and IHPs' relationship with the state and MCOs. The main delivery system and payment model in Minnesota, IHPs, were created through 2010 legislation.[60] This meant that the SIM Initiative period of performance began after implementation of the first six IHPs, whose contracts with Medicaid started on January 1, 2013. HCHs were in place prior to SIM funding, and BHHs were implemented in July 2016.

Minnesota used the SIM Initiative as an opportunity to expand and accelerate participation in HCH and IHP models, rather than design an entirely new model (see ***Table D-2***). Through the SIM Initiative, Minnesota actively and deliberately increased the total number of providers that felt comfortable entering into, and remaining in, shared savings payment arrangements by providing technical support to providers in areas such as health IT, data analytics, practice transformation, and

The Health Care Homes initiative has been in place since 2008. The initiative focuses on transforming primary care to achieve patient-centered and coordinated care. Clinics must meet five criteria to achieve HCH certification, including care planning and performance reporting requirements. HCHs include a multi-payer payment system where certified providers receive monthly payments, stratified based on patient complexity, for performing care coordination activities. SIM-funded grants that focused on practice transformation and practice facilitation strategies supported clinics seeking HCH certification. Additionally, a statewide learning collaborative provided opportunities for HCHs to share best practices (Minnesota Department of Health, 2015).

---

[60] IHPs were referred to as Health Care Delivery Systems demonstration in this legislation. Implementation of this model was in January 2013, while SIM funds were awarded to the state in February 2013.

Table D-2. SIM Initiative–related delivery system and payment models in Minnesota

Delivery system model	Payment model	Participating payers	Retrospective or prospective	Payments based on whom?	Risk[a]	Payment targets	Implementation progress
Integrated Health Partnerships (ACO)	Shared savings/ shared risk	Medicaid (both FFS and managed care populations)	Retrospective payment of shared savings/ repayment of shared losses (annual)	Attributed patients	Integrated Model: one-sided and two-sided Virtual Model: one-sided only	Financial and quality	Operational
Behavioral Health Homes	Per member per month for providing health home services	Medicaid (both FFS and managed care populations)	Retrospective	Patients receiving health home services	N/A	N/A	Operational
Health Care Homes	Per member per month for providing health home services	Multi-payer	Retrospective	Patients receiving health home services	N/A	N/A	Operational

ACO = accountable care organization; FFS = fee for service; N/A = not applicable.

[a] One-sided risk means that providers are eligible to earn shared savings for meeting lower total cost targets but are not subject to penalties for higher-than-expected costs; two-sided risk means that providers are eligible to earn shared savings (the percentage earned is usually higher than one-sided risk options) for meeting lower total cost targets and are expected to pay back money if costs are higher than expected.

integration of the priority settings. Support for providers funded by the SIM Initiative was a particularly crucial factor for smaller or independent provider groups that may not have been able to contemplate transformation without it. Fifty-six practice transformation grants were awarded directly to practices to enable their meaningful participation in an accountable health model like IHPs.

The Behavioral Health Homes model launched in July 2016 through a Medicaid SPA. BHHs are an integral part of the HCH Initiative, addressing the same goal of providing patient-centered, coordinated care. BHHs integrate behavioral and primary care health services to serve Medicaid beneficiaries with serious mental health needs. Certified providers receive PMPM payments for related services delivered. SIM funding did not directly support the BHH model; however, the SIM Initiative supported participation in BHHs through learning collaboratives, learning communities, practice facilitation, and SIM-funded grants. Practice transformation grants supported the development of technical infrastructure and capacity needed for BHH certification (Gavin et al., 2016; Minnesota Department of Human Services, 2017; RTI International, 2017).

Minnesota Medicaid continued to refine the IHP model, taking advantage of lessons learned and finding new ways to continue to expand provider participation. As of April 2017, there were 21 IHPs that represented a variety of providers and locations. The state intended to expand this penetration and considered refinements to the model to accomplish this expansion. IHPs continue to have single-year contracts that auto-renew at the end of 3 years. For the IHPs that have two-sided risk ("integrated IHPs"), levels of financial risk vary by performance year. Year one has only one-sided risk (opportunity for shared savings with no potential for financial losses); year two includes nonreciprocal two-sided risk (i.e., the percentage of losses the IHP can share is smaller than the percentage of savings it can share), and year three has reciprocal two-sided risk (i.e., the percentage of losses the IHP can share is the same as the percentage of savings it can share). Some IHPs ("virtual IHPs") use an exclusively one-sided model. As the first round of IHPs completed their first 3-year contract cycle and wanted to renew, the state used the opportunity of needing to define new agreement terms to refine the model. However, these refinements were minimal, for at the time they only had the limited experience of one completed financial settlement year. ***Table D-3*** provides a summary of the IHPs' contracts.

The state has revised the IHP model since its launch in 2013 and generally refers to these updated versions as IHP 1.5. Revisions since 2013 included updating the attribution methodology and encouraging providers to integrate other providers from priority settings (behavioral health, public health, social services, and post-acute care). The attribution methodology was updated to base attribution of an IHP-eligible Medicaid beneficiary to an IHP using an additional year of claims data to capture low utilizers and create a more stable attributed population. The state offered an option to extend nonreciprocal risk in the first year of a new

Table D-3. IHP contract structure

IHP contracts auto-renew every year for a 3-year period. Year 4 represents the first year in the second agreement period for renewing accountable care organizations.

References to risk refer apply only to “integrated” Integrated Health Partnerships (IHPs). “Virtual” IHPs (with smaller numbers of attributed patients) have one-sided risk only.

Year 1	One-sided risk Quality represents 25% of savings calculation and is pay for reporting
Year 2	Two-sided risk Nonreciprocal risk Quality is 25% of savings calculation and is pay for performance
Year 3	Two-sided risk Reciprocal risk Quality is 50% of savings calculation and is pay for performance
Year 4	Two-sided risk Reciprocal risk Can defer risk if a “significant number” of new providers join, or if they expand the services included in the total cost of care calculations (e.g., mental health).[a] Financial and quality targets are reset based on Year 3 performance

IHP = Integrated Health Partnership.

[a] This option was also available to those IHPs whose first year was in 2016.

agreement period (the fourth year of participation) instead of automatically continuing reciprocal risk. These refinements had, in some cases, less impact on the IHP program than was anticipated. Only two IHPs took advantage of the nonreciprocal risk extension, although both used this favorable financial arrangement to integrate behavioral health into their model.

Having learned lessons from IHP 1.5 and additional full financial settlements, the state is preparing to release Requests for Proposals (RFPs) for IHP 2.0 that will be begin in 2018. Many of these changes are explicit continuations of some of the SIM Initiative goals, and include:

- **Two tracks for participation and elimination of previous distinction between “integrated” and “virtual” IHPs**: Track 1 has no risk and is designed for a small number of providers that wanted to participate in a value based model, but have unique circumstances that do not allow them to take on risk in a meaningful way. Some examples of such circumstances are providers that focus on specialty populations and small independent practices. Track 2 has reciprocal risk.
- **Encouraging Track 2 IHPs to integrate non-embedded providers in areas such as the priority settings**. In exchange for a memorandum of understanding with such a provider that includes revenue sharing, a Track 2 IHP could maintain nonreciprocal risk.
- **Requiring integration of close to real-time admission, discharge, transfer (ADT) alerts**.

- **Population-based payment**. Is expected to be paid retrospectively every quarter and will be included in the total cost of care calculations.

The different IHP versions are summarized in ***Table D-4***.

Table D-4. IHP versions

Version	Date	Attributes
Version 1.0	January 2013	12-month retrospective attribution Interim and final settlements
Version 1.5	January 2016	12- to 24-month attribution Interim and final settlements Introduced option of risk deferment Introduced "virtual" Integrated Health Partnerships, with one-sided risk
Version 2.0	January 2017	12- to 24-month retrospective attribution Interim and final settlements Population-based payment Two tracks: no risk or reciprocal risk Option to be no risk in Track 2 in exchange for inclusion of non-embedded providers in a way that includes revenue sharing Requires meaningful exchange of information

IHP = Integrated Health Partnership.

An ongoing challenge for the IHP financial model is the delay between performance periods (when care is delivered) and the financial incentive payment (when shared savings are paid). The earliest an IHP can see a portion of its shared savings is 6 months after the end of the performance period, through the partial interim settlement. The state reserves the portion of the incentive payment tied to quality; between 25 and 50 percent depending on the contract year. The full settlement is paid 12 months after the performance period. This delay can be a significant challenge for smaller systems, or for systems managing more challenging populations. The two participation tracks and the introduction of population-based payment are intended to provide IHPs more timely funds to help sustain model participation. The population-based payments are also intended to replace HCH payments for HCHs participating in an IHP. Additionally, the state has heard that IHPs are not sharing the revenue directly with their participating providers. As one social services organization noted: "We may be getting more referrals…but not necessarily more dollars."

Consumers described receiving care that was consistent with an accountable health model but that did not necessarily translate into increased satisfaction with care delivery. Not all patients embraced the care coordination that comes with an accountable health model. Focus group participants described having access to a care team, although sometimes seeing a nurse practitioner or physician assistant was interpreted as lack of access because the consumer did not see a physician. Consumers felt listened to, but sometimes felt their doctors "don't do what you tell them to." One consumer described frustration at being referred to physical therapy instead of surgery for back pain. This course of treatment may have been more clinically appropriate and is also consistent with the incentives in a shared savings model to reduce expensive health care utilization. However, the example illustrates challenges in communication with patients about benefits of different approaches to care.

Integration of Minnesota managed care and IHPs, achieved through a complex retrospective patient attribution and shared savings system, was key to the growth of IHPs. This approach allowed the state to retain financial stability through fully capitated payments to Medicaid managed care organizations (MCOs) while simultaneously implementing shared savings for IHPs. Minnesota has a longstanding Medicaid MCO program that allows the state to pay for most Medicaid service delivery on a full capitation basis. Full capitation is valuable to the state because it offers predictable payments for service delivery and shifts risk to experienced MCOs that are able to manage financial risk and unpredictability in enrollment and care volume. State officials were clear that continuing to manage financial risk through these Medicaid MCO contracts was a policy goal. Eighty-five percent of IHP-eligible Minnesotans (i.e., beneficiaries under age 65 and therefore not Medicare-Medicaid enrollees) were enrolled with a Medicaid managed care plan; so, to meet the SIM Initiative goal of a majority of Medicaid beneficiaries enrolled in a patient-centered care coordinated model, it was imperative to capture those beneficiaries in the IHP delivery model. Continuing MCO contracts as the primary financial and reimbursement model also meant that most clinical providers (other than in rural or small communities) could continue to have the majority of their eligible Medicaid patients under a single payment model (i.e., receive payments from MCOs).

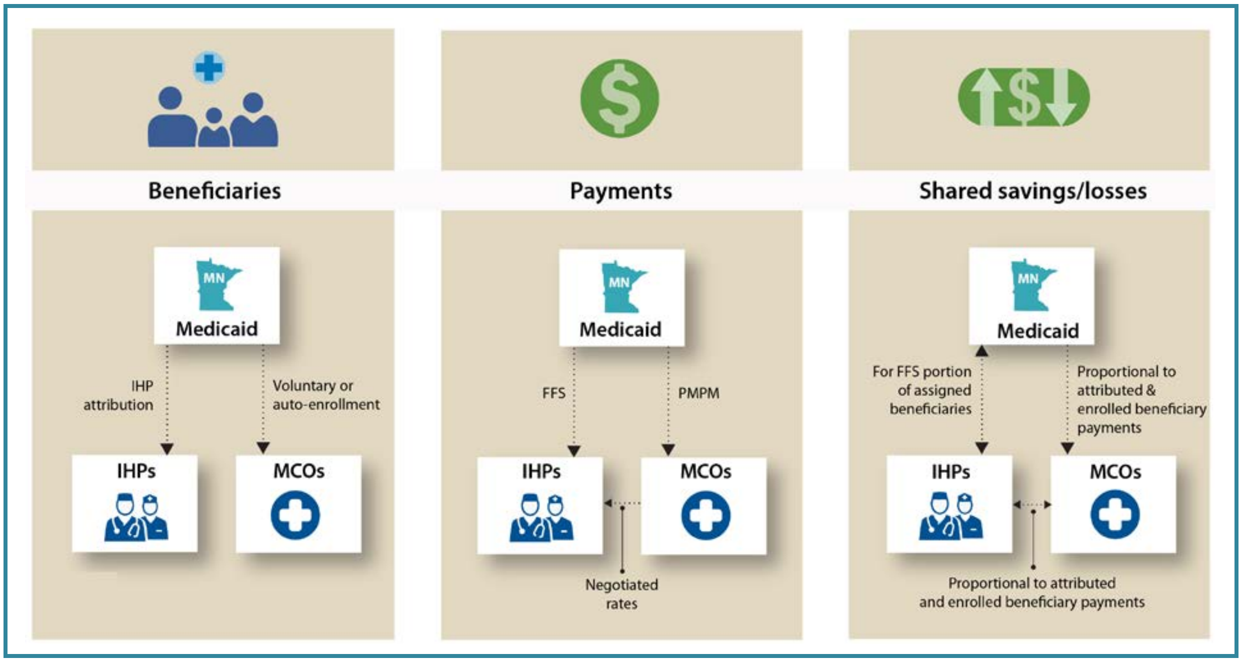
The relationship between Medicaid MCOs, IHPs, and clinical providers in Minnesota is both unique and complex; it requires detailed explanation, which we offer here. To retain the dominant and largely successful MCO program as the primary financial and payment model, while simultaneously integrating/expanding shared savings to clinical providers who are willing to form an IHP, Minnesota created a unique way of connecting the primary financial (MCO) and clinical (IHP) organizations through patient attribution. Because of the longstanding high penetration of MCOs in Minnesota, most clinical providers offered services to Medicaid patients through one or more managed care plans. When forming an IHP, clinical providers still received payment for services rendered to a Medicaid beneficiary from the beneficiary's MCO under their usual contract arrangement. IHP participation only offered the possibility of additional shared savings if performance metrics are met; it did not replace payment rates or models negotiated between MCOs and clinical providers. Similarly, IHPs did not directly or actively enroll Medicaid beneficiaries. Rather, IHP "patients" were retrospectively attributed to IHPs based on where they received the majority of their care the prior year. Performance, and the potential for shared savings, were achieved by an IHP based on these attributed Medicaid beneficiaries. Because most Medicaid beneficiaries received care through MCOs, and most clinical providers participated with and get payments from MCOs, IHPs were effectively assigned, and thus responsible for, Medicaid patients who were already part of the IHP's existing MCO population. This unique approach, while allowing Minnesota to simultaneously continue MCO capitated payments as a financial model, and expand IHP care models and shared savings for clinical providers, created a situation where MCOs were effectively acting as a pass-through for shared savings payments.

Although shared savings payments are accounted for in the capitation rates they receive, MCOs perceived an unfamiliar lack of control that created tension. Minnesota MCOs wanted to be treated as partners. In addition to information on attribution and financial calculation methodologies, they wanted greater involvement in the IHP selection/award process and development of quality measures. MCOs we spoke with agreed that the "IHP is important as a policy statement for accountable care," but expressed concern over the state driving it as the only model for the Medicaid population. MCOs believed that they can provide expertise in risk management and data analysis but did not feel the state had been willing to engage them in this way.

Retaining MCO contracts while also implementing IHPs has benefits to the state but caused tension with the longstanding MCOs. A major contributor to this tension comes from the way shared savings generated by IHPs are paid. Minnesota state staff are responsible for calculating all potential shared savings and losses attributable to IHPs. In cases where IHPs and their attributed Medicaid patients are participants in an MCO—and this is the majority of the Medicaid population—the state directs the MCOs (whose IHP-attributed enrollee experience represents the basis for savings or loss performance) to pay IHPs their portion of the "savings." The MCO is responsible for distributing the state-calculated savings or sharing the losses, with the MCO keeping their share of savings. This is logical, because MCOs are fully capitated for this Medicaid population, so savings generated are savings to the MCOs. MCOs continue to receive their contracted per member per month from the state. As one MCO representative put it "MCOs hold the risk, but we have a lack of transparency and coordination around reconciling the value-based payment."

Refer to ***Figure D-3*** for an illustration of how the beneficiaries, contracts, and payments are distributed between the IHPs, the MCOs, and the state.

Figure D-3. Flow of beneficiaries, payments, and shared savings and losses between Minnesota and the MCOs



FFS = fee for service; IHP = Integrated Health Partnership; MCO = managed care organization; MN = Minnesota; PMPM = per member per month.

MCOs' frustration with the state's lack of transparency with respect to their attribution methodology and shared savings calculations was evident. MCOs expressed discomfort with the role they have been given in Minnesota's IHP program and had multiple sources of concern. Private (non-Medicaid) MCOs and Medicaid MCOs that have developed alternative payment methodologies for paying clinical providers worry that layering the IHP methodology on top of an existing performance-based payment model had the effect of "double-paying" providers that meet benchmarks in both the MCO and the IHP model. The state provided interim monitoring reports twice a year, and regular attribution reports, and these were valuable. Still, MCOs felt this was insufficient to meaningfully help them manage their finances. This led one MCO to consider making providers choose which model they will participate in—the IHP or the MCO's performance-based payment model. Payers serving rural beneficiaries expressed particular concern that their beneficiaries may be overlooked as large health systems focus their improvements in areas with the highest beneficiary concentrations.

Multi-payer alignment around payment reform models never materialized. As one state official noted, private payers were interested in what was going on in the SIM Initiative, but they largely "went off and did their own thing." Fortunately, private payer and Medicare programs were largely similar to the broad goals of the SIM Initiative. The state did operate a Multi-Payer Alignment Task Force to bring multiple payers together, at least to talk and gain awareness of activities across payers. Their major accomplishment was the Continuum of

Accountability Matrix, which was described by a task force member as "one of the foundation pieces that the state used to determine where to award grants." As might be expected in a state that largely contracts payment for services to MCOs, and therefore has resolved its own questions of how to pay for Medicaid services, the state was more engaged in policy decisions around care delivery than detailed proposals on payment reform. As one task force member noted, to the extent the state did engage in payment reform discussions, it was not to drive a conversation around shifting health care financing from volume to value, but was the state representing its own interests as payer. In other words, the state appeared to shift its role from convener of reform to a payer participating in reform when possible.

> *When we got into these questions of "How do you create the systemic pressure to move to true value based reimbursement?" then they behaved, and purposefully said many times, we are here just representing the state of Minnesota as a payer. It seems to me that they didn't have the proper context around having a conversation around the financing of health care; most of their knowledge was around delivery…When it came to these broader questions of "How do you finance health care? What are the options?" they just didn't have a lot of experience or ability to participate in that discussion.*—Task force member

Additional information on the Multipayer Alignment Task Force is in ***Section D.3.3***. A summary of the state's payment reforms can be found in ***Table D-2.***

The original implementation of a payment model to support HCHs, the only payment model in the state supported by multiple payers, was not successful. Most providers noted that the tiered payment structure was too complex for them to implement. In acknowledgement of this, the state is replacing its HCH payments for HCHs participating in an IHP. Specifically, IHPs will receive a population-based payment in lieu of HCH payments for HCHs participating in IHPs.

Minnesota used their SIM funds to award grants to reach a broad range of providers and help them with their efforts to improve care delivery and increase their ability to participate in accountable health models, such as IHPs. Receipt of grant dollars was explicitly predicated on completion of the Continuum of Accountability Matrix.[61] This matrix, developed early in the SIM Initiative in conjunction with the Multi-Payer Alignment and Community Advisory Task Force, helped to clearly define what Minnesota meant when it said "accountable care." Clear definitions helped make the overarching goal of these funds clear to potential grantees at the proposal stage and helped the state focus funding to organizations at different stages along the continuum. Providers feeling more comfortable entering into shared-savings arrangements was evidenced by the large increase in IHP participation over the past 3

---

[61] Available at http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&RevisionSelectionMethod=LatestReleased&dDocName=SIM_RFPs.

years. In addition, the state awarded 11 grants specifically to IHPs to help those organizations improve their data analysis capabilities.

In some cases, Minnesota issued grants to contractors to help reach a broad range of providers. Two practice facilitation contractors, the National Council on Behavioral Health and the Institute for Clinical Systems Improvement, provided technical support to a range of practices attempting to implement quality improvement and other practice-level changes aimed at improving outcomes. Additionally, both grants and contracts were awarded to develop training modules, Learning Days seminars, and Learning Communities and to create stories that illustrate how to develop and use relationships to improve health outcomes. For example, one of the storytelling initiatives developed stories related to community health priorities for health equity and addressing population health in Latino communities. The intent of these learning activities was to provide examples of how these relationships can be developed, viable, and worthwhile.

All stakeholders consistently noted that the value of the SIM Initiative was the intentional relationship building that took place on all levels. Although many providers were collaborating with others such as local public health, behavioral health, and social services prior to the SIM Initiative, those relationships were often short term and so narrowly focused that they offered "one point of connection and nothing more." The state provided SIM funds specifically aimed at creating a structure for these kinds of relationships to help them expand beyond a single person or single relationship into an ongoing conversation between providers and across settings. The grants forced people to "co-manage, come together, and talk about" what they are doing—"they were able to establish relationships with community partners, or individuals, that they didn't have before, and they were able to start to understand each other in different ways." Individual providers observed improved relationships across the provider community, with some focus group participants acknowledging better relationships with other providers and more coordination. A participant from an IHP described partnerships as "a really key strength…at one point we were fierce competitors for our patients, now we are fierce collaborators."

Relationship building was important for state agencies as well. Both state officials and task force members noted that pursuing a project the size and scope of the SIM Initiative broke down the silos between the Department of Human Services (DHS) and Minnesota Department of Health (MDH), strengthening their connection to one another. A state official expected this collaboration to persist after the SIM Initiative, noting "even if it's not called SIM, we'll be able to take it with us as we move forward."

Minnesota viewed development of relationships between traditional settings (such as primary care) and nontraditional provider types (such as behavioral health and social services) as critical to expanding true patient-centered, coordinated care. Stakeholders viewed these relationships as an important legacy of the SIM Initiative and a way for progress to be sustained past the SIM award. Toward this end, Minnesota was very purposeful in directing potential grantees to develop relationships throughout the health care system and local community. ACHs had the explicit goal of connecting IHPs or other ACO-like organizations with community providers, to achieve a common health goal that each partner felt was important to their community. Likewise, the eHealth and Health Information Exchange (HIE) grants were not simply awarded to organizations looking to improve their health IT capabilities; they were targeted to organizations that were intentionally trying to use health IT to communicate outside of their organization in a very specific way that was aimed at improving the health of their community. A provider felt that the state could have facilitated stronger connections across providers “particularly nontraditional providers” and provided guidance on “opportunities and the ability to piece them together.” Some state officials felt that the relationships built, and the silos that were torn down, may be the most lasting positive legacy of the SIM Initiative.

Some stakeholders were unsure if the relationships will last, but felt hopeful. The SIM Initiative developed a breadth of community activity that was broadly sowed across the state, and stakeholders noted that the SIM Initiative was a great way of doing this efficiently. As one payer noted, the legislature “wouldn’t have funded anything as ambitious as this, and on so many fronts.” Some stakeholders expressed concern that the urge to return to familiar silos will prove too great. A member of a “virtual” IHP expressed concern over what will happen if the focus on relationship building that the SIM Initiative started is lost, fearing that smaller providers may not be able to keep up with the bigger health systems and their insurance counterparts if they “move toward more closed systems and narrow networks” and may be forced to merge with the larger systems. Yet stakeholders remained hopeful. A state official shared, “The hope is that once the light is turned on, it’s hard to turn it off” and a provider reflected that “the legacy I’d say is that there is hope for a lot of innovation that can make a difference at the patient level.”

D.3.2 How did providers respond to the SIM Initiative in Minnesota?

KEY INSIGHTS

- Providers generally felt positive about delivery system changes prompted by the expansion of IHPs and other patient-centered, coordinated care models.
- Providers also reported that requirements associated with delivery system change—clinical documentation, the plethora of quality and other metrics, increased use of electronic health records, and other administrative activities—had been burdensome and led to less time with patients.
- Financial incentives often did not filter down to the individual provider level, leaving little incentive for providers to change behaviors to improve quality metrics. Accuracy and timeliness of data posed challenges in creating such financial incentives.

We conducted focus groups with a variety of providers (specialists, primary care, physicians, and nurses) and interviews with providers and health systems to better understand providers’ response to changes associated with the SIM Initiative. Providers reported that overall changes in the way they directly deliver care were largely being driven by individual health systems' and clinics' policy and program changes, rather than financial incentives such as IHP contracts. This aligned with how the SIM Initiative allocated much of its funds to grants that allow providers and health systems to develop their own programs to develop the infrastructure to change care delivery. It was also consistent with observations from health systems and providers that individual providers were not offered direct monetary incentives for performance, in part because of the difficulty of accurately measuring performance from available data. Providers that worked for a health system or clinic that embraced practice change generally felt that team-based care models helped them to better serve their patients because of the additional resources and supports, but the increased amount of documentation required by quality improvement efforts or SIM-funded grants from the state were onerous and took away from time they had to spend with their patients.

Minnesota has not set up a formal way to solicit feedback from participating providers. Interviewees noted that feedback is often given by providers internally within health systems, but there is no formal mechanism to send that feedback to the state. Some interviewees who sat on one of the two SIM-supported task forces felt they had a channel to provide input and feedback on SIM-related efforts, but they had no leverage to implement any changes. Refer to ***Section D.3.3*** for detail on the stakeholder engagement and the SIM-supported task forces.

Although IHPs were required to report on quality metrics, the metrics themselves were not necessarily central in encouraging the changes individual providers made in delivering care. The implementation of reporting quality metrics at the system level, specifically the IHP level, did not necessarily translate to changes in daily care delivery by providers and care teams because of their weak connection to actual incentives for performance on the metrics. During focus groups, many providers noted that they were expected to meet thresholds for these metrics but were also still paid on a volume basis (e.g., fee-for-service), although some noted that they had contracts that were not solely based on visit volume. IHPs, as with most ACO models, paid for services under a fee-for-service model but used shared savings/losses calculations to incentivize appropriate resource use under such a system. As discussed in ***Section D.3.1***, this also resulted in the financial incentive to be realized well after the care was delivered. As of April 2017, shared savings incentives under the IHP model were relatively small compared to the reimbursement that came from the fee-for-service claims.

Additionally, one provider noted that although there were medical providers championing care delivery transformation, the transformation was "very much on the administrative business side and the financial side," and much more needed to be done on the "culture development side." Clinics received financial incentives for performance on quality metrics; however, these incentives have not filtered down to the individual provider level. Providers in the focus groups reported that their clinics are receiving monetary incentives for quality metrics and Medicaid EHR Incentive Program measures. Yet, most financial incentives are clinic based rather than provider specific, leaving little incentive for individual providers to improve quality metrics. Providers who attempted to create incentives through individual provider compensation by tying it to reported outcomes cited difficulty in relying on the accuracy of data reported. Still, based on information gathered during other site visit interviews and focus groups, it was evident that health systems were beginning to move toward changing provider contracts to incentivize on-the-ground changes in care delivery.

Team-based care models gave providers resources to more comprehensively support their patients. Providers working in clinics with team-based models of care reported that being surrounded by a team, notably care coordinators, social workers, and community health workers (CHWs), was critical to better supporting their patients, particularly those with complex needs. A focus group participant described how their job as a provider used to encompass trying to coordinate resources for their patients and figuring out what health and social services they qualify for, but having a care coordinator is “life changing” for both providers and patients.

CHWs are key part of a team-based care model. The focus group attendees and interview informants who practiced in a team-based care environment echoed the importance of CHWs in reaching and engaging vulnerable populations. One provider said, “CHWs is the glue that holds our model together. This population is inclined to use everything but primary care. But having someone like a CHW who looks like them and understands their life experiences are very important.” Minnesota requires CHWs to have a certificate; as of April 2017, more than 650 CHWs have been certified (Minnesota Department of Health, 2017).

Health IT capabilities increased since the start of the SIM Initiative. Many providers noted that it was hard to learn how to use the electronic health record (EHR), but it had become, as one provider put it, “second nature” and they generally found it to be a useful source of information. A notable drawback to its utility, which was described as leading to “gaps in care,” was the lack of EHR interoperability and inability to access patient data statewide.

Documentation takes a lot of resources both at the administrative and clinical levels. Health systems and clinics, and individual providers, noted that although health IT was beneficial and quality metrics supported quality improvement, the documentation became very burdensome. At the health system level, numerous interviewees noted that grant and metric reporting requirements were arduous. One had to hire a specific staff member dedicated to grant reporting. At the clinical level, many focus group attendees acknowledged that documentation created time constraints that took away from their ability to interact and connect with the patient. One provider summarized the focus group’s input as follows: “It’s less and less time engaged with the patient, and more and more time making sure you’re checking all the right boxes and doing all the right things. Having more time with each patient for each visit would be wonderful, wonderful incentive. You mentioned, ‘What would be a great incentive [to change care delivery]?’ Being given more time to spend with patients, and less time doing the documentation pieces.”

Providers expressed uncertainty about long-term impacts on cost and quality. Generally focus group participants felt that the care they were providing at the time of the site visit, as opposed to a decade ago, was more coordinated and comprehensive. Many providers expressed that although they feel these changes are benefitting patients, they admit it is hard to measure and qualify. Equally, they expressed uncertainty about long-term cost savings; one provider said “I think we’ve got great health care, we’ve got great equipment, great technology, but to do it cost-effectively is going to be really a challenge.”

D.3.3 How were stakeholders engaged in Minnesota’s SIM Initiative?

KEY INSIGHTS

- Despite the development of task forces, meaningful engagement from the payers and consumers was limited. Payer stakeholders were reluctant to openly share information and perspectives considered proprietary, making engagement difficult.
- Consumer engagement was attempted indirectly through community engagement.
- Engagement with medical providers and priority setting providers was more successful.

Minnesota established two primary vehicles for obtaining stakeholder input into its SIM activities: the Community Advisory Task Force and the Multipayer Alignment Task Force. The Multipayer Alignment Task Force, led by payer and provider representatives across Minnesota, aimed to develop strategies to create alignment across payers. Goals of this taskforce included to identify barriers to alignment of ACO payment methods, determine common performance measures, standardize data analytic feeds, and align risk adjustments. In addition, the Community Advisory Task Force was charged with providing guidance on communications, consumer engagement, outreach, and strategies to identify and share best practices. Both task forces were charged with identifying and addressing barriers to integration of services across the continuum of care, guiding the state’s evaluation, establishing criteria for ACHs, and providing guidance on sustainability strategies. Both task forces had representation for providers, payers, and local public health. The Community Advisory Taskforce included a lone consumer. The state also established a data analytics subgroup, which developed a report on key data elements needed to achieve greater data sharing among payers, ACOs, and providers. Key stakeholder groups were actively engaged in development of the eHealth roadmap.

Engagement in any level of all-payer reform did not materialize as originally envisioned. In task force discussions, members representing private payers (including private insurers, Medicaid MCOs, and self-insured large employers) were reluctant to share information they considered proprietary, attending meetings because they wanted to hear the task force discussions but not contributing. The state tried to address the unwillingness of members to publicly present their perspectives by assigning "homework," where payers were requested to submit written comments to the state on task force agenda items. The state reported that this strategy yielded limited success. As a result, the task force meetings eventually became a vehicle for the state to brief members on SIM activities but had limited value in soliciting input. As one state official noted: "Payer engagement was a struggle…. they don't want to engage. They are doing their own thing." Another state official noted:

> *We will have them around the table, they will come and listen and speak in generalities, you know, "we are committed to payment reform," but in terms of what does that specifically look like in your organization, or what are your goals, or how can we think about alignment and what does alignment even mean…we don't get very far.*—State official

Multiple task force members reported good engagement early on, when they were "creating a decision framework for distributing grants" (i.e., the Continuum of Accountability Matrix). But members expressed disappointment about an inability to truly align on payment or cost. One member speculated that participants got "bogged down" in mechanics of developing the grants, and another posited that having a second task force appointment that introduced new members slowed things down.

Areas such as health IT and data analytics had a variety of providers actively engaged, but after initial successes progress stalled. Minnesota has had an eHealth advisory committee since 2004 and has representatives from all of the priority settings; those settings were actively engaged in the eHealth Roadmap (see ***Section D.3.4***). A state official characterized the leadership from local public health, behavioral health, and long-term and post-acute care as strong, although engagement from social services has had to be developed over time. The state also established a subgroup for Data Analytics. The subgroup developed recommendations for data sharing between payers and providers in accountable care arrangements, including identification of the key data elements needed to achieve greater consistency in data sharing. The subgroup carried out its work in two phases. Phase one focused on data alignment that can take place within the current health care environment, resulting in a report that specifies recommendations for organizations to standardize their approaches to data analytics in certain very basic areas such as patient demographics, health status, and cost (Center for Health Care Strategies, 2015). Phase two addressed the data elements necessary to address social determinants of health to improve individual and population health (Center for Health Care Strategies, 2016). Several provider stakeholders commented that the work of phase one of the Data Analytics subgroup was one of the most successful SIM initiatives, but phase two proved more challenging. Phase two represented information that was not already being systematically collected by providers or payers, and to reach a consensus in this new territory would have required a higher level of sustained engagement from participants.

The priority settings were represented in many SIM activities. The Community Advisory task force included social service organizations and other community partners in the same conversations with health providers. This type of cross-pollination would not have happened, the state asserts, without the SIM Initiative prompting these conversations. The priority settings were also deeply involved in creating the Continuum of Accountability Matrix and the eHealth Roadmap.

Minnesota focused on community engagement instead of consumer engagement. The state acknowledges that it is not directly reaching consumers and is instead reaching consumers through community engagement such as the Community Advisory Task Force and the Storytelling Project. One taskforce member acknowledged that a lot of storytelling happens at the task force but was "not sure how impactful it is." However, the state reported extensive consumer engagement early in the process of developing its SIM application, and consumers were part of the grant review process.

Engaging consumers was challenging. CMS's budget policies prohibited SIM expenditures for consumer engagement supports, such as childcare, transportation, and meeting refreshments. The state was permitted to provide per diem payments to providers. The consumer we spoke with felt his voice was heard, but echoed this concern:

> *To have the consumer's expenses paid is appropriate and good…because there's a room of people paid to be there except the consumer. And in some people's minds you get what you pay for. I have to sit in a room full of people who are very trained but not a penny is allocated for the training of consumers. So, if CMS is interested in consumers who will stay for a period of time, offer training funds, or a stipend…I can't even go to a SIM conference, because I'm otherwise raising three grandkids…If you want a consumer voice; you want an intelligent consumer voice, to broaden it—they need the training, the longevity of service.*—Consumer

D.3.4 How was behavioral health and other services integration with primary care tested in Minnesota?

KEY INSIGHTS

- Minnesota intentionally designated behavioral health, social services, local public health, and long-term and post-acute care as key components of most SIM-related activities. This focus encouraged traditional health care providers to develop relationships with these providers to address the unmet needs of patients.

A foundation of Minnesota's SIM Initiative has been incorporation of the four priority settings: behavioral health, local public health, social services, and long-term and post-acute care. Key SIM-related activities including ACHs, eHealth grants, practice transformation grants to help implement existing transformation plans, practice facilitation grants to help develop transformation plans, eHealth grants, and IHP contracts, required representation from these settings stated as a condition of participation. The state also continued to leverage SIM activities to facilitate successful participation in HCH and BHH models, which aimed to better integrate care across settings.

The ACHs have provided a flexible platform for focusing on specific populations or needs, facilitating integration of behavioral health social services. For example, one ACH worked to create trauma-informed environments within the public school system. One ACH worked with partners to inform teachers how to pick up on signs of students in trouble and the triggers for students with trauma. A consumer noted that teachers can build resilience in their students by implementing these strategies to identify troubled students into their everyday teaching. SIM funds directly contributed to the integration of primary care and mental health through this type of education. Another ACH used a social services agency to provide care for the disabled population covered by Medicaid. The social services agency noted that SIM funding gave it an opportunity to prove its value to the medical providers, and it has established a well-defined partnership with concrete results. As of April 2017, the agency has a business case as it tries to develop relationships with other providers.

Practice facilitation and practice transformation grants were targeted specifically to behavioral health providers. Both rounds of practice facilitation grants, one targeting clinics and one targeting community mental health centers, required integration of behavioral health to be a priority focus for developing grantees' transformation plans. As discussed in the SIM Initiative Round 1 Evaluation Year 3 Annual Report, the third round of practice transformation grants, aimed at helping implement transformation plans, was specifically used to prepare certain organizations to become BHHs. One practice transformation grantee noted that "the first transformation grant allowed us to go very deep into defining our behavioral health offering…We've tried to use the transformation grant to really provide a robustness to the areas that we needed to focus more energies on." A consumer noted "having primary care and mental health in the same place" and a BHH hiring an RN to better integrate primary care.

A variety of training resources were developed to provide examples and guidance to providers looking to better integrate additional services. One of the Learning Communities grants was targeted to ACHs and provided technical support and peer-to-peer-learning opportunities. Two additional Learning Community grants provided support for integration of behavioral health and community providers. Two Storytelling project grants provided illustrative examples of integration local public health, social services, and cross-sector engagement. A contract funded by the SIM Initiative developed the eHealth roadmap, the purpose of which was to provide a resource specifically for the priority settings to develop and implement health information exchange. The priority settings were specifically represented in the development of the roadmap and reflected in the final product.

Access to behavioral health services remains an issue in some areas. Consumers generally reported seeing mental health providers, although access was more difficult in Duluth compared to Minneapolis. In Duluth, consumers reported difficulty getting referrals and long wait times. A few consumers noted that it is easier for them to receive mental health care by going through the ED. Providers noted a lack of mental health beds in the hospitals.

D.3.5 How were quality measurement and reporting strategies tested in Minnesota?

KEY INSIGHTS

- Minnesota had an existing statewide system for quality measurement and reporting predating the SIM Initiative. Minnesota Medicaid adopted quality measures for IHP contracts that were consistent with this system, yet also deviated when variation in measures was appropriate for a given IHP.
- Despite the existing statewide system to identify a consistent set of measures, providers perceived that quality measure reporting requirements were not aligned across payers.
- SIM-funded grantees developed quality initiatives specific to their organization, adding specificity and accountability, but expanding the number of metrics used in the state.

Minnesota requires quality measurement reporting that is consistent with reporting requirements under Minnesota Community Measurement (MNCM). The MNCM reporting predates the SIM Initiative; the state purposefully applied this well-developed, existing methodology to IHPs. IHPs are required to report on a subset of Minnesota's existing SQRMS quality measures (as described in detail in the SIM Initiative Round 1 Evaluation Years 1 and 2 Annual Reports). Shared savings and losses calculations for years 2 and 3 are calculated based on an IHP's performance, with year 1 quality scores being based on reporting only (as described in more detail in the Year 1 and 2 Annual Reports). ACHs continue to report SQRMS metrics, with measures able to be altered to target the grantee's specific population. BHHs are required by DHS to report quality measures based on the CMS core health home measures.

There was consensus among interviewees that quality measures are not yet aligned across all payers within Minnesota. Although the state has consistently required MNCM metrics, other payers (including Medicare, MCOs, and self-employed insurers) have additional quality measurement requirements. The result is a very large and varied panel of quality metrics that can be burdensome to collect. Providers expressed concern that quality measures are fragmented depending on which health payers' plans the provider accepts.

Multiple providers noted challenges for quality incentives because of a lack of alignment among payer plans. One provider specifically cited the lack of alignment with Medicare to be particularly problematic and asked that we "don't leave the interview without that being in big bold." One payer representative during a site visit interview noted concern that as a payer plan (i.e., Medicaid MCO), it was responsible for reporting quality measures to the state on behalf of its provider network. However, if the payer's measures did not fully align with IHP measures, then the provider was no longer incentivized to perform well on the payer-specific measures. "I don't have a prayer at getting that provider's attention to work on what might be our needs." A member of the Multipayer Alignment Task Force expressed disappointment that less focus was placed on quality measurement alignment among payers.

The state showed flexibility in adjusting quality measurement requirements to meet the needs of providers serving specific populations. From the start of the SIM Initiative, the state reported intentional use of a set of measures aligned with measures that providers were already required to report under SQRMS prior to the SIM Initiative.[62] Although many of these measures were applicable to IHPs, some IHPs found the measures to be a poor fit for their practice or patient mix. The state provided flexibility by allowing providers to introduce alternative measures after presenting their case to the state. For example, the state allowed child-equivalent measures to stand in for adult measures reported by pediatric groups. One IHP requested to add an early C-section measure, which the state agreed to because it would reduce the weight of the other measures. Another IHP, which focused on the mental health population, requested that the optimal vascular care measure, which MNCM specifies as a single measure from multiple related measures being "bundled" together, be unbundled. The bundled measure had a smoking cessation component that was very difficult to achieve in a population with severe and persistent mental illness. Separating out the smoking cessation component allowed this IHP to get credit for the other components of the bundle when performance on those components was high. One provider felt that certain MNCM measures for IHP quality reporting, such as the colonoscopy metric, were a poor fit for the provider's population.

One challenge reported by state officials was a lack of meaningful hospital measures for IHPs. Many hospital-based measures reported by IHPs are standardized; however, most of these measures were performing so well that the data were no longer meaningful, or the measures had "topped out." In addition to the focus on clinic measures, the state focused some IHP 2.0 quality measurement reporting efforts on incorporating more meaningful hospital measures.

SIM-funded grants supported a range of provider-led quality improvement initiatives. Some examples of these initiatives include incorporating validated pain scales, using registries to track immunization rates of A1C and asthma, and best practice advisement based on patient outcomes. A Practice Transformation grantee focused specifically on ED reduction. Without this grant, the provider did not believe it would have explored ED quality measure

---

[62] MDH developed the Minnesota Statewide Quality Reporting and Measurement System (SQRMS) to collect and report quality measurement data. As of January 1, 2010, all hospitals and clinics are required to collect and report annually on a uniform set of measures.

reporting to the same degree. All providers across focus groups reported having access to benchmarks on quality.

Providers faced challenges in quality measurement. Some of the key provider findings from the focus group included concerns about documentation of data needed to calculate quality measures driving the practice, rather than vice versa. This reflected varied opinions, with some providers noting concern about overabundance of information and others noting that information gleaned from quality measurement reporting was helpful to improve quality of care.

D.3.6 How were health IT and data analytic infrastructure implemented in Minnesota?

KEY INSIGHTS

- Minnesota awarded grants to providers to facilitate health information exchange among a variety of provider types. Progress was made, but interoperability across health systems remained a challenge.
- IHPs in particular received robust analytic support.
- State staff used what they learned from the SIM Initiative to inform the state legislature. Stringent state laws regarding data privacy remain a barrier to data sharing that optimizes accountable health models.

Minnesota has a longstanding history of supporting health IT at the state level. In 2007 the state passed legislation that required all providers to have interoperable EHR in place by 2015,[63] which resulted in the majority of the state's providers having functional EHR technology already in place. SIM funding was used mostly to develop HIE capacity between providers, with some funding including data analytics in later years.

To facilitate such exchange, a provider may leverage a connection to either a Health Data Intermediary (HDI) or a Health Information Organization (HIO). HDIs are typically vendors that either provide exchange capability within the EHR itself or will offer such exchange capability as an add-on service. HIOs are similar in function to HDIs. A state official described HIOs as organizations that "provide a governance structure over the data and have increased expectations for interoperability between them, serving as the backbone to statewide interoperability in Minnesota." In all cases, including one of the priority settings was a requirement of funding. Minnesota also had strict privacy and consent laws. SIM funds were used to develop toolkits to advise providers on exchanging electronic health information in this environment, and the

---

[63] Minn. Stat. §62J.495)

lessons learned from SIM activities are playing a role in ongoing recommendations to the governor.

Minnesota issued a series of grants related to HIE that evolved over time. In the first round, MDH awarded 12 eHealth grants, half of which were planning grants. Planning grants were awarded to organizations that knew they wanted to talk to each other, but maybe were not sure exactly what information they wanted to exchange or how they wanted to exchange it. In these cases, the grant caused these providers to "get together at the table and discuss what they actually needed." The remaining grantees in the first round and the four grantees in the second already had selected partners with whom they decided what information they would share with each other. The grant funds were used to implement those discussions. In the third and final round of grants, the state recognized that many providers were using (or wanted to use) their HIE vendor for data analytics as well. MDH and DHS collaborated to award funding for health information exchange, data analytics, or a combination of the two. This bundling strategy also helped to alleviate some of the administrative burden on providers with respect to grant management. A summary of the eHealth grants and how they differed between rounds in available in ***Table D-5***.

Table D-5. eHealth grant rounds

Round	Summary
Round 1	Required ACO or ACO-like entity Required at least one priority setting Implementation or planning Implementation required connecting to an HDI (no functional HIO at that time)
Round 2	Required ACO or ACO-like entity Required at least two priority settings Implementation and required connection to and HDI or HIO
Round 3	Health information exchange and data analytics grants (collaboration with DHS) Required connection to HIO

ACO = accountable care organization; DHS = Department of Human Services; HDI = health data intermediary; HIO = health information organization.

Health Information Organization (HIO): An organization that oversees, governs, and facilitates health information exchange among health care providers that are not related health care entities to improve coordination of patient care and the efficiency of health care delivery.

Health Data Intermediary (HDI): Provides the technical capability or service to enable health information exchange. They may work with HIOs or health care providers directly.

"State-certified HIE" can refer to any HDI or HIO that is state certified.

Source: MDH Webinar slides, 2017.

Minnesota has a market-driven "networks of networks" model for HIE, which introduced competition and complication that may have hindered adoption of meaningful exchange of health information. As noted previously, most providers already had a functioning EHR but needed to better support the ability of that EHR to exchange data. Because HIOs are required to connect to a national network or eHealth exchange, they set policies around how data will be shared among large provider health systems and providers nationally. In contrast, HDIs have policies and procedures with respect to security and data sharing specific to their organization, but there would be no reason for them to apply their policies and procedures beyond in a more holistic way. In some cases, the technical capabilities of the HDIs and HIOs are different. For example, electronic prescriptions sent to a pharmacy by a clinician are readily exchanged between HDIs across the state, but not by many, if any, HIOs. In contrast, HIOs are more likely to act as repositories, allowing providers to use queries and look up patient information in a consolidated record. Although many HDIs may have the technical capability to act as a repository, they lack the governance to properly manage those data. A practice transformation grantee cited the state's "laissez-faire" approach to health information exchange as yielding a lot of "proprietary systems that are competitors" that put "safety net providers and culturally specific providers at a severe disadvantage." She also stated, "Minnesota was pretty active in health IT pretty early…I'm struck by how much didn't change."

The relationship between HIOs, HDIs, and EHRs can be complicated. To exchange data, an EHR must connect to either an HDI or an HIO. HDIs may exchange with one or more EHRs, while HIOs are encouraged to exchange with all EHRs regardless of vendor. HIOs will be required to connect with all other HIOs in the state, although functionality has not been completed yet. HDIs are required to exchange data with at least one of the HIOs, but not with other HDIs. Based on feedback from providers, the state believes the HIOs provide the capabilities needed to shift to accountable care models. In response to this, the state shifted from requiring an HDI or an HIO in early grants to requiring connectivity specifically to an HIO in the final year of grants. As of April 2017, there are 17 HDIs and 3 HIOs in Minnesota, collectively referred to as state-certified HIE providers.

A comparison of the HIOs and HDIs is summarized in ***Table D-6***.

Table D-6. HDI and HIO comparison

HDI	HIO	
	✓	Governance structure
✓	✓	Required to connect to one or more HIOs[a]
	✓	Encouraged to work with all relevant vendors (HDIs, EHRs)
	✓	Connect to national network[b]
✓		Provide unique or transaction specific services
	✓	Required to provide query-based health information exchange

EHR = electronic health record; HDI = health data intermediary; HIO = health information organization.

[a] HIOs are required to connect to all other HIOs.

[b] HDIs may connect to a national network, but it is a requirement for HIOs.

Minnesota faced some significant health IT challenges early on. Around 6 months after awarding the first eHealth grants the state's single HIO folded and an HDI left the market. This resulted in some grantees having to rework their plans for data exchange after their grant had been awarded. This delay in having sustainable HIOs has affected the ability of the state to reach the level of connectivity between HIOs that they had initially wanted at this point and has made it more challenging to push states toward connecting directly toward HIOs. Additionally, Minnesota has oversight over HDIs, which, according to the state, is not common in other states. Minnesota also has oversight over its HIOs.

Exchange with a priority setting was required but not all settings were well represented, in some cases because of payment reform incentives. The eHealth grants required development of a collaborative arrangement with multiple providers. In 2014, the first year grants were awarded, at least one priority setting was required to be a part of an eHealth collaborative. In 2015, the second grant round, at least two priority settings were required. Although there are four priority settings, state officials reporting seeing collaboratives largely including behavioral health and local public health, with inclusion of social services lagging behind. Long-term and Post-Acute Care has the least representation in these collaboratives. In general, the priority settings may not have had the same level of funding available as hospitals and clinics, mainly because of lack of inclusion in the Medicare or Medicaid EHR Incentive Program. However, many of the eHealth grantees were also IHPs, whose population is non–Medicare-Medicaid enrollees. Therefore, IHPs may have had more direct incentives to connect medical care providers with a behavioral health provider than to long-term or post-acute care providers. Some IHP providers may have chosen to pay less attention to long-term and post-acute care, thinking their IHP beneficiaries would not be high users of those services, and if such services were used regularly the beneficiary their status would likely change to dually eligible for Medicare and Medicaid. In other words, IHP providers may have chosen not to invest in health information exchange that mainly addresses beneficiaries that the IHP will not ultimately be held accountable for.

Minnesota has dominant EHR vendors, which has been challenging for both the state and providers. Epic is the dominant EHR vendor in Minnesota, with its headquarters in neighboring Wisconsin. Cerner is the other major EHR vendor; the majority of Minnesota's health care providers use one of those two. Some of the larger systems are getting most of the information they need from within the HDI, and the state has been challenged to convince those providers of the business case for broader connectivity. For smaller providers that do not use Epic, it can be challenging to convince the larger providers to exchange data. As one state official noted "you have to appeal to the goodwill 'for the public good' thing, but that's a hard conversation to have." A payer expressed concern about complete consolidation into one vendor and its effect on rural providers. Smaller providers will often "piggyback" onto the system of larger providers and risk not having their needs met at all in favor of attention being focused on the larger provider from a single vendor. They further expressed concern with Epic integrating claims data well, putting less sophisticated providers who do not have in-house analysis capabilities at a disadvantage. A virtual IHP also echoed the concern that "big vendors are proprietary and they don't want to share," and felt the state didn't "put any teeth" into its interoperability policy. However this IHP did acknowledge being better able to make the case for mutual benefit of health information exchange with the major hospital in the area.

Both consumers and providers are becoming more comfortable with health IT, but there are still concerns. In contrast to the focus groups conducted early in the SIM Initiative, many consumers reported using patient portals to communicate with their physicians, schedule or confirm appointments, or review lab and test results. Although some continue be concerned about security or access to a computer or the Internet, most consumers also perceived that their medical information is "all computerized" and that "notes from every doctor that you've seen" are "within the system," which reflects a lack of consumer understanding of the challenges that remain in health information exchange. Individual providers are aware of the limitations of health information exchange, expressing a desire for a "universal health care record that communicates with others" and frustration over the inability of records to meaningfully talk to each other. Both providers and consumers continue to lament that computers have "taken away from the relationship."

IHPs have provided robust support to their providers to help with data analytics. The state provided IHPs with a single data set that included all of their IHP beneficiaries, regardless of payer (i.e., Medicaid fee-for-service or any Medicaid MCO). Prior to the SIM Initiative, SQRMS data were generally given to providers on the aggregate level. Through the SIM Initiative, the state could provide granular detail on the Medicaid population for all measures, excluding the patient experience measures. As one state official described it, "we're providing data legally, in a protected way, that no other payer was doing." Additionally, 11 IHP grants developed analytic capabilities within IHPs. The IHP provider grants and the HIE and data analytics grants discussed above were intended to address a commonly heard issue with respect to data—it can be “a water hose and it’s hard to know where to invest attention.” The state also hired a contractor to facilitate improvement in data analytics across IHPs. Universally, providers praised both the data and the support provided by the state. As one provider noted:

> *I wouldn’t have the data staff I have without the SIM dollars that allowed us to build and make that area more robust. Those are the pieces that allowed us to move from throwing random, raw data…to actually usable, actionable data. Almost universally. They were like honestly we almost don’t care about the risk, savings, TCOC [total cost of care]. We hope we gain some, but…getting that data can help us accomplish a lot of the care delivery reforms that we’re trying to do.*—Provider

However, one state official noted that smaller providers face more barriers in both data analytics and health information exchange than the larger health systems.

IHP 2.0 will incorporate ways to further integrate health information exchange into its model after the SIM Initiative ends. The state wants its IHP contract to explicitly include an expectation of provider connectivity. The state realizes that “in order for it work, we need to make sure it’s not an unreasonable expectation.” As discussed in ***Section D.3.1*** IHP 2.0 is looking to develop and incorporate a close to real-time ADT alert, among other things. The state is in the process of drafting an RFP for a vendor that providers not already connected to a state-certified HIE provider could use to facilitate receipt and exchange of electronic notifications. Providers already using a state-certified HIE will be able to use it to subscribe to such a notification system. As one state official noted:

> *It’s a place where…we have a lot of great work that happened. We still have some gaps. This [ADT alert] is a way for DHS to make sure that those things continue to work well for Medicaid providers and it will benefit them across their populations. We’ll just get it started. And then if they want to use it for other things, great. But in the meantime, hopefully it helped.*—State official

The lessons learned from the SIM Initiative are informing state policymakers. As noted in ***Section D.3.3***, Minnesota has a longstanding eHealth advisory committee that recommends policy from “formal, legislative perspective to the Department of Health.” The eHealth grants, HIE and data analytics grants, and eHealth Roadmap process (see ***Section D.3.4***) provided “real, concrete information about what was working well and what wasn’t working well. That led us to utilize our eHealth advisory committee groups, health information exchange workgroup, to do a deeper analysis and to set some recommendations and action plan moving forward.” In the summer of 2016, the HIE workgroup within the eHealth advisory committee identified the top barriers to health information exchange and a plan to address them through policy. Concurrently, the governor’s taskforce on health care financing created a health information exchange study to form preliminary recommendations for the legal, financial, and regulatory process related to health information exchange. The results of this study will be completed by 2018, and information learned through the SIM Initiative will drive some of these recommendations.

Privacy laws remain a barrier to exchanging health information, but many have found the resources developed with SIM funds valuable. State officials noted that provider and payer groups want the state's privacy and consent laws to be better aligned with the Health Insurance Portability and Accountability Act. This has not yet happened, but in 2016 there was legislation that introduced to revise the Minnesota Health Records Act to make it less restrictive. Minnesota awarded a Privacy, Security, and Consent Management for Electronic Health Information Exchange grant using SIM funds to develop the Foundations in Privacy Toolkit.[64] The toolkit was completed in March 2017 and uses templates, use cases, flow charts, and checklists, among other tools, to help providers, including behavioral health providers, navigate the state and federal privacy laws.

D.3.7 How were workforce development and practice transformation strategies implemented in Minnesota?

KEY INSIGHTS

- Minnesota invested in helping practices develop care teams and test integration of CHWs, community paramedics, and dental therapists.
- Direct reimbursement from payers is generally insufficient to fully support these emerging professionals, making long-term sustainability post–SIM Initiative uncertain.

Minnesota provided grants to providers to support development and integration of care teams and to test three emerging professions: dental therapists, community paramedics, and CHWs. Some of these professions predated the SIM Initiative; CHWs were able to bill Medicaid since 2009 and licensing of dental therapists was authorized in the same year. The grants issued using SIM funds allowed a broad range of providers to test integration of these professions and establish their business case. The state also used the experience of the grantees to develop toolkits to help additional providers integrate these professions after grant funding is no longer available. The emerging professions grant program funded a total of 14 organizations for 12 months over a 3-year period from July 2014 to July 2016. Each grantee developed and implemented a plan to establish an emerging professional program and to document its approach to facilitate replication by other organizations. A second workforce initiative was practice

---

[64] Available at http://www.gpmlaw.com/Practices/Health-Law/Foundations-in-Privacy-Toolkit.

transformation, a grant initiative to support providers in areas such as training, clinical systems redesign, and implementation of new workflows.

Practice transformation grants helped practices developed care teams critical to HCH and BHH. Over a 3-year period, the state awarded 56 grants to practices to support them in areas such as performance-based payment systems, health IT, quality improvement, and community partnerships. The first round of four grants was open for providers to select from a broad range of activities. The second round was targeted to providers seeking to be certified as HCHs. Development of BHHs was the target for the third set of grants, and the fourth set of grants was targeted to providers seeking to further develop integrated care models. The state reported that in addition to providing providers with a broad array of support, the practice transformation grants were instrumental in moving forward the state's initiative to establish BHHs. In general, providers found these grants useful in improving their practice.

Community paramedics were designed to increase access to primary and preventive care, and stakeholders viewed them as cost-saving by decreasing the use of EDs—enhancing funding prospects from other sources. Community paramedics were based in a hospital setting, working under the direction of an ambulance medical director. They played a key role in providing follow-up services after a hospital discharge to prevent hospital readmission and provide chronic disease monitoring, medication management, health assessments, and minor medical procedures. Several stakeholders commented that because community paramedics were viewed as achieving cost savings, the sponsoring hospitals continued funding the program when the grant funds terminated. For example, a state official told us of an organization that their community paramedic was directly related to in efforts to reduce readmission rates.

CHWs served as a liaison or intermediary between health care, social services, and the community, but faced barriers to integration in health care settings. Their precise roles varied depending on the organizational auspice of their placement and could include improving access to health care, providing health education, improving quality of care for chronically ill people, and promoting healthy communities. The biggest challenge facing CHWs was defining their roles in a clear and attractive way to multiple organizations, which was compounded by the CHW role needing to be defined by the practice trying to integrate them, instead of having an established definition. Each provider needed to assess gaps in its delivery systems and define a role that could be played by CHWs. A state official noted that many practices simply did not understand how to use CHWs effectively and treated them as another care coordinator. A practice transformation grantee criticized the state for not going far enough to incorporate the professions, noting that role definition was determined by "the ones whose territory are getting invaded." Nonetheless, the supply of CHWs increased during the demonstration period, especially in safety net programs such as federally qualified health centers. Providers used

CHWs in a wide range of functions ranging from conducting community outreach to accompanying patients during physician visits, to linking patients with services.

Successful integration of new professions involved structured roles and a clear business case for added value. Dentists voiced a lot of concern over what the dental therapists would do and whether they would be qualified enough to do it. A state official described the opposition becoming hyperbolic, with dental interest groups saying things like “patients were going to die.” However, as the demonstration progressed, opposition from dentists began to wane as they observed dental therapists performing things like minor procedures, which allowed the dentists to focus on higher end services and generated increased revenues for the practice. As discussed above, community paramedics had clearly defined roles and were also able to demonstrate value to many of the hospitals that used them.

The sustainability of most of the emerging professions is questionable. To facilitate sustainability, the state developed a comprehensive toolkit for each emerging profession designed to guide the adoption of the profession by an interested organization. Although these toolkits address sustainability, without the ability of these professions to bill for services many stakeholders questioned how sustainable they can be. CHWs can bill Medicaid for services, but they must be certified, and the payment-eligible services are limited. Direct reimbursement for CHW services is not sufficient to sustain a full-time position. Additionally, providers stated that the certification process for CHWs can be costly. Similarly, community paramedics can bill for services but the population they serve is limited, so reimbursement for services alone cannot support these positions. State officials stated that although they were considering expanding billable services, they really wanted to look at ways to support these positions outside of the fee-for-service structure to ensure their sustainability. Dental therapists are an exception in that the revenue increases associated with them often render them self-funding positions.

D.3.8 What approach did Minnesota take to address population health in its SIM Initiative?

KEY INSIGHTS

- Minnesota is leveraging long-term investments in IHPs, data analytics, health IT, and ACHs to make improvements in population health.
- These investments in population health predate the SIM Initiative and will continue beyond the SIM Initiative. Still, this focus on data and health metrics is providing critical information to identify and focus on population health challenges.

Minnesota developed a *Plan for Improving Population Health,* which summarized both the state's relatively healthy population and its challenges:

- Chronic disease/infectious disease/behavioral risk factors
- Mental health
- Substance abuse
- Health disparities

Minnesota state officials and stakeholders were aware of population health goals, but did not consider improving population health to be a distinct aim of the SIM Initiative. The state viewed all SIM-funded activities, including the expansion and acceleration of IHPs (see ***Section D.3.1***), technical support for data analytics (see ***Section D.3.6***), health IT (see ***Section D.3.6***), and implementation of ACHs (see ***Section D.3.4***) as interventions that would naturally advance the health of the state. Through these activities, Minnesota intended, as of April 2017, to provide state Medicaid recipients with better coordinated care, leverage health IT and other innovations in support of health care providers, and experiment with community-driven initiatives that bring together health care and social services to improve health.

Minnesota successfully awarded 15 ACHs that were experimenting with models of care that addressed specific community needs through coordination of health care and social systems, with some describing positive impacts. In concept, ACHs support population health by creating clinical and community partnerships focused on specific community needs. The future of ACHs beyond the SIM period of performance will depend on their ability to demonstrate impacts. As part of its state self-evaluation, Minnesota is testing whether ACHs demonstrate improvements to health care quality, cost, and experience of care.

Minnesota's longstanding focus on data analytics and measurement supported ongoing population health improvement by providing the monitoring necessary to identify population health challenges. Minnesota leveraged initiatives including "Minnesota Community Measurement" to support disease registries and publicly report health care information. SIM investments in EHRs and other health IT offered health care providers tools to work toward improved population health. As one provider organization noted, SIM investments are helping them gain population health expertise: "….data through the IHP gives us something to work with……It's helping us develop the skills of data analysis and how that's driving patient care."

D.3.9 How will elements of the SIM Initiative in Minnesota be sustained?

KEY INSIGHTS

- The SIM Initiative in Minnesota deepened preexisting relationships and fostered the development of new relationships that would not have been possible without SIM Initiative structure and funding.
- Some of these relationships have the potential to last after SIM funding ends, particularly when associated with models that have a clear business case built on improved performance.

As of April 2017, Minnesota has worked with the task forces described in ***Section D.3.3***, grantees, and other advisory bodies to try and develop a sustainability plan for SIM-funded activities (i.e., activities different from Minnesota Medicaid's implementation of payment and delivery system models: IHPs and BHHs). However, core SIM initiatives—particularly ACHs—were purposefully small-scale and community driven. Long-term sustainability of these community-specific activities will depend more on the outcomes they can achieve and whether a business case can be made for continued funding by another community stakeholder than on state-level planning.

Legislation provided support for payment reforms and exchange of electronic health information. As described in detail Annual Report 3, because the state completed the legislation and state plan amendments it has the authority needed to continue supporting IHP and BHH payment reforms. The state is consciously using contracts with IHPs to require some level of health information exchange and incentivize integration of the priority settings. Details on these facets of IHP 2.0 are in ***Section D.3.1***. There is an ongoing health information exchange study that was authorized by the legislature, and lessons learned from the SIM Initiative will directly inform the findings. This study, and the governor's task force on health care financing that it derives from, are discussed in detail in ***Section D.3.6.***

Minnesota developed a wide array of tools and resources it hopes will facilitate provider adoption of the SIM Initiative models. Minnesota will continue to maintain an active website to facilitate dissemination of key resources: the eHealth Roadmap, Foundations in Privacy Toolkit, and the three Emerging Professions toolkits. Additionally, the Storytelling project produced a number of videos that will remain available as examples to providers wanting to engage in some of the work tested under the SIM Initiative. The toolkits have been received positively by all stakeholders, with a Multipayer Alignment Task Force member noting, "I think the soil was made fertile by the training and tools out there." However the value of resources such as the Storytelling projects and Learning Collaborative were less clear, with an IHP stating that learning days were "really valuable in understanding what's out there…barriers…and what we might able to do about it," but she was "not sure it solved any huge problems." A state official echoed concerns about sharing information effectively, stating “I worry that we haven’t done enough about understanding what we’ve learned and sharing that effectively.”

Whether SIM funding was sufficient for models to build a business case for future partnerships is unclear. As discussed in ***Section D.3.7***, dental therapists are an example of an initiative proving its value. Initially, the greatest adoption of dental therapists was in safety net practices, but the state reported that private practices are increasingly employing them. A social service agency that received a number of SIM grants indicted that it was able to build a business case it feels can convince new medical partners of the advantage to partnering with it, thus generating new business that can further perpetuate the work it has done through the SIM Initiative. With respect to ACHs, a state official expressed her hope that even if an immediate benefit is not apparent the relationships have been positive enough that a benefit is foreseeable, “whether in dollars or in improved partnerships.” Some stakeholders felt more positively about ACHs, stating that “SIM money pushed it along and now the cost benefit is clear and it will continue.” A payer offered a less optimistic anecdote of an ACH that ran out of grant money and reached out to the payer to help sustain the partnership. The payer declined, feeling such support was not in its purview, particularly having not been involved in the development of the relationship it was now being asked to fund.

Stakeholders agreed that the SIM Initiative fostered and developed relationships across providers. Interviewees universally spoke of developing relationships they previously did not know how to develop and pursuing relationships with “intentionality.” With many grants specifically requiring collaboration with a priority setting, providers had leadership in these areas and a structure on which to build these relationships. A provider noted that even going through the application process fostered a relationship with her co-applicant, and she felt that “if I want to know what some community organization is doing, I know who to call.” Another provider noted that the main benefit of her ACH is the good partnerships. Many stakeholders reflected that the SIM Initiative changes the conversation and the way the providers think about health. As one state official describes it:

> *I would have never guessed at the beginning of SIM that it would be something we say we did, but the narrative has changed in Minnesota about “What is health?” There has been a big shift in the awareness of social determinants, the kinds of relationships that need to be in place; it’s not fully due to SIM—those conversations were happening in many other places—but SIM provided a venue and some funding opportunities to accelerate those conversations, and to put them into practice…*—State official

The future direction of the SIM Initiative lies in the hands of the stakeholders engaging with and implementing the activities. As one IHP interviewee put it, “the thing about the SIM grant is, it gets you started, but then question is, how do you sustain it?” The state intentionally wanted the providers to develop the partnerships and models that best suited their needs and the needs of their communities. Further, as noted by an IHP interviewee, awards were not siloed to the big systems or cities. The diffuse nature of these innovations makes it challenging for the state to play a central role in sustaining the relationships or the interventions. The onus of sustaining the SIM relationships and the SIM innovations rests with the providers and communities that developed them.

D.4 Did Integrated Health Partnerships Have an Impact on Key Outcomes After 1 Year of Test Period in Minnesota?

Minnesota used its SIM funding to test several broadly disseminated interventions. The lack of focus on any one specific population or reform led most stakeholders to believe that the impact of the interventions will not be measurable by specific outcomes in the short term (particularly those that were inextricably linked with relationship building, such as the Accountable Communities for Health and the eHealth grants). However, a substantial amount of SIM funding was focused on Integrated Health Partnerships (IHPs) to enhance their ability to use data and coordinate care, and IHPs have financial incentives (shared savings/losses) tied to quality metrics (see ***Section 3.1***). Within the final time period of this evaluation, we can ultimately expect that outcomes related to beneficiaries attributed to IHPs would reflect improvements in quality and utilization that outpace those of their peers who are patients of non-IHP providers.

To estimate the impact of the IHP demonstration in Minnesota, we conducted difference-in-differences (D-in-D) regression analyses using Medicaid enrollment and claims data. We present results of descriptive trends and D-in-D analyses for outcomes for two evaluation domains: care coordination and service utilization.

The analyses presented here represent only an early starting point in the evaluation timeline. Outcomes analyzed here date through 2014, the first year of the SIM Initiative test period. At that time six IHPs were in their second year (having transitioned to IHPs from an earlier pre-SIM Health Care Delivery Systems Demonstration), and three additional IHPs were only in their first year of implementation. Health care home (HCH) and health information exchange (HIE) initiatives also predated the SIM Initiative, although the grants to providers that the state awarded using SIM Initiative funds accelerated participation in these kinds of activities beginning in 2014. However, because as of 2014 none of the SIM-specific activities had reached implementation phase, we cannot attribute modifying effect of the SIM funding reflected in the results presented below. To the extent we see results below, they may be **attributable only to preexisting and similar models' efforts that were the basis for the SIM Initiative and not to the SIM-funded activities themselves.** Note that we did not have access to reliable data with which to do expenditure measures for this report, so only measures of care coordination, utilization, and quality of care are presented here.

KEY INSIGHTS

- For the Minnesota Medicaid beneficiaries attributed to an IHP in 2014, relative to a comparison group, we found the following statistically significant changes after 1 year:
  - The rate of any follow-up visit within 14 days of inpatient discharge increased
  - The inpatient admission rate decreased, but 1.7 percentage points *less* for the IHP-attributed beneficiaries than the comparison group
  - The rate of breast cancer screening increased
- The following results did not improve after 1 year:
  - 30-day readmissions
  - Emergency department visits
- Provider reports of increasing prevalence of near real-time discharge notifications during this time period corroborate these findings.
- The types of measures that improved (process of care measures) are consistent with expectations for the first year. Process measures are easy to implement relative to utilization measures, which require IHPs to develop relationships (1) with patients to drive them to more appropriate care settings and (2) with hospitals to facilitate more aligned incentives. However, to the extent we see results they may be attributable only to preexisting and similar models' efforts that were the basis for the SIM Initiative and not to the SIM-funded activities themselves.
- Medicaid expenditure data were not available for this report.

A challenge in interpreting any findings is, as discussed in ***Section D.3.1***, that some Medicaid payers have additional shared savings initiatives separate from IHPs. In this period of high health care reform activity, it is also possible that non-IHP providers are subject to incentives similar to (or even the same as) IHPs. In addition, we are not able to measure changes in costs because the Minnesota Medicaid managed care encounters do not include payment information. Based on these limitations, the research question we are addressing with our analysis is:

- Do Minnesota Medicaid beneficiaries receiving care in IHPs exhibit greater improvement in quality of care and health service use compared to Minnesota Medicaid beneficiaries never enrolled in IHPs?

To address the research question, we used a D-in-D quasi-experimental design, incorporating a comparison group to control for underlying changes in the health care environment in Minnesota. To derive outcomes for Medicaid beneficiaries in our analytic sample, we used Medicaid claims data provided by the Minnesota Department of Human Services (DHS). In this report, we used data from 2011 to 2014 to examine the 3 years before (2011–2013) and 1 year after (2014) the start of the SIM Initiative. The comparison group comprises beneficiaries who were eligible for attribution but not attributed to an IHP provider.

Following comparison group selection, we constructed annual person-level propensity score weights to balance the IHP group and comparison group on individual and county characteristics. The intervention group and weighted comparison group were similar at baseline on key demographic characteristics (***Table D-7***). The methods that were applied toward our analysis are summarized in the box below, and full methods are detailed in ***Sub-appendix D-2.***

Methods Snapshot for Interim Impact Analysis

- **Study design:** Difference-in-differences quasi-experimental design, incorporating a comparison group to control for underlying changes in the health care environment in Minnesota.
- **Population**: The intervention group consisted of beneficiaries attributed to an IHP. The comparison group consisted of beneficiaries who were not attributed to an IHP but were otherwise eligible.
- **Data**: Medicaid claims data provided by the Minnesota Department of Human Services, with dates of services from 2011 through 2014.
- **Sample**: The analytic sample included individuals of all ages and excluded Medicare-Medicaid enrollees, beneficiaries who had not received any health care home or primary care services between 2011 and 2014, and beneficiaries who did meet the enrollment criteria to be eligible for IHP attribution.[65]
- **Measures:** Care coordination (annual percent), quality of care (annual percent), utilization (quarterly rate). We did not have access to sufficient data to calculate expenditure measures in this report.
- **Statistical analysis:** Weighted logistic regression models weighted by the propensity score times the fraction of time the person was enrolled in Medicaid. Standard errors were clustered at the beneficiary level to account for multiple observations per person. We ran separate models for children, adults, and overall population for all outcomes except for breast cancer screening. The models adjusted for person-level variables (age, gender, Chronic Illness and Disability Payment System risk score, eligibility category, length of enrollment, IHP enrollment prior to 2014, and socioeconomic county-level variables (urban/rural, percentage in poverty, percentage that were minority, and supply of primary care providers).

---

[65] Refer to the Model Summary for additional information on the IHP attribution algorithm: http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_FILE&RevisionSelectionMethod=LatestReleased&Rendition=Primary&allowInterrupt=1&noSaveAs=1&dDocName=dhs16_177106

Table D-7. Weighted baseline characteristics and standardized differences, IHP and comparison groups, 2013

	Children				Adults				Overall			
	IHP group	Comparison group	Standardized difference[a]	p-value	IHP group	Comparison group	Standardized difference[a]	p-value	IHP group	Comparison group	Standardized difference[a]	p-value
N	91,286	90,066			72,092	71,395			163,378	161,312		
Sociodemographic characteristics												
Age	6.9	6.9	0.1	0.85	36.8	36.9	0.5	0.25	20.1	20.2	0.7	0.02
CDPS Risk Score	1.3	1.3	1.1	0.04	1.4	1.4	0.4	0.38	1.4	1.4	0.5	0.2
Female, %	49.5	49.6	0.1	0.84	64.4	64.2	0.4	0.36	56.1	56.2	0.1	0.66
12 months of Medicaid eligibility, %	71.4	71.1	0.6	0.19	64.1	64.1	0.1	0.87	68.2	67.9	0.5	0.12
9+ months of Medicaid eligibility in the prior year, %	60.0	59.8	0.4	0.33	56.8	56.9	0.2	0.66	58.6	58.5	0.3	0.41
Children eligible under medical assistance (age < 18), %	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53.3	53.2	0.2	0.48
Disabled adult (age 18), %	N/A	N/A	N/A	N/A	14.1	15.2	3.0	<0.001	6.2	6.7	2.1	<0.001
Disabled child (age < 18), %	5.1	4.9	0.9	0.33	N/A	N/A	N/A	N/A	2.9	2.7	1.1	<0.001
Received care coordination services[b], %	2.9	2.7	1.5	0.04	2.4	2.3	0.5	0.3	2.7	2.4	1.8	<0.001
County-level characteristics												
Poverty rate, %	12.4	12.3	3.4	<0.001	12.6	12.5	2.2	<0.001	12.5	12.4	2.8	<0.001
Non-white, %	15.6	15.9	3.2	<0.001	14.6	14.8	2.1	<0.001	15.2	15.4	2.5	<0.001
Primary care providers per 1,000 population	0.1	0.1	0.1	0.86	0.1	0.1	0.7	0.12	0.1	0.1	0.4	0.18
Residing in an urban county, %	75.6	75.0	1.5	<0.001	73.3	72.8	1.1	0.02	74.6	73.9	1.6	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnership; N/A = not applicable.

[a] Absolute standardized differences are expressed as percentages. A standardized difference of less than 10% is the conventional threshold for covariate balance with large sample sizes. Means are weighted by the propensity score.

[b] CPT codes S0280 or S0281.

D.4.1 Did care coordination change among IHP Medicaid beneficiaries?

KEY INSIGHTS

- Overall, the rate of **any follow-up visit within 14 days of inpatient discharge increased statistically significantly more for IHP beneficiaries** relative to the comparison group. This finding corroborates reports from providers that the prevalence of near real-time discharge notifications increased during this period. Additionally, the findings could reflect increasing care management activities in IHPs.

We present the results of the D-in-D logistic regression analyses for the annual percentage of hospital discharges with a follow-up visit within 14 days after discharge in ***Table D-8***. We report the D-in-D estimate **for the first year during which SIM funding began enhancing IHP implementation (2014)**, including separate estimates for children and adults.

- Overall, the **rate of any follow-up visit within 14 days of inpatient discharge increased statistically significantly more** for IHP beneficiaries relative to the comparison group.
- **This trend was driven by the 14-day follow-up rates for adults;** there were no changes in the follow-up rates among children. Overall, the follow-up rate for the IHP during the baseline period was 52 percent. During the demonstration period, that rate increased to 55 percent. In contrast, the overall comparison group rates remained even throughout these periods.
- The baseline rates of 14-day follow-up for children was higher than that of adults, suggesting that there was more room for improvement in the adult populations. Further, coexisting initiatives that focus on adults, such as the Shared Savings Program, may cause providers to focus more on the adult population.
- This finding could be tied to improved care management and increasing real-time discharge notifications in IHPs.

Table D-8. Difference in the pre-post change in care coordination for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome (per 100 beneficiaries)	Pre-Period Adjusted Mean, IHP	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, IHP	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	N
Annual rates of 14-day follow-up post inpatient discharge								
Adults	43.69	45.00	47.41	46.58	2.16 (1.07, 3.25) (1.31, 3.01)	4.9	0.001	69,691
Children	67.55	71.75	67.78	70.33	2.02 (−0.19, 4.23) (0.30, 3.74)	3.0	0.132	37,675
Overall	52.00	54.55	54.52	54.58	2.56 (1.60, 3.53) (1.81, 3.32)	4.9	0.000	106,952

CG = comparison group; IHP = Integrated Health Partnership.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payments in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payments in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of annual rates of 14-day follow-up post inpatient discharge. The probability estimates are multiplied by 100 to obtain an approximate rate per 100 beneficiaries/discharges. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-D are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total number of weighted person-years for the 14-day follow-up models are 106,952 (overall), 69,691 (adults), and 37,675 (children).

Data source: RTI analysis of Minnesota Medicaid claims (2011–2014).

D.4.2 Did service utilization change among IHP Medicaid beneficiaries?

KEY INSIGHTS

- The **inpatient admission rate decreased statistically significantly less** for the IHP-attributed beneficiaries relative to the comparison group, which was not the expectation. Because IHPs are incentivized to reduce costs, we expect their admissions rates to decrease more than in the comparison group.
- The **change in 30-day readmissions did not differ between the IHP group and the comparison group.** IHPs are expected to develop relationships with patients to drive them to more appropriate care settings and to have more aligned incentives with hospitals. Building these relationships with respect to both patients and providers will likely take more than 1 year.
- The **change in outpatient emergency department (ED) visits did not differ between the IHP group and comparison group**. Given the time it takes to change consumer behavior and impact utilization rates, we would not expect to see any differences between the IHP group and comparison group in the first year of SIM funding.

We present the results of the D-in-D regression analyses for the quarterly measures of inpatient admissions, outpatient ED visits, and 30-day readmissions in ***Table D-9***. We report the overall D-in-D estimate for **the first year during which SIM funding began enhancing IHP implementation (2014)**, and we provide separate estimates for children and adults.

- Overall, the **quarterly inpatient admission rate** decreased from the baseline period to the first year of SIM funding in both the IHP-attributed beneficiaries and the comparison group. However, **the rate of inpatient admissions decreased statistically significantly less for IHP-attributed beneficiaries** relative to the comparison group, which was not expected. As a result, IHP-attributed beneficiaries had 1.75 more admissions per 1,000 beneficiaries in the implementation period relative to the comparison group ($p < 0.001$).
- Because IHPs are incentivized to reduce costs, we expect their admissions rates to decrease more than in the comparison group, which is not what we observed. This is likely because it was too early in the test period for these incentives to change behavior.
- The decrease in the inpatient admission rate was largely **driven by the pediatric population**.
- From the baseline period to the first year of implementation, the inpatient admission rate stayed the same for adult IHP-attributed beneficiaries but declined for the comparison group beneficiaries. As such, adult IHP-attributed beneficiaries had 3.33 more admissions per 1,000 beneficiaries in the implementation period relative to the comparison group ($p < 0.001$).

Table D-9. Difference in the pre-post change in utilization for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome (per 1,000 beneficiaries)	Pre-Period Adjusted Mean, IHP	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, IHP	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	N
All-cause acute inpatient admissions									
Adults	49.99	47.72	50.24	44.75	3.33	(2.49, 4.17) (2.67, 3.99)	6.7	0.000	1,838,980
Children	23.74	23.02	15.52	13.73	0.94	(0.55, 1.33) (0.63, 1.24)	3.9	0.000	2,340,276
Overall	34.73	34.03	29.73	27.32	1.75	(1.32, 2.17) (1.41, 2.08)	5.0	0.000	4,176,682
Emergency department visits that did not lead to hospitalization									
Adults	184.68	165.05	183.58	163.48	0.59	(−0.9, 2.08) (−0.57, 1.75)	0.3	0.516	1,838,980
Children	133.82	123.17	134.48	124.95	−1.30	(−2.61, 0.01) (−2.32, −0.28)	−1.0	0.103	2,340,276
Overall	156.34	142.43	153.40	139.96	−0.30	(−1.27, 0.68) (−1.06, 0.47)	−0.2	0.618	4,176,682
30-day hospital readmissions per 1,000 discharges									
Adults	117.81	112.80	111.80	107.37	−0.37	(−6.22, 5.49) (−4.93, 4.20)	−0.3	0.918	88,537
Children	59.57	62.67	54.85	60.78	−3.44	(−14.05, 7.17) (−11.71, 4.83)	−5.8	0.594	47,917
Overall	95.63	93.14	93.93	92.02	−0.65	(−5.82, 4.52) (−4.68, 3.38)	−0.7	0.837	135,771

CG = comparison group; IHP = Integrated Health Partnership.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payments in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payments in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain quarterly estimates of the differences in probability of any utilization. Yearly estimates are a weighted average of the four quarterly estimates for the given year. The probability estimates are multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries/discharges. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-D are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total weighted Ns (quarterly person-years) for the inpatient admission rate and the emergency department visit rate models are 4,176,682 (overall), 1,838,980 (adults), and 2,340,276 (children). The total number of weighted quarterly admissions for the readmission rate models are 135,771 (overall), 88,537 (adults), and 47,917 (children).

Data source: RTI analysis of Minnesota Medicaid claims (2011–2014).

- Because it is early in the intervention, admission rates may reflect outreach being done to the sickest patients, thus engaging them in the system in new ways, such as those described in ***Section D.3.2***. It is not clear why children in the intervention group seem to have better admission rates than the adults in the intervention group.
- The change in **the rate of outpatient ED visits and 30-day readmissions did not differ** between IHP-attributed beneficiaries and the comparison group.
- Utilization measures typically reflect a change in consumer behavior facilitated by changes in the delivery system (for example, consumers learning that a newly implemented 24-hour access line at their primary care clinic can help them avoid a visit to the ED). Because such behavior change takes longer to manifest than a prescription of a specific intervention, such as a mammogram, we would expect any significant differences with respect to utilization to take longer than 1 or 2 years of implementation to manifest.

D.4.3 Did quality of care change among IHP Medicaid beneficiaries?

KEY INSIGHTS

- **Breast cancer screening increased by 1.73 percentage points (or 4.7 percent) more** for IHP beneficiaries relative to the comparison group. This is likely because process of care measures are relatively easy to implement and can therefore be expected to show improvements in the short term.

We present the results of the D-in-D logistic regression analyses for the percentage of women with annual mammograms in ***Table D-10***. We report the D-in-D estimate **for the first year during which SIM funding began enhancing IHP implementation (2014)**.

- During the baseline period, approximately 37 percent of eligible women aged 41–69 years received an annual breast cancer screening; during the demonstration period, that average estimate remained unchanged. In contrast, the estimates for the comparison group averages during these two time points, before and during the demonstration, show a slight decrease. As a result, the rate of annual mammogram screening appears to have increased by 1.73 more percentage points (or 4.7 percent) for IHP-attributed beneficiaries relative to the comparison group ($p < 0.001$).
- Note that the overall rates of breast cancer screenings are higher in the comparison group, but are increasing faster in IHPs, suggesting that IHPs are closing a gap.
- Process of care measures, such as cancer screenings, are relatively easy to implement, so short-term improvements can be expected. Although this measure is not assessed specifically as part of the IHP model, a breast cancer screening measure is part of the Medicare Shared Savings Program and Pioneer accountable care organization (ACO) model. Providers may therefore have more of an incentive to focus on this measure.

Table D-10. Difference in the pre-post change in quality of care for Medicaid beneficiaries attributed to IHP providers in Minnesota and the comparison group, first year of SIM implementation (January 2014 through December 2014)

Outcome	Pre-Period Adjusted Mean, IHP	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, IHP	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value
Annual breast cancer screening (%), Women age 41–69	36.56	39.28	37.15	38.13	1.73 (0.85, 2.61) (1.05, 2.42)	4.7	0.001

CG = comparison group; IHP = Integrated Health Partnership.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of annual breast cancer screening. The regression-adjusted D-in-D are calculated as the average treatment effect *on the treated*, whereas the D-in-D derived from the adjusted means represents the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The total number of weighted person-years for the breast cancer screening model is 92,269.

Data source: RTI analysis of Minnesota Medicaid claims (2011–2014).

D.4.4 Discussion and limitations

The SIM Initiative in Minnesota was a statewide effort to transform health care from a medical delivery–based system to one that focuses on accountable care that cross-cuts all determinants of health. Such broad-ranging investments that are predicated on testing a variety of innovations in a variety of settings can be challenging to measure. Many of the stakeholders we spoke with echoed the challenges with respect to measuring the impact of the SIM Initiative. A task force member described a "breadth of community activity" that is "not going to be noticeable right away, it's certainly not going to show up on triple aim indicators [better health, better health care, lower cost]." A virtual IHP echoed this sentiment, stating "It just feels like we're doing a lot of good things, I mean, that we're doing a lot of things differently than we were 8 or 10 years ago that I think are benefitting patients, and hopefully having an impact in cost of the system over time. It's just so hard to measure."

However, clear investment in accelerating IHPs, HIEs, and behavioral health integration can be expected to yield some improvements in near-term outcomes, like breast cancer screenings and 14-day follow-up after discharge, where we saw small but significant positive differences relative to the comparison group. But longer-term outcomes like cost and utilization will likely take multiple years to manifest. This is reflected in the lack of a significant difference between the intervention and comparison groups with respect to ED visits that did not lead to an admission and 30-day readmission rates. Although the change in inpatient admissions were significant in an unexpected direction, this underscores the challenges in developing the relationships needed to show improvements on some of these metrics. Convincing patients to use care differently, and hospitals to align with the shared goals of value-based payment models, are precursors to seeing improvements in metrics like admission rates. As discussed in ***Section D.3.1*** and ***Section D.3.2*** both patients and providers can be resistant to these changes. The analyses presented here include only a single year of implementation, which likely does not reflect the impact we would otherwise see with additional data. Future analysis will look at additional years of post-implementation data and additional populations to help determine whether there are any discernable quantitative findings related to the SIM Initiative in Minnesota.

When looking at results, it is important to remember that IHP providers do not represent that universe of providers who were incentivized to reform how they deliver care as part of the SIM Initiative, nor was the SIM Initiative the only initiative incentivizing providers in the state. The broad-ranging nature of the SIM Initiative may reduce the measurable effect of IHPs because SIM funds were facilitating related delivery systems reforms across the state and not just within IHPs. These broad-reaching activities mean that our comparison group may have experienced non-IHP SIM initiatives such as Health Care Homes, or non-SIM initiatives such as MCO-led or Medicare ACO models. As such, our modeling would estimate effects more conservatively toward the null, and the true effects may be larger than measurable from available data.

D.5 References

Center for Health Care Strategies. (2015). *Data Analytics Subgroup Phase One Report*. Available at http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_FILE&RevisionSelectionMethod=LatestReleased&Rendition=Primary&allowInterrupt=1&noSaveAs=1&dDocName=dhs16_196127

Center for Health Care Strategies. (2016). *Data Analytics Subgroup Phase Two Report*. Available at http://www.dhs.state.mn.us/main/groups/sim/documents/pub/dhs-289330.pdf

Gavin, N., et al. (2016, February). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Two Annual Report.* Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-round1-secondannualrpt.pdf

MDH Webinar slides. *Connecting to Statewide Health Information Exchange (HIE) in Minnesota*. January 31, 2017.

Minnesota Accountable Health Model Webpage (2016). *Health Reform Minnesota. State of Minnesota*. Available at www.health.state.mn.us/healthreform

Minnesota Department of Health. (2017). *Community Health Worker (CHW)*. Available at http://www.health.state.mn.us/divs/orhpc/workforce/emerging/chw/

Minnesota Department of Health and Minnesota Department of Human Services (2015). *Health Care Homes: Annual Report on Implementation*. Available at https://mn.gov/dhs/assets/Health_Care_homes_implementation_tcm1053-165606.pdf

Minnesota Department of Human Services Webpage (2017). *Behavioral Health Home Services. State of Minnesota.* Available at http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&RevisionSelectionMethod=LatestReleased&dDocName=DHS-290481

RTI International. (2017, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Three Annual Report.* Prepared for the Centers for Medicare & Medicaid. Available at https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

[this page intentionally left blank]

Sub-appendix D-1. Methods for Qualitative Data Collection and Analysis

The Minnesota SIM Initiative Round 1 Evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. These sources include information obtained from in-person site visits during which we conducted interviews with key informants and gathered data in provider and consumer focus groups; from a review of relevant documents; and from regular evaluation calls with the state officials leading the state's SIM Initiative.

D-1.1 Site visit key informant interviews

The RTI/NASHP evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Minnesota, usually in person but sometimes by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology (health IT) and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included the state's SIM Initiative teams, Medicaid payers, providers and provider associations, consumer representatives, and relevant state contractors. We solicited suggestions of interview candidates from state officials leading the state's SIM Initiative and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with state SIM Initiative teams or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participants. All interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and were tailored for each state. The interviews were interactive; participants were encouraged to share feedback most relevant to their particular roles in the Minnesota SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Minnesota evaluation team conducted 22 total interviews in April 2017. ***Table D-1-1*** provides a distribution of the completed interviews by interviewee type.

Table D-1-1. Key informant interviews conducted in Minnesota, April 2017

	Number of interviews
State officials	8
Payers and purchasers	3
Providers and provider associations	9
Consumer advocacy groups	1
Other	1
Total	22

D-1.2 Focus groups

Evaluation team members conducted four consumer and four provider focus group discussions in Minnesota on April 18–19, 2017. These focus groups were the third and final round of focus groups conducted for the SIM Initiative Round 1 evaluation.

Table D-1-2 provides an overview of the 2017 focus groups. The consumer groups comprised Medicaid beneficiaries, including parents, adult beneficiaries, and Medicare-Medicaid beneficiaries. The provider groups comprised both primary care providers and a variety of specialists.

Table D-1-2. Overview of focus group participants

Group	Location	No. of participants	Type of participants
1	Duluth	7	Mostly Medicaid beneficiaries
2	Duluth	4	Medicare and Medicaid beneficiaries
3	Duluth	8	Providers, mix of RNs and MDs
4	Duluth	6	Providers, all RNs and NPs
5	Minneapolis	7	Mostly Medicaid beneficiaries
6	Minneapolis	10	Medicare and Medicaid beneficiaries
7	Minneapolis	6	Providers, mostly MDs
8	Minneapolis	7	Providers, mostly MDs
Total	—	55	—

MD = medical doctor; NP = nurse practitioner; RN = registered nurse.

Recruitment. The evaluation team received a list of potential consumers from Minnesota's Department of Human Services and an indicator for which providers were in an Integrated Health Partnership (IHP). This information was shared with the Henne Group via a secure FTP site. The Henne Group was then responsible for contacting consumers and providers via phone to determine their eligibility for participation. If participants were eligible and interested, The Henne Group scheduled them for a focus group. We sought to recruit nine participants and two alternates for each group. We were unable to recruit only IHP providers for our provider focus groups, so our groups ultimately included a mix of IHP and non-IHP providers. Similarly, the consumer groups do not represent IHP-attributed beneficiaries only. However, we do not believe, nor has there been evidence from providers, that providers treat their patients differently dependent on payer; therefore, the perceptions of care by consumers should be broadly applicable.

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion, how the information from the discussion would be used, and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

D-1.3 Document review

The evaluation team used Minnesota's quarterly and annual reports, operational plans, state-evaluation reports, and other state documents to obtain updated information on its implementation progress during the current analytic period of April 2016–April 2017. To supplement these documents, we collected relevant news articles on the Minnesota SIM Initiative activities and related initiatives, and we searched reform-oriented websites that the state maintains.

In addition, we obtained numbers of providers and payers participating in and populations served by the different innovation models from reports Minnesota submits to the Innovation Center in conjunction with its quarterly reports. We provide Minnesota's reported figures in both ***Chapter 2*** and ***Appendix D***.

The total count of participating providers in IHPs sums state-reported numbers of participating primary care physicians and specialists (CMS, 2017). The count of participating providers in HCHs is a state-reported number (CMS, 2017). The number of providers in HCHs represents all certified providers—which includes physicians, nurse practitioners, and physician assistants.

Counts of population reached, used as the numerators for percentages, are state-reported numbers (CMS, 2017). Denominators used to compute the percentage of the population reached are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017). For all payer counts, the denominator includes other publicly insured and uninsured individuals, and Medicaid, Medicare, and privately insured individuals.

Percentages of state population by insurance type are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

D-1.4 State evaluation calls

The RTI//NASHP evaluation team for Minnesota, the state officials leading Minnesota's SIM team, and the state's Innovation Center project officer typically attended each state evaluation call. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest for the evaluation. The Minnesota evaluation team held eight calls with Minnesota between April 2016 and April 2017, the analytic period of this report.

For each meeting used to collect additional information and perspective from state officials leading the SIM Initiative in Minnesota, the evaluation team prepared a list of state-specific questions—including the status of related policy levers and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to the state ahead of the call and asked the state to have knowledgeable state officials available to answer the questions during the call.

D-1.5 Analysis

The RTI/NASHP evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visit key informant interviews, site visit focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

D-1.6 References

Centers for Medicare & Medicaid Services. (2017). *Minnesota State Innovation Model Progress Report, Quarter 1 2017*. Supplied by CMS.

Kaiser Family Foundation. (2017). *Health insurance coverage of the total population*. Available at http://kff.org/other/state-indicator/total-population/

[this page intentionally left blank]

Sub-appendix D-2. Methods and Measures for Interim Impact Analysis

Overview. To estimate the impact of the Integrated Health Partnerships (IHPs) in Minnesota, we conducted difference-in-differences (D-in-D) regression analyses comparing beneficiaries attributed to an IHP to those not attributed to an IHP that were otherwise eligible. The Minnesota Department of Human Services (DHS) provided Medicaid data that indicated which beneficiaries were attributed to an IHP during 2013 and 2014. Note that IHPs were implemented in 2013, but we considered 2013 part of the pre-period to better align the formal start of the SIM Initiative, which began in October 2013.[66] This may result in conservative impact estimates. We present results of descriptive trends and D-in-D analyses for outcomes for two evaluation domains: care coordination and service utilization. We did not have access to reliable expenditure data for this report. This appendix details the methods we used for this analysis.

IHP in the context of Minnesota Medicaid. In Minnesota, approximately 14 percent of the population has their health insurance through Medicaid. Minnesota has a longstanding Medicaid managed care program. In 2014, just over 70 percent of Minnesotans covered by Medicaid were enrolled in a Medicaid managed care organization.[67]

The delivery system and payment model in Minnesota that is the focus of this analysis, Medicaid accountable care organizations (ACOs) known as IHPs, was created through 2010 legislation. IHP implementation introduced the opportunity for groups of providers to share one- or two-sided risk with the Medicaid program, regardless of their contracts with Minnesota's Medicaid MCOs; thus, Medicaid managed care enrollment does not determine nor exclude eligibility for IHP attribution.[68] By 2017, when the state had 21 IHPs engaged in the program, 59 percent of the total Minnesota Medicaid population—almost all who are eligible—were receiving care from more than 10,000 IHP providers; to achieve this level of participation, DHS has contracted with more IHPs each year, and more providers have joined IHPs each year.

Between 22 and 33 percent of the Medicaid population is *not* eligible to be attributed to an IHP. As stated in the state's Payment Model Overview,[69] Minnesotans not eligible for IHP attribution (and therefore excluded from both intervention and comparison groups) include those with:

---

[66] IHPs were referred to as Health Care Delivery Systems demonstration in this legislation. Implementation of this model was in January 2013, while SIM funds were awarded to the state in February 2013.

[67] Source: 2014 Medicaid Managed Care Enrollment Report, Centers for Medicare & Medicaid Services, U.S. Department of Health and Human Services, Spring 2016. Summarized and available at https://www.kff.org/medicaid/state-indicator/total-medicaid-mc-enrollment

[68] For additional details on how IHPs work in this managed care environment, refer to ***Section D.3.1.***

[69] https://mn.gov/dhs/assets/2017-ihp-rfp-appendix-d_tcm1053-294444.pdf

- No health care home or evaluation and management claims (3 to 5 percent)
- Medicare eligibility, or enrollment in partial benefit plans such as the Family Planning Program or Emergency Medical Assistance Program (12 to 18 percent)
- Limited enrollment duration, including fewer than 6 months of continuous enrollment or fewer than 9 months of noncontinuous enrollment (7 to 10 percent).

Of IHP-eligible Minnesotans, 85 percent are enrolled with a Medicaid managed care plan, a slightly higher percentage than the 70 percent of the overall Medicaid population enrolled in managed care.

Prior to 2014 Minnesota provided Medicaid coverage to childless adults up to 75 percent of the federal poverty line (FPL). In 2014, as with many other states, Minnesota expanded its Medicaid coverage to childless nondisabled adults whose household income does not exceed 138 percent of the FPL. We cannot identify which beneficiaries in our data are newly eligible as a result of this expansion, but have no reason to believe the expansion affects the intervention and comparison groups differently. Because expansion of coverage to a new set of adults in the 75–138 percent FPL range coincided with the beginning of the post period, it is possible that changes in outcomes in the post period when compared to the baseline may have been the result of a new type of beneficiary in the sample, and possibly bias outcomes to show greater use of primary care because of pent-up demand of this new population. However, of childless adults covered by Medicaid overall, fewer than 40 percent fall into the 75–138 percent FPL range,[70] and potentially even fewer will meet the basic eligibility requirements to be enrolled in an IHP (e.g., 6 months of continuous enrollment or 9 months of noncontinuous enrollment) and therefore eligible for our sample in either the IHP or comparison groups. Additionally, adults newly eligible in 2014 would still need 6 months of continuous or 9 months of noncontinuous enrollment to be attributed to the intervention or comparison group—restricting the proportion of the sample affected by the change in eligibility policy in 2014 to an even smaller group (i.e., those who enrolled in the first 6 months of 2014). We have not restricted our study sample related to this policy change because our model design already uses an unbalanced panel, which allows for a given beneficiary's first year of eligibility to be in the post period. More information on study design is presented later in this section, and more information on sample construction is available in ***Section D-2.3***.

Profile of IHP participating providers. IHPs are a diverse group, with some representing large integrated delivery systems (known as "integrated IHPs") while others are smaller provider-led organizations (known as "virtual IHPs"). Implementation of the first six IHPs, whose contracts with Medicaid started on January 1, 2013, occurred prior to the SIM

---

[70] Estimates based on issue brief available here: http://www.mnbudgetproject.org/research-analysis/economic-security/health-care/covering-more-minnesotans-through-medicaid-would-improve-health-outcomes-and-reduce-state-costs

Initiative implementation period beginning October 1, 2013. These first six IHPs included four that were integrated health systems (with or without a managed care partner); one focused on pediatric care (Children's Hospitals and Clinics of Minnesota) and one network of urban federally qualified health centers. Three more IHPs received contracts starting January 1, 2014: the Mayo Clinic, Southern Prairie Community Care (providers in rural counties), and Hennepin Health, which is a county-based provider that had been operating as an ACO under a Medicaid waiver for 2 years prior to being recognized as an IHP. We anticipate including 2015 IHPs in the final annual report analyses.

Minnesota leveraged its SIM activities to get broad participation in IHPs over time, which increased the diversity of providers involved in IHPs as more joined the program annually since 2013. DHS designed the IHP requirements to offer flexibility in how providers participated, with the intent of reducing barriers to entry in the program.[71] Some IHPs represent providers treating specific populations, such as people with disabilities or children. IHPs are present throughout the state, in both urban and rural areas. We have limited information to compare providers who participated in an IHP by 2014 and those who had not. The intent of our analysis is to determine whether, as of 2014, those providers in an IHP are yielding better outcomes for IHP-eligible Medicaid beneficiaries than those providers who are not in IHPs. As noted earlier, IHPs represent a diverse group of providers, with that diversity expected to increase in future years. Although we do not have enough information to account for practice-level variables, we use beneficiary and county-level factors to balance the intervention and comparison groups.

Study design. Our analysis compares the pre-period (2011–2013) and post-period (2014) trends for the intervention and comparison groups using a longitudinal design with an unbalanced panel. That is, we used all available data for beneficiaries attributed to the intervention and comparison groups in any given quarter and did not restrict our analysis to beneficiaries who had continuous enrollment in Medicaid. This means we included beneficiaries who were eligible for Medicaid for the first time in the year of their attribution. The rationale for an unbalanced panel—as opposed to using a balanced panel approach—is to provide estimation of the program's impact encompassing the entire population of attributed beneficiaries—not a subset based on prior eligibility. The disadvantage of an unbalanced design, however, is the inclusion of beneficiaries without baseline observational data prior to their attribution. Even so, 37.55 percent of the sample does have a full panel of data. In addition, as shown in ***Figures D-2-2*** through ***D-2-3***, we pass the parallel trends test in the baseline period. And finally, as shown in the balance tables by year (***Tables D-2-2*** through ***D-2-13***), average beneficiary characteristics do not differ substantially year to year within the intervention group or within the comparison group, suggesting that even though some beneficiaries may not have baseline data,

---

[71] http://www.dhs.state.mn.us/main/groups/sim/documents/pub/dhs16_197631.pdf

the characteristics of the sample are not changing over time. Note that if a beneficiary was ever attributed to an IHP, they were excluded from the comparison group, whether or not they were attributed in 2014 (i.e., the post-period). The difference in the changes over time from the pre-period to the post-period between the IHP group and its comparison group provides an estimate of the impact of the IHP in its first year of implementation.

Identifying intervention and comparison groups. Minnesota attributes beneficiaries yearly, retrospectively. A beneficiary is attributed to an IHP if a provider within that IHP provided a health care home service, or, if the beneficiary did not receive any health care home services during the year, the IHP providers provided the plurality of primary care services to that beneficiary. As noted earlier, we received from DHS beneficiary-level files, which included an attribution flag for beneficiaries attributed to an IHP in 2013, 2014, and 2015, and an indication of beneficiaries who were eligible but not attributed. The state also provided a file indicating the organization National Provider Identifiers (NPIs) participating in an IHP. Prior to attributing the comparison group we excluded beneficiaries who were ever attributed to an IHP during 2013–2015 to prevent comparison group beneficiaries from becoming test group beneficiaries when including additional years in future analyses. Subsequently, we used Minnesota's IHP attribution methodology, using professional claims, to attribute eligible but non-IHP-attributed beneficiaries to a non-IHP participating organization. Comparison group attribution was done separately for each demonstration year (2013 and 2014) to confirm that (1) each beneficiary in the comparison group had at least one health care home or evaluation and management service in a given year (a requirement to be eligible for IHP attribution), and (2) the comparison group beneficiaries received the plurality of their primary care services from a non-IHP provider during that year. More information on sample construction is available in ***Section D-2.3***.

Balancing intervention and comparison groups. Because Medicaid beneficiaries were not randomly assigned to IHPs or the comparison group, there may be observed sociodemographic and geographic differences between IHP-attributed beneficiaries and comparison group beneficiaries that may influence results. To address this, we used propensity score weighting to statistically adjust the study sample to remove these differences. To apply propensity score weighting, we first used logistic regression to predict a Medicaid beneficiary's likelihood of being attributed to an IHP based on select sociodemographic and geographic characteristics. This predicted likelihood is known as the propensity score. We then took the inverse of the propensity score using the formula (1/(1-propensity score)) to create what is known as the inverse probability weight. We then applied each comparison group member's inverse probability weight to our regression models. IHP-attributed beneficiaries receive an inverse probability weight of one. By applying these weights, comparison group beneficiaries are made to look more like the IHP beneficiaries. An alternate way of applying propensity scores is matching, whereby an IHP-attributed beneficiary is matched to a comparison group beneficiary who has a similar propensity score. This method was considered, but not used. Among others, one reason we selected weighting over matching is that it has the advantage of preserving sample size. With matching, IHP-attributed beneficiaries and potential comparison group beneficiaries may be excluded from the analysis if a good match cannot be found. After propensity score weighting, the standardized differences between the weighted comparison group means and intervention group means were all well under the standard 10 percent threshold. More information on propensity score weighting is available in ***Sections D-2.3*** and ***D-2.4.***

Statistical approach. Analyses used logistic regression for binary outcomes. All analyses used clustered standard errors to account for repeated observations from the same beneficiaries over time.

Even though clustering at an organizational level is a commonly applied strategy for obtaining unbiased standard errors in D-in-D models (Bertrand, Duflo, & Mullainathan, 2004), we did not do this because accurately identifying organizational clusters over time would require making several ad hoc assumptions to track organization NPIs across observation periods and because organization NPIs do not represent all of the treatment providers with whom beneficiaries actually engage. Accordingly, these factors would greatly reduce our confidence that clustering at an organizational level is correcting the bias in our standard errors. Furthermore, it is likely that this is a minor limitation because ignoring organizational-level interdependence is associated with a downward bias in standard errors in D-in-D models, suggesting that some hypotheses with p-values just below 0.10 should in fact be rejected. However, we had virtually no marginally significant findings (i.e., with p-values just below 0.10). In fact, many of our statistically significant findings would remain significant even if standard errors were downwardly biased by as much as 100 percent. Finally, we did cluster at an individual level, and individual-level clustering likely removes a substantial amount of bias in our standard errors.

The outcome models controlled for demographic, health plan, health status, and county-level characteristics. More information on outcomes is available in ***Section D-2.2.*** More information on the regression model is available in ***Section D-2.5***.

D-2.1 Data sources

Medicaid data. To derive eligibility information and claims-based outcomes for Medicaid beneficiaries in our analytic sample, we used Medicaid claims data provided by the Minnesota Department of Human Services (DHS). In this report, we used data from 2011 to 2014 to examine the 3 years before (2011–2013) and 1 year after (2014) the start of the SIM Initiative. We also received data for 2015, but these data were included only in measures that had follow-up time periods beyond the calendar year-end date. The Medicaid claims data included three linkable types of files: (1) an enrollment file, containing beneficiary characteristics, monthly enrollment indicators, and coverage information; (2) a provider file, containing National Provider Identifier, specialty, and name; and (3) Medicaid claims files, including inpatient, outpatient, professional, and pharmaceutical claims. These files include information for

Medicaid beneficiaries attributed to an IHP in years 2013–2015 and those that were not attributed but were otherwise eligible. To be eligible for an IHP a beneficiary must meet certain length-of-enrollment criteria and not be dually eligible for Medicare and Medicaid. The analytic sample included individuals of all ages and excluded Medicare-Medicaid enrollees.

Attribution file. We received a beneficiary-level annual IHP indicator file from the Minnesota DHS that included all Medicaid beneficiaries attributed to providers participating in the IHP demonstration in 2013, 2014, or 2015. Additionally, we received eligibility and claims information for beneficiaries that the state identified as being eligible for attribution to an IHP but were not attributed to one (e.g., because the beneficiary did not have the plurality of their Evaluation & Management [E&M] visits in a year at an IHP provider). Beneficiaries in this second group form the comparison group for our analysis. Provider attribution was independent across years, and we received annual indicators of IHP enrollment at the beneficiary level in the IHP indicator file. Beneficiaries included in these attribution lists were linked to the enrollment and claims data to form the analysis sample. Only beneficiaries attributed to an IHP in at least 1 year (to either intervention of the comparison group) were included in the sample.

Area Health Resource File (AHRF). The AHRF comprises data collected by the Health Resources and Services Administration from more than 50 sources containing more than 6,000 variables related to health care access at the county level. We used 2010 and 2013 information on health professions supply, and population characteristics and economic data to select the comparison group and to use as covariates in the analysis.

D-2.2 Outcome measures

D-2.2.1 Care coordination

To evaluate the impact of the IHP demonstration in Minnesota on care coordination, we report the following care coordination measure. The measure was calculated annually for all eligible beneficiaries in the IHP group and comparison group overall and for children and adults separately.

- **Percentage of acute inpatient hospital admissions with a follow-up visit within 14 days:** This measure calculates the percentage of patients who had an acute care hospitalization[72] and who had a qualifying evaluation and management outpatient visit within 14 days of discharge. For an acute care hospitalization to be included in the denominator, the beneficiary was required to (1) be eligible at both the time of admission and 14 days post-discharge, (2) be alive both at discharge and 14 days post-discharge, and (3) not have a readmission within 14 days post-discharge. We used the following CPT codes to identify a follow-up visit:

---

[72] Psychiatric hospital admissions are included in the short-term acute care hospitalizations. They cannot be identified separately in the Minnesota Medicaid data.

- 99201 through 99205; New Patient, Office/Other Outpatient Services
- 99211 through 99215; Established Patient, Office/Other Outpatient Services
- 99241 through 99245; Evaluation and Management Consultation Services
- 99341 through 99350; Home-based Ambulatory Care Visits
- 99381 through 99387; New Patient, Preventive Medicine Services
- 99391 through 99397; Established Patient, Preventive Medicine Services
- 99401 through 99412; New or Established Patient; Counseling Risk Factor Reduction and Behavior Change Intervention
- 99420 through 99429; Other Preventive Medicine Services, Counseling Risk Factor Reduction and Behavior Change Intervention
- G0402, G0438, G0439, G0463; Preventive Physical Examination and Wellness Visits

D-2.2.2 Utilization

Utilization measures are reported as rates per 1,000 covered lives (or discharges for readmissions). For each measure, we first calculated the probability of any use. To calculate the probability, the numerator indicates having had at least one event (an inpatient admission or an emergency department [ED] visit that did not lead to a hospitalization) and the denominator is the number of eligible Medicaid beneficiaries (ED visit and admissions measures) or discharges (readmissions measure) in the state enrolled during the period. We multiplied the probability of use by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the probability by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries, because it assumes no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because the majority of the population had zero or one ED visit or admission per quarter. Events are included in a period's total if the discharge date or "service to" date on the claim was during the period. These results are reported both overall and for adults and children separately.

- **Probability of having any inpatient use:** This is an indicator of whether the beneficiary had at least one admission to an acute-care hospital reported in the inpatient file for the quarter, divided by the number of beneficiaries in the same quarter. For Minnesota, we identified all-cause acute care hospital admissions using a combination of type of bill for inpatient services (11 or 12) and category of service for general inpatient, inpatient neo-natal ICU, and an undefined category (001, 073, or 999). We included the undefined category at the state's recommendation, because all inpatient encounters with a consolidated pay to provider (a large percentage of the claims) are assigned to this category. However, despite using the combination of these fields, we are unable to identify and remove acute psychiatric admissions and they are included in our measure. Some records in the inpatient claims files may appear to be multiple admissions but are in fact transfers between different facilities; these records were counted as a single admission. To combine transfers into one acute admission, we identified claims that had no more than 1 elapsed day between the discharge date of the index claim and the admission date of the subsequent claim. We combined the claims into one record by taking the earliest admission date and latest discharge date and summing all payment amounts. This approach was also taken for continuing care claims when these criteria were met and the facilities were the same.

- **Probability of having any ED visits that did not lead to a hospitalization (outpatient ED) use:** This is an indicator of whether the beneficiary had at least one visit to the ED that did not result in an inpatient hospital admission, divided by the number of beneficiaries in the same period. For all data sources, ED visits (including observation stays) are identified in the outpatient services file as visits with a revenue center line item equal to 045X, 0981 (ED care) or 0762 (treatment or observation room, thus including observation stays in the overall count). If the procedure code on every line item of the ED claim equaled 70000–89999 and no line items had a revenue center code equal to 0762, that claim was excluded (thus excluding claims for which only radiology or pathology/laboratory services were provided unless they were observation stays). Multiple ED visits on a single day were counted as a single visit. If there was an inpatient ED visit on the same day, the outpatient encounter was excluded.
- **Probability of having a readmission within 30 days of hospital discharge:** This is a dichotomous variable indicating beneficiaries with at least one hospital readmission within 30 days of a live discharge. The denominator includes all acute care hospital discharges identified using the criteria described above. Additionally, we excluded discharges if the beneficiary died during the hospitalization or was not eligible for the full 30 days post-discharge. The numerator includes readmissions to any acute care hospital within 30 days of discharge.

D-2.2.3 Quality of care

To evaluate the impact of the IHP demonstration in Minnesota on quality of care, we report the following measure. The measure was calculated annually for all eligible beneficiaries in the IHP group and the comparison group.

- **The percentage of women 41–69 years of age who had a mammogram to screen for breast cancer.** This measure is based on the HEDIS Breast Cancer Screening specifications. To be eligible for inclusion in the denominator, the following criteria needed to be met:
  - Beneficiary was a woman aged 41–69 years at the end of the calendar year; and
  - Beneficiary had to be eligible 11 of 12 months in the calendar year

Women were excluded from the denominator if they had any of the following:

- A bilateral mastectomy code;
- A unilateral mastectomy code with a bilateral modifier;
- Two unilateral mastectomy codes on different dates of service; or

- A unilateral mastectomy code with a right side modifier and a unilateral mastectomy code with a left side modifier (may be on the same date of service).

We went back as far as 2010 to look for historical data each measurement year.

The numerator is an indicator of a mammogram in the measurement year. Mammograms are identified using the following codes:

- CPT codes 77055–77057 (professional and outpatient files);
- HCPCS codes G0202, G0204, G0206 (professional and outpatient files);
- ICD-9 procedure codes 87.36 or 87.37 (inpatient file); or
- UB Revenue codes 0401 or 0403 (outpatient or inpatient files).

D-2.3 Comparison group and propensity score weighting

For the impact analysis, we are using a pre-post comparison group design, in which the comparison group provides an estimate of what would have happened in the IHP treatment group absent the effect on the intervention. The difference in the changes over time from the pretest to the test period between the IHP group and its comparison group provides an estimate of the impact of the IHP. Ideally, the comparison group should be similar to the intervention group on all relevant dimensions (e.g., demographic, socioeconomic, political, regulatory, health, and health systems) except for the policy change being tested.

In the following section, we detail the procedures we used to select the comparison group for the IHP demonstration in Minnesota.

D-2.3.1 Selection of comparison group

As noted earlier, the files we received from DHS included data for beneficiaries attributed to an IHP in 2013, 2014, and 2015 and those that were eligible but not attributed. Prior to attributing the comparison group we excluded beneficiaries that were ever attributed to an IHP during that time period. Attribution used only professional claims that were subset to claim types A or V, which excluded dental codes. Subsequently, we used Minnesota's IHP attribution methodology to attribute IHP beneficiaries in this potential comparison group pool for each demonstration year (2013 and 2014) separately.

There were three steps in attribution:

1. **Health Home Claim Code Attribution.** If procedure code S0280 or S0281 occurred on a line item, we attributed the beneficiary to the billing provider that had the most occurrences of those S codes for each year.

   For beneficiaries remaining unattributed, go to step 2.

2. **Primary Care E&M Attribution.** Line items from the professional claims were selected if the following E&M codes occurred on the line item; 99201–99215,

99304–99350, 99381–99387, 99391–99397, G0402, G0438, or G0439. These claims were then subset to those provided by primary care providers (PCPs). A PCP was identified using the provider taxonomy crosswalk provided by DHS. These specialties included family medicine, internal medicine, obstetrics & gynecology, pediatrics, ambulatory health care facilities/clinics, midwives, clinical nurse specialist, nurse practitioner, physician assistant, and students in an organized health care training program. A beneficiary was attributed to the billing provider that had the most E&M service claims, with a PCP rendering the service, during the attribution year. If an equal number of such claims were present for different providers, then the beneficiary was attributed based on the most recent E&M date of service.

   For those beneficiaries remaining unattributed, go to step 3.

3. **Specialist E&M Attribution.** Using the E&M line items selected in step 2, use the taxonomy crosswalk to select those provided by specialists. For example, these specialties included surgeons, mental health providers, emergency medicine, oncology, neonatal critical care, allergy & immunology, dermatology, and ophthalmology. A beneficiary was attributed to the billing provider having the most E&M claims performed by the specialists during the attribution year. If there are an equal number of E&M claims, then the recipient is assigned based on the most recent E&M date of service.

   Beneficiaries who did not receive any of these services from any of these providers during the applicable year remain unattributed to either the intervention or comparison group during the applicable year. A full description of Minnesota's attribution methodology is available from the Minnesota Department of Human Services.[73]

D-2.3.2 Calculation of person-level weights

To balance the population characteristics for the claims-based analyses, we estimated propensity scores for all individuals from the comparison group. A propensity score is the probability that an individual is from the IHP demonstration group rather than the comparison group.

The objective of propensity score modeling is to create a weighted comparison group with characteristics equivalent to those for the IHP demonstration population. To the extent that these characteristics are correlated with utilization, care coordination, and quality outcomes, propensity weighting will help balance pre–SIM Initiative levels of the outcomes as well.

Medicaid beneficiaries were not randomly assigned to IHPs or the comparison group. As a result, there may be observed sociodemographic and geographic variables that differ between

---

[73] Payment Model Overview. Memo available at http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_FILE&RevisionSelectionMethod=LatestReleased&Rendition=Primary&allowInterrupt=1&noSaveAs=1&dDocName=dhs16_177106

IHP attributed beneficiaries and comparison group beneficiaries, and these differences may influence results. To address this, we used propensity score weighting to statistically adjust the study sample to remove these differences. To apply propensity score weighting, we first used logistic regression to predict a Medicaid beneficiary's likelihood of being attributed to an IHP based on select sociodemographic and geographic characteristics (described in ***Section D-2.4***). This predicted likelihood is known as the propensity score. We then took the inverse of the propensity score using the formula (1/(1-propensity score)) to create what is known as the inverse probability weight. We then applied each comparison group member's inverse probability weight to our regression models. IHP-attributed beneficiaries receive an inverse probability weight of one (Austin & Stuart, 2015). By applying these weights, comparison group beneficiaries are made to look more like the IHP beneficiaries, and we demonstrate in ***Tables D-2-2*** through ***D-2-13*** that by applying this weight IHP-attributed and comparison group beneficiaries look similar on several selected characteristics.

There are other methods to apply propensity scores to an analysis. Aside from weighting, one frequently used method is matching, whereby an IHP-attributed beneficiary is matched to a comparison group beneficiary who has a similar propensity score (Stuart & Rubin, 2008). Although we considered this method, we decided not to pursue matching for several reasons. Propensity score weighting has been shown to produce less biased estimates, less modeling error (e.g., mean squared error, type 1 error), and more accurate variance estimation and confidence intervals when modeling dichotomous outcomes; and this analysis includes many dichotomous utilization and quality of care outcomes (Austin, 2013; Forbes & Shortreed, 2008). In addition, with matching, IHP-attributed beneficiaries and potential comparison group beneficiaries may be excluded from the analysis if a good match cannot be found. Weighting has the advantage of preserving sample size.

Person-level characteristics

The initial step in the process was to select person-level characteristics to be used in each propensity score model. ***Table D-2-1*** shows the characteristics used grouped by whether they control for demographic, health plan, or health status characteristics.

Table D-2-1. Covariates for propensity score logistic regressions

Covariates
Demographic characteristics
Gender
Age (age and age squared)
Percent minority (AHRF)
Resides in metropolitan area (yes/no)
Percent persons in poverty (AHRF)
PCP/Population ratio (AHRF)
Health plan characteristics
Medicaid eligibility category (medical assistance child, disabled child, medical assistance adult, disabled adult)
Continuous enrollment indicator (yes/no)
At least 9 months of eligibility in prior year
Health status measures
Care coordination and planning visit[a]
Chronic Illness and Disability Payment score (count of major comorbidities)

AHRF = Area Health Resource File; PCP = primary care provider.

[a] CPT codes S0280 or S0281. Note that these codes are used during the first attribution step. These codes are not unique to IHP beneficiaries.

Estimation and weighting procedures

Using the characteristics listed in ***Table D-2-1***, we estimated propensity models by logistic regression, in which the outcome was 1 for beneficiaries attributed to IHP and 0 = comparison group beneficiaries. Separate models were estimated for 2011, 2012, 2013, and 2014 data. Separate Medicaid models were estimated for children and adolescents (ages 0–18 years) and adults (ages 19–64 years).

We set analysis weights to 1 for all individuals in IHP demonstration group. The weight for a comparison group individual was initially a function of his or her predicted propensity score—where weight = p/(1-p), with p being the predicted propensity. We then trimmed weights to .05 if they were less than .05 and capped weights at a maximum value of 20 to prevent any single individual from having undue influence on the results.

D-2.4 Propensity model evaluation

We evaluated several aspects of the propensity score models. First, we examined plots of predicted probabilities to ensure sufficient overlap in the distributions of the IHP demonstration group and the comparison group. This feature, known as common support, is critical because it provides the basis for inferring effects from group comparisons. We found that scores in both groups adequately covered the same ranges.

Second, we compared the logistic results in the three pre-demonstration years, to determine whether the same characteristics were influential over time. With a few minor exceptions, we found that the models were similar each year. This is not surprising, because the same individuals frequently appear in the databases for multiple years. The variables with the greatest impact in the propensity score models were the AHRF variables (poverty, PCP ratio, and minority population) and age (overall model only), and having care coordination and planning visits[74] (overall and children models). Thus, the major differences between the IHP demonstration group and comparison group were found with respect to differences in where a beneficiary resides and the provision of coordinated care.

Finally, we compared unweighted and propensity-weighted means for the characteristics in the model. As expected, we found that, after weighting, the comparison group means were within a few percentage points of the values for the IHP demonstration group. The standardized difference was below the standard 10 percent threshold for all covariates for the overall, child and adult populations. However, for the subgroup analysis on breast cancer screening for women age 41–69, we found that the standardized difference was larger than 10 percent (although still under 25 percent) for a few county-level variables. This is not surprising because the county-level variables have a large standard deviation because of the small number of counties and, therefore, the small effective sample size. However, a comparison of the means shows that the actual values are very similar. Moreover, a threshold of a standardized difference less than 25 percent is acceptable in smaller sample sizes, and the sample size of the subgroup analysis is substantially smaller than the overall analysis.

Figures D-2-1 to ***D-2-3*** show the propensity score distributions for the IHP demonstration group and the comparison group for each year of our analyses (2011–2014). Comparison groups have both unweighted and weighted propensity score distributions. We also present these figures separately for the overall population and for the children and adult populations.

- Across all years, and populations, we see very good overlap in the propensity score distributions for IHP beneficiaries versus non-IHP beneficiaries. There are few propensity score values that are at either extreme (i.e., 0 or 1).

---

[74] These visits are represented by health care home services, represented in claims as CPT codes S0280 (Medical home program, comprehensive care coordination and planning, initial plan) or S0281 (Medical home program, comprehensive care coordination and planning, maintenance of plan).

Figure D-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, overall Minnesota population

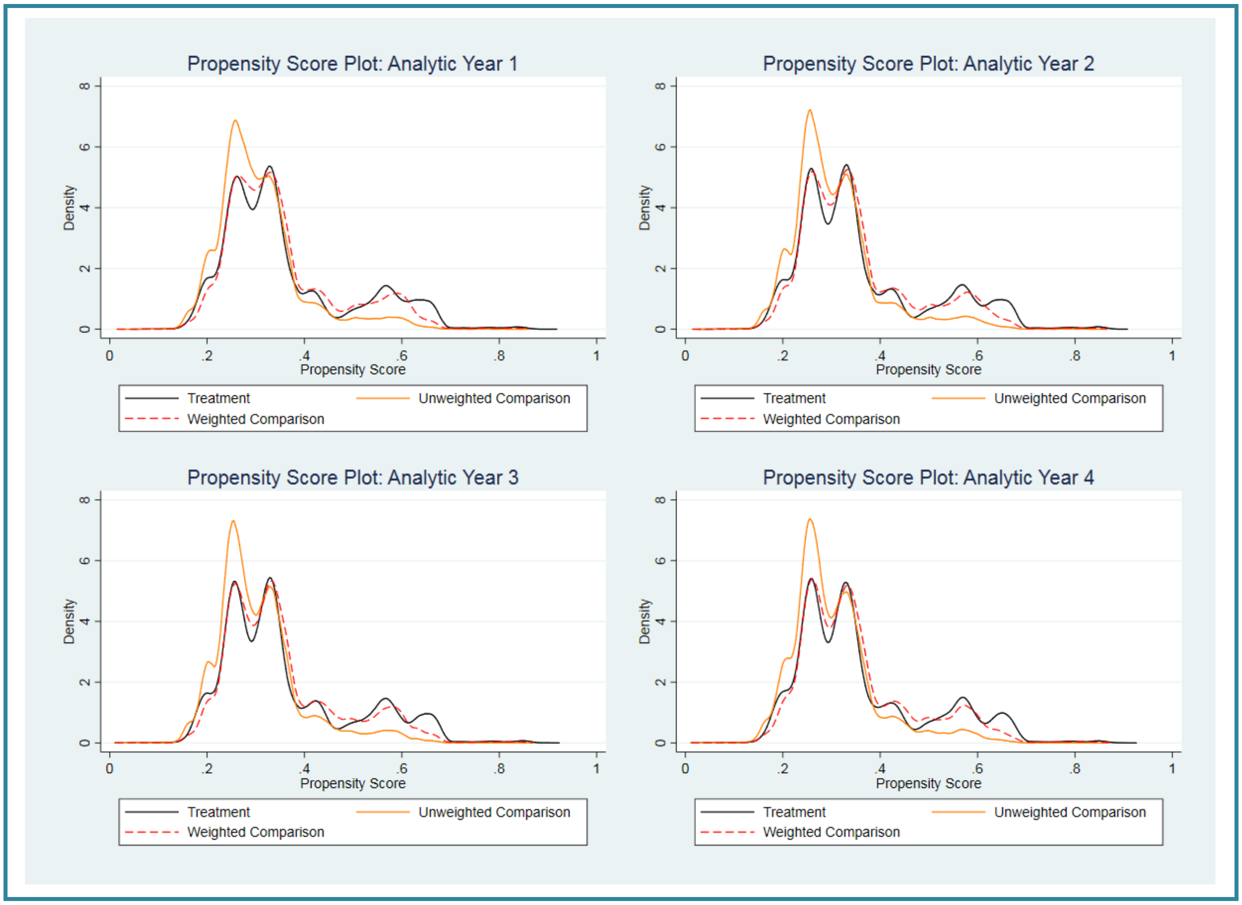


Figure D-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, Minnesota adult population

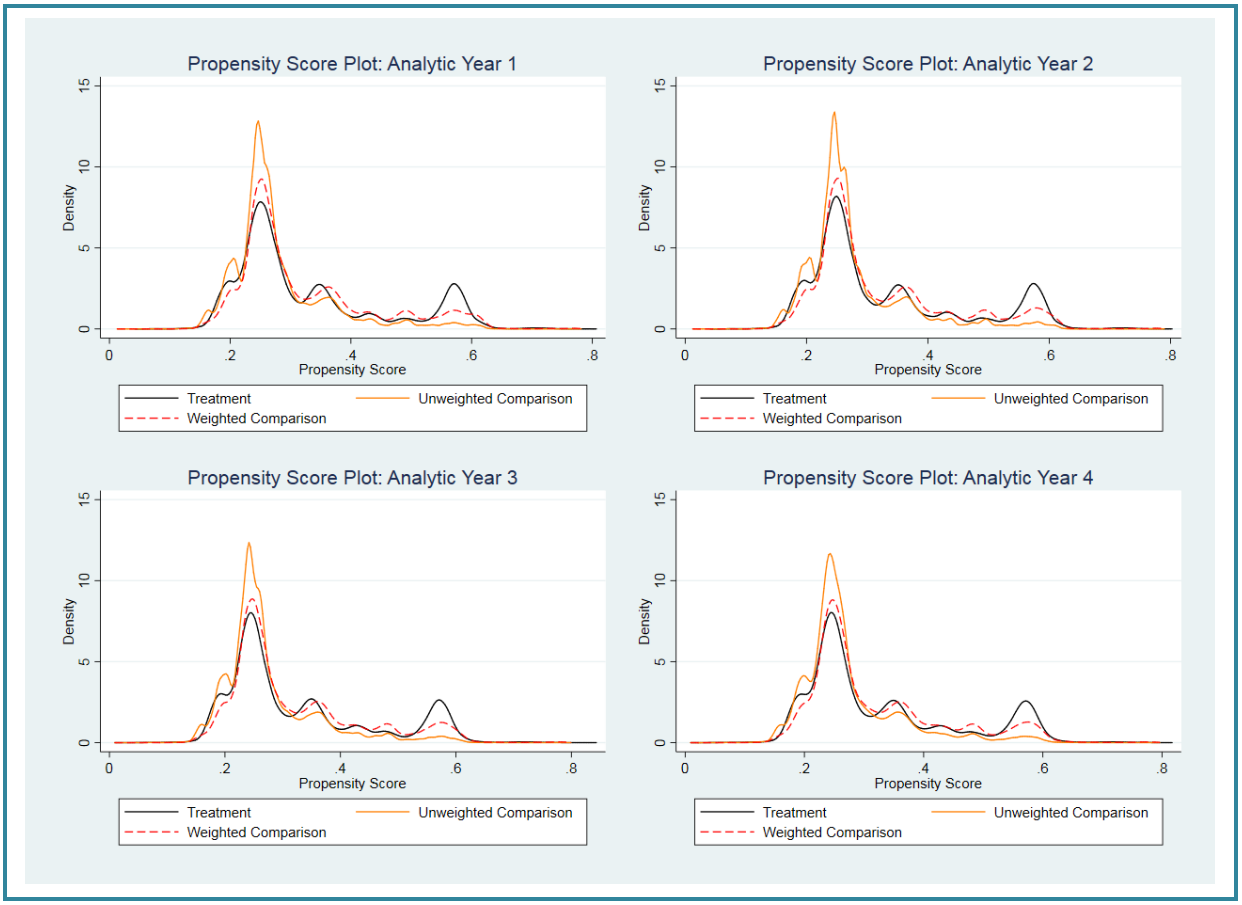
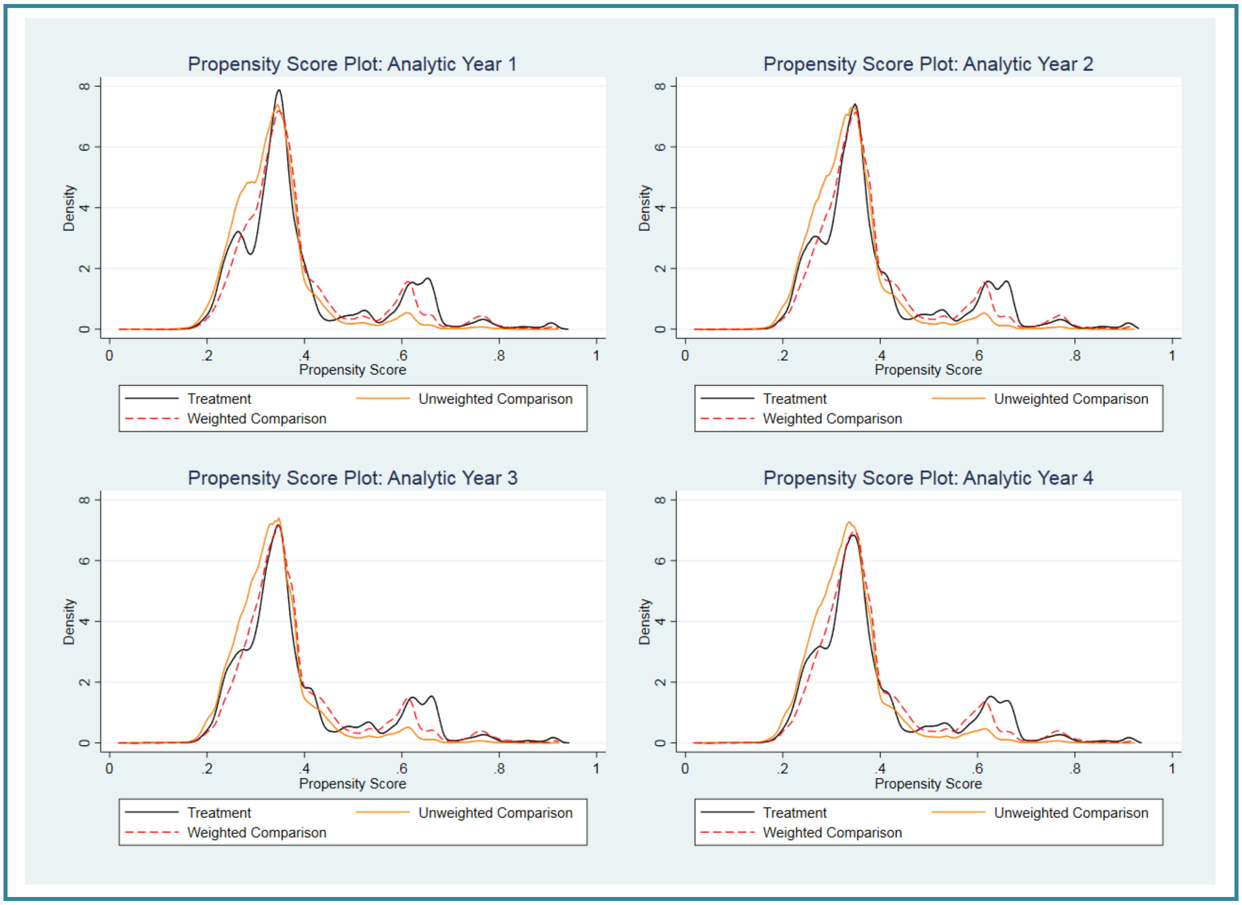


Figure D-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, Minnesota child population



Tables D-2-2 to ***D-2-13*** show unweighted and (propensity score) weighted means/proportions for the IHP demonstration group and the comparison group for each year of our analyses (2011–2014) for the Minnesota Medicaid population. They are also reported for the children and adult models. The propensity score weighted means/proportions substantially mitigate any observed covariate imbalance.

Table D-2-2. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2011

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	121,000	253,500			121,000	119,474		
Age (mean, years)	19.3	21.5	12.4	<0.001	19.3	19.5	0.9	0.01
Age (squared)	664.8	757.9	9.8	<0.001	664.8	674.2	1.0	0.006
CDPS score (mean)	1.3	1.2	4.3	<0.001	1.3	1.3	0.7	0.1
Percent poverty in county	12.5	11.9	17.9	<0.001	12.5	12.4	3.2	<0.001
Percent minority in county	15.3	16.2	9.6	<0.001	15.3	15.5	2.5	<0.001
Ratio of PCPs to county population	0.1	0.1	23.2	<0.001	0.1	0.1	0.1	0.87
Urban county in 2013 (%)	74.6	72.6	4.5	<0.001	74.6	73.9	1.6	<0.001
Gender (percent female)	57.0	57.2	0.3	0.45	57.0	57.1	0.1	0.81
12 months eligibility (%)	70.2	68.5	3.7	<0.001	70.2	70.1	0.4	0.32
9+ months eligibility prior year (%)	61.4	59.7	3.6	<0.001	61.4	61.4	0.1	0.86
Medical assistance child (%)	54.3	48.4	11.8	<0.001	54.3	54.1	0.3	0.4
Disabled adult (%)	6.6	6.6	0.2	0.62	6.6	7.2	2.3	<0.001
Disabled child (%)	3.3	2.7	3.8	<0.001	3.3	3.1	1.2	0.002
Received care coordination services[b] (%)	3.1	1.0	14.9	<0.001	3.1	2.7	1.9	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-3. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2011

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	55,397	133,539			55,397	54,876		
Age (mean, years)	34.8	34.8	0.0	0.94	34.8	34.9	0.6	0.26
Age (squared)	1,381.2	1,380.5	0.1	0.88	1,381.2	1,388.1	0.7	0.18
CDPS score (mean)	1.4	1.3	4.7	<0.001	1.4	1.4	0.6	0.28
Percent poverty in county	12.6	12.0	18.7	<0.001	12.6	12.5	2.6	<0.001
Percent minority in county	14.7	16.3	16.1	<0.001	14.7	14.9	2.0	<0.001
Ratio of PCPs to county population	0.1	0.1	20.9	<0.001	0.1	0.1	0.5	0.33
Urban county in 2013 (%)	73.3	73.3	0.0	0.94	73.3	72.8	1.1	0.03
Gender (percent female)	65.7	64.8	2.0	<0.001	65.7	65.4	0.6	0.24
12 months eligibility (%)	66.7	65.3	2.9	<0.001	66.7	66.8	0.1	0.79
9+ months eligibility prior year (%)	59.4	57.4	4.0	<0.001	59.4	59.7	0.5	0.32
Disabled adult (%)	14.4	12.5	5.8	0.1	14.4	15.5	3.1	0.95
Received care coordination services[b] (%)	2.7	1.4	9.2	<0.001	2.7	2.6	0.5	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-4. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2011

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	65,603	119,961			65,603	64,730		
Age (mean, years)	6.3	6.6	7.3	<0.001	6.3	6.3	0.1	0.78
Age (squared)	59.9	64.8	7.4	<0.001	59.9	59.8	0.2	0.69
CDPS score (mean)	1.3	1.2	4.8	<0.001	1.3	1.3	1.2	0.07
Percent poverty	12.4	11.8	17.9	<0.001	12.4	12.3	4.0	<0.001
Percent minority	15.8	16.2	4.0	<0.001	15.8	16.1	3.3	<0.001
Ratio of PCPs to population	0.1	0.1	25.6	<0.001	0.1	0.1	0.6	0.25
Urban county in 2013 (%)	75.8	71.9	8.8	<0.001	75.8	75.2	1.5	0.002
Gender (percent female)	49.7	48.7	2.0	<0.001	49.7	49.8	0.1	0.8
12 months eligibility (%)	73.2	72.0	2.6	<0.001	73.2	73.0	0.5	0.37
9+ months eligibility prior year (%)	63.2	62.2	2.0	<0.001	63.2	63.0	0.3	0.58
Disabled child1 (%)	5.4	4.8	2.9	<0.001	5.4	5.2	1.2	0.04
Received care coordination services[b] (%)	3.4	0.5	20.7	>0.99	3.4	3.1	1.5	>0.99

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-5. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2012

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	137,559	287,502			137,559	135,791		
Age (mean, years)	19.7	22.0	13.5	<0.001	19.7	19.8	0.8	0.01
Age (squared)	688.0	794.4	10.8	<0.001	688.0	697.0	0.9	0.007
CDPS score (mean)	1.4	1.3	3.5	<0.001	1.4	1.3	0.7	0.08
Percent poverty in county	12.5	11.9	18.0	<0.001	12.5	12.4	3.1	<0.001
Percent minority in county	15.2	16.3	10.3	<0.001	15.2	15.5	2.6	<0.001
Ratio of PCPs to county population	0.1	0.1	22.9	<0.001	0.1	0.1	0.2	0.65
Urban county in 2013 (%)	74.6	73.0	3.6	<0.001	74.6	73.9	1.6	<0.001
Gender (percent female)	56.5	56.6	0.2	0.52	56.5	56.6	0.1	0.68
12 months eligibility (%)	69.5	68.0	3.2	<0.001	69.5	69.4	0.2	0.5
9+ months eligibility prior year (%)	61.7	60.3	2.9	<0.001	61.7	61.6	0.2	0.6
Medical assistance child (%)	54.1	47.7	12.8	<0.001	54.1	54.0	0.2	0.49
Disabled adult (%)	6.5	6.7	0.9	0.005	6.5	7.0	2.3	<0.001
Disabled child (%)	3.2	2.5	4.1	<0.001	3.2	3.0	1.2	0.001
Care coordination[b] (%)	3.0	0.9	15.1	<0.001	3.0	2.7	1.9	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-6. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2012

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	61,341	148,882			61,341	60,733		
Age (mean, years)	35.9	36.0	0.8	0.09	35.9	36.0	0.6	0.21
Age (squared)	1,459.7	1,466.3	0.7	0.17	1,459.7	1,467.1	0.7	0.14
CDPS score (mean)	1.4	1.3	4.0	<0.001	1.4	1.4	0.6	0.26
Percent poverty in county	12.6	12.0	19.1	<0.001	12.6	12.5	2.5	<0.001
Percent minority in county	14.6	16.3	16.6	<0.001	14.6	14.8	2.1	<0.001
Ratio of PCPs to county population	0.1	0.1	21.1	<0.001	0.1	0.1	0.5	0.3
Urban county in 2013 (%)	73.3	73.6	0.8	0.09	73.3	72.7	1.1	0.02
Gender (percent female)	65.1	64.1	2.2	<0.001	65.1	64.9	0.5	0.3
12 months eligibility (%)	66.5	65.0	3.1	<0.001	66.5	66.6	0.3	0.6
9+ months eligibility prior year (%)	60.2	58.5	3.4	<0.001	60.2	60.3	0.2	0.62
Disabled adult (%)	14.5	12.9	4.6	<0.001	14.5	15.6	3.2	0.86
Received care coordination services[b] (%)	2.7	1.3	9.9	<0.001	2.7	2.6	0.5	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-7. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2012

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	76,218	138,620			76,218	75,192		
Age (mean, years)	6.6	7.0	8.0	<0.001	6.6	6.6	0.0	0.92
Age (squared)	66.9	72.8	7.8	<0.001	66.9	66.9	0.1	0.79
CDPS score (mean)	1.3	1.2	4.0	<0.001	1.3	1.3	1.1	0.06
Percent poverty	12.4	11.8	17.8	<0.001	12.4	12.3	3.7	<0.001
Percent minority	15.7	16.2	5.2	<0.001	15.7	16.0	3.4	<0.001
Ratio of PCPs to population	0.1	0.1	24.9	<0.001	0.1	0.1	0.4	0.49
Urban county in 2013 (%)	75.7	72.4	7.5	<0.001	75.7	75.0	1.5	0.001
Gender (percent female)	49.6	48.6	1.9	<0.001	49.6	49.7	0.1	0.79
12 months eligibility (%)	71.9	71.3	1.4	0.001	71.9	71.7	0.4	0.35
9+ months eligibility prior year (%)	62.9	62.2	1.4	0.002	62.9	62.7	0.3	0.51
Disabled child1 (%)	5.4	4.8	2.8	<0.001	5.4	5.1	1.1	0.04
Received care coordination services[b] (%)	3.3	0.5	20.5	>0.99	3.3	3.0	1.6	>0.99

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-8. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2013

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	163,378	343,733			163,378	161,312		
Age (mean, years)	20.1	22.6	14.0	<0.001	20.1	20.2	0.7	0.02
Age (squared)	713.4	827.9	11.3	<0.001	713.4	721.3	0.8	0.01
CDPS score (mean)	1.4	1.3	4.2	<0.001	1.4	1.4	0.5	0.2
Percent poverty in county	12.5	11.9	17.9	<0.001	12.5	12.4	2.8	<0.001
Percent minority in county	15.2	16.3	11.0	<0.001	15.2	15.4	2.5	<0.001
Ratio of PCPs to county population	0.1	0.1	22.3	<0.001	0.1	0.1	0.4	0.18
Urban county in 2013 (%)	74.6	73.3	3.0	<0.001	74.6	73.9	1.6	<0.001
Gender (percent female)	56.1	56.2	0.3	0.35	56.1	56.2	0.1	0.66
12 months eligibility (%)	68.2	66.6	3.4	<0.001	68.2	67.9	0.5	0.12
9+ months eligibility prior year (%)	58.6	57.0	3.2	<0.001	58.6	58.5	0.3	0.41
Medical assistance child (%)	53.3	46.4	13.7	<0.001	53.3	53.2	0.2	0.48
Disabled adult (%)	6.2	6.4	0.8	0.007	6.2	6.7	2.1	<0.001
Disabled child (%)	2.9	2.2	4.0	<0.001	2.9	2.7	1.1	<0.001
Care coordination[b] (%)	2.7	0.8	14.3	<0.001	2.7	2.4	1.8	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-9. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2013

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	72,092	177,338			72,092	71,395		
Age (mean, years)	36.8	36.9	0.7	0.11	36.8	36.9	0.5	0.25
Age (squared)	1,523.2	1,529.3	0.6	0.17	1,523.2	1,529.6	0.6	0.18
CDPS score (mean)	1.4	1.3	5.3	<0.001	1.4	1.4	0.4	0.38
Percent poverty in county	12.6	11.9	19.4	<0.001	12.6	12.5	2.2	<0.001
Percent minority in county	14.6	16.3	17.1	<0.001	14.6	14.8	2.1	<0.001
Ratio of PCPs to county population	0.1	0.1	20.4	<0.001	0.1	0.1	0.7	0.12
Urban county in 2013 (%)	73.3	73.9	1.5	<0.001	73.3	72.8	1.1	0.02
Gender (percent female)	64.4	63.3	2.3	<0.001	64.4	64.2	0.4	0.36
12 months eligibility (%)	64.1	62.9	2.6	<0.001	64.1	64.1	0.1	0.87
9+ months eligibility prior year (%)	56.8	54.8	4.0	<0.001	56.8	56.9	0.2	0.66
Disabled adult (%)	14.1	12.4	4.9	<0.001	14.1	15.2	3.0	0.98
Received care coordination services[b] (%)	2.4	1.2	9.4	<0.001	2.4	2.3	0.5	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-10. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2013

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	91,286	166,395			91,286	90,066		
Age (mean, years)	6.9	7.3	8.0	<0.001	6.9	6.9	0.1	0.85
Age (squared)	73.8	80.4	7.8	<0.001	73.8	73.7	0.1	0.74
CDPS score (mean)	1.3	1.2	4.5	<0.001	1.3	1.3	1.1	0.04
Percent poverty	12.4	11.8	17.2	<0.001	12.4	12.3	3.4	<0.001
Percent minority	15.6	16.2	6.1	<0.001	15.6	15.9	3.2	<0.001
Ratio of PCPs to population	0.1	0.1	24.4	<0.001	0.1	0.1	0.1	0.86
Urban county in 2013 (%)	75.6	72.5	7.0	<0.001	75.6	75.0	1.5	<0.001
Gender (percent female)	49.5	48.7	1.6	<0.001	49.5	49.6	0.1	0.84
12 months eligibility (%)	71.4	70.5	2.0	<0.001	71.4	71.1	0.6	0.19
9+ months eligibility prior year (%)	60.0	59.4	1.4	<0.001	60.0	59.8	0.4	0.33
Disabled child (%)	5.1	4.5	2.5	<0.001	5.1	4.9	0.9	0.07
Received care coordination services[b] (%)	2.9	0.4	19.2	>0.99	2.9	2.7	1.5	>0.99

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-11. Unweighted and weighted means and standardized differences, IHP and comparison groups, overall, 2014

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	163,378	343,732			163,378	161,277		
Age (mean, years)	21.1	23.6	14.0	<0.001	21.1	21.2	0.7	0.03
Age (squared)	755.3	874.5	11.4	<0.001	755.3	763.1	0.8	0.02
CDPS score (mean)	1.5	1.4	3.9	<0.001	1.5	1.5	0.0	0.95
Percent poverty in county	12.5	11.9	17.8	<0.001	12.5	12.4	2.8	<0.001
Percent minority in county	15.2	16.3	10.9	<0.001	15.2	15.4	2.6	<0.001
Ratio of PCPs to county population	0.1	0.1	22.3	<0.001	0.1	0.1	0.4	0.19
Urban county in 2013 (%)	74.6	73.3	3.1	<0.001	74.6	73.9	1.6	<0.001
Gender (percent female)	56.1	56.2	0.3	0.35	56.1	56.2	0.2	0.61
12 months eligibility (%)	88.7	86.9	5.4	<0.001	88.7	88.4	0.9	0.003
9+ months eligibility prior year (%)	68.2	66.6	3.4	<0.001	68.2	67.9	0.5	0.09
Medical assistance child (%)	51.5	44.7	13.7	<0.001	51.5	51.4	0.2	0.63
Disabled adult (%)	6.5	6.9	1.4	<0.001	6.5	7.0	2.0	<0.001
Disabled child (%)	2.8	2.1	4.5	<0.001	2.8	2.6	1.2	<0.001
Care coordination[b] (%)	2.7	0.8	14.3	<0.001	2.7	2.4	1.8	<0.001

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-12. Unweighted and weighted means and standardized differences, IHP and comparison groups, adults, 2014

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	72,092	177,337			72,092	71,380		
Age (mean, years)	37.8	37.9	0.7	0.14	37.8	37.9	0.6	0.21
Age (squared)	1,599.2	1,604.7	0.5	0.23	1,599.2	1,606.2	0.7	0.15
CDPS score (mean)	1.6	1.5	6.4	<0.001	1.6	1.6	1.0	0.04
Percent poverty in county	12.6	11.9	19.3	<0.001	12.6	12.5	2.3	<0.001
Percent minority in county	14.6	16.3	17.1	<0.001	14.6	14.8	2.1	<0.001
Ratio of PCPs to county population	0.1	0.1	20.4	<0.001	0.1	0.1	0.8	0.11
Urban county in 2013 (%)	73.3	74.0	1.5	<0.001	73.3	72.8	1.1	0.02
Gender (percent female)	64.4	63.3	2.3	<0.001	64.4	64.2	0.4	0.39
12 months eligibility (%)	84.4	83.3	3.0	<0.001	84.4	84.1	0.8	0.09
9+ months eligibility prior year (%)	64.1	62.9	2.6	>0.99	64.1	64.1	0.0	>0.99
Disabled adult (%)	14.5	13.1	4.1	<0.001	14.5	15.6	2.9	<0.001
Received care coordination services[b] (%)	2.4	1.2	9.4	>0.99	2.4	2.3	0.4	>0.99

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

Table D-2-13. Unweighted and weighted means and standardized differences, IHP and comparison groups, children, 2014

	Unweighted				Weighted			
	IHP group	Comparison group	Standardized difference[a]	p-values	IHP group	Comparison group	Standardized difference[a]	p-values
N	91,286	166,395			91,286	90,047		
Age (mean, years)	7.9	8.3	7.9	<0.001	7.9	7.9	0.1	0.83
Age (squared)	88.9	96.2	7.8	<0.001	88.9	88.7	0.1	0.74
CDPS score (mean)	1.4	1.3	3.7	<0.001	1.4	1.4	1.0	0.05
Percent poverty	12.4	11.8	17.2	<0.001	12.4	12.3	3.4	<0.001
Percent minority	15.6	16.2	5.9	<0.001	15.6	16.0	3.3	<0.001
Ratio of PCPs to population	0.1	0.1	24.5	<0.001	0.1	0.1	0.1	0.84
Urban county in 2013 (%)	75.6	72.5	7.1	<0.001	75.6	75.0	1.5	<0.001
Gender (percent female)	49.5	48.7	1.6	<0.001	49.5	49.6	0.1	0.8
12 months eligibility (%)	92.1	90.8	4.5	<0.001	92.1	91.9	0.8	0.06
9+ months eligibility prior year (%)	71.4	70.5	2.0	<0.001	71.4	71.1	0.6	0.15
Disabled child (%)	5.1	4.4	3.1	0.59	5.1	4.8	0.9	0.11
Received care coordination services[b] (%)	2.9	0.4	19.2	0.44	2.9	2.6	1.6	0.93

CDPS = Chronic Illness and Disability Payment System (larger CDPS scores correspond with a larger number of comorbidities or a more severe set of comorbidities); IHP = Integrated Health Partnerships; PCP = primary care provider.

[a] Absolute standardized differences are expressed as percentages.

[b] CPT codes S0280 or S0281.

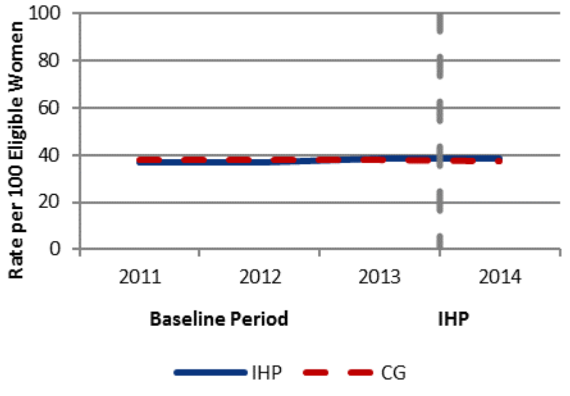
D-2.5 Statistical analysis

D-2.5.1 Regression model

The underlying assumption in D-in-D models estimating the impact of the IHP is that trends in the outcomes among individuals in IHP groups and their respective comparison groups would be similar absent the IHP (i.e., that the two were on "parallel paths" prior to the start of the SIM Initiative). As a first pass at assessing whether the parallel assumption is valid, we looked at the unadjusted outcomes over time across individuals in the IHP group versus the comparison group.

Figures D-2-4 and ***D-2-5*** provide, for IHP beneficiaries and the comparison group, unadjusted[75] annual rates of mammogram screening and hospital discharges with a follow-up visit within 14 days after discharge by year, respectively.

Figure D-2-4. Average rate of mammogram screening, 2011 through 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group

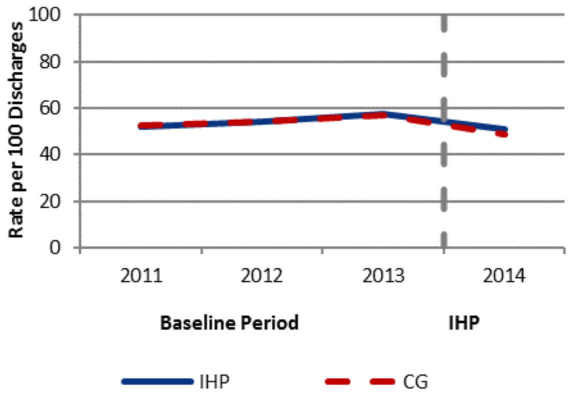


For Minnesota IHP beneficiaries, the average rate of mammogram screening remained fairly constant over the baseline and implementation periods, while there was a steep increase in the rate in the demonstration period for the comparison group (***Figure D-2-4***). The comparison group also had consistently higher rates of screening in the baseline period relative to the IHP group.

---

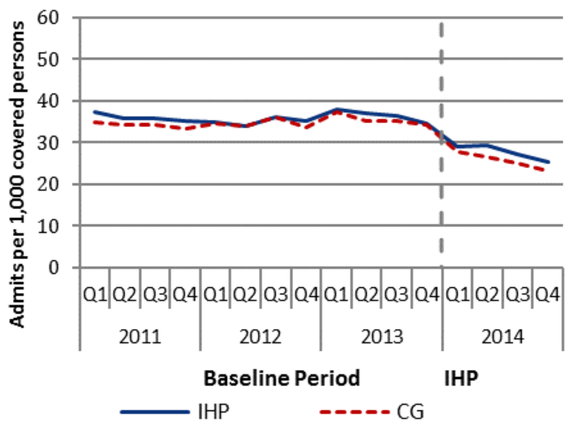
[75] The rates are weighted by eligibility fraction and propensity score weight.

Figure D-2-5. Average rate of follow-up visits 14 days post-discharge, 2011 through 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group

	Average rates of 14-day follow-up visits post discharge were consistently slightly higher in the comparison group than in the IHP group (***Figure D-2-5***). There was a slight overall downward trend for both groups in the demonstration period.

We next present graphs of quarterly, unadjusted averages for IHP-attributed beneficiaries and the comparison group for the baseline period (2011–2013) and the first year of implementation (2014).[76] ***Figures D-2-6*** and ***D-2-7*** provide, for IHP beneficiaries and comparison group beneficiaries, the rate of inpatient admissions and outpatient ED visits per 1,000 Medicaid beneficiaries by quarter, respectively. ***Figure D-2-8*** shows this same information for readmissions per 1,000 discharges for the adult population.

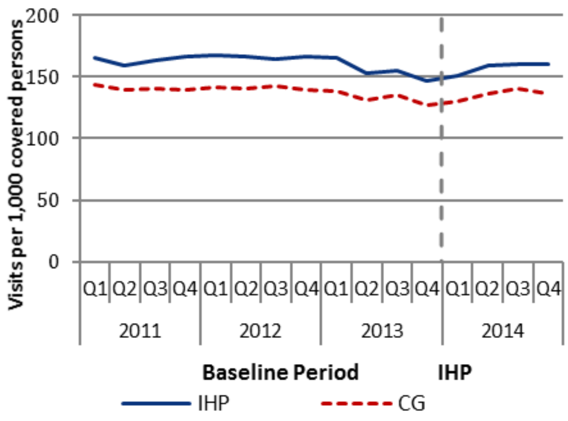
Figure D-2-6. All-cause acute inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group

	The trend line of **acute inpatient admissions** for the IHP group and the comparison group is similar throughout the baseline period. Both groups experienced decreases in the rate of admissions in 2014 (***Figure D-2-6***).

---

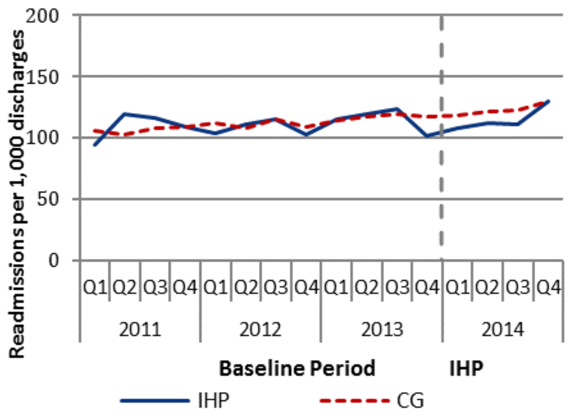
[76] The quarterly averages were weighted by the product of two factors: (1) the fraction of the quarter during which the beneficiary was eligible for the analyses (the eligibility fraction) and (2) the beneficiary's propensity score. Because the weighted quarterly averages are not adjusted for the covariates included in the regression model, the magnitude and direction of the trends in the weighted quarterly averages may differ from the regression adjusted averages shown in the D-in-D tables.

Figure D-2-7. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2014, for the Medicaid beneficiaries in IHPs in Minnesota and the comparison group



The trend in the rate of **outpatient ED visits** was steady for both the IHP and comparison group beneficiaries throughout the analytic time period—both prior to and during the IHP intervention period—with IHP beneficiaries having a slightly higher rate of visits throughout this entire period (***Figure D-2-7***).

Figure D-2-8. All-cause 30-day acute readmissions per 1,000 discharges, first quarter 2011 through fourth quarter 2014, for Medicaid beneficiaries in IHPs in Minnesota and the comparison group



The rate of **readmissions** was similar for both the IHP and comparison group adults throughout the baseline period (***Figure D-2-8***), with the comparison group exhibiting a slightly higher rate during this time. During the demonstration period, both groups show a trend toward increasing rates, but that increase is greater for the beneficiaries in the comparison group.

To more formally assess the parallel assumption's validity, we modelled core utilization outcomes during the baseline period with a linear time trend interacted with a dichotomous variable indicating the beneficiary was attributed to an IHP provider in the test group. The following section describes the baseline analysis we conducted to inform the D-in-D model.

A quarterly fixed-effects model considered for the evaluation is shown in ***Equation D-2.1***:

$$\gamma = \alpha_0 + \alpha_1 I + \sum \beta_n Q_{n,b} + \sum \phi_t Q_{t,p} \bullet I + \delta X + \mu \qquad \text{(D-2.1)}$$

where

y = a performance measure (e.g., total per member per month cost per quarter) for the i-th beneficiary in the j-th group (test or comparison), in period t (i,j,t subscripts suppressed).

I = a 0,1 indicator (0 = comparison group, 1 = test group).

X = a vector of patient and demographic characteristics.

$Q_{n,b}$, $Q_{t,d}$ = 0,1 indicator of the n-th or t-th calendar quarter in the base (b) or post (p) period (n starts counting at first baseline period, whereas t starts with first SIM Model quarter).

μ = error term.

The model in ***Equation D-2.1*** assumes that, except for an intercept difference α_0, the outcomes for beneficiaries in the intervention group and beneficiaries in the comparison groups followed a similar growth trend during the baseline period. We investigated whether the baseline period before the start of SIM activities satisfied the baseline trend assumptions of the D-in-D model in ***Equation D-2.1***—that is, whether the outcome trends for beneficiaries in intervention and in the comparison group were similar during this period. Because we have 12 baseline quarters, it is possible to assess whether baseline outcome trends were, in fact, similar across groups.

One option for testing the assumption that IHP beneficiaries and the comparison group had similar baseline trends is to estimate the model in ***Equation D-2.1*** for the baseline period only and expand the model by including a set of interactions between I_j (the Test indicator) and the indicators for the baseline quarters on the right-hand side of the model. Statistically significant interaction coefficients would indicate whether the outcome difference between the Test and the comparison group increased or decreased in particular baseline quarters. However, it is difficult to make a judgment about a trend on the basis of a large number of interaction coefficients, because it is not clear how to interpret the many sequences of significant and insignificant coefficients that could arise.[77]

As an alternative, simpler approach to testing the similarity of baseline trends, we used a model with a linear trend during the baseline period. We tested whether this trend differed for IHP participants relative to comparison group participants. Specifically, the model for the outcomes may be written as follows:

$$y=\alpha_0+\alpha_1 I+\theta\bullet t+\lambda I\bullet t+\delta X+\mu. \qquad \text{(D-2.2)}$$

---

[77] For example, suppose that the interactions coefficients for quarters 2, 5, and 8 are statistically significant. From such a pattern, it would be difficult to conclude whether outcome trends during the baseline period were similar or not.

In ***Equation D-2.2***, *y, I,* X, and μ are defined as in ***Equation D-2.1***. The variable *t* is linear time ranging from 1 to 12. The linear time trend in the comparison group is θ•*t*, whereas for Test group beneficiaries (*I* = 1) it is (θ+λ)*t. Hence, λ measures the difference in linear trends and the *t*-statistic for this coefficient can be used to test the null hypothesis of equal trends (λ = 0). In other words, rejecting the null hypothesis would suggest that the assumption of equal trends underlying our outcome models is not met.

The parameters of ***Equation D-2.2*** were estimated using weighted maximum likelihood logistic regression models for five key outcomes. The weights are a function of the eligibility fraction and propensity scores. For each outcome, we report estimates and standard errors of the difference between the baseline trend in the test and the comparison groups (λ). To show the adjusted means in the pre- and post-periods for the intervention and comparison groups, we used a linear model that allows for the calculation of means that will sum to the D-in-D estimate. Although this model has strong assumptions of normality of the outcome, the ordinary least squares model still produces unbiased estimates even when the normality assumptions is violated as long as errors are uncorrelated and have a constant variance (Gauss-Markov Theorem). However, we can and do control for the correlation and variance in errors with clustered standard errors. Additionally, the model yields estimates that are readily interpretable and do not require additional transformation.

Tables D-2-14 and ***D-2-15*** show estimates of the baseline trend differences for the following outcomes overall and for children and adults separately:

- Probability of any acute inpatient stay.
- Probability of any outpatient ED visit.
- Probability of readmission within 30 days after an inpatient discharge.
- Probability of a follow-up visit within 14 days after an inpatient discharge.
- Probability of breast cancer screening

Relative to the comparison group, the only statistically significant difference in the change in the probability of having an acute inpatient stay was in the IHP group for children. The probability of having an inpatient admission increased slightly slower (1 percentage point slower gain, ***Table D-2-14***). There were no statistically significant differences in the change in the probability of having an outpatient ED visit or a readmission within 30 days of discharge. In addition, over the baseline period, 14-day follow-up and breast cancer screening had a marginally significant ($p < 0.10$) faster increase in the IHP overall group relative to the comparison group. There was also a faster increase among IHP adults for the 14-day follow-up measure.

Table D-2-14. Differences in probability of use during the baseline period, Minnesota IHP beneficiaries and comparison group beneficiaries

Parameter estimate	Any inpatient	Any ED visit	Any 30-day readmission	Any 14-day follow-up after discharge	Breast cancer screening
Test–CG trend difference children	−0.010***	−0.0016	0.022	0.043	n/a
	(0.0029)	(0.0014)	(0.016)	(0.029)	
Test–CG trend difference adults	0.00085	0.00081	−0.0043	0.041**	n/a
	(0.0022)	(0.0012)	(0.0075)	(0.020)	
Test–CG trend difference overall	−0.000038	0.00013	−0.0016	0.042*	0.028*
	(0.0023)	(0.0012)	(0.0095)	(0.016)	(0.016)

CG = comparison group; ED = outpatient emergency department; IHP = Integrated Health Partnership.

Baseline is the period January 2011–December 2013. The trend (slope) is the quarter-to-quarter change in probability of use or length of stay. Standard errors are given in parentheses. *p < 0.10; **p < 0.05; ***p < 0.01.

We found that most of the baseline trends did appear similar and thus concluded that we can assume that IHP demonstration group and the comparison group were on a similar trajectory before the implementation of the SIM Initiative.

D-in-D regression model. The D-in-D model is shown in ***Equation D-2.3***. The model is a quarterly fixed effects model as shown in ***Equation D-2.1.*** As in ***Equation D-2.1***, Y_{ijt} is the outcome for individual i in state (IHP or comparison group) j in quarter t; I_{ij} (=0,1) is an indicator equal to 1 if the individual is in the Test group and 0 if the individual is in its comparison group; Qn is a series of quarter dummies for the baseline period (quarters 1 to 12); and Q_t is a series of quarter dummies for the post quarters (quarters 13 to 17). The interaction of the Test group indicator and Q_t ($I_{ij} * Q_t$) measures the difference in the pre-post change between the Test group and its comparison states.

$$Y_{ijt} = \alpha_0 + \beta_1 I_{ij} + \sum \beta_2 Q_n + \sum \alpha_2 Q_t + \sum \gamma I_{ij} * Q_t + \lambda X_{ijt} + \varepsilon_{ijt} \qquad \text{(D-2.3)}$$

Table D-2-15 illustrates the interpretation of the D-in-D estimate from this model. The coefficient β_1 in ***Equation D-2.3*** is the difference in the measure between individuals in IHP and the comparison group at the start of the baseline period, holding constant other variables in the equation. The β_2 and α_2 coefficients are for the quarterly fixed effects and capture differences over time for each baseline and post quarter, respectively. The coefficient of the interaction term between Q_t and IHP (I) measures any differences for the IHP group relative to the comparison group in the post quarters relative to baseline quarters. Thus, in the post period, the comparison group mean is captured by $\alpha_0 + \alpha_2$, whereas the IHP group mean is captured by $(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$. In other words, the between-group difference changes from β_1 during the baseline years to $\beta_1 + \gamma$ during the post period. The D-in-D parameter, γ, shows whether the between-group

Table D-2-15. Difference-in-differences estimate

Group	Pre period	Post period	Pre-post difference
IHP	$\alpha_0 + \beta_1 + \beta_2$	$(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$	$\alpha_2 + \gamma$
Comparison	$\alpha_0 + \beta_2$	$\alpha_0 + \alpha_2$	α_2
Between group	β_1	$\beta_1 + \gamma$	γ

IHP = Integrated Health Partnership.

difference increased ($\gamma > 0$) or decreased ($\gamma < 0$) after the SIM model was implemented. Using the quarterly fixed effects model, we calculated yearly and overall estimates by taking linear combinations of the quarterly estimates.

The models for the probabilities of inpatient admissions and ED outpatient visits were estimated with the beneficiary quarter as the unit of analysis. Models for unplanned readmissions and 14-day follow-up visits were estimated at the quarter-discharge and annual-discharge level, respectively. Breast cancer screening was estimated with the beneficiary year as the unit of analysis. Observations were assigned to a quarter or a year on the basis of service to date. For the utilization outcomes, we converted quarterly utilization counts into binary outcomes (1 = any use) and used weighted logistic regression models. Count models are not appropriate because of the low occurrence of multiple hospitalizations and ED visits for individual beneficiaries in any quarter; however, we multiplied the marginal effect from the logistic regression models by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the marginal effect by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes that no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because at least 98 percent of the Medicare population had zero or one ED visit or admission per quarter.

Control variables. Control variables depended on whether the model was for children, adults, or overall (***Table D-2-16***). Control variables for the overall models include person-level variables (age, gender, CDPS risk score) and county-level variables (urban/rural, percentage in poverty, percentage that were minority, and supply of primary care providers). In addition, state-specific variables such as eligibility categories (disabled children, disabled adults, and children on medical assistance), whether the beneficiary was in an IHP in 2013 (pilot period) or received care coordination and planning (S codes) services in 2014 were included. Lastly, we included indicators for full eligibility in a given year and having at least 9 months of eligibility in the prior year.

Table D-2-16. Covariates for logistic regressions

	Overall	Adults	Children
Sociodemographic characteristics			
Female	✓	✓	✓
Age (age and age squared)	✓	✓	✓
Percent minority (AHRF)	✓	✓	✓
Resides in metropolitan area (yes/no)	✓	✓	✓
Percent persons in poverty (AHRF)	✓	✓	✓
PCP/population ratio (AHRF)	✓	✓	✓
Health plan characteristics			
IHP indicator[a]	✓	✓	✓
Medicaid eligibility category:			
Medical assistance child	✓	N/A	N/A
Disabled child	✓	N/A	✓
Disabled adult)	✓	✓	N/A
Continuous enrollment indicator (yes/no)	✓	✓	✓
At least 9 months of eligibility in prior year	✓	✓	✓
Health status measures			
Care coordination and planning visit[b]	✓	✓	✓
Enrolled in IHP in 2013 (pilot period)	✓	✓	✓
Chronic Illness and Disability Payment score (count of major comorbidities)	✓	✓	✓

AHRF = Area Health Resource File; IHP = Integrated Health Plan; N/A = not applicable; PCP = primary care provider.

[a] Indicates whether the beneficiary was attributed to an IHP.

[b] CPT codes S0280 or S0281

Our model design uses a repeated, cross-sectional approach to maximize the use of available data. This design uses all available observations for a beneficiary, regardless of whether they were enrolled for the entire analysis year. To account for beneficiaries who were not enrolled the entire time, our analysis uses an eligibility fraction for each individual. The eligibility fraction is defined as total number of months the person was enrolled in a given period divided by total number of months in the period. For example, an individual enrolled in insurance 2 months of a quarter has an eligibility fraction of 0.67 for that 3-month period. The eligibility fraction is used to inflate outcome data if an individual was not enrolled for an entire period. The eligibility fractions are also used as weights in the regression models. This prevents individuals with limited enrollment but extreme outcomes from strongly influencing the results. The percentage of beneficiaries will full eligibility ranged from 70 to 88 percent in a given year.

The adult and child models were identical with the exception that adult models excluded the child eligibility indicators, and the child models excluded the adult eligibility indicators.

Weighting and Clustering. All of the regression models were estimated using weighted regressions and weighted by the propensity score times the eligibility fraction. In addition, standard errors were clustered at the beneficiary level to account for multiple observations per person. Even though clustering at an organizational level is a commonly applied strategy for obtaining unbiased standard errors in D-in-D models (Bertrand, Duflo, & Mullainathan, 2004), we did not do this because accurately identifying organizational clusters over time would require making several ad hoc assumptions to track organization NPIs across observation periods, and because organization NPIs do not represent all of the treatment providers with whom beneficiaries actually engage. Accordingly, this would greatly reduce our confidence that clustering at an organizational level is correcting the bias in our standard errors. Furthermore, it is likely that this is a minor limitation because ignoring organizational-level interdependence is associated with a downward bias in standard errors in D-in-D models, suggesting that some hypotheses with p-values just below 0.10 should in fact be rejected. However, we had virtually no marginally significant findings (i.e., with p-values just below 0.10). In fact, many of our statistically significant findings would remain significant even if standard errors were downwardly biased by as much as 100 percent. Finally, we did cluster at an individual level, and individual-level clustering likely removes a substantial amount of bias in our standard errors.

D-2.6 References

Austin, P. C., & Stuart, E. A. (2015). Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Statistics in Medicine, 34*, 3661–3679. http://dx.doi.org/10.1002/sim.6607.

Austin, P. C. (2013). The performance of different propensity score methods for estimating marginal hazard ratios. *Statistics in Medicine, 32*(16), 2837–4289. http://dx.doi.org/10.1002/sim.5705. Epub 2012 Dec 12.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics, 119*, 249–275.

Forbes, A., & Shortreed, S. (2008), Inverse probability weighted estimation of the marginal odds ratio: Correspondence regarding ‘The performance of different propensity score methods for estimating marginal odds ratios’ by P. Austin. *Statistics in Medicine, 27*, 5556–5559. http://dx.doi.org/10.1002/sim.3362

Stuart, E. A., & Rubin, D. B. (2008). Chapter 11: Best Practices in Quasi–Experimental Designs: Matching Methods for Causal Inference. In J. Osborne (Ed.), *Best Practices in Quantitative Methods*. http://dx.doi.org/10.4135/9781412995627.d14

[this page intentionally left blank]

Appendix E: Oregon SIM Initiative Progress and Findings

E.1 Synopsis of the SIM Initiative in 2017

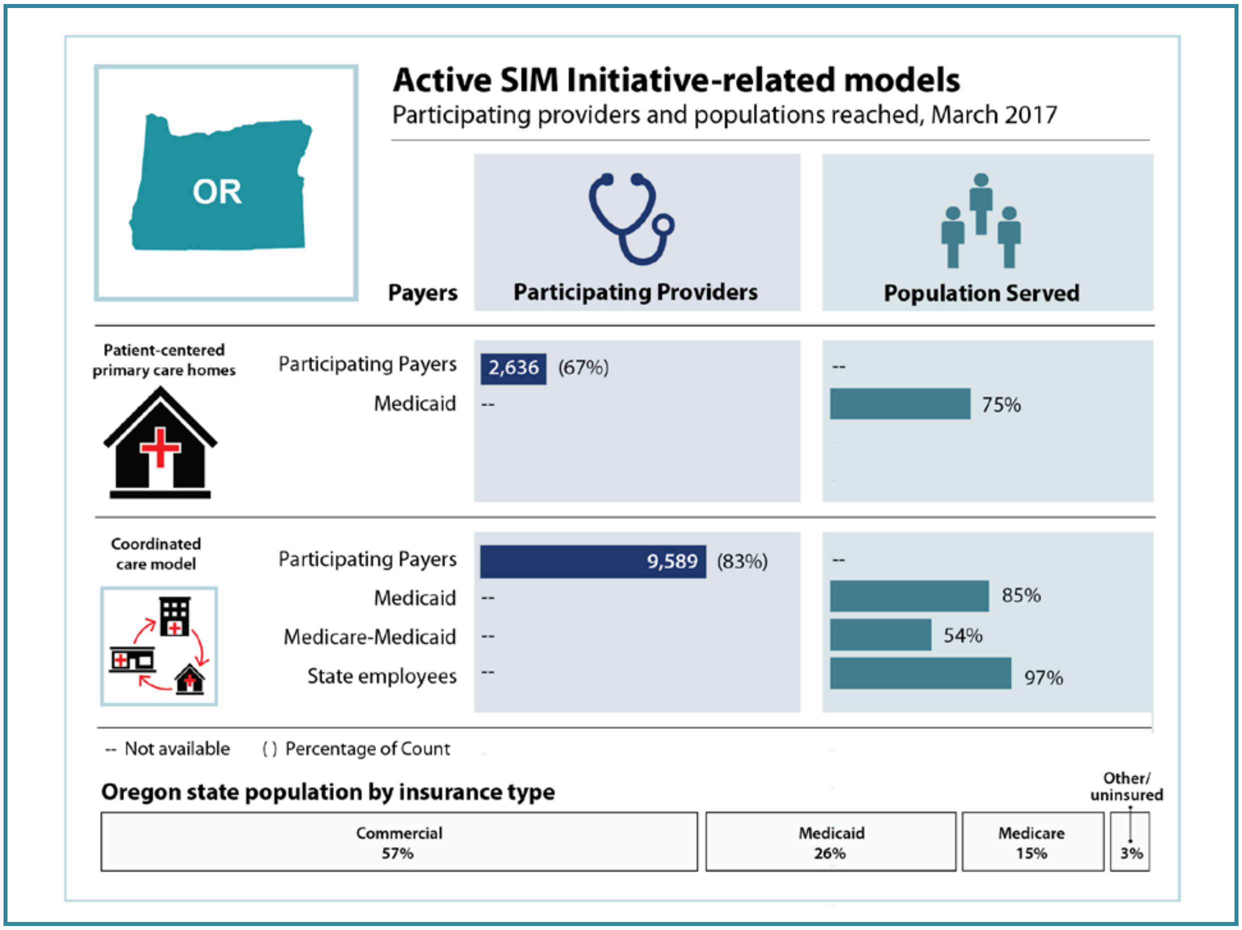
As of April 2017, 3.5 years after the SIM Initiative began, Oregon continued to focus on reinforcement of the Coordinated Care Model (CCM) and spreading key features of the model to new payers and populations beyond Medicaid. SIM-supported strategic efforts to advance these goals include expansion of the Patient-Centered Primary Care Homes (PCPCHs), Oregon's version of a patient-centered medical home, and dissemination of best practices and technical assistance, particularly around adoption of value-based payments and integration of physical and behavioral health care, through the Transformation Center. See ***Section E.2*** for an overview of these models and strategies and for a description of the CCM.

Key Results From Oregon's SIM Initiative, April 2016–April 2017

- More than two-thirds of eligible primary care clinics across the state adopted the PCPCH, exceeding the state's goal for the program. State and non-state stakeholders considered the PCPCH program one of the most successful initiatives advanced by the SIM Initiative because of high engagement of providers in the model and achieved reductions in total health care costs found in the state's own SIM-funded study.
- The independent federal evaluation analysis of the impact of the PCPCH model on utilization, expenditures, and quality of care since the model's inception in 2011 through 2014, presented in this report, revealed that the PCPCH model increased the use of primary care, particularly among adolescents, and increased quality as measured by several indicators of disease screening. At the same time, it increased total cost of care per person, at least in the short run, among patients who had been enrolled in their plans since the beginning of the program.
- According to state officials, CCM health plans extended to state employees had not yet had the desired impact on costs, and members newly enrolled in CCM plans reported perceiving little difference in how they accessed and experienced care compared to traditional health plans.
- The impact of CCM on primary care providers serving Medicaid patients seemed to vary by Coordinated Care Organization (CCO). Although some providers felt that treating Medicaid patients enrolled in CCOs was business as usual, others reported that CCOs were driving quality improvements for their Medicaid population and all other patients.
- Although progress was made, integration of behavioral health and primary care was still in process. Many primary care providers reported having behavioral health specialists on staff and appreciated the added focus on the behavioral and psychosocial needs of their patients; however, integration varied across CCOs. Integration of dental health and primary care was at an early stage of development.
- State and many non-state stakeholders believed that the SIM-sponsored Transformation Center had been very effective in assisting CCOs in adoption of the CCM. Some non-state stakeholders, however, were doubtful of the value the Transformation Center brought to the state's health care reforms.
- With the SIM Initiative ending, Oregon prioritized sustainability of the Transformation Center and PCPCH program to continue the CCM spread. However, securing multi-payer participation in the CCM may be necessary for lasting effects of Oregon's health system transformation efforts.

Reach of SIM Initiative-related delivery system and payment models among providers and populations. According to Oregon's Quarter 1 Progress Report for 2017, 75 percent of all Medicaid beneficiaries were served by PCPCHs, with 67 percent of the state's primary care providers participating in the model. By March 2017, the state reported that 83 percent of Oregon's providers participated in the CCM, serving 85 percent of total Medicaid population. ***Figure E-1*** depicts the scope of participation in Oregon's PCPCH and CCM program in terms of individual providers and populations, as of March 2017. The first column presents the absolute number of individual providers participating in each delivery system/payment model, as reported by participating payers. The next column shows the percentage of each payer's population served by participating providers, as reported by the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with commercial, Medicaid, Medicare, or other health insurance coverage, to give some insight into statewide reach of each model. The methods for qualitative data collection and analysis for this appendix, including document review that produced ***Figure E-1***, are available in ***Sub-appendix E-1.***

Figure E-1. Providers and populations reached by Oregon's SIM Initiative–related delivery system and payment models



- The number of individual primary care providers practicing in certified PCPCHs increased to 2,636 by March 2017, 196 more than in March 2016 when these data were last reported in the SIM Initiative Round 1 Evaluation Year 3 Annual Report (CMS, 2017). The number of practices participating in PCPCHs also increased since in March 2016 (not shown in ***Figure E-1***), exceeding the state's original goal of 600 practices participating in the model (CMS, 2017).
- PCPCHs served 75 percent of the *total* Medicaid population. This represents a slight decrease from 77 percent in March 2016, probably caused by a concurrent decrease in the total Medicaid population (1,060,093 to 964,200). The exact cause for the drop off in Oregon's Medicaid-only enrollment is unknown, but was likely the result of a combination of factors, including a temporary hold on eligibility redeterminations which may have artificially inflated 2016 Medicaid enrollment (Wilson, 2017).
- By March 2017, 83 percent of Oregon providers were engaged by CCOs, the measure of participation in the CCM (Oregon Health Authority, 2016).
- In March 2017, 85 percent of the *total* Medicaid population was served by CCOs (a total of 818,606 beneficiaries). Oregon had intended for CCM to reach 90 percent of the Medicaid population by the end of the SIM test period, and it came very close to this goal.
- The proportion of Medicare-Medicaid beneficiaries and state employees reached by the CCM was 54 percent and 97 percent, respectively, lagging behind the state's goal of 65 percent for the Medicare-Medicaid beneficiaries and only slightly behind the goal of 100 percent for state employees (CMS, 2017).

Impact of the PCPCH program (2011–2014). Predating the SIM test period by 2 years, the PCPCH model was introduced in 2011 and attracted a growing number of practices through 2014. During the SIM test period, Oregon used SIM funds to support the spread of the PCPCH model and to provide technical assistance to primary care practices seeking PCPCH certification, thereby increasing the number of recognized PCPCHs (see ***Section E.3.1*** for more details about the PCPCH model). Our analysis of effects of the PCPCH model on utilization, expenditures, and quality of care spanned the model's inception in 2011 through 2014, and used a difference-in-differences model with clinic and time fixed effects to identify the impacts of PCPCH recognition. Results revealed that, as intended, the PCPCH model increased the use of primary care, particularly among adolescents, and increased quality as measured by several indicators of disease screening. At the same time, total cost of care per person increased. Although not necessarily expected, the total cost of care finding may well reflect increased primary care use that may result in lower inpatient and other costs in the future. All data and a brief discussion of these results appears in ***Section E.4*** of this appendix, with a full discussion of methods in ***Sub-appendix E-2***. ***Figure E-2*** depicts the time periods covered by different analyses in this report, with implementation analysis reported in ***Section E.3*** and interim impact analysis reported in ***Section E.4***. In the next annual report, we will also report on the impact of the CCM. These analyses require complete all-payer claims data from 2015, which were not available at the time this report was written.

Figure E-2. Time periods covered by different analyses in this report

E.2 Overview of the Oregon SIM Initiative

In the final year of its test period, Oregon continued to invest SIM funding to accelerate health system transformation efforts already in place before the SIM Initiative was implemented in October 2013. Oregon's major delivery system reform effort was the adoption and spread of key elements of the CCM. As of April 2017, Oregon had leveraged state purchasing power to spread the CCM beyond Medicaid CCOs to state employee and public educator health plans. In January 2015, state employees insured through the Public Employees Benefit Board (PEBB) were offered options for health benefits featuring CCM elements, and using a process similar to the one used for PEBB, the Oregon Educators Benefit Board (OEBB) selected new plans with CCM elements for employees to choose in the fall 2017 open enrollment period. Fostering the PCPCH, a key component of the CCM, was another ongoing strategy that the state sought to support and spread as part of its SIM Initiative. Surpassing its goal of recognizing 600 primary care practices as PCPCHs by the end of the SIM test period, Oregon, as of April 2017, recognized 659 such practices (CMS, 2017). See ***Section E.3.1*** for more details about the CCM and PCPCH efforts.

Oregon's Coordinated Care Model

Oregon's Coordinated Care Model (CCM) aims to achieve better health, better care, and lower cost by (1) using best practices to manage and coordinate care, (2) encouraging providers and consumers to share responsibility for health, (3) increasing transparency in price and quality, (4) measuring performance, (5) paying for better quality and health outcomes, and (6) achieving sustainable rate of growth.

CCM was first implemented in Oregon's Medicaid program under Oregon's 2012 amendment to its Medicaid Section 1115 waiver. Almost all Oregon's Medicaid beneficiaries are enrolled in one of the 16 Coordinated Care Organizations (CCOs) operating statewide. CCOs are Accountable Care Organization–like networks of different provider types that operate under global budgets to provide coordinated physical, behavioral, and dental services to Medicaid enrollees.

Continued advancement of CCOs has been partially supported by SIM funds because state officials consider CCOs' success in adopting the CCM to be crucial to the spread of the model to other populations. Oregon's SIM goal was to have two million Oregonians, or 50 percent of the population, enrolled in care featuring the six CCM elements by July 2016.

For more details on Oregon's CCM see http://www.oregon.gov/oha/HPA/Pages/CCOs-Oregon.aspx.

Oregon made significant investments of SIM funds to support the Transformation Center, a state-run resource supporting CCOs and the spread of the CCM through technical assistance and learning collaboratives on key health system transformation topics (see ***Section E.3.1*** for more details). CCOs, which had served Medicaid beneficiaries since 2012, continued to work on integration of behavioral health and dental care services, adoption of alternative payment models,[78] and a range of other initiatives designed to transform the health care system in Oregon (see ***Section E.3.4*** for more details about these activities). The state made advances in its population health efforts by adding new metrics to CCO performance incentives and fostering partnerships between local public health departments and CCOs (see ***Section E.3.8*** for more details about the population health efforts). To promote both the successful operation of CCOs and the spread of the CCM, Oregon, with SIM funding and other resources, continued its investments in supporting strategies such as health information technology (health IT) development, data infrastructure, and workforce development (see ***Sections E.3.6*** and ***E.3.7*** for more details about these activities). Although the quality measurement and reporting efforts were not funded directly by SIM, CCO incentive measures were an important driver of health delivery system change in keeping with SIM goals (see ***Section E.3.5*** for more details about quality measurement). To encourage participation in Oregon's health reform models from private payers, in 2016, the Transformation Center convened the legislatively mandated Multi-Payer Primary Care Payment Reform Collaborative (see ***Section E.3.3*** for more details about stakeholder engagement).

SIM funds helped support several small-scale initiatives and projects. These include the Health Evidence Review Commission's work to design patient decision support tools, development of Early Learning hubs and coordination between hubs and CCOs to promote kindergarten readiness, and funding for long-term care innovator agents to work with CCOs on coordinating with long-term services and supports (LTSS) providers. The SIM Initiative also provided financial support for the development and launch of the Housing with Services (HWS) program, designed to coordinate health care and social support services for the older adults and people with disabilities residing in public housing (see ***Section E.3.4*** for more details).

In anticipation of the end of its SIM funding, the Oregon Health Authority (OHA), the state agency responsible for health care, was seeking state funding in Oregon's 2017 budget cycle for the next 2 years, albeit scaled back from the level provided by the SIM Initiative, to allow the work of the Transformation Center in its support of CCOs to continue. In an effort to economize as the SIM Initiative ended in 2016, OHA had consolidated the formerly separate PCPCH program into the Transformation Center, which served as both the administrator of the PCPCH program and as a source of technical assistance for practices. The activities supported with SIM Initiative funding throughout the test period are shown in ***Table E-1,*** and more details about the state's plans for sustaining its SIM models and activities can be found in ***Section E.3.9.***

---

[78] In this section, we use the term "alternative payment model or method" as it is defined in Oregon and not under CMS's Quality Payment Program established by the Medicare Access and CHIP Reauthorization Act of 2015.

Table E-1. Summary of SIM Initiative activities in Oregon supported in part or fully by SIM funding, through Spring 2017

Activity type	Activity	Payers	Provider types	Dates[a]	Supporting policies
Delivery/Payment System Reforms	Expansion of Coordinated Care Model (CCM)	Medicaid / CCOs Public Employees Benefit Board (PEBB) Oregon Educators Benefit Board (OEBB)	Varies by CCO and PEBB/OEBB plans, but can include: Primary care Specialty care Behavioral health Dental care	Medicaid implemented 8/1/2012; PEBB implemented 1/1/2015; OEBB implemented 10/1/2017 – all ongoing to date	Health benefit purchasing contract provisions: State legislation Alignment of quality metrics and reporting
	CCM Alignment Workgroup	Medicaid / CCOs PEBB OEBB		2013; 2014–2016	
Delivery System Reforms	Expansion of patient-centered primary care homes (PCPCHs)	Medicaid One commercial carrier (Aetna) PEBB OEBB	Primary care	Medicaid implemented in 2011; Aetna implemented in 2013; PEBB implemented in 2015; OEBB implemented in 2013 – all ongoing to date	PCPCH standards Incentive metric for CCOs and PEBB, OEBB plans
Payment System Reforms	Adoption of Alternative Payment Models by CCOs	Medicaid / CCOs	Primary care Specialty care Behavioral health Dental care Pharmacy Other/nonclinical	2012 to date	Section 1115 waiver Technical assistance from Transformation Center, in collaboration with Divisions across OHA State legislation Primary Care Payment Reform Collaborative
Practice Transformation **Delivery/Payment System Reforms** **Behavioral and Oral Health Integration**	Transformation Center: Technical Assistance Bank Learning Collaboratives Innovation Café Coordinated Care Model Summit Council of Clinical Innovator Fellows	Medicaid / CCOs	Primary care; Behavioral and oral health; Multidisciplinary professionals	2013 to date	Funded through state general funds

(continued)

Table E-1. Summary of SIM Initiative activities in Oregon supported in part or fully by SIM funding, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates[a]	Supporting policies
Practice Transformation	Patient Centered Primary Care Institute: Learning Collaboratives Webinars Online resources	Medicaid Commercial	Primary care	2012–2017	
	Health Evidence Review Commission	Medicaid Commercial	Primary care	2016 to date	
Behavioral Health Integration	Expansion of Project ECHO (Extension for Community Healthcare Outcomes)	Medicaid PEBB	Primary care	2014–2017	
Population Health	Oregon Public Health Assessment Tool	Medicaid PEBB		2012–2017	
	Community Prevention Grant Program	Medicaid		2013–2017	
	Oregon State Health Improvement Plan	Medicaid PEBB; OEBB Commercial		2015–2019	Quality metrics
Workforce Development	Office of Equity and Inclusion: Health Care Interpreter training program	Medicaid	Certified health care interpreters	2014 to date	

(continued)

Table E-1. Summary of SIM Initiative activities in Oregon supported in part or fully by SIM funding, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates[a]	Supporting policies
Practice transformation Workforce Development	Office of Equity and Inclusion: Regional Health Equity Coalitions	Medicaid	Local health departments, other public systems	2011, 2014	
	Office of Equity and Inclusion: Developing Equity Leadership through Training and Action	Medicaid	Local health departments, other public systems	2013 to date	
Delivery System Reforms Coordination with LTSS	Housing with Services Pilot	Medicaid	FQHC, social service providers	2014 to date	
Delivery System Reforms Practice Transformation Coordination with LTSS	Long Term Care Innovator Agents	Medicaid	LTSS providers	2013–2017	State general funds
Delivery System Reforms Coordination with Early Learning System	Early Learning Councils: Kindergarten Readiness	Medicaid		2013–2017	State legislation

(continued)

Table E-1. Summary of SIM Initiative activities in Oregon supported in part or fully by SIM funding, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates[a]	Supporting policies
Health IT	Emergency Department Information Exchange (EDIE) & PreManage	Medicaid Commercial	Hospitals CCO providers	2014 to date	State legislation
	CareAccord Direct Secure Messaging	Medicaid	Hospitals Primary care FQHCs	2012–2017	State legislation
	Telehealth pilots		RHCs Dental care Pharmacists Home care Pediatric Psychiatrists	2014–2016	State legislation

CCM = Coordinated Care Model; CCO = Coordinated Care Organization; FQHC = Federally Qualified Health Center; Health IT = Health Information Technology; LTSS = long-term services and supports; OEBB = Oregon Educators Benefit Board; PCPCH = Patient-Centered Primary Care Home; PEBB = Public Employees Benefit Board; RHC = Rural Health Center.

[a] Note that some activities began prior to the SIM Initiative and some continue post SIM-funding. The SIM test period lasted from October 1, 2013, to May 31, 2017, including a no-cost extension period from October 1, 2016, to May 31, 2017.

E.3 Implementation of the SIM Initiative in Oregon After 3.5 Years of the Test Period

This section synthesizes findings on SIM Initiative implementation in Oregon after 3.5 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix E-1***:

- Stakeholder interviews conducted in a Portland, Oregon, site visit, April 25 to 27, 2017. Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.
- Focus groups conducted with providers and consumers involved with some aspect of the SIM Initiative. The providers selected for focus groups were primary care providers who had a contract with at least one of Oregon's CCOs and practiced in Portland or the Hood River area; a total of 27 participated in four focus groups. The consumers were state employees enrolled in one of the CCM PEBB health plans and living in the Portland, Salem, or Hood River area and individuals participating in the HWS Program in Portland; a total of 37 people participated in four focus groups. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.
- Document review, including state-developed reports and local news articles.
- Telephone conversations held between April 2016 and March 2017 with state officials used to gather more in-depth information on select topics and to review other evaluation-related news.

Table E-2. Stakeholder interviews conducted in Oregon, April 2017

	Number of interviews
State officials	9
Payers and purchasers	5
Providers and provider associations	3
Consumer advocacy groups	5
Other	4
Total	26

E.3.1 What changes to health care have SIM-related delivery system and payment models yielded?

KEY INSIGHTS

- Oregon advanced its efforts to expand the CCM model to new populations by including CCM elements in health plans serving state employees and Oregon educators. Some state officials, however, questioned the impact of the CCM implementation so far among state employees. Similarly, focus groups of state employees enrolled in CCM plans revealed that employees had not observed a major change in how their care is delivered.
- The PCPCH program continued to grow, albeit at a slower pace than in the past, and was generally highly regarded among state and non-state stakeholders, particularly in light of the state's own recent evaluation findings demonstrating the positive impacts of the program on total costs. However, efforts to engage a wide range of payers in financial support of the PCPCH model have progressed more slowly than anticipated, causing concerns about the financial viability of the model for providers.
- Supporting many of Oregon's payment and delivery efforts, including the CCM, was the Transformation Center, a major SIM-funded activity. Although most stakeholders thought the Transformation Center was essential in advancing the CCM, others believed it had limited impact on the overall health system change.

This section describes the main findings on delivery system and payment reforms in Oregon's SIM Initiative, which focused on furthering the spread of the state's CCM to populations beyond Medicaid beneficiaries and strengthening Medicaid CCOs in their effort to deliver care under the CCM. These dual efforts entailed using SIM funds to develop new delivery system and payment reforms while also supporting existing ones. Chief among the various methods to advance these reforms was using state purchasing authority to bring state employees, public educators, and their dependents under the CCM by incorporating CCM elements in contracts with health plans serving PEBB and OEBB members. The state also focused on continued support to primary care providers to broaden the reach of Oregon's PCPCH program and strengthen the implementation of the CCM from the ground up. Finally, the Transformation Center supported Medicaid CCOs in their implementation of the delivery and payment reforms, including integration of behavioral and oral health, and served as the health care innovation center for OHA. More information about the role of the Transformation Center in stakeholder engagement and practice transformation support can be found in ***Sections E.3.3*** and ***E.3.7.*** Behavioral health and dental service integration into primary care is discussed in detail in ***Section E.3.4***. Selected features of payment and delivery reforms used in Oregon's SIM Initiative are presented in ***Table E-3***.

Table E-3. SIM Initiative–related delivery system and payment models in Oregon, 2015–2016

Delivery system model	Payment model	Participating payers	Retrospective or prospective	Payments	Risk[a]	Payment targets	Implementation progress
PCPCH	Voluntary PCPCH recognition payment	CCOs, PEBB, OEBB, Prominent commercial carriers[b] Aetna[c]	Prospective	Selected enrollees in Medicaid, PEBB, OEBB, prominent commercial carriers, and selected Aetna plans	N/A	N/A	9 of 15 CCOs[d] 5 of 9 prominent commercial carriers 0 of 9 prominent Medicare Advantage carriers 2 of 2 prominent PEBB and OEBB carriers[e]
CCM	Global cap	CCOs, PEBB, OEBB	Prospective	All attributed members	One-sided risk to plans; risk sometimes passed to providers	3.4% growth cap	Cost experience varies
CCM	Alternative Payment Models[f]	CCOs, PEBB, OEBB	Both	Selected enrollees in Medicaid, PEBB, and OEBB plans	Varies by type of alternative payment method	Financial or quality	35.9% of CCO payments are non-FFS[g]

CCM = Coordinated Care Model; CCO = Coordinated Care Organization; FFS = fee-for-service; N/A = not applicable; PCPCH = Patient-Centered Primary Care Home; PEBB = Public Employees Benefit Board; OEBB = Oregon Educators Benefit Board.

[a] One-sided risk means that providers are eligible to earn shared savings for meeting lower total cost target but are not subject to penalties for higher-than-expected costs; two-sided risk means that providers are eligible to earn shared savings (the percentage earned is usually higher than one-sided risk options) for meeting lower total cost target and are expected to pay back money if costs are higher than expected.

[b] Prominent carrier is defined as a health insurance carrier with annual premium income of $200 million or more. These include Health Net Health, Kaiser, Moda Health, PacificSource, Providence, Regence BlueCross BlueShield, Trillium, United Healthcare, and United Healthcare of Oregon.

[c] Patient-Centered Primary Care Home Program: Payment Incentives, http://www.oregon.gov/oha/pcpch/Pages/payment-incentives.aspx.

[d] There are 16 CCOs, 2 of which are operated by PacificSource Health Plans and are combined for this table.

[e] Information on PCPCH recognition payments is based on calendar year 2015. Source: Primary Care Spending in Oregon: A report to the Oregon State Legislature, February 2017.

[f] Alternative payment models include pay-for-performance, partial capitation, case rates, per member per month, shared savings, shared risk, and bundled payments.

[g] Data from Oregon SIM Quarterly Progress Report, October-December 2016. The SIM goal was that 57% of all CCO payments to providers should be non-FFS.

Using state purchasing authority, Oregon's efforts to spread the CCM to populations beyond Medicaid were advanced by introducing CCM elements into both PEBB and OEBB health plans that cover state employees and public educators and their dependents starting in benefit year 2015 for PEBB and in the October 2017–September 2018 benefit year for OEBB. Although OEBB revised its plan offerings to conform to CCM standards beginning in 2017, Moda, the largest OEBB carrier, began offering plans in some counties as early as October 2014 that featured CCM elements, such as incentivizing members to select a medical home. The SIM Initiative supported PEBB/OEBB transition to CCM through a model contract and other tools, such as various factsheets, toolkits, and a communications tool, developed by the Coordinated Care Model Alignment Work Group to assist purchasers in adopting the CCM. The state has also used its purchasing authority by imposing a cost trend cap of 3.4 percent to PEBB and OEBB health plans starting in 2013. This is the same global spending cap Oregon used in its Medicaid program. One stakeholder noted, however, that the PEBB and OEBB cap was imposed not so much as a payment reform but more to help solve a state budget gap.

PEBB and OEBB health plans combined cover 270,000 members (employees and dependents) (Loretz & Fairbanks, 2017), about 6 percent of Oregon's total population. Importantly, however, not all members had chosen a CCM plan (see below) as of April 2017. Moreover, the share of Oregon population affected by the CCM remained flat between first quarter 2016 and first quarter 2017, with about 50 percent of Oregonians (regardless of insurer) receiving care containing elements of the CCM (CMS, 2016a, 2017). This included Medicaid beneficiaries enrolled in CCOs, all state employees and their dependents (because even PPO plans include some CCM features such as standard metrics and the cost growth cap), Medicare-Medicaid beneficiaries enrolled in CCOs, and commercially insured individuals who the state estimated as being seen by a PCPCH certified primary care provider.

Some stakeholders, however, questioned how transformative the PEBB and OEBB transitions to the CCM had been. State officials acknowledged that the success of the PEBB/OEBB transition had been somewhat limited. Despite being offered a reduction in their premium share if they enroll in a CCM plan, many PEBB members had not selected a CCM plan and instead remained in a preferred provider organization (PPO) plan, a longstanding plan choice in both PEBB and OEBB (42 percent of PEBB members in plan year 2017 remained in PPO plans). Although CCM plans for OEBB members will only begin to be held financially responsible for performance on CMM elements in the plan year 2017/2018, as mentioned earlier, Moda had been offering CCM health plans to OEBB members since 2014. However, only about 50 percent of OEBB members enrolled in Moda plans in plan year 2016–2017 (Loretz & Fairbanks, 2017). As one state official observed, even with the cost advantage to enroll in a CCM plan, "change is hard and as long as there is a PPO plan…people tend not to move too much."

Furthermore, although it had not yet been rigorously evaluated, the transition to the CCM did not appear to have had a desired effect on costs, according to one state official. Indeed, the cost trend for PEBB enrollees since 2015 had been rising compared to the relatively flat trend line of commercial plans in Oregon (Loretz & Fairbanks, 2017). Another state official said, "they [the state] made progress in baking [CCM elements] into contracts…I'm not sure that is enough." For example, when asked what kind of changes PEBB and OEBB members in CCM plans were seeing in terms of care coordination, integration of behavioral health, and overall experience with care, one state official commented that there had not been "any big huge movement in the PEBB and OEBB commercial market around that." This situation could soon change, however. To help reduce state health care spending and fill a budget gap, in the spring of 2017, the Oregon legislature was considering legislation (HB 3428) which called for moving all eligible public sector employees into CCOs.[79]

Consumer focus groups revealed that PEBB state employees enrolled in CCM plans had mixed experiences with their health care. When asked to rate their health care in a CCM plan compared to the health care they had before they enrolled in a CCM plan, PEBB focus group participants living in Salem rated their current care the same or better now, whereas those in Portland rated their care the same or worse. Hood River PEBB focus group participants had mixed opinions, with most rating their current health care slightly better or slightly worse. In all three locations where focus groups were conducted (Portland, Hood River, and Salem), PEBB members expressed frustration over not getting accurate information about what was and was not covered under their CCM plans, and many felt their benefits were more limited than that of their previous non-CCM plans (for example, limited alternative medicine options). Some focus group participants with higher needs said they had to put in many phone calls and "jump through a lot of hoops" to get their specialist visits, treatments, and medications approved by their CCM plans. Many PEBB members in Portland also complained about having to see their primary care provider to obtain referrals for specialists and to obtain primary care from a recognized medical home or pay more out of pocket, which sometimes created barriers to access. PEBB members in Salem and Hood River spoke more favorably about their care experience than those in Portland. Many, for example, felt their specialists and primary care providers shared information among themselves and noted receiving preventive services, follow-up calls, and assistance with lifestyle changes. However, most also said this was always the way they were treated and did not think it was because they were now in a medical home or a CCM plan. A majority of PEBB members said the lower premium share and copays were the biggest factors in their decision to switch to CCM plans.

Many of the primary care providers who participated in focus groups felt that significant changes had recently occurred in health care delivery for Medicaid

---

[79] The bill did not get a vote in the 2017 legislative session and was passed to committee upon adjournment.

beneficiaries. The extent to which providers felt CCOs played a role in those changes varied by location. The majority of providers who participated in focus groups reported that care coordination had improved significantly in recent years, which allowed them to focus more of their time with patients on preventive care and medical issues, while ancillary support staff, such as care coordinators and behavioral health specialists, worked with patients to address social and behavioral health issues. Most Portland providers, however, said CCOs made little difference in their "life on the ground in the trenches," and did not associate CCOs with increased care coordination. In contrast, providers practicing in Hood River and surrounding rural communities reported receiving support from local CCOs in taking care of Medicaid patients and noted that Medicaid was driving quality improvements for their commercially insured patients as well. More details about provider experiences with the CCM and CCOs can be found in ***Section E.3.2***.

CCO adoption of alternative payment methods had been slow. As we reported in the SIM Initiative Round 1 Evaluation Year 3 Annual Report, CCOs only recently begun to focus on adoption of alternative payment methods, and progress in development and implementation of these payment methods varied from CCO to CCO. The state made payment reform resources and technical assistance available through the Transformation Center, but although the initial uptake of alternative payment methods among CCOs was encouraging, there appeared to have been little progress since April 2016. According to latest data available from the state, the share of CCO payments to providers that were not paid on a fee-for-service (FFS) basis was only 35.9 percent in fourth quarter 2016 (CMS, 2016b), short of the state goal of 57 percent (***Table E-3***). Some CCO representatives reported that many payment reform models were still under development or only being tested at a few sites, suggesting that much work remained in this area to meet the state's goal. To accelerate the use of alternative payment methods in CCOs, Oregon's Medicaid 1115 waiver renewal, approved in January 2017, authorized the state to require CCOs to enter into value-based payment contracts with providers (Oregon Health Authority, 2017a).

Oregon's Patient-Centered Primary Care Home Program

The Patient-Centered Primary Care Home (PCPCH) program was established by the Oregon's Legislature in 2009 and began operating in 2011, before the SIM Initiative. Primary care clinics, group practices, and solo practitioners can apply for recognition as a PCPCH by self-attesting to criteria organized into six core standards of care: (1) access to care, (2) accountability, (3) comprehensive whole-person care, (4) continuity of care, (5) coordination and integration of care, and (6) person- and family-centered care. Eleven measures are classified as "must-pass" that every practice is required to meet to be recognized at any level. Depending on total points earned by attesting to the remaining criteria, practices are assigned one of five tiers of PCPCH recognition, with tier 5 (called 5 STAR) designation reserved for the most advanced clinics. For more information about Oregon's PCPCH program visit http://www.oregon.gov/oha/HPA/CSI-PCPCH/Pages/index.aspx.

The number of primary care clinics certified as a PCPCH, a cornerstone of the CCM, continued to rise, and the PCPCH model was favorably viewed across a range of stakeholders. As of April 2017, an estimated two-thirds of eligible clinics statewide were certified as a PCPCH, according to one state official, an increase since March 2016. Through various means (e.g., CCO quality metrics, technical assistance, coaching, peer learning, and in some cases payments from CCOs), Oregon actively supported the PCPCH model, and, in general, it was viewed positively by state officials and other stakeholders. For example, one stakeholder praised the state for including a technical assistance component in the PCPCH program—not just building a delivery model but also supporting providers in its adoption. One payer interviewed also felt that the PCPCH program had value and said it "has definitely been a huge deal and allowed providers to look at themselves and how they practice and want to do better and get that certification as a PCPCH. It really led to some competition even." Another stakeholder commented that the level of engagement in the model was greater than anyone could have expected, evidenced by the fact that almost all PCPCH clinics chose to reattest to the higher standards when the state revamped the model and added more recognition tiers in 2017.

State officials similarly felt the PCPCH program was valuable, "a glowing area of success" under the SIM Initiative, as one state official characterized the program. In addition, several state officials highlighted a 2016 SIM-sponsored evaluation study that reported, overall, that the PCPCH program reduced total service expenditures per person by 4.2 percent and that every $1 increase in primary care spending by a PCPCH resulted in $13 savings in other services, including specialty care and emergency department (ED) use (Gelmon et al., 2016). Owing in part to these findings, the Oregon legislature in the 2017 session passed a measure that requires CCOs, PEBB, OEBB, and commercial insurers to spend, by 2023, at least 12 percent of their total expenditures on primary care services, akin to Rhode Island's primary care spend targets (Senate Bill 934).[80] Our own analysis of outcomes from PCPCH implementation appears in ***Section E.4.***

Although the PCPCH program was generally viewed favorably, payers have been slow to voluntarily offer to make additional payments to PCPCH-certified clinics for providing care coordination and case management. Payment is not part of the PCPCH program; it is strictly a care delivery model. The state's hope was that payers would voluntarily pay some additional amount to primary care clinics that became PCPCH certified. The extent to which this happened has been limited, however. A recent OHA report to the state legislature showed that 9 of 15 CCOs paid an additional amount to PCPCHs in 2015 (Oregon Health Authority, 2017b) although according to site visit interviewees, the level of those payments varied across CCOs. Apart from Medicaid CCOs, only one prominent commercial carrier, two carriers serving PEBB and OEBB, and one smaller carrier made additional payments to selected

---

[80] SB 934 was signed into law on June 27, 2017, and goes into effect on January 1, 2018.

primary care clinics in their network that were PCPCH certified in 2015. In contrast, a larger number of carriers (and more CCOs) made additional payments to practices recognized by the National Committee for Quality Assurance Patient Centered Medical Home (PCMH) program (Oregon Health Authority, 2017b). Stakeholders offered various reasons private payers had not embraced the Oregon's PCPCH model. Some felt that the model was not a sufficiently robust patient-centered care model to warrant a change in payment. Some payers thought that the PCMH model they already used was superior to the PCPCH, and one payer stated "we support our providers in our own way." One stakeholder commented that over the years, the PCPCH program had become rigid and bureaucratic. On the other hand, another interviewee observed that the PCPCH program had been successful in that it was easy to participate and could show providers how to do things differently, but the downside was that there was limited multi-payer participation, which made it difficult for some providers to maintain the model. In retrospect, not working out the payment aspect of the model up front was viewed as a mistake by some interviewees. "We saved the thorniest thing for last," as one stakeholder said.

Over the past few years, Oregon had sought to get payers to make additional payments to PCPCHs with variable success. In 2013, the state convened a series of meetings with payers and other stakeholders to develop a strategy to support PCPCHs. Several payers signed an agreement that said they would work on a voluntarily basis toward supporting patient-centered primary care that advanced better health and better care at lower costs, but little came of the agreement (Oregon Health Authority, 2013). Then in 2016, in response to state legislation, Oregon convened a multi-payer collaborative to help bring alignment around the CCM, specifically valued-based payment. This group, the Primary Care Payment Reform Collaborative, produced a series of recommendations. Although the collaborative did not mandate that payers make recognition payment to PCPCHs, it did recommend that all payers be required to spend a set portion of their overall spending on primary care. This recommendation was included in Senate Bill 934, which was under consideration by the Oregon legislature at the time of our site visit (Senate Bill 934).[81]

Supporting Oregon's many payment and delivery reforms was Oregon's Transformation Center, a major SIM-funded activity. The Transformation Center sponsored several initiatives to help strengthen CCOs in their adoption of the CCM, including convening learning collaboratives, helping CCOs with clinical innovation and developing strategies to help them meet performance benchmarks, and engaging and supporting CCOs to implement alternative payment methods. The Transformation Center also provided technical assistance to CCOs on a range of topics, from integrating behavioral health services into primary care to

---

[81] SB 934 passed in June 2017. The bill also requires CCOs participating in the Comprehensive Primary Care Plus (CPC+) Initiative, a CMMI-funded model that includes performance-based incentive payments for primary care, to offer similar payments to all PCPCH practices in their networks. CPC+ is a CMMI-funded advanced primary care model that aims to increase access to primary care and to improve the quality, cost, and efficiency of primary care delivery.

assisting CCO Community Advisory Councils (CACs), which comprise CCO members and community representatives, in effectively engaging CCOs to address community needs. Apart from supporting CCOs, the Transformation Center sponsored efforts to help spread the CCM to other payers by commissioning studies, convening stakeholders, and providing technical assistance with the messaging on the CCM to PEBB and OEBB members.

Stakeholders had mixed views on whether the Transformation Center has played a significant role in health care transformation. State officials and some non-state stakeholders regarded the Transformation Center's role as important to the spread of the CCM, but others were less enthusiastic about the Center's impact as the hub for innovation. As we reported in the SIM Initiative Round 1 Evaluation Year Two Annual Report, CCOs were initially skeptical of the Transformation Center and its role, and some did not know how (or were too busy in standing up their CCOs) to use the resources and assistance offered by the Transformation Center. Per a state official, this reluctance has diminished over time, particularly with the help of learning collaboratives that fostered relationship building and information sharing across CCOs. Both state and non-state stakeholders agreed that the Transformation Center was very effective in bringing stakeholders together to share ideas, challenges, and successes. Another successful Transformation Center initiative that CCOs found particularly helpful was the Council of Clinical Innovators program, which gives funding to CCO providers to conduct clinically based work that supports CCOs and the spread of the CCM. One CCO executive said that the Innovators program "has really been career changing for them and it has been a huge benefit for our region just because of the leadership." One non-state stakeholder thought that the Transformation Center was particularly effective in assisting CCOs in behavioral health integration. A few state officials also commented that the Transformation Center helped to organize the OHA around health care transformation.

At the same time, several stakeholder interviewees were unsure about the value the Transformation Center has brought to Oregon's overall health system reform efforts, with one interviewee commenting that although Oregon has implemented some health care innovations, the presence of the Transformation Center was not necessary for that to happen. Another interviewee remarked that the Center "has failed to capture the attention and the involvement of CCOs leadership, [and] health system leadership in general." In contrast to their praise for some aspects of the Center's work as noted above, CCO executives we interviewed seemed to be underwhelmed by the technical assistance offered by the Transformation Center. One CCO interviewee, for example, thought that the Technical Assistance Bank was a good idea in theory but in practice, the 10-hour sessions allotted to each topic were too few and not worth the trouble to get meaningful assistance with a particular issue. Another CCO representative said that the quality and usefulness of assistance from the Transformation Center varied. Yet another CCO interviewee said they grew to rarely use the Transformation Center resources, feeling as though the Center's value had diminished in recent years, and shared, "I don't even know what they do. I don't know if it's us [providers or CCOs] not engaging them [the Center] but I don't see the value. It was there at the beginning. I don’t know if it’s a leadership issue or communication issue.”

E.3.2 How did providers respond to the SIM Initiative in Oregon?

KEY INSIGHTS

- Primary care providers in CCO networks caring for Medicaid beneficiaries reported variable impacts from implementation of the CCM on their practices.
- Although providers noticed recent improvements in care coordination, most providers in Portland did not attribute these improvements to CCOs, while providers in Hood River attributed dramatic changes in services and quality of care for their Medicaid-insured patients to how CCOs were conducting business.

This section describes providers’ responses to the overall changes in the health care system Oregon undertook during the SIM Initiative. To assess provider responses to the Oregon’s health system transformation efforts, we conducted focus groups with primary care providers who contracted with CCOs to serve Medicaid beneficiaries and whose practices were located in Portland and rural areas in Hood River and surrounding communities. CCO providers seemed to have embraced the CCM, although their perceptions of the impact CCOs had on how health care was delivered ranged from complete unawareness of CCOs’ potential effects to giving CCOs full credit for transformation that had taken place in their practices and communities.

Primary care providers embraced coordinated care. The majority of primary care providers who participated in focus groups (not all of whom were part of a recognized PCPCH) reported that care coordination had improved significantly in recent years. Providers said they were practicing more preventive and population-based care and working in teams, primarily because of the expansion of ancillary support staff (such as care managers, referral coordinators, behavioral specialists, and community health workers) who managed nonclinical aspects of patient care. Those in larger urban and rural practices reported relying heavily on support staff to make calls to bring patients in for checkups, follow up with patients after hospitalization or ED visit, provide health and wellness education, help patients sign up for benefits and access needed social services and supports, conduct panel management, and perform a host of other services. Physicians appreciated this level of support and said it freed up their time to focus on patients’ clinical issues and be more proactive in preventing complications.

> *I have found it really helpful to have a behaviorist in my office, and also a pharmacist, and also one of our medical assistants is the official care coordinator… So, care coordination, to me these days, really means a team approach*—Focus group provider

> *They [support staff] spend all day on the phone reducing barriers for patients to get their medications, come to their appointments, to take the weight off of us as providers…*—Focus group provider

Some providers in rural areas, however, noted that ancillary health care workers were in short supply. Although on the whole providers were positive about care coordination and team-based care, a few were skeptical about whether these approaches were beneficial in terms of improving care and reducing health care spending.

> *I think that coordination of care is important, but what bothers me is the more people you get involved the coordination becomes fragmented. Because, you've got one patient dealing with four or five different people, and that's difficult*—Focus group provider

Not all providers attributed changes in care coordination to CCOs, with strong differences between providers in urban Portland versus in rural areas. When asked how CCOs had affected care coordination and patient care, most Portland providers who participated in focus groups seemed unsure but a few made the connection to CCOs. Providers from federally qualified health centers (FQHCs) talked about the impact of care coordination through "hot spotting," where a health resiliency specialist, provided by a CCO, was embedded in their clinic to identify and manage some of the most complex and high-need Medicaid beneficiaries. A solo practitioner said that although he was not able to become a medical home, he often connected his high-need Medicaid beneficiaries with care management entities made available by a local CCO. Some Portland providers, however, did not feel that CCOs had made a difference in how they delivered care to Medicaid beneficiaries. One provider said that CCOs were a "brilliant idea" but his practice on the ground had not changed as a result. Others thought CCOs were not good partners in patient care and that getting their Medicaid-insured patients to see specialists had remained difficult, as had obtaining prior authorizations and determining which treatments, services, and prescription drugs were covered by Medicaid plans.

> *I guess I've seen that it's brought in more ancillary staff so we have more clinical pharmacy and we have behavioral health, but they [CCOs] don't really address mental health. I think that's a huge gap in care, especially for our vulnerable patients*—Focus group provider

> *I would say they [CCOs] create barriers to care, not create access to care…By denying claims, denying medications, denying referrals, denying resources*—Focus group provider

In sharp contrast, CCO providers in Hood River and surrounding rural areas who participated in a focus group reported receiving support from their local CCOs and did not hesitate to attribute positive changes that had taken place in their practices and communities to CCOs. They said CCOs were responsive to the needs of their patients and that Medicaid was at the forefront of driving improvements in quality of care for all, not just their Medicaid-insured patients.

> *They've [CCOs have] gotten a lot of money back from meeting quality measures and because of that, we've funded services like health promotion services or veggie vouchers or Meals on Wheels, …we've been able to hire extra staff in part funded by the CCO, so that increases our ability to care for all of our patients, so even people that aren't in Medicaid are benefiting in getting better health care because of the CCO*—Focus group provider

> *I do think, if the objective of the CCO was to transform the care of Medicaid patients and improve it, I would say absolutely…I think if you look at Medicaid pre-Affordable Care Act and pre-CCO … compared to what it is now, it's like the difference between a crappy old Honda and a Mercedes; it's totally different*—Focus group provider

Quality incentive metrics seemed to be driving improvements in how providers deliver care, but not all providers' reactions were positive. Providers treating CCO members talked a great deal about quality measurement and reporting during the focus group discussions. On the positive side, providers felt quality measures made them accountable, helped them identify previously undiagnosed issues, and helped them to understand how well they were providing care and where improvements could be made.

> *I would assume I was taking good care of my diabetics, but I would have no idea if that was true or not… but it's really getting the feedback [from performance reports]*—Focus group provider

In other instances, quality measurement and reporting were often a source of frustration for providers for multiple reasons. Some providers felt it was extra work and that filling out forms and checking boxes had taken up time that could be spent with patients; others thought "chasing metrics" had sometimes forced them to do things that were not clinically necessary, such as administering a screening to a patient who had already been diagnosed to meet the screening targets. There were also complaints about the accuracy of measures and providers being held accountable for things that were out of their control (e.g., the patient's situation or behavior). Some expressed frustration when the scores did not reflect the work providers put in. Providers also felt that there were too many metrics to focus on and that the metrics changed too often.

> *There is a bit of frustration, I think, in that there is form fatigue of patients filling out forms, checking off boxes, looking at measures, and it takes away from me sitting down and talking to the patient…*—Focus group provider

> *Some of the measures were things that were very game-like. You had to screen x number of people with x number of dot-phrases.*[82] *You were doing medical work, but you could kind of game it*—Focus group provider

> *They give me my list of my uncontrolled diabetics, and you look at the list and you're like, "Not a medical problem." There were 12 of them and each of them… There was nothing on this list that I could do, short of going to their house and injecting their insulin for them*—Focus group provider

When asked whether providers thought quality measures had changed their behavior, they were unsure how to respond and whether the same type of attention would be paid to patients were there no metrics. One provider said having the data made a difference and that just the mere act of measuring something and having those results did force change. This provider also pointed out that it was not the provider who changed but the health care system itself.

> *When you say, "change provider behavior" I think that's really interesting too, because most of the metrics that we focus on aren't a provider doing anything differently, it's the system and how we engage with people. So, what I'm doing hasn't changed very much, but the fact that they are calling patients in and telling them that I have a dedicated community health worker that can explain why colon cancer screening is important, that I have an MA [medical assistant] and a whole system of tracking those results, that's all changed because of the metrics. I don't know that what I'm doing has changed that much.*—Focus group provider

E.3.3 How were stakeholders engaged in Oregon's SIM Initiative?

KEY INSIGHTS

- Relying primarily on the Transformation Center as the hub for the state's health system reform efforts, stakeholders were engaged in Oregon's health care transformation through a variety of methods, including summits, technical assistance, collaboratives, and CCOs' Community Advisory Councils.
- Throughout the SIM Initiative, the state actively engaged providers via the PCPCH program. The state also convened several workgroups to solicit stakeholder input into direction and scope of health system transformation activities.
- Although most stakeholder interviewees thought the Transformation Center and the state were effective in engaging stakeholders, some pointed out that the loss of leadership at the governor's level had dampened the spirit of those involved in Oregon's SIM Initiative. In addition, some consumer groups and social service stakeholder groups reportedly had limited or no access to state policymakers.

In this section, we briefly describe the SIM Initiative governance structure and present the main findings from Oregon's efforts to engage a wide range of stakeholders in the SIM Initiative. OHA was responsible for managing the SIM Initiative activities under the direction of

---

[82] "Dot phrases" is an electronic medical record term for commonly used shorthand abbreviations.

the Oregon Health Policy Board, the policy-making and oversight body of OHA. Most state agencies involved in the SIM Initiative operated within OHA, including the Office of Health Analytics, the Office of Information Systems, the Office of Health Equity and Equity Coalitions, the Public Health Division, PEBB, and OEBB. In addition, OHA has housed the Transformation Center, which as mentioned above was a major SIM-funded activity designed to support Oregon's efforts to achieve better health, better care, and lower costs through convening stakeholders and facilitating the spread of innovative practices. The PCPCH program, also within OHA (moved under the directorship of the Transformation Center in 2016), has focused on engaging primary care providers in the PCPCH model. Although the governance of the SIM Initiative was solely in the state's hands, Oregon solicited input into its SIM activities from non-state stakeholders through numerous workgroups.

Throughout its SIM Initiative, Oregon engaged stakeholders mainly through the Transformation Center, which has served as the hub of state health system transformation activities. Over the years, the Transformation Center has engaged CCOs, providers, payers, and consumers who sit on CCOs' CACs. The Transformation Center has used a variety of strategies to involve stakeholders. Some of these strategies included facilitating CCO learning collaboratives, convening the Primary Care Payment Reform Collaborative, and hosting three annual CCM summits that gathered stakeholders from across the state to discuss the CCM and health care transformation in Oregon. In addition to the Transformation Center's activities, consumers have been engaged in the CCM through CACs, which are designed to bring the consumer voice and perspective to the CCO. Each CCO is contractually required to have at least one CAC, and the Transformation Center convened a CAC Learning Community to assist CCOs with recruitment and retention of CAC members.

Through the Transformation Center, Oregon has convened a wide range of stakeholders to support CCOs and to spread the CCM as part of the SIM Initiative. As one stakeholder said, with change "there's always resistance. There's always an inertia of change. I think that is why SIM was so successful, because it helped to make the transition from the old world, from the siloed health plans, to start to work together and show them how to do so." To that end, the Transformation Center hosted events and collaboratives targeted at CCOs, providers, payers, and consumers. It has provided technical assistance to CCOs through the Technical Assistance Bank, for example. The Transformation Center has also begun to directly engage primary care providers through recently absorbing the PCPCH program, which administers the PCPCH certification process and conducts verification site visits that include a technical assistance component.

A principal way consumers have been engaged in the CCM is through the CACs, but there were mixed views among informants on how effective the CACs have been. Although many stakeholders felt that having CACs was important, "they are not yet living up to their promise" as one non-state interviewee opined. In part, this was attributed to the legislation around CACs being too vague. The circumscribed role of some CACs was also attributed to how seriously individual CCOs had taken the CACs, which was characterized as varying widely. In some instances, CACs were described as having a big influence on how the CCO made some of its decisions but in other CCOs, the CACs have had virtually no influence at all. One consumer interviewed said that in some parts of the state, the CCOs did not respond to even basic enquiries about who was on the CAC. The state was aware of the issue and was working to "help CACs keep the consumer voice at the table," with support from the Transformation Center. For example, in August 2016 the Transformation Center held a recruitment and retention event for CAC members. The event brought together 63 members from all 16 CCOs, with the goal of identifying successful strategies to engage and recruit CAC members.

To engage payers, the Transformation Center convened the Primary Care Payment Reform Collaborative in 2016, as mandated by Senate Bill 231. The Collaborative's primary directive was to advise the legislature on how to facilitate health care innovation and care improvement in primary care. A wide range of stakeholders were engaged to participate, including primary care providers, consumers, employers that offer self-insured health plans, CCOs, private payers, and the state. The Transformation Center convened the Collaborative in April 2016 and has continued to meet in 2017. In general, informants thought the state had identified the right stakeholders, and that the Collaborative helped to build relationships, although one payer said that "at times I felt there were too many voices around the table and …initiatives [got] watered down."

A primary way Oregon has engaged providers in the CCM has been through the PCPCH program. State officials maintained that the PCPCH program, which was moved into the Transformation Center in 2016, has not only been effective at certifying practices, but also at offering the state an opportunity to directly engage with primary care providers about the CCM and the goals of the SIM Initiative to improve health and quality of care at lower costs. The state officials believed that the "continual and consistent touches with providers" afforded by the PCPCH certification process and verification site visits have helped build trust between the state and providers. A provider group representative echoed this sentiment, particularly highlighting that the state had effectively engaged primary care providers in defining and refining the PCPCH model at different junctures. Furthermore, by designating the PCPCH model as the foundation for the spread of the CCM and incentivizing CCOs and PEBB/OEBB plans to use PCPCHs (i.e., one of the quality metrics is the share of members enrolled in PCPCHs), the state had created an environment that encouraged providers to seek PCPCH recognition.

Although interviewees felt that the state did a good job of engaging stakeholders in transformation work, some felt that not all stakeholder groups had the same access to the state. Over the SIM Initiative test period, Oregon engaged providers, payers, consumer advocates, and other stakeholders in Oregon's health care reform efforts through numerous workgroups, including the Sustainable Health Care Expenditures Workgroup, PCPCH Standards

Advisory Committee, Metrics and Scoring Committee, and Coordinated Care Model Alignment Work Group. However, stakeholders “outside of the inner circle of the health care sector” (as one interviewee put it), did not necessarily have access to the state in shaping health policy through workgroups or otherwise. These included some consumer advocacy groups, dental providers, and groups engaged in social determinants of health work like housing agencies and social services. Further, regarding the inadequate resources and influence CACs may have had in CCOs, one consumer noted, “I have seen responses to our concerns but not changes in policy.” Two non-state interviewees involved in dental and behavioral health observed that with the implementation of CCOs, which integrated contracting of physical, behavioral, and eventually dental health care into a single entity, they lost their direct link to the state that they had historically. Since then, if a matter has needed attention these interviewees needed to go through the CCO, the entity that holds the contract with the state. Although they understood the change, it removed them from direct contact with the state.

Several interviewees remarked that state leadership and vision for reform had diminished since 2015. The decline in health care leadership and vision was almost exclusively attributed to the 2015 resignation of Governor John Kitzhaber. Following his resignation, there was a “large brain drain” and since that time “a lack of visionary leadership” as one non-state interviewee put it. “This has affected engagement in transformation in that it is difficult to sustain interest and momentum if stakeholders do not feel it is going anywhere.” Although Governor Kate Brown was lauded by many stakeholders for generally continuing with the pathway set by her predecessor, several interviewees commented that Oregon health care transformation changed. As one non-state interviewee said, unlike Governor Kitzhaber, Governor Brown “is not out there pushing people around health care….that’s the reality around state government.”

E.3.4 How was behavioral, oral, and social services integration with primary care tested in Oregon?

KEY INSIGHTS

- Although progress was made over the last few years, integration of behavioral health and primary care is not consistent across CCOs. The integration of dental health and primary care is at an early stage of development.
- The Housing with Services program, supported in part by the SIM Initiative, successfully integrated health care with social services and housing and became a promising model for addressing social determinants of health—possibly a new focus for Oregon in promoting whole-person care.

In this section, we provide a brief background and present findings from Oregon’s SIM Initiative efforts focused on integration of behavioral, oral, and social services with primary care. The 2011 authorizing legislation establishing CCOs required these CCOs to integrate physical, behavioral, and dental care (House Bill 3650). Although CCOs met their legal requirement to establish contractual relationships with behavioral health and dental health providers, integration of care delivery at the practice level varied for behavioral health and was at an early stage of development for dental health integration. The implementation of primary care and behavioral health integration within CCO primary care practices took various forms, including coordination between primary care practices and off-site partners, co-location with a behavioral health provider on-site but working in a separate medical record system, and full integration wherein a behavioral health provider was on-site and on-staff (paid for by the clinic or directly by the CCO) and working within the same medical record system. Both behavioral health–related CCO quality metrics and PCPCH certification requirements related to behavioral health were credited with helping to build momentum around the integration of behavioral health and primary care; however, the lack of supporting payment models remained an obstacle. Oregon used SIM funds to support integration efforts through technical assistance provided to CCOs by the Transformation Center, which received positive feedback from providers and other informants. In addition, Oregon used SIM funding to support the HWS program, a pilot program viewed by state officials as a successful model for the integration of health care with social services and housing to address social determinants of health.

Although there was increasing attention focused on achieving primary care and behavioral health integration, implementation varied across CCOs. One state official stated that although Oregon stopped contracting separately with mental health managed care plans following the launch of CCOs, some CCOs continued to rely on those same behavioral health organizations to administer behavioral health benefits. The state official described the administration of those behavioral health benefits as sometimes remaining "pretty carved out." Another state official described the level of progress in behavioral health integration at CCOs as follows: "Now the CCOs pay for it [behavioral health], but in some regards those contractual relationships haven't changed dramatically, and that is our next focus. There are a few CCOs that have tried to implement value-based payment with their behavioral health organization and that work is starting. Others have taken longer and it has been harder."

Demand for primary care and behavioral health integration was gaining momentum, in part because of CCO quality metrics. One CCO interviewee described the attention to integration as having "crossed a tipping point." This sentiment was shared by a state official who said "I've seen more integration of behavioral health in the past few years than I have in my entire 18 years in health care." Evolving norms among providers were furthering that trend. One provider noted that new medical residents coming onto the job market "won't consider a job that doesn't have an integrated behavioral clinician" and there was a shift among providers from wondering "why do we need one of these people" to seeing the value of behavioral health providers in primary care clinics and wanting more. These sentiments were echoed in provider focus groups, with most primary care providers reporting having behavioral health specialists in their clinics and praising their role in patient care. State officials cited behavioral health–related CCO quality metrics such as SBIRT (Screening, Brief Intervention, and Referral to Treatment) as important drivers for increasing focus on integration. One state official put it this way: “Clinics quickly learned that if you are screening everyone for drug and alcohol abuse and you don’t have anyone on staff remotely prepared to have behavior change conversations with people that is a problem. Some of those CCO metrics helped people see how having in-house behavioral health would make a difference. You can’t achieve the CCO metrics without doing that.”

At the clinic level, PCPCHs helped advance behavioral health integration both within clinics and beyond. Integration of behavioral health services was a “must-pass standard” for a practice to be certified as a PCPCH,[83] and to be certified at the highest tier (Tier 5), a practice must have fully integrated behavioral health on site. One state official credited the state’s SIM Initiative and its support for PCPCH for not only spurring integration within clinics, but also for helping to build the relationships necessary to coordinate behavioral health care required outside of the primary care setting, such as following up on referrals to specialists. This official said, “People have … started connecting outside of practice walls. The first couple of years, people were figuring out teams and quality improvement within a clinic. I think a lot more now people have success stories about working with players outside their practice.”

Oregon supported CCOs’ primary care and behavioral health integration efforts through technical assistance provided by the Transformation Center and received positive feedback from stakeholders on those efforts. The technical assistance offerings were informed by a series of one-on-one meetings between the Transformation Center and the CCOs, which were completed in the first half of 2016. One of the main goals of these meetings was to get feedback on where to focus targeted future technical assistance related to behavioral health integration. According to one state official, this series of meetings not only helped inform topics of most interest for technical assistance (e.g., metrics and payment), it also signaled to CCOs the need to prioritize behavioral health integration and created an opportunity to further the intra-CCO relationships necessary for successful integration. In September 2016, the Transformation Center launched a behavioral health integration resource library[84] including virtual site visits and expert interviews. It has also maintained a Technical Assistance Bank and contracts with experts whom CCOs can access for assistance when needed. In March 2017, the Transformation Center convened a 1-day event focused on behavioral health integration specifically for those with severe and persistent mental illness (Oregon Health Authority, n.d.). The event attracted 124 attendees and garnered positive ratings, suggesting a demand among providers for opportunities to make the connections necessary to serve this population with complex needs. As noted earlier, although stakeholder opinions on the overall impact of the Transformation Center were mixed, some stakeholder interviewees thought the Transformation Center was helpful in promoting behavioral health and primary care integration. State officials shared the following insights on

---

[83] For further details on PCPCH certification related to behavioral health integration, please see page 50 of the technical manual at https://www.oregon.gov/oha/pcpch/Documents/TA-Guide.pdf.

[84] See https://www.PCPCI.org/BHRL.

lessons learned from providing technical assistance on primary care and behavioral health integration:

- It is not sufficient to merely add a behavioral health provider to clinic staff. Technical assistance and guidance on how to best integrate these providers into the clinic workflow is required to ensure that they are used effectively.
- At the clinic level, it is most helpful to providers to learn best practices related to integration from their peers (i.e., from other providers).

Looking forward, the state was planning to sustain its efforts to support primary care and behavioral health integration through technical assistance by maintaining staff at the Transformation Center with this responsibility. Behavioral health integration was also a focus of Oregon's Medicaid demonstration waiver renewal that was approved by CMS in December 2016 and will run through 2022. There were also other initiatives in the state beyond the SIM Initiative likely to keep the momentum going forward, such as ongoing work to develop standards for behavioral health homes.

Several CCOs reported that alternative payment models and data infrastructure investments were needed to support primary care and behavioral health integration. CCOs stressed the importance of having a payment model that supported behavioral health integration, and some were prioritizing the development of such a model. CCOs are required to implement at least one alternative payment model for how they pay their providers, and several focused their efforts on behavioral health integration. For example, one CCO was using some of its revenue from meeting quality incentive measures to pay bonuses to behavioral health providers who met outcome-based care targets tied to case rates. Data sharing is crucial to successfully implement alternative payment models, but both state officials and CCOs identified the sharing of behavioral health data as a challenge. According to one CCO official, "We are asking these institutions to play at the same level and at the same level of sophistication with data, but they didn't have the same kind of federal support to do that. Maybe we need to provide some of those capabilities and attestation that helped drive the innovation in primary care to them [behavioral health providers]."

The need for multi-payer alignment to support successful primary care and behavioral health integration was highlighted in one of the recommendations to the Oregon Health Policy Board issued in December 2016[85] by the Primary Care Payment Reform Collaborative. The recommendation called for payers to develop value-based primary care payment models to promote greater integration of behavioral health and for developing technical assistance to providers to support successful integration.

---

[85] For full recommendations made by the PCPRC to the Oregon Health Policy Board see http://oafp.org/assets/SB231-PCPRC-OHPB-Recommendations-FINAL.docx

Project ECHO

Oregon invested SIM resources to advance behavioral health and primary care integration through Project ECHO (Extension for Community Healthcare Outcomes). Project ECHO is a national hub and spoke tele-mentoring model whereby specialists (the hub) connect with primary care providers (the spokes) through videoconferencing. Project ECHO sessions may last an hour or two and typically include a didactic presentation by the specialist(s) followed by case-based learning. The primary care providers retain responsibility for the care of their patients. The Transformation Center cited Project ECHO-related efforts to help stakeholders use telehealth as one of their major accomplishments. The two SIM-supported Project ECHO initiatives were an infrastructure project (including a team-based care ECHO pilot program) and a child psychiatry project.

Infrastructure

With SIM funds, the Transformation Center contracted with the Oregon Practice-based Research Network to conduct the Oregon Project ECHO Infrastructure Project. Project ECHO infrastructure-building efforts included a team-based care ECHO pilot program for 30 participants across eight practices working to integrate behavioral health and primary care services. This five-session pilot covered topics such as team attributes, roles and goals, financial sustainability, and chronic pain management in primary care. Evaluation through post-session surveys indicated high levels of participant engagement and satisfaction.

Child Psychiatry Consultation Clinic

With SIM funds, the Transformation Center contracted with Oregon Health and Science University to conduct a child psychiatry project with 27 participants from 17 rural clinics. Forty percent of the clinics were located 50 miles or more from a pediatric inpatient facility. The project spanned 30 sessions from August 1, 2016, to March 30, 2017. Topics include child psychiatric assessment, psychotropic prescribing, specific mental health issues, and making referrals. The evaluation process included pre-, mid-, and post-program participant surveys and demonstrated rising comfort levels in assessing and treating mood and behavior disorders. Participants also reported a high degree of learning across various topics. The topic for which the highest percentage of participants (89 percent of participants) reported a high degree of learning was screening for patients with mental health disorders. The lowest percentage of participants (39 percent of participants) reported a high degree of learning for the topic on prescribing and managing medications for co-occurring mental health and substance use.

The growing momentum for primary and behavioral health integration in CCOs was not reflected in dental health integration. Although CCOs were required to establish contractual relationships with dental care organizations as of July 1, 2014, those contractual relationships did not yet translate into integration on a clinical level. Under the direction of the state's first ever Dental Director, hired in 2015, the state invested SIM funds in technical assistance contracts to produce several resources to help spur greater dental integration activity: (1) an environmental scan of local and national initiatives to integrate oral health (Health Management Associates, 2016b), (2) a toolkit to support oral health integration published in November 2016 (Health Management Associates, 2016c) and (3) the Oral Health Roadmap report prepared for the OHA in December 2016 (Health Management Associates, Artemis Consulting, 2016). There was additional SIM-funded work, still in progress as of April 2017 to develop consumer messaging on the importance of oral health and to translate it into five languages.

Challenges to dental health integration under CCOs include resistance by dental providers, cultural differences between primary care and dental practice, and the lack of metrics to motivate dental integration. Stakeholders reported resistance by dental providers to being included under the CCOs' global budget because of concerns about losing their autonomy. Several state officials also pointed to the existence of cultural differences between primary care, which is increasingly team-based oriented, and dental care, in which the solo practitioner model prevails, as a barrier to integration. Although CCO metrics were credited with helping to advance behavioral health integration, one provider argued that the existing dental-related measures (Mental, Physical, and Dental Health Assessments within 60 Days for Children in Department of Human Services Custody and Dental Sealants on Permanent Molars for Children Ages 6–14) did not necessarily encourage primary care providers to integrate dental health and that integration-focused measures were necessary to help motivate change. Looking beyond the SIM Initiative, the state was considering a series of meetings with CCOs focused on dental integration, similar to the successful series of meetings focused on behavioral health integration in 2016, and it was planning to offer targeted technical assistance through the Transformation Center based on recommendations from the environmental scan report (Health Management Associates, 2016b).

Interest in integrating services to address social determinants of health was growing. Several stakeholders commented that there was a growing recognition around the state about the impact of social determinants of health on outcomes and spending, with some CCOs and health systems piloting efforts to address patients' nonclinical needs such as housing, food security, and other social risk factors. One CCO, for example, was providing "health resiliency" workers to primary care practices to work with high users and address some of the underlying causes for frequent ED visits and hospitalizations, which often are tied to social and economic issues. A non-state stakeholder also reported that about half of CCOs had developed projects around housing assistance. One state official thought that integrating services to address social determinants of health should be the next big push for CCOs, in addition to behavioral and dental health integration, although technical assistance and other support for this work may be limited because of the SIM award ending.

State officials viewed the HWS program as a successful example of health care and social services integration. HWS brings together housing, social services, and health care providers to integrate and coordinate health care and social services for low-income seniors and people with disabilities residing in 11 affordable housing buildings in downtown Portland. The SIM Initiative provided startup funding that supported the program design and launch and paid for staff salaries and contracts with social service providers in the first 2 years of the program. According to some state officials and stakeholder interviewees, HWS had become "a national example" of a successful integration of health and social services to meet the needs of vulnerable populations. A HWS evaluation report, also funded through the SIM Initiative, indicated that program participants were more likely than those residents who never used the HWS program to use preventive and mental health services, had better access to LTSS, and experienced less food insecurity (Institute on Aging, Portland State University, 2016).

HWS participants in focus groups were generally very pleased with assistance and services made available in their buildings as part of the HWS program, particularly those who had previously had a difficult time navigating the health care system because of social or language barriers. Many appreciated educational seminars, exercise classes, volunteering opportunities, and other activities promoting social interactions provided through HWS.

> *Before I lived in the [one of the buildings], I didn't care about anybody or anything anymore. I was ready to give up. Now I care. I help people in my building that can't help themselves and it makes me feel good*—HWS consumer focus group participant

E.3.5 How were quality measurement and reporting strategies tested in Oregon?

KEY INSIGHTS

- Oregon developed and has continued to update a standard set of performance metrics for CCOs, which stakeholders almost universally identified as changing how health care is delivered by providers participating in CCOs.
- Oregon has been trying to align performance measurement across all payers delivering the CCM as a critical step in sustaining momentum in changing practice to improve quality of care delivery, but progress has been slower than expected.

This section contains findings from Oregon's SIM Initiative quality measurement strategy, which builds on the measurement strategy that was developed for CCOs under its Medicaid Section 1115 waiver: (1) CCO performance measurement and reporting and (2) the alignment of quality metrics between CCOs and health plans participating in the CCM. With SIM support of the Transformation Center and the All Payers All Claims (APAC) database, the Metrics and Scoring Committee, whose members represent payers, providers, consumers, and experts in health outcome measures, was charged by 2012 legislation with developing a robust set of performance metrics. SIM-funded Transformation Center activities were particularly focused on assisting CCOs to improve their performance on the common set of metrics. The newly formed Health Plan Quality Metrics (HPQM) Committee was charged by legislation passed in 2015 (Senate Bill 440) with identifying quality measures that may be applied to services provided by CCOs and plans offered by PEBB and OEBB and those sold on Oregon's health insurance marketplace. The Committee began working on aligning health outcome and quality measures used in Oregon to ensure that the measures and requirements are coordinated, evidence-based, and focused on promoting the state's goals of better health, better care, and lower costs.

Oregon's system of performance metrics was widely credited with changing health care delivery among providers participating in CCOs. State officials, CCO leadership, and other stakeholders identified the performance metrics by which all CCOs are evaluated, and which directly affect payments they receive, as promoting desired changes in Oregon's health care delivery system. CCOs will eventually have 5 percent of their revenue withheld, pending the achievement on benchmarks set by the Metrics and Scoring Committee. ***Table E-4*** lists the CCO performance metrics being used for 2016. State officials and CCO executives reported that early on, the focus of CCOs was simply meeting the benchmarks to qualify for payment from the "quality withhold pool,"[86] and part of the SIM-funded Transformation Center mandate was to help CCOs with that task. There was originally skepticism within CCOs about the value of some measures on topics such as effective contraception use and developmental screenings, but some of that resistance had softened and some CCOs began to see value in previously discounted measures. The presence of these unfamiliar measures also fostered partnerships between health care providers and other social services, an important goal of the designers of CCOs.

---

[86] Depending on their performance on predetermined incentive measures, CCOs are eligible for payments from a quality incentive pool, which is funded by withholding a certain percentage of the CCO's global budget funds.

Table E-4. 2016 CCO incentive metrics

- Adolescent well-care visits
- Alcohol and drug misuse (SBIRT)
- Ambulatory Care: emergency department utilization
- CAHPS composite: access to care
- CAHPS composite: satisfaction with care
- Childhood immunization status
- Cigarette smoking prevalence
- Colorectal cancer screening
- Controlling high blood pressure
- Dental sealants on permanent molars for children
- Depression screening and follow-up plan
- Developmental screening in the first 36 months of life
- Diabetes: HbA1c Poor Control
- Effective contraceptive use among women at risk of unintended pregnancy
- Follow-up after hospitalization for mental illness
- Mental, physical, and dental health assessments within 60 days for children in the Department of Human Services custody
- Patient-Centered Primary Care Home enrollment
- Timeliness of prenatal care

CAHPS = Consumer Assessment of Healthcare Providers and Systems; CCO = Coordinated Care Organization; HbA1c = Hemoglobin A1c; SBIRT = Screening, Brief Intervention, and Referral to Treatment.

One example highlighted by a CCO executive was developmental screenings. Originally this measure was viewed as outside of the purview of the health care sector, but as the CCO worked to meet its benchmark, CCO staff were required to interact with the education system. As the executive put it, "[W]e're working on metrics about developmental screening and kids in foster care immunizations and we're starting to see this obvious connection where if we want to deal with high utilizers we have to deal with early life health and prevention and how we care for these clients in order to avoid future high utilizers. Those parallel paths worked very well to drive us into this space. I don't think we would have gotten there without those metrics—they've been very effective."

Similar statements about the impact of metrics on changing perspectives at the practice level were reported about measures of effective contraceptive use and substance abuse screening. On the latter, as highlighted in ***Section E.3.4*** above, one state official noted that the effect of the CCOs trying to meet their benchmark for the SBIRT measure was driving awareness of the importance of behavioral health integration with primary care. Providers in focus groups generally agreed that CCO metrics forced them to focus more on preventive care and behavioral health issues and were responsible for driving quality improvement processes. Another example of a performance metric used to achieve integration of previously siloed sectors is the recently added tobacco prevalence metric, intended to align population health goals and clinical care goals for reducing tobacco use. The CCO metrics have been revisited periodically, allowing the state to revise and add new metrics that promote better coordination of care across sectors.

Not all CCOs were entirely sold on the effectiveness of some metrics, however. An example given by one CCO executive was the new childhood immunization measure, which relied on outdated state data reporting in systems not linked to electronic medical records. This disconnect made it unlikely that the performance metric would drive provider behavior in real time, because providers would not be able to assess their performance on this metric periodically.

The use of quality incentives to drive behavior at the provider level was growing, but still uneven. As discussed in ***Sections E.3.1*** and ***E.3.4*** above, the use of alternative payment models by CCOs was growing slowly, was not yet widespread, and typically fell short of strong value-based payment. In focus groups, providers who contracted with CCOs were aware of the metrics that CCOs were working on because providers often got reports on their own performance, but only some providers reported that CCOs passed down the incentives they received from the state to them for meeting the quality metrics.

Alignment of metrics across payers other than Medicaid was viewed as a critical lever to sustain momentum for changing care delivery. Some external stakeholders were disappointed at the pace of alignment efforts, which originally had been slated to have occurred already, and as introduced in 2015, SB440 would have required OEBB and PEBB plans to align their quality metrics in January 2016. The legislation as passed, however, delayed implementation of the measure alignment for PEBB, OEBB, and marketplace plans until January 2018. The HPQM Committee, which began its work early in 2017, has been developing the quality measurement strategy to be implemented at that time. Although PEBB and OEBB plan quality metrics aligned with CCO metrics to some extent, providers in focus groups were frustrated by having multiple sets of metrics from different plans. These providers also reported that they focused more often on metrics that had incentive payments tied to them.

E.3.6 How were health IT and data analytic infrastructure implemented in Oregon?

KEY INSIGHTS

- SIM investments made the Emergency Department Information Exchange (EDIE) and PreManage available to providers and CCOs across the state and were widely viewed as successful health IT projects and important for advancing coordinated care.
- Stakeholders, however, had mixed views on other health IT and data analytic initiatives supported in part by the SIM Initiative, most notably Care Accord and the APAC database.
- The SIM award also provided support for telehealth pilot projects to increase specialty provider capacity in rural areas of the state.

In this section, we present findings from health IT and data analytic infrastructure developments Oregon undertook as part of its SIM Initiative. A portion of SIM resources was dedicated to supporting development of health IT capacity and telehealth initiatives to aid providers in improving the way care is delivered. Since the SIM Initiative implementation began, these efforts included implementation of EDIE and its companion tool, PreManage; development of a direct secure messaging platform in Care Accord; and telehealth pilots.

Spreading EDIE and PreManage was the biggest health IT accomplishment of the Oregon SIM Initiative. EDIE was designed to collect and share ED and inpatient admission, discharge, and transfer data among hospitals, and to help hospitals identify patients who use EDs often or have complex health needs and direct them to more appropriate care settings. All hospitals in the state are now connected (Oregon Health Leadership Council, 2017). Oregon also encouraged the use of PreManage—a subscription-based tool allowing subscribers (such as health plans, CCOs, and providers) to view their members'/patients' information in EDIE and receive real-time notifications when a member/patient uses the ED. Under the enhanced subscription of PreManage, users could also upload patient information so hospitals may divert patients frequently presenting in the ED to their primary care provider when appropriate. State officials viewed these tools as successful, and both CCOs and primary care providers who used them gave the tools high marks. One CCO in the Portland area found PreManage particularly helpful in caring for its members with behavioral health problems. However, at least one CCO wanted more data than what EDIE and PreManage offered and was looking for ways to expand its own health information exchange (HIE) systems to include not just the ED data but the entire community health record to enable providers to see the full picture and inform their decision-making on appropriate care when they received ED visit alerts.

CareAccord, a state-administered health information exchange product supported by the SIM Initiative, did not find a receptive user base. CareAccord is an HIE system that provides a secure messaging platform to facilitate provider-to-provider communication and secure sharing of patient information for care coordination, referrals, and follow-up care. Stakeholders generally did not think CareAccord had been embraced by a large enough group of providers to be an effective HIE tool. Although all were aware of its existence, there was general agreement that CareAccord was not being widely used outside of FQHCs. Many providers in focus groups reported using a competing electronic health record product, Epic, which offers a platform similar to CareAccord (called Care Everywhere) that enables providers to communicate and exchange patient data with other Epic users.

The APAC database, although successfully implemented with the help of SIM funds, did not find a broad user base outside of OHA. The state found the APAC database useful in policy analysis and in writing reports. Specifically, Oregon funded researchers at Portland State University to evaluate the impact of the PCPCH program using the APAC data. The data were also used in a related analysis reported on in ***Section E.4*** below and will be the source of ongoing work for this evaluation through next year. CCOs we contacted did not find a need for APAC data, because they had their own data systems with more detailed data from medical records and the capacity for analyzing them internally. From the state's perspective, however, having data beyond the Medicaid program was important, especially as Oregon seeks to expand the CCM to other payers.

Telehealth projects were of use largely in rural areas of the state where providers are geographically dispersed. The state supported five telehealth pilot projects that aimed to increase access to specialty services in these areas, mostly through videoconferencing. The pilots launched between May and October 2015 and concluded by June 2016. Project focus areas included (1) dementia care using telemedicine technology, (2) dental care for school-aged children delivered by telehealth dental health teams, (3) medication management consultations via videoconferencing for people living with HIV/AIDS, (4) videoconferencing mental health services for children, and (5) reduction of hospital readmissions through enabling community paramedics to communicate in real time with an at-risk patient's provider. One CCO interviewee found the psychiatric telehealth project particularly useful for expanding access to psychiatric services in a rural area.

Most investments in health IT made with SIM funds were viewed as one-time expenditures or startup funding, but some projects will be sustained by other sources. All SIM-funded health IT activities other than CareAccord and telehealth pilot projects have other funding sources identified by OHA. EDIE will be supported using a utility model funded jointly by CMS and the state.[87] PreManage secured ongoing funding through a CCO and health system subscription model. No plans were in place for the continued support of CareAccord at the time of our site visit. Telehealth pilot projects were one-time grant opportunities.

---

[87] The Medicaid share is supported by Medicaid federal matching rate and the state matching comes from $3.0 million in transformation funds, available through 2018. Oregon plans to cover the state match after 2018 from state general funds.

Telehealth Projects in Oregon

In partnership with the Office of Rural Health, the Oregon SIM Initiative awarded grants ($272,000 in combined funding) to five telehealth projects to test innovative approaches aiming to improve care coordination and increase access to specialty services for vulnerable and underserved populations in Oregon. Although the formal evaluation of the telehealth pilots is pending, below are brief descriptions and preliminary findings from each project:

Alzheimer's Care via Telemedicine by the Layton Aging and Alzheimer's Disease Center at OHSU piloted a direct-to-home telemedicine program to (1) test the reliability of measures used to assess patient and caregiver well-being via telemedicine, and (2) establish the feasibility and usability of direct-to-home video dementia care using telemedicine. During the project, four providers completed virtual visits with 37 patients and their caregivers. Preliminary results indicated that clinical assessments via telemedicine technology were reliable except in acute situations and that pilot achieved 98.2 percent feasibility. In addition, both providers and patients expressed high levels of satisfaction with telemedicine care.

Community Paramedic Services project sought to reduce hospital readmissions because of lack of post-discharge follow-up with a primary or specialty care provider. Adventist Tillamook Medical Health Group put high-speed data connectivity and tablets in each ambulance to enable community paramedics who visit patients identified as at-risk for hospital readmission to communicate directly with the patient's care coordinator or provider to help patients manage their follow-up care at home. More than 40 high-risk patients enrolled in the project and the paramedics conducted 29 home visits by early June 2016.

HIV Alliance telehealth project worked to increase access to care for people living with HIV in rural Oregon by enabling pharmacists to video-conference with rural patients to provide regular education and consultations focused on medication adherence and coordinate with patient providers to optimize HIV antiviral therapy and medications for other comorbidities. The pilot showed improvements in viral load and medication adherence among participants and improved communication among providers. Additionally, patients were very satisfied with their care.

Tele-psychiatry pilot run by Trillium Family Services aimed to improve access to mental health services for vulnerable children in rural Oregon by providing psychiatric assessments, follow-up and medication management via telehealth for children discharged from residential treatment and children in rural areas who have limited access to outpatient psychiatry services. The telehealth approach experienced significant resistance from eligible clients and the project fell well short of established targets, with only one child served upon discharge and 11 children served in school-based settings.

Virtual Dental Home was a partnership between University of the Pacific, OHSU and Capitol Dental Care to test the effectiveness of tele-dentistry model for Kindergarten-second grade children in Polk County. This approach allowed a remotely located dentist to see patients (via video-conferencing) at a different location with help from the Expanded Practice Dentist Hygienist. Early results showed that preventive services were delivered to 415 students in their schools, with almost half (47 percent) not needing follow-up care.

Sources: http://www.oregon.gov/oha/HPA/OHIT/Pages/Telehealth-Pilots.aspx;

https://www.ohsu.edu/xd/outreach/oregon-rural-health/about/rural-health-conference/upload/Thursday-3-30-Telehealth-Innovation-in-Rural-Oregon.pdf;

https://nosorh.org/wp-content/uploads/2016/08/Oregon-Office-Innovative-Mental-Behavioral-Telehealth-Models-Meredith-Guardino.pdf

E.3.7 How were workforce development and practice transformation strategies implemented in Oregon?

KEY INSIGHTS

- The state has made substantial investments of SIM funds in practice transformation support to CCOs through the Transformation Center, and providers via the PCPCH program and Patient Centered Primary Care Institute (PCPCI).
- The SIM Initiative also sponsored several workforce development activities ranging from training health care interpreters to cultivating the next generation of health equity and innovation leaders, but Oregon also leveraged non–SIM-funded workforce development initiatives to advance the SIM goals and address provider shortages in the state, most notably the expansion of traditional health workers.

This section provides a brief background on and key findings from the workforce development and practice transformation initiatives supported by Oregon's SIM funds. Encouraging and supporting ongoing transformation in Oregon's 16 CCOs and in primary care practices was the cornerstone and major focus of the state's SIM Initiative. Over the period of April 2016 through April 2017, SIM funds continued to support the Transformation Center and the PCPCI, which were established to assemble resources and expert knowledge and provide technical assistance, training, and networking opportunities to CCOs and primary care providers. The SIM Initiative also partially funded the PCPCH program staff who conduct verification site visits with recognized PCPCH practices (because PCPCH certification is obtained through self-attestation). As part of these site visits, practices receive hands-on practice coaching and technical assistance on implementing the PCPCH model. One state official reported that the technical assistance component had become valued by providers, to the point where some clinics began requesting the verification site visits.

Oregon did not produce a SIM Workforce Plan, but the health care workforce development activities supported by the SIM Initiative complemented other state strategies aimed at increasing workforce capacity and developing a new line of health care workers and leaders to realize health system transformation. The SIM Initiative, via the Transformation Center, funded three cohorts of the Council of Clinical Innovator Fellows who received financial support and technical assistance in implementing innovative health system transformation projects in their communities. The SIM Initiative also supported two cohorts of the Developing Equity Leadership through Training and Action (DELTA) program, which provided health equity-focused training, coaching, and networking to health, community, and policy leaders. Regional Health Equity Coalitions, which are cross-sector coalitions working with CCOs, local health departments, and other public systems on developing policy- and system-level strategies to eliminate health disparities, were also partially SIM-funded. Finally, the SIM Initiative sponsored six learning collaboratives to train 150 to 180 certified health care interpreters in Oregon, as reported by a state official in April 2017. Although stakeholders had mixed feelings about the efficacy and reach of the Transformation Center in facilitating health system change, as reported in ***Section E.3.1***, most other practice transformation and workforce development activities not facilitated by the Transformation Center were well received.

Oregon leveraged other non-SIM sources of funding and legislation to support workforce development and advance SIM goals. The state was strategic in supporting health system transformation by aligning with other workforce development initiatives funded with non-SIM sources and promoting workforce capacity through legislative activities. For example, as part of its Medicaid waiver, the state engaged in training and certifying traditional health workers (THWs), which include community health workers, peer support counselors, health care navigators, and doulas. The Transformation Center, funded by the SIM Initiative, worked with CCOs on promoting the use of THWs in care coordination and integration of behavioral and dental care, and in 2015, the state passed a law that authorized OHA to develop rules for certification and reimbursement methodology for THWs to perform oral health assessments and preventive services (House Bill 2024). Feedback from provider focus groups and interviews with stakeholders indicated that THWs were becoming more prevalent and valued in communities across Oregon, as described below.

Perhaps the most noticeable positive impact from Oregon's workforce development efforts was the expansion of THWs and other ancillary health care staff. Even though the efforts to train and certify THWs were not sponsored by the SIM Initiative, they helped advance its goal of better quality of care. Primary care providers who participated in focus groups appreciated the recent increase in new types of support staff to coordinate patient care and ensure integration of behavioral health and social services. By addressing behavioral and psychosocial issues of patients, these support staff provided a huge benefit to the providers, who traditionally lack time (or a billing code) to focus on nonclinical issues. Patients who may face mental health, housing, transportation, and other social issues that affect their health, also benefit from additional assistance and support provided by the ancillary health care staff. One provider said that the flexibility these health care workers had, for example, to accompany a client to an appointment with a specialist or to visit them at home, was invaluable in connecting the dots and facilitating the patient-centered and whole-person approach to care.

Some workforce development initiatives were embraced by CCOs more enthusiastically than others. According to a state official, there was resistance among CCOs toward the health care interpreter program, with some wondering why the certification requirement was necessary. A lesson learned from this experience for one state official was the need for more ground work in preparing CCOs and health systems for major initiatives (i.e., that the state could communicate better around "why" some things had to be done in addition to providing education and assistance on "how" to do them). CCO representatives we interviewed spoke highly of innovator agents and the Council of Clinical Innovators program, as mentioned above, and regarded the agents and fellows as instrumental to the development of innovative strategies that address local community health needs. State officials administering the DELTA program reported seeing an increasing interest from CCOs in promoting health equity and participating in the training along with their community-based partners. The use of THWs and focus on social determinants of health also seemed to be gaining a foothold in Oregon. One of Portland's CCOs, for example, established its own community health worker model and was developing protocols, training opportunities, and IT infrastructure to support and coordinate community health worker efforts among various organizations in their service area.

The degree to which CCOs offered practice transformation assistance or other support to providers in adopting the CCM seemed to vary from CCO to CCO. Among the CCOs whose representatives we interviewed in this final site visit, all supported providers in their networks in some way, although most of the assistance offered seemed to revolve around helping the providers meet quality incentive metrics. The examples of CCO assistance to providers included paying incentive bonuses for meeting quality metrics, providing HIE infrastructure free of charge, analytics support, trainings and learning collaboratives, practice coaching, and supplying ancillary staff or external care managers to coordinate care for high-need patients. In focus groups with providers who contract with CCOs, we learned that most did not receive or were not aware of any support their CCO provided to help them transform their practice or meet quality improvement goals. The exceptions were providers with a high volume of Medicaid patients (e.g., FQHCs) and those in rural areas who reported receiving technical assistance from their local CCOs in addition to capitated payments and incentive bonuses.

Oregon continued to struggle with health care provider shortages, particularly in rural areas. Despite SIM and other funding dedicated to workforce development and capacity building, there were still critical shortages of primary care, behavioral health, and specialty care providers, a situation which may had been exacerbated by Medicaid expansion authorized by the Patient Protection and Affordable Care Act. Although some primary care providers in Portland complained about shortages of specialists and mental health providers who accept Medicaid beneficiaries, providers practicing in rural communities reported even more difficulties with access to specialty services for their patients. Per state requirements, there was at least one community mental health provider in every Oregon county, but in many rural counties there was no more than one, which forced many patients to travel long distances or face delays in obtaining appointments. An additional challenge that life in small rural communities presents, according to one stakeholder, is that some patients may hesitate to seek needed mental health, substance use, and behavioral health services simply because it could be difficult to maintain anonymity.

Primary care providers in remote rural areas reported being particularly stressed not only about the shortages of specialists but health care personnel in general. For example, one focus group participant said he was the only provider in a 1,000-square-mile area and his office was critically understaffed: "The amount of juggling, we're so cross-trained that it's nuts… We're not able to process claims or anything because somebody [clinic staff] is on a two-week vacation right now and everybody's had to change a chair." Another interviewee pointed out that open positions in clinics located in rural counties often remained unfilled for months at a time because many clinics could not offer high-enough salaries to persuade good candidates to move to remote parts of the state. At least one CCO reported setting aside funds to be used for attracting more health care workforce into rural communities. Although concrete details about how those funds should be used were not determined yet at the time of our site visit, the CCO recognized that provider shortage in rural communities was a serious issue that needed to be addressed.

With the SIM Initiative ending, Oregon made provisions for sustaining practice transformation support. Oregon put much effort into planning for sustainability of the Transformation Center, deemed by state officials as essential to advancing health system change. OHA included funding for the Transformation Center from the state general fund in its budget through the next biennium (2018–2019) so technical assistance and networking opportunities should be sustained, if approved by the legislature, although on a smaller scale. State general funds would also continue to fund the PCPCH program site visit verification teams for at least 2 more years. The PCPCI fell under SIM activities considered a one-time investment, but the Oregon Quality Corporation that had been housing the PCPCI was working on securing funding to keep the Institute open. PCPCI educational resources and training modules were preserved and continue to be available on the Transformation Center website. At the time of our site visit, new funding mechanisms had not been secured for workforce development efforts that were brought about or expanded through the SIM Initiative, although the state had some modest funding for health equity work and was considering charging fees for trainings.

E.3.8 What approach did Oregon take to address population health in its SIM Initiative?

KEY INSIGHTS

- Oregon directed a portion of SIM funds to the Public Health Division (PHD) to support several initiatives designed to promote collaboration between CCOs and public health departments.
- CCOs’ focus on addressing population health varied across the state but seemed to have intensified with the addition of two population health–-related metrics in the CCO Incentive Measure set.

This section presents findings from Oregon’s population health activities. Between April 2016 and April 2017, Oregon continued to support population health activities, including investment of SIM funds in an OHA staff position in the PHD, the final round of the community prevention grants, and the Oregon Public Health Assessment Tool. Additionally, the PHD targeted numerous SIM resources beginning in 2016–2017 to promote connections and relationship building between the CCOs and the local public health departments, for example, by providing information on evidence-based prevention strategies and analyses of public health indicators by CCO region. These investments helped to develop public health infrastructure at both the state and CCO levels to support the goal that population health remains a priority after the SIM Initiative ends.

CCO requirements to develop community health assessments and community health improvement plans fostered partnerships between CCOs and local public health departments in some, but not all, regions. CCOs were required to conduct a community health needs assessment (CHA) and to develop community health improvement plans (CHIPs). PHD provided CCOs with access to data to help inform their plan development through the Oregon Public Health Assessment Tool. State officials, payers, and other stakeholders noted that development and subsequent implementation of the CHAs and CHIPs went better in some regions than others. For example, in specific regions, CCOs and local public health departments developed their respective CHAs and CHIPs independently of each other, while others leveraged the resources of the CCO and the local public health department and collaborated to develop a joint CHA and CHIP. A representative from the CCO that used the latter strategy commented, "…we were able to convene those organizations to pool our dollars and then get to a statistically [sound] survey methodology about how our community members feel about their health, how they feel about their ability to get to care, and well-being indicators. By pooling our money and our efforts, we were able to have much higher level of actionable data and much higher level of community engagement."

To maintain local flexibility, there were no prescriptive requirements in the CCO legislation or from OHA about how to develop the CHA or implement the CHIP. Given that flexibility, some CCOs did not engage their local health departments in doing so. Nevertheless, one state official thought that there was a lot of synergy to build on post-SIM implementation when noting that the state had made "a lot of progress to put infrastructure and systems in place so public and population health are part of conversation in health system transformation."

Incorporating two population health–related metrics into the CCO incentive measure set was a policy lever to motivate CCOs to focus on population health. CCOs were also required to report on quality measures and can receive incentive payments annually based on their performance. In previous years, PHD had spent significant time with the Metrics and Scoring Committee to develop population health metrics; these conversations were ongoing at the time of our site visit. There were two population health–related CCO incentive metrics for performance years 2016 and 2017: tobacco use prevalence and childhood immunization status. These two measures tied directly to two of the seven priority areas outlined in the current Oregon State Health Improvement Plan. The PHD had been working with CCOs on strategies to decrease tobacco use among their members and improve immunization rates among children. Because CCOs were being held accountable for their performance in these areas, population health remained a focus. As one state official put it, "[t]his [incentive metrics] is a main lever; CCOs invest heavily for their incentive dollars."

Community prevention grants fostered long-term Medicaid and local public health collaboration among many grantees. The final year of the 3-year community prevention grant program—a SIM-funded initiative—ended in 2016. These grants provided funding to four partnerships consisting of at least one CCO and at least one local public health department in the region, and other partners. The goal of the grant program was to foster collaboration between CCOs and local public health departments as they implemented strategies for addressing priority health concerns identified in CCOs' CHIPs. Each grantee's project targeted a different prevention area: (1) opiate overdose reversal with naloxone distributed/administered by social workers and their clients, (2) pregnancy screening and prenatal care, (3) developmental screenings, and (4) tobacco cessation. CCOs involved in two of the projects committed to funding a position to continue their respective work after the SIM grant funding ended. Although state officials note that this was a very successful grant program in promoting partnerships to improve population health, it also highlighted workforce issues. One official noted that it was hard for some CCOs and local public health departments to find qualified people to manage these projects, particularly in rural areas.

Strong leadership commitment to population health was critical in promoting local change. Stakeholders offered lessons learned for other states to consider when incorporating population health into health care delivery reform. As noted earlier in the section, tying quality measures to incentive payments was a critical lever to help CCOs focus on population health. Another stakeholder identified that having a central contact point within the PHD was also critical, because that person could triage requests or inquiries from the rest of OHA and from CCOs for the division. Lastly, another official felt that strong leadership directives from OHA was very important, noting, "We are lucky here in Oregon that Medicaid and Public Health sit within agency so we have same the goals and direction. I think those have been critical."

Community Prevention Grants

The Oregon SIM Initiative awarded grants in December 2013 for four Community Prevention projects that ran for 3 years, from 2014 to 2016. SIM funding totaled $646,891. Funds were directed almost entirely to contracts to implement the programs. Successful applicants identified a prevention goal to work through a partnership including at least one CCO and at least one local public health department. State officials credited these grants with successfully strengthening local partnerships involving clinical, public health, and other community partners.

Opioid Overdose Reversal & Prevention: Health Share of Oregon CCO, county health departments (Multnomah, Clackamas, and Washington counties), and the HOPE (Healthy Oregon Partnership for Equity) Coalition formed a partnership to prevent opioid overdoses in two ways: (1) by training social service providers and their clients to distribute and administer naloxone to reverse opioid overdoses and (2) by working with providers to develop standard opioid prescribing guidelines. The project had a health equity focus and included specific outreach to engage communities of color and others served by the HOPE Coalition.

Early Developmental Screening: Eastern Oregon Coordinated Care Organization, county health departments serving rural counties (Baker, Grant, Harney, Lake, Malheur, Morrow, Gilliam, Sherman, and Umatilla counties), and the Center for Human Development formed a partnership to implement universal developmental screening within the first 36 months of life. Eastern Oregon committed to funding a staff coordinator position for this work beyond the end of SIM funding, indicating the perceived value of the partnership by the CCO.

Prenatal Care & Screening: AllCare Coordinated Care Organization, Jackson Care Connect Coordinated Care Organization, PrimaryHealth of Josephine County Coordinated Care Organization, county health departments (Jackson and Josephine counties), and the Health Care Coalition of Southern Oregon formed a partnership to advance comprehensive prenatal care through (1) routine screening for pregnancy intent and (2) a community- wide preconception health campaign. The project emphasized outreach to the Latina population.

Tobacco Cessation: Intercommunity Health Network Coordinated Care Organization and county health departments (Linn, Lincoln, and Benton counties) formed a partnership to reduce tobacco use in two ways: (1) through screening and referrals to smoking cessation support services and (2) through stricter licensing requirements for tobacco retailers.

Sources:
http://www.oregon.gov/oha/ph/ProviderPartnerResources/HealthSystemTransformation/Pages/Community-Prevention-Program.aspx;

https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

E.3.9 How will elements of the SIM Initiative in Oregon be sustained?

KEY INSIGHTS

- Oregon identified several SIM activities that were deemed critical to continued health system transformation efforts, most notably the Transformation Center and PCPCH program. To be sustained, these activities require ongoing support from the state's general budget, an inherently unpredictable source of funds, according to stakeholders we interviewed.
- Other SIM investments were intended to be a one-time activity and thus do not need to be sustained after the SIM Initiative, while others became self-sustaining.

This section summarizes the main findings on sustainability plans put in place by Oregon to continue many of the reforms funded by the SIM Initiative after the test period. Using SIM funds, OHA contracted with Health Management Associates (HMA) to produce a report and provide recommendations for sustaining activities undertaken during the test period (Health Management Associates, 2016a). The report divided Oregon's SIM activities into three categories:

1. Activities that did not require a sustainability plan because they were one-time investments for which the SIM Initiative provided only startup funding. These include the communication activities in the Transformation Center supporting the spread of the CCM, the PCPCI, health IT investments in EDIE and PreManage, the Health Evidence Review Commission work around patient decision support tools, population health integration activities, and support for the HWS program.
2. The initiatives that would require ongoing financial support after SIM funding ended to sustain the momentum for changing care delivery, which include the operation of the PCPCH program, the Transformation Center's technical assistance and payment reform activities, health equity initiatives, and alignment work to extend the CCM to Medicare-Medicaid beneficiaries, and ongoing testing and evaluation of transformation activities.
3. Activities external to OHA and with unclear sources of funding going forward, which include CCO coordination with Early Learning hubs to promote kindergarten readiness and LTSS providers.

With the SIM Initiative ending, Oregon prioritized sustainability of the Transformation Center and PCPCH program to continue the CCM spread, but support from the state budget may be limited. Although the HMA report helped Oregon determine financial viability of each SIM activity, state officials had long considered the continued existence of the Transformation Center as the hub for all health system innovation as essential for sustaining changes in the health system, as evidenced by the state's successful inclusion of funding for the Transformation Center in OHA's budget to keep the Center open through the end of calendar year 2017. The OHA budget request for the next biennium (2018–2019) also included funding for the Transformation Center and for the PCPCH program, albeit at lower levels than were available under the SIM Initiative. Given that the state was facing an estimated $1.6 billion budget deficit (Hansen, 2017), the challenge going forward will be to prioritize the most valuable Transformation Center activities to keep funding.

Some SIM activities that received one-time "startup" support continued; others were still looking for new sources of funding. Many activities that received one-time support from the SIM award continued post SIM funding. For example, some of the PHD activities were to be sustained with state funding. As one state official noted, "while SIM funding ends, this work will continue to be ongoing, largely because of infrastructure and relationships." Similarly, SIM investments in health IT helped launch EDIE and PreManage tools, which would continue to be financed by a utility model and user fees. In addition, the CCM communication materials developed with SIM support would be available for further use. HWS used SIM funding to stand up the program and conduct an impact evaluation, but the program has always relied and will continue to rely on support for its operations from both the partner organizations participating in the program and philanthropic funding. With regard to activities that were still looking for funding in the long term, the PCPCI also fell under SIM activities considered a one-time investment, but the Oregon Quality Corporation, which has been housing PCPCI, assumed responsibility for it and was working on securing funding to keep the Institute open. A possibility that one stakeholder mentioned may be for the Institute to get involved with the CPC+ Initiative and continue to provide technical assistance to primary care providers.

State legislation helped advance many SIM objectives, but obtaining multi-payer participation may be necessary for ongoing sustainability of Oregon's health system transformation efforts. As we reported in the SIM Initiative Round 1 Evaluation Year 3 Annual Report, Oregon passed several bills, and was considering some new ones in the 2017 legislative session, that support health system delivery and payment reforms, including legislation around multi-payer payment reform, workforce development, alignment of metrics, and health IT. However, many of the passed bills, particularly around payment reform, have had more limited effect than as originally envisioned. As one stakeholder interviewed described it, "some key legislators really take a hard line but after a month of lobbying, it really waters it [the bill] down." Many stakeholders believed that it was necessary that commercial payers and private business buy into the CCM and value-based payments for Oregon to build on its SIM Initiative. A major challenge for continued existence of the PCPCH program, which is the building block for the CCM, is the lack of value-based payment models to support PCPCH providers in making often substantial changes in how they organize their practices and deliver care. Provider representatives and other stakeholders agreed that this type of practice transformation required resources and time commitment that were difficult to sustain without additional support from payers. The state convened the Primary Care Payment Reform Collaborative and encouraged CCOs to use alternative payment models, and recently launched the CPC+ Initiative, but these efforts have yet had little impact on bringing Medicare and commercial payers on board with primary care payment reforms. As one interviewee commented, “we have gotten as far as we can without a multi-payer solution to how we continue to get better.”

E.4 Did Patient-Centered Primary Care Homes Have an Impact on Key Outcomes After Implementation in Oregon?

As described in the preceding sections, Oregon’s SIM Initiative has sought to transform health care in the state by supporting and spreading the Coordinated Care Model (CCM). The first driver of the initiative was “Improving care coordination at all points in the system, with an emphasis on patient-centered primary care.” The Patient-Centered Primary Care Home (PCPCH) program is Oregon’s version of the patient-centered medical home (PCMH) and currently has five tiers of recognition based on how many standards the clinic meets. Using many of the same types of criteria as the National Committee for Quality Assurance PCMH program, the PCPCH program awards points in six domains for clinics that are (1) accessible, (2) accountable, (3) comprehensive, (4) continuous, (5) coordinated, and (6) patient and family centered. The PCPCH program began recognizing clinics in October 2011. By the first quarter of 2015, 548 practices were recognized, most of which had achieved the highest tier rating based on the number of total points awarded, although some stakeholders noted variation in “PCPCH-ness” even among that tier (Gavin et al., 2016).

Central to the success of the PCPCH program, and thus a key goal behind spreading the CCM beyond Medicaid Coordinated Care Organizations (CCOs), is giving clinics an incentive to become PCPCH recognized. To that end, Oregon has been working to convince more health plans to make incentive payments to PCPCHs. Initially, only some Medicaid CCOs made such payments; later some plans offered by the Public Employees Benefit Board (PEBB) covering state employees started to make per member per month payments to recognized PCPCH clinics (Patient-Centered Primary Care Home Program, 2016). In addition, some PEBB and Oregon Educators Benefit Board (OEBB) health plans began to incentivize their members to choose PCPCH clinics by offering lower copays when they received care from those clinics, but no PEBB or OEBB plan required members to use these providers exclusively.

The data currently available only cover the period *before* PEBB plans began paying incentives to PCPCH and before PEBB, OEBB, or other commercial plans began offering reduced copays to their subscribers. However, an important assumption of the SIM Initiative is that as long as a sufficient portion of a clinic’s care delivery is paid for under models like PCPCH, the clinic’s entire patient panel will see changes in the way care is delivered. There is reason to believe that becoming PCPCH-certified would have a significant change in the way practices deliver care and therefore change utilization and costs. As of spring 2015, PCPCH providers reported in focus groups that the certification process was having the desired impact in improved care coordination and access, by calling attention to prevention and emphasizing integrated, patient-centered care (Gavin et al., 2016). SIM funds supported the Patient-Centered

Primary Care Institute, a public-private organization under contract with the state to offer practice-level assistance to help providers implement the PCPCH model (Gavin et al., 2016).

We estimated the effects of PCPCH recognition on a variety of outcomes measured at the patient-month level for individuals covered by Medicaid, a PEBB plan, an OEBB plan, or a commercial product (methods are discussed in more detail below and ***Sub-appendix E-2***). Estimating effects of PCPCH recognition by payer, these data provide an early test of the assumption that it is PCPCH certification, rather than the financial incentive alone, that has an impact on care delivery. Future analyses will investigate the period when PEBB plans had adopted elements of the CCM (January 1, 2015) to estimate the effect of PCPCH recognition and the effect of any changes in reimbursement.

Because the PCPCH model is a delivery system rather than a payment model, its anticipated effect on costs is less clear than its anticipated effect on utilization. For example, we expect primary care utilization, and hence primary care costs, to increase as PCPs take a more active role in monitoring and promoting their patients' health. This should be reflected in increased rates of screening and well-care visits. The expected effect on specialty care utilization is ambiguous. Although improvements in primary care may shift some utilization away from specialist offices into the primary care clinic, it may also improve the referral process and the identification of health problems requiring the attention of a specialist and thus increase utilization of specialists. Finally, the increase in primary care is expected to result in reductions in more expensive emergency department (ED) care and preventable hospitalizations, although the expected total effect on hospital inpatient stays is unclear because improved primary care may identify problems requiring planned hospital admissions. Although improved primary and preventive care may not result in reductions in the total cost of care in the short run, it may have that effect in the long run, but in the period of analysis reported here we did not expect to see cost reductions. We anticipate, however, that PCPCH providers will increase their rates of follow-up after hospitalizations and thus reduce readmission rates.

KEY INSIGHTS

- The overall estimated effects of primary care clinics becoming PCPCH-recognized are generally consistent with the goals of patient-centered primary care, demonstrated by:
  - **Increased primary care use**
  - **Increased adolescent well-care visits (except Medicaid)**
  - **Increased colorectal cancer screenings**
  - **No increase in ED use (except Medicaid)**
- These effects were generally consistent across all populations—Medicaid, PEBB, OEBB, and commercial—after a practice became PCPCH-certified. This finding lends confidence to the hypothesis that it is PCPCH certification, rather than financial incentive payment (offered by Medicaid CCOs), that was the most significant change that primary care practices experienced.
- The most consistently significant improvements in care were found among individuals whose insurer was least likely to offer a financial incentive to their primary care practice for being recognized as a PCPCH (i.e., not Medicaid).
- Generally **total expenditures *increased*** after PCPCH recognition (except in Medicaid). Whether the effect of changes in utilization will change long-run expenditures is not evaluated in this analysis.
- In some cases, the attribution of patients to a primary care provider is inexact and may introduce measurement error that could bias impact estimates toward zero. However, the use of the average utilization experience of providers' entire patient panels should greatly reduce the size of any bias introduced by individual attribution errors. To the extent that any bias remains, impact estimates presented here are likely conservative.

To assess the effects of Oregon's PCPCH recognition program on utilization, expenditures, and quality of care, we analyzed data from Oregon's APAC database from 2011 to 2014 to examine the impact of a primary care clinic obtaining recognition as a PCPCH. Event-level data on all Oregonians covered by Medicaid, PEBB, OEBB, or a commercial insurance plan were used to attribute each individual to a single primary care clinic. Individuals with both Medicaid and Medicare coverage were excluded from the analysis. Because each payer may reimburse the care delivered in PCPCH clinics differently, we estimated the effects of PCPCH recognition separately for patients by payer. Individuals with both Medicaid and Medicare coverage were excluded from the analysis. In Oregon, participating clinics achieved PCPCH recognition at different points of time during the study period, starting in 2011 through 2014. Consequently, some patients who received treatment at PCPCH clinics had more than 3 years of exposure to the PCPCH model, whereas others had less than 1 year, and the measured treatment effect is an average across patients with this varying exposure to the PCPCH model. Data limitations prevent an analysis of differential effects by PCPCH exposure time. This feature of the Oregon model necessitated an analytical approach to accommodate the different number of treatment months across PCPCH clinics (see ***Sub-appendix E-2*** for more details). Two-way fixed effects difference-in-differences (D-in-D) models were estimated, with clinic and year-month fixed effects, which is a more general formulation of the most familiar D-in-D model.[88] That is, like the most familiar formulation of the D-in-D model, this formulation exploits variation across patients who received medical care at PCPCH clinics (treatment group) and patients who received care at non-PCPCH clinics (control group), before and after PCPCH recognition was achieved. Some clinics represented in the data never received recognition during the analysis period and are included in the control group. Full data and methods discussions are found in ***Sub-appendix E-2***.

Methods Snapshot for Impact Analysis

- **Study design:** D-in-D quasi-experimental design.
- **Population:** The intervention group comprised clinics that achieved PCPCH certification and a control group that included clinics that did not receive PCPCH certification.
- **Data:** All payer all claims (APAC) data from Oregon, covering years 2011 through 2014. Clinics achieved PCPCH status at different points in time throughout the study period.
- **Sample:** Individuals enrolled commercial health insurance plans, Medicaid (excluding Medicare and Medicaid enrollees), PEBB, and OEBB plans.
- **Measures:** Total expenditures, utilization, and quality of care (monthly rates).
- **Statistical analysis:** Ordinary least squares (OLS) D-in-D models with clinic and year-month fixed effects estimated among those with each type of health insurance.

Table E-5 presents descriptive statistics on demographics, average monthly utilization and expenditures, and quality of care, by payer during the observation period 2011–2014. Since the ACA was implemented in 2014, with many Oregonians gaining coverage through Medicaid or the Marketplace, the composition and risk profile of Oregon's insured population changed. To account for this, we limit the samples for each payer to persons first observed with that type of coverage in 2011. The methods are summarized below and full data and methods discussions are found in ***Sub-appendix E-2***.

---

[88] See Angrist and Pischke (2009, p. 227) for an intuitive discussion on the relationship between fixed effects and D-in-D and an analogous D-in-D model with state and time fixed effects.

Table E-5. Individual characteristics (average per person-month), by payer, across all years (2011 to 2014)

	Medicaid	PEBB	OEBB	Commercial
Demographics				
Female	56.6%	54.4%	57.1%	54.5%
Age	21.6	36.7	38.5	37.6
Utilization & Expenditures				
Any spending in month	38.7%	36.1%	32.7%	31.2%
Total spending in month	$298	$366	$358	$308
Any primary care visit	21.1%	18.6%	17.5%	16.8%
Number of primary care visits per 1,000 person months	262.8	220.4	205.4	197.4
Any prenatal care visits 0–9 months before delivery	29.5%	30.1%	25.4%	29.2%
Number of prenatal care visits 0–9 months before delivery	458	452.5	370.9	448.5
Any postpartum care visits 0–2 months after delivery	17.6%	20.6%	23.6%	23.1%
Number of postpartum care visits 0–2 months after delivery	204.0	240.6	269.5	280.6
Any child well-care visits, among children age 0–1	26.5%	21.1%	27.9%	27.1%
Number of child well-care visits per 1,000 person months	280	216	286	277
Any adolescent well-care visits, among children ages 12–21	2.7%	2.2%	2.6%	2.8%
Number of adolescent well-care visits per 1,000 person months	27.1	22.4	26.2	28.6
Any specialty care visits	8.2%	9.3%	8.5%	7.9%
Number of specialty care visits per 1,000 person months	114.9	123.3	115.4	106.5
Any Emergency Department visit	5.4%	1.4%	1.1%	1.2%
Number of Emergency Department visits, per 1,000 person months	66.4	15.4	12.9	13.6
Any inpatient stay	0.8%	0.3%	0.3%	0.3%
Number of inpatient stays, per 1,000 person months	9.8	3.8	3.8	4.0
Quality of Care				
Any depression screening, ages 12+ & 1+ outpatient encounter	0.0%	0.0%	0.0%	0.0%
Number of depression screenings per 1,000 person months	0.0072	0.005	0.0035	0.0004
Any SBIRT screening, ages 18+ & 1+ outpatient encounter	0.4%	0.0%	0.2%	0.1%
Number of SBIRT screenings per 1,000 person months	3.5	0.2	2.0	1.1
Any cervical cancer screening, women ages 24–64	0.8%	1.1%	1.1%	1.1%
Number of cervical cancer screenings per 1,000 person months	8.5	10.7	11.2	11.0
Any colorectal cancer screening, ages 51–75	0.7%	1.0%	1.1%	1.1%
Number of colorectal cancer screenings per 1,000 person months	7.1	9.9	11.1	11.5
Any HbA1c test, diabetics age 18–64	2.3%	2.6%	3.3%	2.9%
Number of HbA1c tests per 1,000 person months	23.3	25.9	33.4	28.9
Any LDL-C test, diabetics age 18–64	1.3%	1.9%	2.1%	1.8%
Number of LDL-C tests per 1,000 person months	13.2	19.1	20.8	18.4
Any 30-day readmissions, among those with discharge	11.1%	6.7%	5.9%	7.3%
Number of 30-day readmissions per 1,000 readmissions per month	125.6	74.8	64.1	81.6
Number of clinic-month observations	177,159	161,094	190,907	505,943
Number of person-months	17,003,526	4,537,510	4,657,925	46,214,998

HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; OEBB = Oregon Educators Benefit Board; PEBB = Public Employees Benefit Board; SBIRT = Screening, Brief Intervention, and Referral to Treatment.

E.4.1 Did PCPCH recognition affect expenditures and service utilization?

KEY INSIGHTS

- The estimated effects of a primary care clinic becoming PCPCH recognized on several measures of utilization across several payer types are generally consistent with the goals of patient-centered primary care. For example, the **use of primary care increased**, as did **well-care among adolescent patients** for all individuals except Medicaid beneficiaries.
- Increases in primary care and well-care utilization were not accompanied by significant increases in the use of **emergency or inpatient hospital care**, though there were also **no significant decreases.**
- **Total per member per month costs did generally increase after recognition**, with one exception (Medicaid). Whether this reflects an increase in primary care use that eventually leads to decreases in other types of utilization and cost remains to be seen.

We present the results of the D-in-D regression analyses for total spending, primary care and specialist visits, inpatient admissions, outpatient ED visits, and 30-day readmissions in ***Tables E-6*** to ***E-9.***

For **Medicaid beneficiaries** whose primary care provider (PCP) gained PCPCH recognition (***Table E-6***):

- The likelihood of **receiving any type of care increased** significantly in the months after their PCP became PCPCH recognized, by 2.01 percentage points, or 5.5 percent.
- However, the **$10.60 increase** in average **total spending** per month on that care was **not significant**.
- Similarly, the probability of having a **primary care visit** in any given month **increased** by just under 1 percentage point (or 4.6 percent relative to the mean) after recognition, but the increase in the average number of visits was **not statistically significant**.
- There were **marginally significant increases** in both the likelihood and number of **specialty care visits**.
- Other measures, such as ED visits, inpatient stays, and well-care visits did not significantly change by PCPCH status.
- The increase in the probability of primary care utilization after PCPCH recognition is consistent with expectations that primary care utilization will increase as PCPs take a more active role in monitoring and promoting their patients’ health. Although other forces beyond the PCPCH may affect trends in utilization and expenditure, the design of the empirical analysis, which identifies these effects based on a variable date of clinic recognition should minimize the confounding effect of these other forces.

PEBB members whose PCP gained PCPCH recognition experienced (***Table E-7***):

- **Increased use of any care and primary care**, but unlike Medicaid beneficiaries, the **increased spending on these measures was statistically significant**. Primary care visits increased by approximately 10 percent, whether measured by use of any primary care visit in a month or the number of such visits.
- **Increased well-care visits among adolescents** ($p < 0.1$).
- **A decrease in the probability of having an inpatient stay of 7.3 percent** ($p < 0.1$).

Similarly**, OEBB members** whose PCP gained PCPCH recognition experienced (***Table E-8***):

- **Increased use of any care and the use of primary care, both in the probability of using care and the mean amount used** ($p < 0.01$).
- **Increased use of adolescent well-care** by about 27 percent.
- **Increased use of specialty care**, and although there was no firm prediction of how improved primary care would affect specialty services, this may reflect increased referrals resulting from increased primary care attention.
- Unlike other groups, **increased use of the ED, both in terms of the likelihood of any visits** (0.10 percentage points, 9.0 percent) or the **number of visits per 1,000 person months** (1.21 visits or 9.9 percent). Nothing about the PCPCH program or other changes we observe would lead us to expect such an effect. That it is only observed in the OEBB population suggests random chance, but further observation with another year of data may be warranted to see if this finding is robust.

Finally, **commercially insured individuals** (***Table E-9***) not in PEBB or OEBB whose PCP gained PCPCH recognition experienced:

- **Increased use of any services and an increase in primary care visits**.
- **Increased adolescent well-care visits** once their PCP became PCPCH recognized, like the other groups.
- **Decreased use of specialty care**, unlike the other three groups. Again, although there is no firm prediction of how specialty care would be affected by primary care, decreased use might reflect substitution toward PCPs for services previously received from specialists. However, given significant increases observed among other payers, more analysis will likely be necessary to determine the forces at play on this measure.

Table E-6. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon Medicaid enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with spending in month	**36.84**	**39.70**	**2.01**	**(1.28, 2.74)** **(1.44, 2.58)**	**5.5**	**0.000**	17,003,526
Total spending in month	276.98	327.47	10.60	(−1.04, 22.25) (1.53, 19.68)	3.8	0.134	17,003,526
Percent with primary care visit	**20.08**	**21.91**	**0.92**	**(0.20, 1.63)** **(0.36, 1.48)**	**4.6**	**0.035**	17,003,526
Number of primary care visits per 1,000 person months	250.77	275.54	8.70	(−1.13, 18.53) (1.04, 16.36)	3.5	0.146	17,003,526
Percent with child well-care visits, among children age 0–1	26.30	26.50	0.64	(−0.05, 1.32) (0.10, 1.17)	2.4	0.129	639,595
Number of child well-care visits per 1,000 person months	277.87	280.17	4.78	(−4.93, 14.49) (−2.78, 12.34)	1.7	0.418	639,595
Percent with adolescent well-care visits, among children ages 12–21	2.60	2.51	0.18	(−0.01, 0.38) (0.03, 0.33)	7.1	0.117	3,538,074
Number of adolescent well-care visits, ages 12–21, per 1,000 person months	26.36	25.53	1.96	(−0.003, 3.92) (0.43, 3.49)	7.4	0.101	3,538,074
Percent with specialty care visits	**7.65**	**8.56**	**0.53**	**(0.06, 1.00)** **(0.17, 0.90)**	**7.0**	**0.061**	17,003,526
Number of specialty care visits per 1,000 person months	**104.04**	**124.66**	**8.86**	**(1.51, 16.21)** **(3.14, 14.59)**	**8.5**	**0.047**	17,003,526
Percent with emergency department visit	5.31	5.61	0.04	(−0.05, 0.13) (−0.03, 0.11)	0.7	0.486	17,003,526
Number of emergency department visits, per 1,000 person months	64.38	68.82	1.35	(−0.02, 2.72) (0.28, 2.41)	2.1	0.105	17,003,526
Percent with inpatient stay	0.83	0.89	−0.03	(−0.09, 0.03) (−0.07, 0.02)	−3.3	0.431	17,003,526
Number of inpatient stays, per 1,000 person months	9.66	10.61	−0.26	(−0.91, 0.38) (−0.76, 0.24)	−2.7	0.503	17,003,526

CG = Comparison Group; PCPCH = Patient-Centered Primary Care Home.
Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-7. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon PEBB enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with spending in month	**34.96**	**36.41**	**1.19**	**(0.69, 1.69) (0.80, 1.58)**	**3.4**	**0.000**	4,537,510
Total spending in month	**353.27**	**368.25**	**15.42**	**(0.73, 30.12) (3.97, 26.87)**	**4.4**	**0.084**	4,537,510
Percent with primary care visit	**17.52**	**18.37**	**1.87**	**(1.37, 2.37) (1.48, 2.26)**	**10.7**	**0.000**	4,537,510
Number of primary care visits per 1,000 person months	**208.16**	**218.71**	**21.42**	**(15.38, 27.46) (16.72, 26.13)**	**10.3**	**0.000**	4,537,510
Percent with child well-care visits, among children age 0–1	21.04	20.98	0.51	(−1.39, 2.41) (−0.97, 1.99)	2.4	0.659	33,078
Number of child well-care visits per 1,000 person months	215.30	214.59	3.91	(−17.73, 25.55) (−12.94, 20.76)	1.8	0.766	33,078
Percent with adolescent well-care visits, among children ages 12–21	**2.15**	**2.13**	**0.17**	**(0.02, 0.31) (0.05, 0.28)**	**7.8**	**0.063**	718,664
Number of adolescent well-care visits, ages 12–21, per 1,000 person months	**21.82**	**21.64**	**1.79**	**(0.27, 3.31) (0.60, 2.98)**	**8.2**	**0.053**	718,664
Percent with specialty care visits	9.16	9.57	−0.15	(−0.46, 0.16) (−0.40, 0.09)	−1.7	0.418	4,537,510
Number of specialty care visits per 1,000 person months	121.21	127.02	−2.29	(−6.95, 2.38) (−5.92, 1.35)	−1.9	0.420	4,537,510
Percent with emergency department visit	1.34	1.36	0.03	(−0.01, 0.08) (0.00, 0.07)	2.5	0.235	4,537,510
Number of emergency department visits, per 1,000 person months	15.29	15.53	0.06	(−0.61, 0.73) (−0.46, 0.59)	0.4	0.876	4,537,510
Percent with inpatient stay	**0.34**	**0.36**	**−0.02**	**(−0.05, −0.0009) (−0.04, −0.01)**	**−7.3**	**0.087**	4,537,510
Number of inpatient stays, per 1,000 person months	3.82	3.99	−0.24	(−0.52, 0.04) (−0.46, −0.03)	−6.3	0.152	4,537,510

CG = Comparison Group; PCPCH = Patient-Centered Primary Care Home.
Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-8. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon OEBB enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with spending in month	**30.48**	**32.68**	**3.16**	**(2.46, 3.86)** **(2.61, 3.70)**	**10.4**	**0.000**	4,657,925
Total spending in month	**338.82**	**356.68**	**30.72**	**(11.89, 49.55)** **(16.05, 45.39)**	**9.1**	**0.007**	4,657,925
Percent with primary care visit	**15.54**	**17.54**	**2.66**	**(2.03, 3.29)** **(2.17, 3.15)**	**17.1**	**0.000**	4,657,925
Number of primary care visits per 1,000 person months	**182.55**	**206.32**	**31.49**	**(24.05, 38.93)** **(25.69, 37.29)**	**17.3**	**0.000**	4,657,925
Percent with child well-care visits, among children age 0–1	27.73	27.98	0.06	(−1.44, 1.56) (−1.10, 1.23)	0.2	0.945	31,650
Number of child well-care visits per 1,000 person months	284.00	286.80	1.02	(−16.82, 18.87) (−12.87, 14.92)	0.4	0.925	31,650
Percent with adolescent well-care visits, among children ages 12–21	**2.33**	**2.44**	**0.63**	**(0.40, 0.85)** **(0.45, 0.80)**	**26.9**	**0.000**	731,547
Number of adolescent well-care visits, ages 12–21, per 1,000 person months	**23.66**	**24.81**	**6.47**	**(4.17, 8.78)** **(4.68, 8.27)**	**27.4**	**0.000**	731,547
Percent with specialty care visits	**8.01**	**8.58**	**0.33**	**(0.14, 0.53)** **(0.18, 0.49)**	**4.2**	**0.005**	4,657,925
Number of specialty care visits per 1,000 person months	**109.13**	**117.28**	**4.72**	**(0.92, 8.53)** **(1.76, 7.69)**	**4.3**	**0.041**	4,657,925
Percent with emergency department visit	**1.09**	**1.15**	**0.10**	**(0.05, 0.15)** **(0.06, 0.14)**	**9.0**	**0.001**	4,657,925
Number of emergency department visits, per 1,000 person months	**12.20**	**12.87**	**1.21**	**(0.61, 1.81)** **(0.74, 1.68)**	**9.9**	**0.001**	4,657,925
Percent with inpatient stay	0.34	0.35	−0.02	(−0.05, 0.01) (−0.04, 0.00)	−5.5	0.283	4,657,925
Number of inpatient stays, per 1,000 person months	3.75	3.84	−0.16	(−0.49, 0.17) (−0.41, 0.10)	−4.2	0.435	4,657,925

CG = Comparison Group; OEBB = Oregon Educators Benefit Board; PCPCH = Patient-Centered Primary Care Home.
Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-9. Estimated effects of PCPCH recognition on utilization and expenditures, Oregon commercially insured individuals (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate	(90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	Weighted N
Percent with spending in month	**28.33**	**32.13**	**1.28**	**(0.98, 1.59)** **(1.05, 1.52)**	**4.5**	**0.000**	46,214,998
Total spending in month	**263.56**	**326.43**	**8.62**	**(0.43, 16.82)** **(2.24, 15.01)**	**3.3**	**0.084**	46,214,998
Percent with primary care visit	**14.50**	**17.30**	**1.70**	**(1.39, 2.01)** **(1.45, 1.94)**	**11.7**	**0.000**	46,214,998
Number of primary care visits per 1,000 person months	**170.43**	**203.69**	**20.56**	**(16.54, 24.58)** **(17.43, 23.69)**	**12.1**	**0.000**	46,214,998
Percent with child well-care visits, among children age 0–1	27.02	27.09	0.24	(−0.52, 0.99) (−0.35, 0.82)	0.9	0.605	359,108
Number of child well-care visits per 1,000 person months	276.09	276.77	0.80	(−7.98, 9.58) (−6.04, 7.64)	0.3	0.881	359,108
Percent with adolescent well-care visits, among children ages 12–21	**2.76**	**2.68**	**0.43**	**(0.32, 0.55)** **(0.35, 0.52)**	**15.8**	**0.000**	6,315,905
Number of adolescent well-care visits, ages 12–21, per 1,000 person months	**27.97**	**27.26**	**4.45**	**(3.30, 5.60)** **(3.55, 5.35)**	**15.9**	**0.000**	6,315,905
Percent with specialty care visits	**7.57**	**8.16**	**−0.45**	**(−0.60, −0.30)** **(−0.56, −0.34)**	**−5.9**	**0.000**	46,214,998
Number of specialty care visits per 1,000 person months	**97.20**	**112.43**	**−5.13**	**(−7.08, −3.19)** **(−6.65, −3.62)**	**−5.3**	**0.000**	46,214,998
Percent with emergency department visit	1.10	1.25	0.02	(−0.01, 0.04) (−0.0008, 0.04)	1.5	0.252	46,214,998
Number of emergency department visits, per 1,000 person months	12.32	14.17	0.13	(−0.16, 0.42) (−0.10, 0.35)	1.0	0.477	46,214,998
Percent with inpatient stay	0.32	0.36	0.01	(−0.01, 0.03) (−0.01, 0.03)	2.7	0.524	46,214,998
Number of inpatient stays, per 1,000 person months	3.55	4.12	0.10	(−0.14, 0.34) (−0.08, 0.28)	2.8	0.485	46,214,998

CG = Comparison Group; PCPCH = Patient-Centered Primary Care Home.
Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

E.4.2 Did PCPCH recognition affect quality of care?

KEY INSIGHTS

- One positive finding is across all populations in the analysis, **colorectal cancer screenings** increased after the primary care clinic received PCPCH recognition across all payers. There were no other improvements in quality of care for Medicaid beneficiaries.
- **One negative finding among PEBB enrollees** who had given birth was that **the probability of having a postpartum visit within 2 months of birth** and number of such visits both **decreased significantly** after PCPCH recognition. The data available offer no clear explanation for this finding, but nothing about the PCPCH program would lead physicians to reduce access to postpartum care.
- More positively, commercial patients had **significant increases** in **SBIRT**, **cervical cancer screenings**, and **HbA1c tests among diabetics**, all indications of improved quality of care. The one exception to this general improvement was a **statistically significant increase in hospital readmission rates**, as yet neither explained by the structure of the PCPCH program or identified in qualitative data and thus subject to further study as more data become available.

Tables E-10 to ***E-13*** present the results of D-in-D analyses on the effects, by payer, of PCPCH recognition on quality of care outcomes per month.

Medicaid beneficiaries (***Table E-10***), after their PCP achieved PCPCH recognition, experienced the following:

- **An increase of 0.1 percentage points (17.4 percent) in the probability of having a colorectal cancer screening**, and an increase of 1.1 screenings per thousand person months (17.2 percent) among beneficiaries age 51–64.[89] This increase is consistent with expectations about the effect of improved primary care. However, for Medicaid beneficiaries, colorectal cancer screening was also included in the set of incentive metrics for CCOs, which may have affected the rate of screening more generally over time. That said, SBIRT, depression, and diabetes screenings were also CCO incentive metrics, and these did not increase significantly.

Similarly **PEBB members** (***Table E-11***) whose PCP achieved PCPCH recognition experienced the following:

- **Increased colorectal cancer screenings**, which is consistent with improved quality of primary care even though there are no explicit incentives associated with this service for PEBB.
- **A decreased probability of having a postpartum visit within 2 months of birth and decreased number of such visits**, which is not consistent with improvements in primary care.

---

[89] As outlined in ***Sub-appendix E-2***, colorectal cancer screenings are measured for all individuals age 51 to 75. However, we exclude Medicaid beneficiaries 65 and older who are also enrolled in Medicare.

OEBB members (***Table E-12***) whose PCP achieved PCPCH recognition experienced the following:

- **Increased colorectal cancer screenings**, like PEBB members, consistent with improved quality of primary care.

Finally, **commercially insured individuals** (***Table E-13***), after their provider achieved PCPCH recognition experienced the following:

- **Increased colorectal cancer screenings** of similar magnitude to other groups studied.
- However, unlike other patients, they also had **increases in SBIRT (2.97 screenings per 1,000 person months or 263.8 percent), cervical cancer screenings (0.65 per 1,000 person months or 6.4 percent), and significant increases in HbA1c tests among diabetics (2.54 per 1,000 person months or 9.0 percent)**. Although PCPCH recognition was not explicitly incentivized for the commercially insured population, these effects were generally consistent with expectations about the effect of improved primary care.
- The one exception to this general improvement in quality, and one without ready explanation, was a statistically **significant increase in hospital readmission rates among the commercially insured** (13.57 per 1,000 readmissions or 17.7 percent).

Table E-10. Estimated effects of PCPCH recognition on quality of care, Oregon Medicaid enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with depression screening, ages 12+ and 1+ outpatient encounter	0.0004	0.0003	0.001	(−0.0006, 0.0002) (−0.0003, 0.0002)	228.2	0.355	1,807,784
Number of depression screenings, ages 12+, per 1,000 person months	0.004	0.003	0.01	(−0.01, 0.02) (−0.003, 0.02)	228.2	0.355	1,576,733
Percent with SBIRT screening, ages 18+ and 1+ outpatient encounter	0.24	0.21	0.27	(−0.03, 0.56) (0.04, 0.50)	109.6	0.137	1,576,733
Number of SBIRT screenings, ages 18+, per 1,000 person months	2.44	2.13	2.69	(−0.28, 5.66) (0.38, 5.00)	110.2	0.136	4,153,267
Percent with cervical cancer screening, women ages 24–64	0.85	0.88	−0.03	(−0.09, 0.02) (−0.08, 0.01)	−4.1	0.336	4,153,267
Number of cervical cancer screenings, women ages 24–64, per 1,000 person months	8.55	8.87	−0.34	(−0.95, 0.27) (−0.81, 0.13)	−4.0	0.358	1,880,026

(continued)

Table E-10. Estimated effects of PCPCH recognition on quality of care, Oregon Medicaid enrollees (2011–2014) (continued)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with colorectal cancer screening, ages 51–64	0.65	0.66	0.11	(0.01, 0.21) (0.03, 0.19)	17.4	0.066	1,880,026
Number of colorectal cancer screenings, ages 51–64, per 1,000 person months	**6.56**	**6.63**	**1.13**	**(0.10, 2.15)** **(0.33, 1.93)**	**17.2**	**0.071**	174,799
Percent with HbA1c test, diabetics age 18–64	2.21	2.23	0.21	(−0.07, 0.48) (−0.01, 0.42)	9.3	0.226	174,799
Number of HbA1c tests, diabetics age18–64, per 1,000 person months	22.29	22.46	1.95	(−0.83, 4.74) (−0.21, 4.12)	8.8	0.248	174,799
Percent with LDL-C test, diabetics age 18–64	1.35	1.35	−0.07	(−0.28, 0.15) (−0.24, 0.10)	−4.9	0.620	174,799
Number of LDL-C tests, diabetics age 18–64, per 1,000 person months	13.45	13.48	−0.50	(−2.71, 1.70) (−2.22, 1.21)	−3.7	0.707	119,131
Percent with 30-day readmissions, among those with discharge	10.74	10.85	0.65	(−0.18, 1.48) (−0.00, 1.29)	6.0	0.201	119,131
Number of 30-day readmissions, per discharge, per 1,000 readmissions per month	122.09	123.38	7.05	(−2.37, 16.47) (−0.29, 14.39)	5.8	0.218	312,781
Percent with prenatal care visits 0–9 months before delivery	29.95	30.01	−1.06	(−2.37, 0.24) (−2.08, −0.05)	−3.6	0.181	312,781
Number of prenatal care visits 0–9 months before delivery	456.92	459.75	−0.08	(−27.65, 27.50) (−21.56, 21.40)	−0.0	0.996	112,996
Percent with postpartum care visits 0–2 months after delivery	17.46	17.57	0.23	(−1.14, 1.59) (−0.84, 1.29)	1.3	0.784	112,996
Number of postpartum care visits 0–2 months after delivery	202.85	204.25	1.44	(−15.67, 18.56) (−11.89, 14.77)	0.7	0.890	1,807,784

CG = Comparison Group; HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; PCPCH = Patient-Centered Primary Care Home; SBIRT = Screening, Brief Intervention, and Referral to Treatment.

Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. As outlined in ***Sub-appendix E-2***, colorectal cancer screenings are measured for all individuals age 51 to 75. However, we exclude Medicaid beneficiaries 65 and older who are also enrolled in Medicare, resulting in the age range of 51 to 64 for the Medicaid population.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-11. Estimated effects of PCPCH recognition on quality of care, Oregon PEBB enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with depression screening, ages 12+ and 1+ outpatient encounter	0.0001	0.0001	0.0015	(−0.0011, 0.0041) (−0.0005, 0.0035)	1300.1	0.348	606,059
Number of depression screenings, ages 12+, per 1,000 person months	0.001	0.0005	0.015	(−0.011, 0.041) (−0.0054, 0.035)	1300.1	0.348	606,059
Percent with SBIRT screening, ages 18+ and 1+ outpatient encounter	0.02	0.01	0.01	(−0.01, 0.04) (−0.01, 0.04)	80.7	0.388	588,350
Number of SBIRT screenings, ages 18+, per 1,000 person months	0.19	0.11	0.15	(−0.14, 0.43) (−0.07, 0.37)	80.7	0.388	588,350
Percent with cervical cancer screening, women ages 24–64	1.03	1.09	−0.01	(−0.14, 0.12) (−0.11, 0.09)	−1.0	0.898	1,666,621
Number of cervical cancer screenings, women ages 24–64, per 1,000 person months	10.36	11.02	−0.04	(−1.32, 1.23) (−1.03, 0.95)	−0.4	0.957	1,666,621
Percent with colorectal cancer screening, ages 51–64	0.92	0.94	0.17	(0.09, 0.24) (0.11, 0.22)	18.2	0.000	1,421,463
Number of colorectal cancer screenings, ages 51–64, per 1,000 person months	9.27	9.46	1.66	(0.92, 2.41) (1.09, 2.24)	17.9	0.000	1,421,463
Percent with HbA1c test, diabetics age 18–64	2.43	2.42	0.49	(−0.15, 1.13) (−0.01, 0.99)	20.1	0.211	59,891
Number of HbA1c tests, diabetics age18–64, per 1,000 person months	24.43	24.31	4.82	(−1.63, 11.28) (−0.20, 9.85)	19.8	0.219	59,891
Percent with LDL-C test, diabetics age 18–64	1.90	1.85	0.10	(−0.51, 0.71) (−0.37, 0.58)	5.3	0.785	59,891
Number of LDL-C tests, diabetics age 18–64, per 1,000 person months	19.08	18.57	0.92	(−5.25, 7.09) (−3.89, 5.72)	4.8	0.806	59,891
Percent with 30-day readmissions, among those with discharge	6.60	6.61	0.24	(−1.41, 1.90) (−1.05, 1.53)	3.6	0.811	15,365
Number of 30-day readmissions, per discharge, per 1,000 readmissions per month	74.15	74.00	2.58	(−17.54, 22.70) (−13.10, 18.25)	3.5	0.833	15,365

(continued)

Table E-11. Estimated effects of PCPCH recognition on quality of care, Oregon PEBB enrollees (2011–2014) (continued)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with prenatal care visits 0–9 months before delivery	30.61	29.85	−0.47	(−3.22, 2.29) (−2.61, 1.68)	−1.5	0.780	43,928
Number of prenatal care visits 0–9 months before delivery	467.00	450.05	−19.19	(−73.27, 34.90) (−61.31, 22.94)	−4.1	0.559	43,928
Percent with postpartum care visits 0–2 months after delivery	22.41	21.00	−3.56	(−6.83, −0.29) (−6.11, −1.01)	−15.9	0.073	13,141
Number of postpartum care visits 0–2 months after delivery	268.09	248.14	−54.90	(−99.06, −10.75) (−89.30, −20.51)	−20.5	0.041	13,141

CG = Comparison Group; HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; PCPCH = Patient-Centered Primary Care Home; PEBB = Public Employees Benefit Board; SBIRT = Screening, Brief Intervention, and Referral to Treatment. Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-12. Estimated effects of PCPCH recognition on quality of care, Oregon OEBB enrollees (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with depression screening, ages 12+ and 1+ outpatient encounter	0.000002	0.00030	0.0021	(−0.0015, 0.0056) (−0.0007, 0.0049)	96639.6	0.341	571,413
Number of depression screenings, ages 12+, per 1,000 person months	0.00002	0.0030	0.021	(−0.015, 0.056) (−0.007, 0.049)	96639.9	0.341	571,413
Percent with SBIRT screening, ages 18+ and 1+ outpatient encounter	0.18	0.01	0.47	(−0.05, 1.00) (0.06, 0.89)	264.6	0.139	565,275
Number of SBIRT screenings, ages 18+, per 1,000 person months	1.79	0.09	4.78	(−0.53, 10.08) (0.64, 8.91)	266.7	0.139	565,275
Percent with cervical cancer screening, women ages 24–64	0.99	1.14	0.08	(−0.02, 0.17) (−0.00, 0.15)	7.6	0.202	1,872,260
Number of cervical cancer screenings, women ages 24–64, per 1,000 person months	10.04	11.60	0.86	(−0.13, 1.86) (0.09, 1.64)	8.6	0.154	1,872,260

(continued)

Table E-12. Estimated effects of PCPCH recognition on quality of care, Oregon OEBB enrollees (2011–2014) (continued)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with colorectal cancer screening, ages 51–64	1.06	1.10	0.08	(0.02, 0.15) (0.03, 0.13)	7.7	0.036	1,733,340
Number of colorectal cancer screenings, ages 51–64, per 1,000 person months	10.66	11.07	0.80	(0.15, 1.44) (0.30, 1.30)	7.5	0.042	1,733,340
Percent with HbA1c test, diabetics age 18–64	3.31	3.28	0.14	(−0.38, 0.67) (−0.27, 0.55)	4.3	0.654	59,270
Number of HbA1c tests, diabetics age18–64, per 1,000 person months	33.19	32.87	1.40	(−3.87, 6.67) (−2.71, 5.50)	4.2	0.662	59,270
Percent with LDL-C test, diabetics age 18–64	1.94	2.03	0.29	(−0.12, 0.70) (−0.03, 0.61)	14.9	0.241	59,270
Number of LDL-C tests, diabetics age18–64, per 1,000 person months	19.49	20.41	2.72	(−1.37, 6.81) (−0.47, 5.90)	13.9	0.275	59,270
Percent with 30-day readmissions, among those with discharge	5.98	5.65	0.34	(−1.67, 2.35) (−1.23, 1.91)	5.7	0.781	15,883
Number of 30-day readmissions, per discharge, per 1,000 readmissions per month	65.77	62.65	1.28	(−21.68, 24.23) (−16.61, 19.16)	1.9	0.927	15,883
Percent with prenatal care visits 0–9 months before delivery	26.89	25.43	−2.74	(−6.07, 0.60) (−5.34, −0.14)	−10.2	0.177	48,077
Number of prenatal care visits 0–9 months before delivery	398.88	370.45	−43.94	(−109.72, 21.84) (−95.18, 7.31)	−11.0	0.272	48,077
Percent with postpartum care visits 0–2 months after delivery	25.27	23.74	−2.77	(−6.46, 0.91) (−5.64, 0.10)	−11.0	0.216	14,533
Number of postpartum care visits 0–2 months after delivery	287.12	268.01	−21.15	(−63.60, 21.29) (−54.22, 11.91)	−7.4	0.412	14,533

CG = Comparison Group; HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; OEBB = Oregon Educators Benefit Board; PCPCH = Patient-Centered Primary Care Home; SBIRT = Screening, Brief Intervention, and Referral to Treatment. Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

Table E-13. Estimated effects of PCPCH recognition on quality of care, Oregon commercially insured individuals (2011–2014)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with depression screening, ages 12+ and 1+ outpatient encounter	0.00002	0.00002	0.0002	(−0.0002, 0.0007) (−0.0001, 0.0006)	1006.7	0.409	5,291,441
Number of depression screenings, ages 12+, per 1,000 person months	0.0002	0.0002	0.002	(−0.002, 0.007) (−0.001, 0.006)	1006.7	0.409	5,291,441
Percent with SBIRT screening, ages 18+ and 1+ outpatient encounter	0.11	0.03	0.29	(0.001, 0.59) (0.07, 0.52)	262.1	0.098	5,245,469
Number of SBIRT screenings, ages 18+, per 1,000 person months	1.12	0.32	2.97	(0.03, 5.91) (0.68, 5.26)	263.8	0.097	5,245,469
Percent with cervical cancer screening, women ages 24–64	1.01	1.10	0.06	(−0.003, 0.12) (0.01, 0.11)	6.0	0.114	16,651,319
Number of cervical cancer screenings, women ages 24–64, per 1,000 person months	10.17	11.14	0.65	(0.02, 1.28) (0.16, 1.14)	6.4	0.091	16,651,319
Percent with colorectal cancer screening, ages 51–64	1.00	1.16	0.14	(0.09, 0.18) (0.10, 0.17)	13.6	0.000	13,852,600
Number of colorectal cancer screenings, ages 51–64, per 1,000 person months	10.08	11.67	1.39	(0.91, 1.86) (1.02, 1.76)	13.8	0.000	13,852,600
Percent with HbA1c test, diabetics age 18–64	2.81	2.84	0.25	(0.05, 0.46) (0.09, 0.42)	9.1	0.045	556,960
Number of HbA1c tests, diabetics age18–64, per 1,000 person months	28.13	28.47	2.54	(0.45, 4.63) (0.91, 4.17)	9.0	0.046	556,960
Percent with LDL-C test, diabetics age 18–64	1.76	1.82	0.14	(−0.02, 0.30) (0.01, 0.26)	7.9	0.153	556,960
Number of LDL-C tests, diabetics age18–64, per 1,000 person months	17.66	18.30	1.31	(−0.30, 2.92) (0.06, 2.57)	7.4	0.180	556,960
Percent with 30-day readmissions, among those with discharge	6.85	7.16	1.01	(−0.03, 2.04) (0.20, 1.81)	14.7	0.109	161,362
Number of 30-day readmissions, per discharge, per 1,000 readmissions per month	76.46	79.82	13.57	(0.72, 26.42) (3.56, 23.58)	17.7	0.082	161,362

(continued)

Table E-13. Estimated effects of PCPCH recognition on quality of care, Oregon commercially insured individuals (2011–2014) (continued)

	Pre-Period Adjusted Mean, PCPCH	Pre-Period Adjusted Mean, CG	Difference-in-Differences estimate (90% confidence interval) (80% confidence interval)		Relative difference (%)	p-value	Weighted N
Percent with prenatal care visits 0–9 months before delivery	30.12	29.20	−1.49	(−3.03, 0.05) (−2.69, −0.29)	−5.0	0.111	480,813
Number of prenatal care visits 0–9 months before delivery	463.89	451.19	−32.75	(−76.67, 11.17) (−66.97, 1.46)	−7.1	0.220	480,813
Percent with postpartum care visits 0–2 months after delivery	23.82	22.61	0.77	(−1.23, 2.76) (−0.79, 2.32)	3.2	0.528	144,583
Number of postpartum care visits 0–2 months after delivery	290.52	270.80	22.00	(−15.61, 59.61) (−7.30, 51.30)	7.6	0.336	144,583

CG = Comparison Group; HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; PCPCH = Patient-Centered Primary Care Homes; SBIRT = Screening, Brief Intervention, and Referral to Treatment.
Note: Two-way fixed effects, difference-in-differences (D-in-D) regression models were estimated using Ordinary Least Squares. The relative difference is the D-in-D estimate expressed as a percentage of the intervention group's pre-intervention period adjusted mean. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only.

SOURCE: Urban Institute analysis of Oregon All Payer All Claims Data (2011–2014).

E.4.3 Discussion and limitations

The estimated effects of a primary care clinic becoming PCPCH-recognized on several measures of utilization across several payer types are generally consistent with the goals of patient-centered primary care, which include increases in well-care and in the use of preventive screenings and the coordination of care across other providers. For example, the use of primary care increased for all payers, as did well-care among adolescent patients for all individuals except Medicaid beneficiaries. In addition, colorectal cancer screenings increased for all payers after the primary care clinic received PCPCH recognition. And although per member per month costs did generally increase after recognition, with one exception (Medicaid), these increases in utilization were not accompanied by significant increases in ED use, although there were also no significant decreases. In addition, we did not find evidence that effects were any stronger for Medicaid patients than for other patients, even though Medicaid patients were the only group for whom providers received financial incentives. Even so, provider stakeholders noted that there was not enough financial support for PCPCHs during the period of analysis for this report, so effects could be greater over time as financial incentives from other payers to become a PCPCH increase. Future analyses will explore whether effects differ when including data from 2015, when financial incentives increased and spread to other payers occurred, most notably certain PEBB plans.

Compared with previous research on the effects of the Oregon PCPCH program (Gelmon et al., 2016), results from the present analysis reveal both a common element and a marked difference. The consistent theme across the two analyses is that the PCPCH program increased primary care use, which is reassuring given that the program is expected to increase such utilization. In contrast to the previous study, however, the present analysis reveals an overall *increase* to total spending as a result of the PCPCH program, whereas the prior study reported a significant *decrease* in total spending.

One explanation for this discrepancy could be differences in the subsamples analyzed from the APAC data across studies, which warrant further investigation. First, Gelmon and colleagues limit the APAC sample to individuals who had one type of health insurance coverage throughout the entire study year, whereas the present study does not make such a restriction. Should the PCPCH program be more effective in decreasing overall costs for those who do not change their health insurance coverage during the year, or should those who change coverage be less likely to benefit from PCPCH, we could observe increased spending in the present analysis yet decreased spending in the previous study. Further, the present analysis seeks to exclude the large number of new Medicaid enrollees who gained coverage in 2014 through the ACA by limiting the sample to persons first observed in 2011. Because the Gelmon analysis does not make this exclusion, it may be that the large number of new Medicaid beneficiaries have lower monthly costs, driving down cost estimates in the last year of the analysis. Future work will formally investigate both hypotheses.

There are several limitations to these analyses. Most notably, the procedure to assign PCPCH status to individual clinics is not straightforward, because it requires linking providers who file claims for any primary care services and are indexed by an Oregon-specific identifier to PCPCH-recognized clinics which are indexed by National Provider Identifier. As such, the universe of PCPs as represented in claims is not necessarily the same as the universe of clinic sites that could qualify as a primary care home. Although we follow commonly used methods to attribute patients to a PCP, there is room for error in this assignment process which could make it more difficult to measure effects of PCPCH status, if any. (See ***Sub-appendix E-2.3*** for details on the PCPCH attribution process and its limitations.) We do not have reason to believe, however, that error introduced into the attribution process is systematically related with any of the outcomes measured in this study (which could result in biased estimates). That is, should this error be random it most likely would make measuring an effect more difficult, but we do not have reason to believe this is a large concern. In addition, for an individual to be associated with a primary care clinic it is necessary to observe, at some point during the study period, utilization of primary care services. Consequently, our results cannot be generalized to the broader population of individuals, some of whom may only receive specialty care or no care at all.

E.5 References

Angrist, J.D., & Pischke J. (2009) *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press.

Centers for Medicare & Medicaid Services (CMS). (2016a). *Oregon State Innovation Model Progress Report, Quarter 1 2016*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2016b). *Oregon State Innovation Model Progress Report, Quarter 4 2016*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2017). *Oregon State Innovation Model Progress Report, Quarter 1 2017*. Supplied by CMS.

Gavin, N., et al. (2016, February). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Two Annual Report*. Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-round1-secondannualrpt.pdf

Gelmon, S., Wallace, N., Sandberg, B., Petchel, S., & Bouranis, N. (2016). *Implementation of Oregon's PCPCH Program: Exemplary Practice and Program Findings* [Internet]. Oregon Health Authority, Patient Centered Primary Care Home Program. Available at https://www.oregon.gov/oha/pcpch/Documents/PCPCH-Program-Implementation-Report-Sept2016.pdf

Hansen, K. (2017). *Lawmakers: Oregon Budget Deficits Could Get Worse* [Internet]. Associated Press. 2017 Aug 21. Available at https://www.usnews.com/news/best-states/oregon/articles/2017-04-21/lawmakers-oregon-budget-deficits-could-get-worse

Health Management Associates, Artemis Consulting. (2016 Dec). *Oregon Health Authority Oral Health Roadmap: Moving into the Future* [Internet]. [cited 2017 May 25]. Available at https://www.oregon.gov/oha/Transformation-Center/Resources/Oral-Health-Roadmap.pdf

Health Management Associates. (2016a). *Final Report: SIM Sustainability Planning for the Oregon Health Authority*. Dec.

Health Management Associates. (2016b). *Oral Health Integration in Oregon: Environmental Scan and Recommendations* [Internet]. 2016 Nov. [cited 2017 October 12]. Available at http://www.oregon.gov/OHA/HPA/CSI-TC/Resources/Oral%20Health%20Integration%20in%20Oregon%20-%20Environmental%20Scan%20and%20Recommendations.pdf

Health Management Associates. (2016c). *Oral Health Toolkit: Resources for Supporting Oral Health Integration in Oregon* [Internet]. 2016 Nov [cited 2017 May 25]. Available at https://www.oregon.gov/oha/Transformation-Center/Resources/Oral-Health-Toolkit.pdf

House Bill 2024 [Internet]. Available at https://olis.leg.state.or.us/liz/2017R1/Measures/Overview/HB2024

House Bill 3650 [Internet]. Jul 1, 2011. Available at http://gov.oregonlive.com/bill/2011/HB3650/

Institute on Aging. (2016 Oct). *Portland State University. Housing Services Executive Summary, October 2016* [Internet]. Available at https://www.oregon.gov/oha/analytics/Evaluation%20docs/Housing%20with%20Services%20Evaluation%20-%20Executive%20Summary%20and%20Report.pdf

Loretz, K, & Fairbanks, M. (2017). *Public Employees' Benefit Board/Oregon Educators Benefit Board 2017–2019*. Human Services Legislative Subcommittee on Ways and Means.

Oregon Health Authority (2013). *Oregon's State Innovation Model Project Implementation Period Final Report* [Internet]. [cited 2017 September 29]. Available at http://www.oregon.gov/oha/HPA/CSI-TC/SIM/Oregon-SIM-Implementation-Period-Annual-Progress-Report-Dec-2013.pdf

Oregon Health Authority (2016). *2015 Physician Workforce Survey* [Internet]. [cited 2017 August 2]. Available at http://www.oregon.gov/oha/HPA/ANALYTICS/Documents/2015PhysicianWorkforceSurveyReport.pdf

Oregon Health Authority. (2017a). *Oregon's Waiver: 1115 Demonstration Renewal with the Centers for Medicare & Medicaid Services*. [cited 2017 September 29]. Available at http://www.oregon.gov/oha/HPA/HP-Medicaid-1115-Waiver/Documents/Waiver%20Renewal%20PowerPoint-3-14-17.pdf

Oregon Health Authority (2017b). *Primary Care Spending in Oregon: A Report to the Oregon Legislature* [Internet]. [cited 2017 May 25]. Available at https://www.oregon.gov/oha/pcpch/Documents/2017%20SB231_Primary-Care-Spending-in-Oregon-Report-to-the-Legislature.pdf

Oregon Health Authority. (n.d.). *Transformation Center: Behavioral Health Integration* [Internet]. [cited 2017 May 25]. Available at https://www.oregon.gov/oha/Transformation-Center/Pages/Behavioral-Health-Integration.aspx

Oregon Health Leadership Council. (2017). *EDIE/PreManage* [Internet]. Available at http://www.orhealthleadershipcouncil.org/edie/

Oregon Health Policy Board (n.d.). [Internet] *Oregon's coordinated care model. Better health, better care, lower costs: The Oregon Way*. Available at http://www.oregon.gov/oha/HPA/Documents/Coordinated-Care-Model.pdf.

Patient-Centered Primary Care Home Program (n.d.). *Patient-Centered Primary Care Home Program Recognized Patient-Centered Primary Care Homes* [Internet]. [cited 2017 May 25]. Available at http://www.oregon.gov/oha/pcpch/Pages/recognized-clinics.aspx

Patient-Centered Primary Care Home Program. (2016). *Payment Incentives* [Internet]. 2016 Oct 11. Available at https://www.oregon.gov/oha/pcpch/Pages/payment-incentives.aspx/

RTI International. (2017, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Three Annual Report*. Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

Senate Bill 440 [Internet]. Available at https://gov.oregonlive.com/bill/2015/SB440/

Senate Bill 934 [Internet]. Available at https://olis.leg.state.or.us/liz/2017R1/Downloads/MeasureDocument/SB934

Wilson, D. J. (2017). *Oregon Medicaid enrollment sharply down* [Internet]. 2017 Feb 22. Available at http://stateofreform.com/featured/2017/02/oregon-medicaid-enrollment-sharply/

[this page intentionally left blank]

Sub-appendix E-1. Methods for Qualitative Data Collection and Analysis

The Oregon SIM Initiative Round 1 Evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. These sources include information obtained from in-person site visits during which we conducted interviews with key informants and gathered data in provider and consumer focus groups; from a review of relevant documents; and from regular evaluation calls with the state officials leading the state's SIM Initiative.

E-1.1 Site visit key informant interviews

The Urban Institute and NASHP evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Oregon, usually in person but sometimes by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included Oregon's SIM Initiative teams, other state officials, Medicaid and commercial payers, providers and provider associations, consumers and consumer representatives, health infrastructure personnel, and state contractors. We solicited suggestions of interview candidates from state officials leading the Oregon SIM Initiative teams and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with state SIM Initiative teams or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participant. All but a few interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings except for a few interviews where a note taker was not present. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and were tailored for Oregon. The interviews were interactive; participants were encouraged to share feedback most relevant to their particular roles in the state's SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Oregon evaluation team conducted 26 total interviews in April and May 2017. ***Table E-1-1*** provides a distribution of the completed interviews by interviewee type.

Table E-1-1. Key informant interviews conducted in Oregon, April-May 2017

	Number of interviews
State officials	9
Payers and purchasers	5
Providers and provider associations	3
Consumer advocacy groups	5
Other	4
Total	26

E-1.2 Focus groups

Evaluation team members conducted four consumer and four provider focus group discussions in Oregon on April 25–27, 2017. These focus groups were the third and final groups conducted for the SIM Initiative Round 1 evaluation.

Table E-1-2 provides an overview of the 2017 focus groups. The consumer groups comprised participants in the Housing with Services (HWS) Initiative (1 group) and individuals enrolled in Public Employees Benefit Board (PEBB) Coordinated Care Model (CCM) Health Plans. The provider groups comprised primary care providers contracting with Medicaid Coordinated Care Organizations (CCOs).

Recruitment. The evaluation team received lists of potentially eligible PEBB consumer focus group participants from the state to recruit for three consumer focus groups and compiled lists of potentially eligible CCO provider focus group participants from online provider directories for four provider focus groups. For these seven groups, The Henne Group contacted potential participants via phone, screened for eligibility, and scheduled them for the focus groups. HWS staff recruited HWS consumers for one consumer focus group.

Table E-1-2. Overview of focus group participants

Group	Location	No. of participants	Type of participants
1	Portland	7	Providers in CCOs
2	Portland	9	Providers in CCOs
3	Portland	8	Providers in CCOs
4	Portland	9	Consumers in HWS Initiative
5	Portland	10	Consumers enrolled in PEBB CCM health plans
6	Hood River	3	Providers in CCOs
7	Salem	10	Consumers enrolled in PEBB CCM health plans
8	Hood River	8	Consumers enrolled in PEBB CCM health plans
Total	—	64	—

CCM = Coordinated Care Model; CCO = Coordinated Care Organization; HWS = Housing with Services; PEBB = Public Employees Benefit Board.

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion and how the information from the discussion would be used and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes, and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health information technology, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

E-1.3 Document review

The evaluation team used Oregon's quarterly and annual reports, operational plans, and other state documents to obtain updated information on its implementation progress during the current analytic period of April 2016–April 2017. To supplement these documents, we collected relevant news articles on the Oregon SIM Initiative activities and related initiatives, and we searched reform-oriented websites that the state maintains.

In addition, we obtained numbers of providers and payers participating in and populations served by Oregon's different innovation models from reports the states submit to the Innovation Center in conjunction with their quarterly reports. We provide Oregon's reported figures in ***Chapter 2*** and ***Appendix E***.

The estimated number of providers working in a recognized PCPCH was calculated based on the state-reported number of PCPCHs (CMS, 2017) multiplied by the state's estimated median of four clinicians per PCPCH (Oregon Health Authority, 2015). To calculate the total percentage of providers in the state participating in the PCPCH model, we used as the denominator the number of active patient care primary care physicians in the 2015 State Physician Workforce Data Book (Association of American Medical Colleges, 2015). Active patient care primary care physicians are federal and nonfederal physicians with a Doctor of Medicine (MD) or a Doctor of Osteopathic Medicine (DO) who are licensed by a state, work at least 20 hours per week, whose self-reported type of practice is direct patient care, and have one of the self-designated primary specialties.

The estimated number of providers participating in CCM was calculated using the state-reported percentage of providers participating in the CCM (CMS, 2017), which was based on providers accepting Medicaid patients as calculated from data obtained through the Physician Workforce Survey (Oregon Health Authority, 2016). This percentage was multiplied by the number of active physicians in the 2015 State Physician Workforce Data Book (Association of American Medical Colleges, 2015) to calculate the number of providers. Active physicians are federal and nonfederal physicians with an MD or a DO who are licensed by a state and work at least 20 hours per week.

The percentage of population reached under PCPCHs was calculated based on the state-reported percentage of Medicaid population in CCOs multiplied by the percentage of CCO members in PCPCHs (CMS, 2017). Percentages of populations reached under CCM are state-reported numbers (CMS, 2017). Counts of populations reached, described in the text in ***Appendix E***, were calculated by multiplying the percentages of the populations reached under CCM by the Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

Percentages of state population by insurance type are Kaiser Family Foundation population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017).

E-1.4 State evaluation calls

The evaluation team for Oregon, the state officials leading the Oregon SIM team, and the state's Innovation Center project officer typically attended each state evaluation call. Occasionally these calls were joined by state officials responsible for individual SIM activities and CMS technical assistance contractors. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest for the evaluation. The Oregon evaluation team held seven calls with the state between April 2016 and April 2017, the analytic period of this report.

For each meeting used to collect additional information and perspective from state officials leading the SIM Initiative in Oregon, the evaluation team prepared a list of state-specific questions—including the status of delivery and payment system reform initiatives and other SIM activities, related policy levers, and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to the state ahead of the call and ask the state to have knowledgeable state officials available to answer the questions during the call. We also used the calls to review and ask questions about state evaluation findings from particular SIM-funded activities.

E-1.5 Analysis

The evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visit key informant interviews, site visit focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

E-1.6 References

Association of American Medical Colleges (2015, November). *2015 State Physician Workforce Data Book*. Available at https://www.aamc.org/data/workforce/reports/442830/statedataandreports.html.

Centers for Medicare & Medicaid Services (CMS). (2017). *Oregon State Innovation Model Progress Report, Quarter 1 2017*. Supplied by CMS.

Kaiser Family Foundation. (2017). *Health Insurance Coverage of the Total Population*. Available at http://www.kff.org/other/state-indicator/total-population/

Oregon Health Authority (2015). *The Oregon Health Authority Patient-Centered Primary Care Home Program 2014 –2015 Annual Report*. Available at http://www.oregon.gov/oha/pcpch/Documents/2014-2015%20PCPCH%20Program%20Annual%20Report.pdf

Oregon Health Authority (2016). *2015 Physician Workforce Survey* [Internet]. [cited 2017 August 2]. Available at http://www.oregon.gov/oha/HPA/ANALYTICS/Documents/2015PhysicianWorkforceSurveyReport.pdf

Sub-appendix E-2. Methods and Measures for Interim Impact Analysis

To estimate the impact of the Patient-Centered Primary Care Homes (PCPCH) program in Oregon, we conducted difference-in-differences (D-in-D) regression analyses using the Oregon All Payer All Claims (APAC) Data. We present results for outcomes across two evaluation domains: (1) service utilization and expenditures and (2) quality of care. This appendix details the methods we used for this analysis.

PCPCH program structure. The PCPCH program was established by Oregon's Legislature in 2009 and began recognizing clinics in October 2011. Central to the success of the PCPCH program, and thus a key goal behind spreading the CCM beyond Medicaid CCOs, is giving clinics an incentive to become PCPCH recognized. To that end, Oregon has been working to convince more payers to make incentive payments to PCPCHs, and several types of payers have done so, but on different schedules. Initially, only some Medicaid CCOs made such payments, later some plans offered by the Public Employees Benefit Board (PEBB) covering state employees started to make per member per month (PMPM) payments to recognized PCPCH clinics (Patient-Centered Primary Care Home Program, 2016). In addition, some PEBB and Oregon Educators Benefit Board (OEBB) health plans began to incentivize their members to choose PCPCH clinics by offering lower copays for care received from those clinics. By the end of the analysis period, in December 2014, 548 practices were recognized; the state estimated that 81 percent of Medicaid CCO members, and 50 percent of the entire state population, were served by a recognized clinic.

Patients served by PCPCH-certified clinics. Model participants are defined as those who received the plurality of their primary care services at a given PCPCH-certified clinic. Note that not all clinics achieved PCPCH certification, and patients who received the plurality of their services at non-PCPCH clinics are considered nonparticipants. Participation is broader than the Medicaid population and includes patients of PCPCH clinics covered by commercial, Medicaid, OEBB, and PEBB health insurance; we study each population in turn because each payer may reimburse the care delivered in PCPCH clinics differently. Restrictions (discussed below) are applied to the sample to address increased access to health insurance under the Affordable Care Act on the composition of patients by payer, and individuals insured by both Medicaid and Medicare.

Profile of participating providers. A survey of PCPCH practices conducted in 2013, when 368 practices had been recognized, found that practices were distributed across the state, in both urban (64.4 percent) and rural (35.6 percent) areas. Approximately a quarter of practices were small (2 or fewer clinicians), another a quarter were large (10 or more clinicians), and the remaining half of practices had between 3 and 9 clinicians.

Study design. The data are an unbalanced panel. The primary sample includes those who were first observed as insured by a given type of insurance in 2011 (described below). We study monthly frequency data, where a given individual may change insurance status throughout the year, making the panel unbalanced (i.e., when a patient changes the type of insurance they are covered by from one month to the next, or transitions to uninsured, they drop out a given sample, yet may reappear should their insurance status change again at a later month). We choose this design, compared with further limiting the sample to a balanced panel, because we are concerned about introducing nonrandom selection that could bias the results. That is, the characteristics of those whose insurance status does not change are very likely related to other important unobservable characteristics we cannot control for.

Intervention group, timing of intervention, and relationship with analytical approach. The level of intervention is the PCPCH, which is a clinic-level intervention. The intervention group is defined as clinics that achieved PCPCH certification, and the patients who receive medical treatment at those clinics covered each of the insurer groups studied (commercial, Medicaid, and two state employee health plans—OEBB and PEBB). See ***Sub-appendix E-2.3*** for details on the PCPCH attribution process. There are two restrictions applied to the patients whose data are included in the analysis. First, patients dually eligible for both Medicaid and Medicare were excluded from the Medicaid-covered study population because Medicaid claims present only a partial picture of health care use among Medicare-Medicaid beneficiaries. Second, to avoid confounding the analysis because of new insurance options via the Affordable Care Act, and consequent changes in the composition of individuals insured by a given payer, the sample is limited to individuals first observed insured by a given payer in 2011, the earliest year for which we have data.

There was "rolling entry" of clinic certification, starting in 2011 through 2014, which coincides with the study period. Dates of PCPCH recognition were then used to separate observations into pre- and post-recognition periods, which were not equal across clinics because some obtained recognition early or later than others. Roughly a quarter of clinics were newly certified in each year, 2011 through 2014. Consequently, some patients had more than 3 years of exposure to the PCPCH model, whereas others had less than 1 year, and the measured treatment effect is an average across patients with this varying exposure to the PCPCH model.

This feature of the intervention is accounted for in the D-in-D regression models by including year-month and clinic fixed effects as explanatory variables. This more flexible approach is a natural choice because it does not require the researcher to arbitrarily divide the control group (clinics that never gain PCPCH certification) into dichotomous pre- and post-treatment periods.

Comparison group. The comparison group is defined as clinics that were not PCPCH certified and the patients who received medical treatment at those clinics. Patients were attributed to clinics based on where they received the plurality of primary care services in any given year. Patients who did not receive any primary care services over the study period were not included in the analysis.

Statistical approach. We estimate D-in-D models that account for the fact that the post-treatment period is not equal across clinics with clinic and year-month fixed effects. The unit of analysis in all models is clinic-month-year. Ordinary Least Squares (OLS) models were estimated for all outcomes. Separate models are estimated for each subpopulation (Medicaid, commercial, OEBB, PEBB) and performance measure. The models control for age and sex except for outcomes that are gender specific (in which case sex is omitted from the model). Each clinic-month observation is weighted by the number of individuals represented by the given year-month cell such that the results are interpreted as effects, if any, on individuals (not clinics). Standard errors are clustered at the clinic level.

Clinic fixed effects account for characteristics specific to each individual clinic, related with health and medical care utilization, that do not change over the sample period. This could include geographic characteristics of the clinic (e.g., community, local social norms, general economic status of the local population or those who frequent the clinic, medical service pricing and the overall supply of primary care, and capacity to offer services specific to the community's needs). It may also account for a given clinic's general practices or administration that could influence medical care received (e.g., appointment reminders, unique treatment capacities or skills of staff).

Year-month fixed effects account for any general trends in the outcomes studied that are common to both PCPCH-certified clinics and non-PCPCH certified clinics (e.g., should there be seasonality in the utilization of medical services, or overall economic changes over time, that influence medical treatment, the year-month fixed effects would control for such changes over time).

Patients' age and sex account for the fact that individuals of different ages and sex have different health care needs, which influences different types of medical utilization.

E-2.1 Data sources

Oregon APAC data. The Oregon SIM evaluation team at the Urban Institute used medical claims and enrollment data covering calendar years 2011 to 2014 from Oregon's APAC database. The data covered four populations: (1) Medicaid beneficiaries, (2) PEBB members, (3) OEBB members, and (4) other commercially insured individuals. Commercial health plans and third-party administrators with 5,000 or more covered lives are required to report data to APAC (Oregon Health Authority, n.d.). Data are submitted to APAC based on a rolling 12-month submission model, in which data covering a 12-month period are submitted each quarter. Thus, two subsequent quarterly submissions have 9 months of overlap. The new data replace the old data for the overlapping period. APAC data for a particular calendar year are released approximately 2 years later.

APAC data are collected and processed by Milliman, Inc. with oversight from the Oregon Health Authority (OHA). In addition to validating the data collected from submitters, Milliman applies its Health Cost Guidelines (HCG) Grouper, which sorts medical claims into benefit service categories (Milliman).

Our APAC data files included the following files: (1) medical claims, (2) pharmacy claims, (3) enrollment data, and (4) provider crosswalk. The provider crosswalk file enabled our team to crosswalk from the submitter-specific provider identifiers present on APAC claims to National Provider Identifiers (NPIs). The analytic sample included individuals of all ages and excluded Medicare-Medicaid enrollees.

PCPCH directory. Data on PCPCH clinics were provided by the PCPCH program. The directory included dates of recognition for each PCPCH clinic and NPIs associated with the clinic.

National Provider Identifier Registry. The NPI Registry is a directory of all active NPI records and associated provider information, including clinic address. We used it to identify NPIs associated with the same place of care as part of our Primary Care Provider (PCP) attribution process, as described later. The NPI registry is made accessible online by CMS.

E-2.2 Outcome measures

Claims and enrollment data covering calendar years 2011–2014 were used to create 32 person-month level measures of expenditures, utilization, and quality of care. Several of these correspond closely with Oregon’s performance metrics that are shared by CCOs and PEBB and OEBB plans. Specifications for each measure are provided in this section. For most measures, specifications were sourced from publicly available OHA performance metric specifications (Oregon Health Authority, n.d.). However, in some cases measures specifications were not available from OHA and in other cases they needed to be cross-referenced against other sources to ensure that they were generalizable to all-payer data. For these reasons we consulted several other sources of measure specifications published by payers and quality measurement organizations (CMS, 2016; “Measure #134”, 2017; Molina Health Care, 2017; WellCare Health Plans, 2017).

E-2.2.1 Utilization and expenditures

Utilization measures are reported as rates per 1,000 person-months (or discharges for readmissions). For each measure, we calculated the probability of any utilization and the amount of utilization. For the former, the numerator is the number of eligible individuals who had at least one event (e.g., inpatient admission or ED visit) during the month, while for the latter the numerator is the number of events among eligible individuals in the month. For both, the denominator is the number of eligible individuals during the month. We multiplied each measure by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries per month. Events are included in a month's total if admission or service date on the claim was during the period.

Average expenditures were calculated on a per member per month (PMPM) basis. Expenditures were defined as payments for claims with a status of "paid" or "managed care encounter." Averages include all individuals enrolled during the period, meaning that they reflect the presence of individuals with zero medical costs. Negative payments on claims were included in total expenditures, because we were advised by OHA that summing across negative and positive payments would be approximately accurate in aggregate. Payments were included in a month's total if the admission or service date on the claim occurred during the month.

- **Total spending:** Payments were summed across all inpatient and outpatient (facility and professional) claims. This measure excludes member cost-sharing and pharmacy component expenditures.
- **Primary care visits:** Visits to PCPs were selected based on Milliman's HCG Grouper. A primary care visit was counted when a claim line had one of the following HCG codes:
  - P32c: Professional Office/Home Visits—PCP
  - P42: Professional Preventive Well Baby Exams
  - P43: Professional Preventive Physical Exams

Multiple primary care visits on a single day were counted as a single visit.

- **Specialist visits:** Visits to specialty providers were counted when the claim line had an HCG code of "P32d" (Professional Office/Home Visit—Specialist). Multiple specialty provider visits on a single day were counted as a single visit.
- **Thirty-day readmissions per hospital discharge:** This is the total number of unplanned hospital readmissions within 30 days of discharge, divided by the total number of index admissions in the month. An index hospital discharge is identified as an inpatient stay with a discharge date within the given month. We excluded admissions if the beneficiary died during the hospitalization.
- **ED utilization:** ED visits (including observation stays) were counted when a claim line had a revenue code to 0450, 0451, 0452, 0456, 0459, or 0981. Multiple ED visits on a single day were counted as a single visit.
- **Inpatient hospitalizations:** Inpatient hospitalizations were identified with the following HCG codes:
  - I11a: Facility Inpatient Medical—General
  - I12: Facility Inpatient—Surgical

- I13a: Facility Inpatient Psychiatric—Hospital
- I14a: Facility Inpatient Alcohol and Drug Abuse—Hospital
- I21a: Facility Inpatient Maternal Normal Delivery
- I21b: Facility Inpatient Maternal Normal Delivery—Mom\Baby Combined
- I22a: Facility Inpatient Maternal C-Section Delivery
- I22b: Facility Inpatient Maternal C-Section Delivery—Mom\Baby Combined
- I23: Facility Inpatient Well Newborn
- I24: Facility Inpatient Other Newborn
- I25: Facility Inpatient Maternity Non-Delivery

We did not include facility inpatient claims with HCG codes for rehabilitation facility, psychiatric residential facility, alcohol and drug abuse residential facility, and skilled nursing facility.

Some claims that appear to indicate multiple admissions are in fact transfers between facilities. These records were counted as a single admission. To combine transfers into one acute admission, we identified claims that had no more than 1 elapsed day between discharge date of the index claim and admission date of the subsequent claim. We combined the claims into one record by taking the earliest admission date and latest discharge date.

E-2.2.2 Quality of care

To evaluate the impact on quality of care, we report the following quality measures. Measures were calculated on a PMPM basis, and we calculated both the probability of the event occurring in a person-month and the number of events per 1,000 person-months. Inpatient discharges were calculated on a per admission per month basis.

- **Depression screenings (ages 12 and older):** Depression screenings were counted when a visit included a claim line with the Healthcare Common Procedure Coding System (HCPCS) code G8431 or G8510. The denominator for this measure included enrollment months for individuals at least 12 years old as of December 31 of the measurement year that had at least one eligible outpatient encounter during the month as indicated by any of Current Procedural Terminology (CPT) codes 90791, 90792, 90832, 90834, 90837, 90839, 92625, 96116, 96118, 96150, 96151, 97003, 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215; or HCPCS codes G0101, G0402, G0438, G0439, G0444, and without telehealth modifiers GQ or GT.
- **Screening, Brief Intervention and Referral to Treatment (SBIRT) screenings (ages 18 and older):** SBIRT screenings were counted when a visit included a claim line with CPT code 99408 or 99409, HCPCS code G0443, G0396, G0397, or diagnosis code V82.9. We also included visits that included both CPT code 99420 and ICD-9 diagnosis code V82.9. The denominator for this measure included enrollment months for individuals at least 18 years old as of December 31 of the

measurement year and had at least one eligible outpatient service as indicated by CPT codes 99201–99205, 99211–99215, 99241–99245, 99341–99345, 99347–99350, 99383–99384, 99385–99387, 99393–99394, 99395–99397, 99401–99404, 99408, 99409, 99411, 99412, 99420, or 99429; HCPCS codes G0396, G0397, G0402, G0442, G0443, T1015, or diagnosis code V20.2.

- **Cervical cancer screenings (females ages 24–64):** Cervical cancer screenings were counted when a visit included a claim line with CPT code 88141, 88142, 88143, 88147, 88148, 88150, 88152, 88153, 88154, 88164, 88165, 88166, 88167, 88174, or 88175; or HCPCS code G0123, G0124, G0141, G0143, G0144, G0145, G0147, G0148, P3000, P3001, or Q0091; or revenue code 0923. The denominator for this measure included enrollment months for women ages 24–64 as of December 31 of the measurement year.

- **Colorectal cancer screenings (ages 51–75):** Colorectal cancer screenings were counted when a visit included a claim line with CPT code 82270, 82274, 45330–45335, 45337–45342, 45345–45347, 45349, 45350, 44388–44394, 44401–44408, 45378–45393, 44397, 45355, or 45398; or HCPCS code G0328, G0104, G0105, G0121. The denominator for this measure included enrollment months for individuals ages 51–75 as of December 31 of the measurement year.

- **Diabetes care screenings: HbA1c tests (diabetics ages 18–64):** HbA1c tests were counted when a visit included a claim line with CPT code 83036 or 83037; or HCPCS code 3044F, 3045F, or 3046F. The denominator for this measure included enrollment months for individuals who had at least one inpatient visit with a diabetes diagnosis or two outpatient visits with a diabetes diagnosis during the measurement year, as indicated by any of the following ICD-9 diagnosis codes: 250.0–250.93, 357.2, 362.01–362.07, 366.41, or 648.00–648.04. Inpatient and outpatient encounters were identified with the HCG codes in ***Table E-2-1***.

- **Diabetes care screenings: LDL-C tests (diabetics ages 18–64):** LDL-C tests were counted when a visit included a claim line with any of the following CPT codes: 80061, 83700, 83701, 83704, 83721, 3048F, 3049F, or 3050F. The denominator for this measure included enrollment months for individuals who had at least one inpatient visit with a diabetes diagnosis or two outpatient visits with a diabetes diagnosis during the measurement year, as indicated by any of the following ICD-9 diagnosis codes: 250.0–250.93, 357.2, 362.01–362.07, 366.41, or 648.00–648.04. Inpatient and outpatient encounters were identified with the HCG codes in ***Table E-2-1***.

Table E-2-1. Codes for identifying inpatient and outpatient visits

Description	HCG Code
Inpatient visit	I11A, P31a, P31b
Outpatient visit	P32c, P32d, P33, P43, P40a, P51, P52, O11a, O11b

HCG = Health Cost Guidelines.

- **Prenatal care visits:** Prenatal visits were counted when a claim indicated a visit to an OB/GYN practitioner (as identified by National Uniform Claim Committee Provider Taxonomy Code) and one of the following criteria, or a visit to a primary care practitioner with a pregnancy-related diagnosis and one other of the following criteria. ***Table E-2-2*** lists qualifying diagnosis and procedure codes for each criterion.
    - Basic physical obstetrical exam
    - Obstetric panel
    - Ultrasound of pregnant uterus
    - TORCH antibody panel (Toxoplasma, Rubella, Cytomegalovirus, and Herpes simplex testing)
    - Rubella antibody test/titer with a Rh incompatibility (ABO/Rh) blood typing
    - Pregnancy-related diagnosis
        - The denominator for this measure includes enrollment months 0–9 months before a delivery, excluding deliveries that did not result in a live birth. ***Table E-2-3*** lists diagnosis and procedure codes used to identify appropriate deliveries.
- **Postpartum care visits:** Postpartum visits were identified with the procedure codes listed in ***Table E-2-2***. The denominator for this measure includes enrollment months 0–2 months after a delivery, excluding deliveries that did not result in a live birth.
- **Well-child visits (ages 0–1):** Well-care visits for infants were counted when a visit included a claim line with a CPT code of 99381–99385, 99391–99396, or 99461, HCPCS code of G0438 or G0439, or an ICD-9 diagnosis code of V20.2, V20.3, V20.31, V20.32, V70.0, V70.3, V70.5, V70.6, V70.8, or V70.9. The denominator for this measure included enrollment months for infants up to age one as of December 31 of the measurement year.
- **Adolescent well-care visits (ages 12–21):** Well-care visits for adolescents were counted when a visit included a claim line with a CPT code of 99383–99385, 99393–99395; or HCPCS code G0438 or G0439; or an ICD-9 diagnosis code of V20.2, V20.3, V20.31, V20.32, V70.0, V70.3, V70.5, V70.6, V70.8, or V70.9. The denominator for this measure included enrollment months for adolescents ages 12–21 as of December 31 of the measurement year.

Table E-2-2. Codes to identify prenatal and postpartum care visits

Description	CPT	HCPCS	UB Revenue	ICD-9 Diagnosis
Basic physical obstetrical exam	99201–99205, 99211–99215, 99241–99245, 0500F, 0501F, 0502F	H1000-H1004	0514	
Obstetric panel	80055			
Ultrasound of pregnant uterus	76801, 76805, 76811, 76813, 76815–76821, 76825–76828			
TORCH antibody panel	8644 AND 86762 AND ONE OF (86694, 86695, 86696) AND ONE OF (8677, 86778)			
Rubella antibody test/titer with an Rh incompatibility (ABO/Rh) blood typing	86762 AND ONE OF (8900, 86901)			
Pregnancy-related diagnosis code				64x.x3, 65x.x3, 678.x3,679.x3, V22, V23, V28
Postpartum visit	57170, 58300, 59430, 88147, 88148, 88150, 44174, 88175, 88141–88143, 88152–88155, 88164–88167, 0503F	G010, G0123, G0124, G0141, G0143, G0144, G0145, G0147, G0148, P3000, P3001, Q0091	0932	

CPT = Current Procedural Terminology; HCPCS = Healthcare Common Procedure Coding System; ICD-9 = International Classification of Diseases, Ninth Revision; TORCH = Toxoplasma, Rubella, Cytomegalovirus, and Herpes simplex; UB = uniform billing.

Table E-2-3. Codes to identify deliveries resulting in live births

Description	CPT	ICD-9 Diagnosis
Delivery	59400, 59409, 59410, 59510, 59514, 59515, 59610, 59612, 59614, 59618, 59620, 59622	640.x1, 641.x1, 642.x1, 642.x2, 643.x1, 644.21, 645.x1, 646.x1, 646.x2, 647.x1, 647.x2, 648.x1, 648.x2, 649.x1, 649.x2, 651.x1, 652.x1, 653.x1, 654.x1, 654.02, 654.12, 654.32, 654.x2, 655.x1, 656.01, 656.11, 656.21, 656.31, 656.51, 656.61, 656.71, 656.81, 656.91, 657.01, 658.x1, 659.x1, 660.x1, 661.x1, 662.x1, 663.x1, 664.x1, 665.01, 665.x1, 665.x2, 666.x2, 667.x2, 668.x1, 668.x2, 669.x1, 669.x2, 670.02, 671.x1, 671.x2, 672.02, 673.x1, 673.x2, 674.x1, 674.x2, 675.x1, 675.x2, 676.x1, 676.x2, 678.x1, 679.x1, 679.x2
Non-live birth (exclude)		630–637, 639, 656.4, 768.0, 768.1, V27.1, V27.4, V27.7

CPT = Current Procedural Terminology; ICD-9 = International Classification of Diseases, Ninth Revision.

E-2.3 Identification of PCPCH clinics and attribution of individuals to primary care providers

Our study design required that we identify months each individual was served by a PCP, by PCPCH status. To do so we needed to identify PCPCH clinics among PCPs and attribute individuals to PCPs. To complete these tasks, we (a) created a dataset of provider "site units," (b) merged PCPCH recognition data to our site unit dataset, and (c) attributed individuals to a site unit based on where they received their primary care during the measurement year. We used the methodology described in OHA's September 2016 PCPCH Program Implementation Report (Gelmon et al., 2016) and 2014 PCPCH Cost and Efficiency Evaluation (Wallace, 2014) as starting points for this analysis.

Creation of site units. We started our process by building a dataset of provider site units that reflect locations where patients receive primary care. First, we restricted the public NPI registry to records with site addresses in Oregon and bordering states. Each record of the NPI registry is unique. Because NPIs can be registered to either individuals or to organizations, it is possible for multiple NPIs to be associated with the same clinic. For this reason we formed site units by grouping NPIs that had the same site address and organization mailing address.

Identification of PCPCH providers. To identify PCPCH clinics in our dataset, we merged the PCPCH directory onto the site unit dataset by NPI. Most records in the PCPCH directory had both a "site NPI" and an "organization NPI," although often these two fields were equivalent. We first merged using site NPI, and then performed a second merge using organization NPI for PCPCH records that did not match on the first merge. After two rounds of merging, over 99 percent of PCPCH records that had an associated NPI were matched to the site unit dataset. Only one NPI within the site unit had to have a match in the PCPCH directory for the site unit to be identified as a PCPCH site. PCPCH records that could not be matched to the site unit dataset, but had NPIs, were added as new site units. A small number of PCPCHs did not have at least one associated NPI. These PCPCHs were excluded from this study because they cannot be identified in the APAC claims data.

Attribution of individuals to primary care providers. To attribute individuals to PCPs we first identified primary care claims in each year based on HCG code, as described in the specifications for the primary care visits measure. Because APAC medical claims contain provider identifiers that are specific to each submitter, we used the provider crosswalk from OHA to attribute NPIs to primary care claims. Each claim record had two provider identifiers—a billing ID and an attending ID. We first merged records to the provider crosswalk by billing ID and performed a second merge by attending ID for records that we could not match based on billing ID. Next we merged primary care claims to our site unit dataset by NPI. Of the NPIs represented among primary care visits, only those that were represented in the NPI registry could be matched to our site unit dataset (because it was created from the NPI registry). Ultimately, over 95 percent of primary care visits in each year were matched to a site unit.

Finally, we attributed each individual to the site unit where they had the plurality of their primary care visits in a year. In the absence of a plurality, the individual's most recent visit determined their site unit attribution. Individuals who did not receive any primary care services in a given year were assigned to the clinic to which they were most recently attributed. Thus, the share of individuals who we were unattributed to a site unit declines over the sample period. Although site units are attributed at the person-year level, we ultimately assigned a PCPCH status to each month that an individual was covered during the analysis period. The PCPCH status reflected whether the person's attributed site unit was a recognized as a PCPCH during the particular month. That is, months before a clinic was recognized as PCPCH and months after the recognition was withdrawn did not count as PCPCH months.

E-2.4 Descriptive analyses

Table E-2-4 presents descriptive statistics on demographics, average monthly utilization and expenditures, and quality of care, by payer during the observation period 2011–2014. Since the Patient Protection and Affordable Care Act was implemented in 2014, with many Oregonians gaining coverage through Medicaid or the Marketplace, the composition and risk profile of Oregon's insured population changed. To account for this, we limit the samples for each payer to persons first observed with that type of coverage in 2011.

As shown in ***Table E-2-4***, relative to the Medicaid covered population, the populations covered by the other three payer types were substantially older. Medicaid and OEBB beneficiaries were slightly more likely to be female than PEBB or commercial beneficiaries. In terms of overall utilization, among the four groups, Medicaid beneficiaries were the most likely to have a medical expenditure in a given month, but their average spending per month was lowest. Medicaid beneficiaries were more likely to have a primary care visit and had a larger average number of such visits compared to the other groups. Among screening measures, Medicaid beneficiaries had the highest rates for depression and SBIRT screening, but the lowest rates for cancer screenings. Diabetic Medicaid beneficiaries also had the lowest rates of HbA1c and LDL-c testing. In addition, Medicaid beneficiaries were most likely to use ED and inpatient services and to use them most intensively. Finally, Medicaid beneficiaries were most likely to have had a readmission within 30 days of a hospital discharge.

Table E-2-4. Individual characteristics (average per person-month), by payer, across all years (2011 to 2014)

	Medicaid	PEBB	OEBB	Commercial
Demographics				
Female	56.6%	54.4%	57.1%	54.5%
Age	21.6	36.7	38.5	37.6
Utilization and Expenditures				
Any spending in month	38.7%	36.1%	32.7%	31.2%
Total spending in month	$298	$366	$358	$308
Any primary care visit	21.1%	18.6%	17.5%	16.8%
Number of primary care visits per 1,000 person months	262.8	220.4	205.4	197.4
Any prenatal care visits 0–9 months before delivery	29.5%	30.1%	25.4%	29.2%
Number of prenatal care visits 0–9 months before delivery	458	452.5	370.9	448.5
Any postpartum care visits 0–2 months after delivery	17.6%	20.6%	23.6%	23.1%
Number of postpartum care visits 0–2 months after delivery	204.0	240.6	269.5	280.6
Any child well-care visits, among children age 0–1	26.5%	21.1%	27.9%	27.1%
Number of child well-care visits per 1,000 person months	280	216	286	277
Any adolescent well-care visits, among children ages 12–21	2.7%	2.2%	2.6%	2.8%
Number of adolescent well-care visits per 1,000 person months	27.1	22.4	26.2	28.6
Any specialty care visits	8.2%	9.3%	8.5%	7.9%
Number of specialty care visits per 1,000 person months	114.9	123.3	115.4	106.5
Any emergency department visit	5.4%	1.4%	1.1%	1.2%
Number of emergency department visits, per 1,000 person months	66.4	15.4	12.9	13.6
Any inpatient stay	0.8%	0.3%	0.3%	0.3%
Number of inpatient stays, per 1,000 person months	9.8	3.8	3.8	4.0

(continued)

Table E-2-4. Individual Characteristics (average per person-month), by payer, across all years (2011 to 2014) (continued)

	Medicaid	PEBB	OEBB	Commercial
Quality of Care				
Any depression screening, ages 12+ and 1+ outpatient encounter	0.0%	0.0%	0.0%	0.0%
Number of depression screenings per 1,000 person months	0.0072	0.005	0.0035	0.0004
Any SBIRT screening, ages 18+ and 1+ outpatient encounter	0.4%	0.0%	0.2%	0.1%
Number of SBIRT screenings per 1,000 person months	3.5	0.2	2.0	1.1
Any cervical cancer screening, women ages 24–64	0.8%	1.1%	1.1%	1.1%
Number of cervical cancer screenings per 1,000 person months	8.5	10.7	11.2	11.0
Any colorectal cancer screening, ages 51–75	0.7%	1.0%	1.1%	1.1%
Number of colorectal cancer screenings per 1,000 person months	7.1	9.9	11.1	11.5
Any HbA1c test, diabetics age 18–64	2.3%	2.6%	3.3%	2.9%
Number of HbA1c tests per 1,000 person months	23.3	25.9	33.4	28.9
Any LDL-C test, diabetics age 18–64	1.3%	1.9%	2.1%	1.8%
Number of LDL-C tests per 1,000 person months	13.2	19.1	20.8	18.4
Any 30-day readmissions, among those with discharge	11.1%	6.7%	5.9%	7.3%
Number of 30-day readmissions per 1,000 readmissions per month	125.6	74.8	64.1	81.6
Number of clinic-month observations	177,159	161,094	190,907	505,943
Number of person-months	17,003,526	4,537,510	4,657,925	46,214,998

HbA1c = Hemoglobin A1c; LDL-C = Low-density Lipoprotein Cholesterol; OEBB = Oregon Educators Benefit Board; PEBB = Public Employees Benefit Board; SBIRT = Screening, Brief Intervention, and Referral to Treatment.

E-2.5 Statistical analysis

E-2.5.1 Regression model

We estimate two-way fixed effects, a generalized version of D-in-D models (Angrist & Pischke 2008, p. 227) that account for the fact that the post-treatment period is not equal across clinics. That is, PCPCH certification was staggered throughout the study period (2011 to 2014). The main specification takes the following form:

$$\overline{\mathrm{Y}}_{ct} = \alpha_c + \eta_t + \tau \mathrm{D}_{ct} + \overline{\mathrm{X}}'_{ct}\theta + \epsilon_{ct} \tag{E-2.1}$$

where

$\overline{\mathrm{Y}}_{ct}$ equals the average value of a given performance measure Y (e.g., total spending per member per month) across all individuals attributed to primary care clinic *c* during month *t*;

α_c are clinic fixed effects;

η_t are month-year fixed effects;

D_{ct} equals 1 for a given clinic *c* that achieved PCPCH certification for all calendar months *t* after certification, and 0 otherwise;

$\overline{\mathrm{X}}_{ct}$ includes the average for each control variable (age and sex) across all individuals attributed to clinic *c* in month *t*;

ϵ_{ct} is the error term.

As indicated in ***Equation E-2.1*** the unit of analysis in all models is clinic-month-year, indicated by subscripts *c* and *t*. OLS models were estimated for all outcomes. Separate models are estimated for each subpopulation (Medicaid, commercial, OEBB, PEBB) and performance measure (Y).

The coefficient estimate of interest from ***Equation E-2.1*** is $\hat{\tau}$, which the D-in-D estimator that measures whether the between-group difference (PCPCH or non-PCPCH) in the performance measure increased ($\hat{\tau} > 0$), decreased ($\hat{\tau} < 0$), or did not change ($\hat{\tau} = 0$) after the SIM model was implemented. Year-month fixed effects, η_t, capture trends over time in Y common to both PCPCH and non-PCPCH clinics. Clinic fixed effects, α_c, control for differences across clinics associated with a given outcome Y that do not change over time. Note that we do not include a dummy variable to identify the treatment group (clinics with PCPCH status) because it would be perfectly collinear with the clinic fixed effects (α_c). Similarly, we do not include a post-treatment period dummy variable because it would be perfectly collinear with the month-year fixed effects (η_t).

Control variables. Age and sex are the two control variables included in ***Equation E-2.1***, which generally does not change (in terms of their inclusion in the model) across subpopulations or performance measures. The exception is for measures that are sex specific, in which case sex is omitted from the model. Clinic fixed effects serve as control variables for area-level variables affecting patient health and access to care. To the extent that patients remain with the same PCP, the clinic fixed effects also control for other differences in average patient health.

Weighting and clustering. Each clinic-month observation is weighted by the number of individuals represented by the given person-year-month cell such that the results are interpreted as effects, if any, on individuals (not clinics). Standard errors are clustered at the clinic level, *c*.[90]

Subsample restrictions. Individuals covered by both Medicare and Medicaid (dually eligible for both) were excluded.[91] The analysis was executed on the remaining full sample (no restrictions except for Medicare and Medicaid enrollment) and among only those individuals who were first observed in 2011. Results reported correspond to the latter subsample. There are two reasons we restrict the data in this way. The first, and most important, concerns the 2014 ACA Medicaid and Marketplace Expansions in Oregon (e.g., the number of Medicaid enrollees in Oregon increased by approximately 55 percent after the Medicaid expansion, which significantly changed the composition of Medicaid beneficiaries) (Henry J. Kaiser Family Foundation). Given that some clinics who served the Medicaid population and Marketplace enrollees also obtained PCPCH status in 2014, which we use to identify the effect of PCPCH, we are unable to disentangle observed changes a given outcome because of the new enrollees or PCPCH status. Restricting attention to only those individuals first observed in 2011 therefore standardizes the population to those enrolled in Medicaid based on pre-ACA eligibility rules, whereby any changes in the Medicaid population in 2014 are unrelated with the expansion.

E-2.6 References

Angrist, J.D., & Pischke J. (2009) *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press.

Centers for Medicare & Medicaid Services (CMS). (2016). *Quality Rating System Measure Technical Specifications, 2016* [Internet]. Available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/Downloads/2017_QRS-Measure_Technical_Specifications.pdf

Gelmon, S., Wallace, N., Sandberg, B., Petchel, S., & Bouranis, N. (2016). *Implementation of Oregon's PCPCH Program: Exemplary Practice and Program Findings* [Internet]. Oregon Health Authority, Patient Centered Primary Care Home Program. Available at https://www.oregon.gov/oha/pcpch/Documents/PCPCH-Program-Implementation-Report-Sept2016.pdf

---

[90] Unlike the analyses included in other chapters of this report, we do not use inverse-propensity weighting in this analysis. Clinic fixed effects control for unobservable differences across clinics and any observable differences that inverse propensity weighting would capture.

[91] Medicare fee-for-service claims are not available in APAC data. In addition, because Medicare does not recognize PCPCH in its physician payment policy, inclusion of duals, for whom Medicare is the primary payer, would obscure any effect of Medicaid payment policy on PCPCH impacts.

Measure #134 (NQF 0418): *Preventive Care and Screening: Screening for Depression and Follow-Up Plan* [Internet]. [cited 2017 Mar 28]. Available at https://www.psychiatry.org/File%20Library/Psychiatrists/Practice/Practice-Management/quality-measures/2017/Preventative-Care-and-Screening-Screening-for-Depression-and-FollowUp-134-Claims.pdf

Molina Healthcare. 2017. *HEDIS 2016 Provider Guide and Toolkit* [Internet]. Available at http://www.molinahealthcare.com/providers/wa/medicaid/comm/PDF/WA-Medicaid-HEDIS-Provider-Guide-Toolkit-COMBINED.pdf

Oregon Health Authority (2015). *The Oregon Health Authority Patient-Centered Primary Care Home Program 2014–2015 Annual Report* [Internet]. [cited 2017 November 10]. Available at http://www.oregon.gov/oha/HPA/CSI-PCPCH/Documents/2014-2015%20PCPCH%20Program%20Annual%20Report.pdf

Oregon Health Authority. (n.d.). *Technical Specifications and Guidance Documents for CCO Incentive Measures* [Internet]. [cited 2017 Mar 21]. Available at http://www.oregon.gov/oha/analytics/Pages/CCO-Baseline-Data.aspx

Wallace N. 2014 Aug. *Patient Centered Primary Care Home (PCPCH) Evaluation: Cost and Efficiency* [Internet]. Oregon Health Authority, Patient Centered Primary Care Home Program. Available at https://www.oregon.gov/oha/pcpch/Documents/2014 PCPCH Cost and Efficiency Evaluation.pdf

WellCare Health Plans. *2016 HEDIS Adult Resource Guide* [Internet]. [cited 2017 Mar 30]. Available at https://www.wellcare.com/~/media/PDFs/NA/Provider/na_hedis_adult_resource_guide_eng_01_2016_v2.ashx

Appendix F: Vermont SIM Initiative Progress and Findings

F.1 Synopsis of the SIM Initiative in 2017

As of March 2017, 3.5 years after its SIM Initiative began, Vermont continued its implementation efforts concentrating on payment and delivery models, practice transformation, and health data infrastructure. See ***Section F.2*** for an overview of Vermont's SIM Initiative. The state's signature advancement was the launch of its new All-Payer Accountable Care Organization (ACO) Model, beginning with implementation of a Next Generation Medicaid ACO model in four communities. Concurrently, Vermont's focus shifted to completion of practice transformation and health information technology (health IT) projects; evaluation efforts, including stakeholder interviews, consumer focus groups, and provider surveys; and sustainability planning and transitioning in advance of its performance period ending in June 2017. See ***Section F.3*** for detailed information.

Key Results From Vermont's SIM Initiative, April 2016–March 2017

- Vermont concluded Year 3 of its Medicaid and commercial ACO Shared Savings Programs (SSPs) in December 2016. At that time, the Medicaid SSP served 46 percent of all Medicaid-only beneficiaries.
- This evaluation's quantitative analysis of the Medicaid SSP, and the state's program results, both found mixed impact in the first 2 years, 2014–2015. We found statistically significant results in the desired direction for ACO-attributed Medicaid beneficiaries relative to the Vermont non-ACO attributed Medicaid comparison group for emergency department visits, total expenditures, and one quality of care outcome. Vermont reported that one ACO earned shared savings in Year 2 (down from two in Year 1), and both ACOs participating in the Medicaid SSP improved their quality scores.
- Building on lessons learned from the Medicaid and commercial SSPs, Vermont reached an agreement with CMS to advance an All-Payer ACO Model, which features an all-inclusive population payment to be paid by each payer to the risk-bearing ACO. Year zero of the model's staggered implementation began in January 2017 with the launch of the Vermont Medicaid Next Generation ACO program.
- In tandem with the continued evolution of its delivery and payment reform initiatives, Vermont's community-level collaborations evolved and converged to become Regional Collaborations, featuring local governance and priorities that could sustain beyond the SIM Initiative period of performance. Regional Collaborations and various locally defined initiatives integrate three overlapping SIM projects: alignment of Blueprint for Health and ACO SSP payment model efforts; Integrated Communities Care Management Learning Collaboratives; and Accountable Communities for Health Peer Learning Lab. These efforts were buoyed by strong support from medical and nonmedical providers and organizations.
- Stakeholders view their engagement and the new connections and awareness of other participants' needs and systems as the greatest achievement of Vermont's SIM Initiative. State officials and stakeholders perceive that these engagements and connections led to improved coordination between providers and across initiatives in the state.

Reach of SIM Initiative-related delivery system and payment models among providers and populations. Vermont reported increases in 2016 in providers participating in its Medicaid and commercial ACO SSP models and in its Blueprint for Health patient-centered medical home (PCMH) model. ***Figure F-1*** depicts the scope of participation in Vermont's ACO SSP models and Blueprint for Health model in terms of individual providers and populations, as of December 2016, when Vermont's Medicaid SSP ended. The first column presents the absolute number of individual providers participating in each delivery system/payment model, as reported by each participating payer or all participating payers combined. The next column shows the percentage of each payer's population served by participating providers, based on numerators reported by the state. Below the model-specific statistics, a horizontal bar gives the percentage of the total state population with commercial, Medicaid, Medicare, or other health insurance coverage to give some insight into statewide reach of each model. In all components of ***Figure F-1***, Vermont's Medicare-Medicaid enrollees are categorized as Medicare. The methods for qualitative data collection and analysis for this appendix, including document review that produced ***Figure F-1***, are available in ***Sub-appendix F-1.***

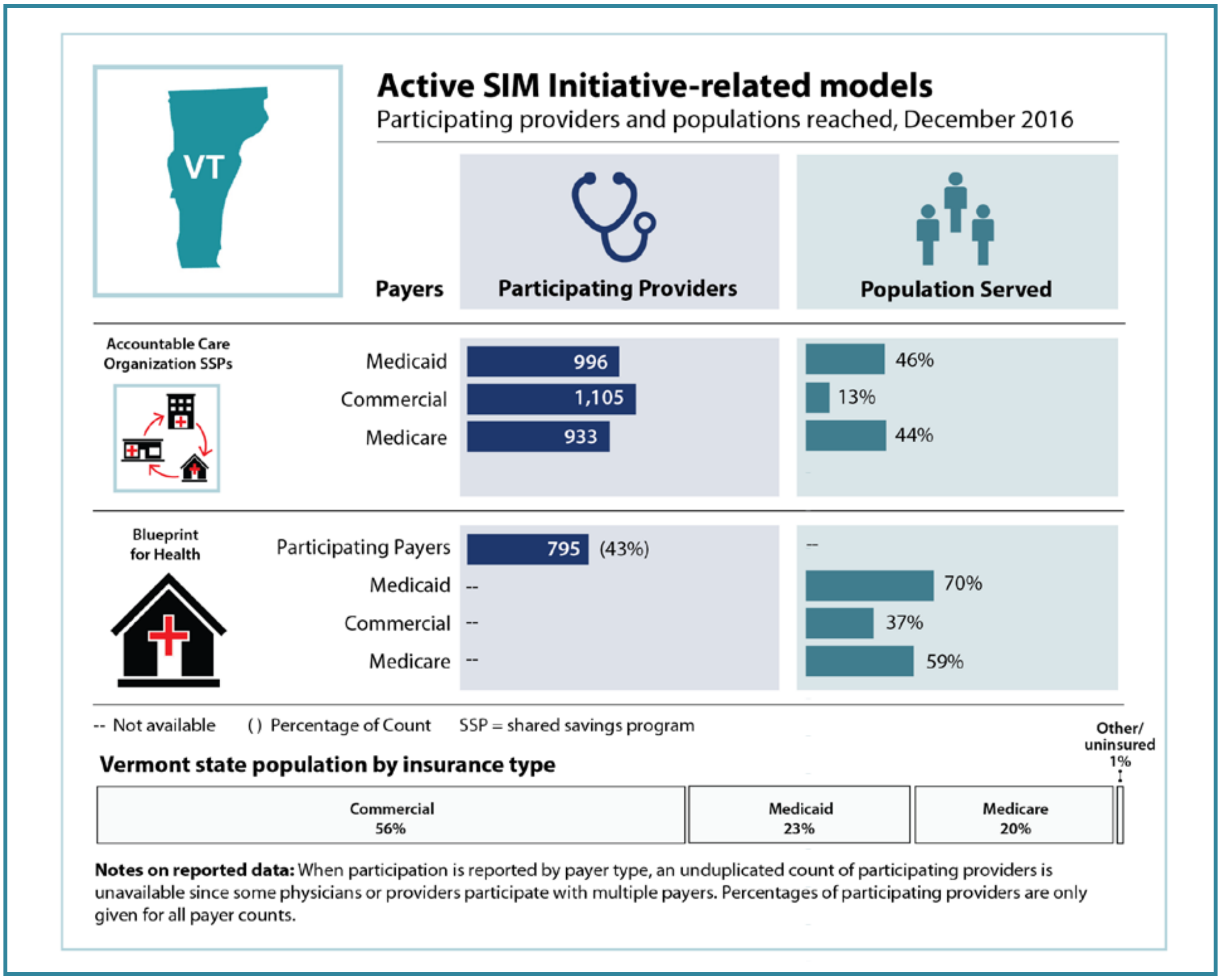
Although the Medicaid SSP and the commercial SSP were the two models newly implemented through Vermont's SIM Initiative, the state reported participation by payer in all ACO SSPs and the Blueprint for Health. Vermont reported counts for all models because its SIM Initiative aimed to advance and align statewide multi-payer efforts, rather than implement models or reforms in isolation.

- As of December 2016, 996 providers were participating in the Medicaid ACO SSP.
- These 996 providers served 67,515 Medicaid beneficiaries in the ACO model as of December 2016, representing 46 percent of Vermont's total Medicaid-only population.[92] The 67,515 Medicaid beneficiaries represent 66 percent of Vermont's original goal to serve 101,000 Medicaid beneficiaries with this model.
- The number of providers in an ACO who served the commercial population was 1,105.
- Through December 2016, ACOs served 44,472 commercially insured individuals, which represented 13 percent of the total commercial population in Vermont and 70 percent of the state's goal for its commercial SSP model. The relatively small percent served is the result of the commercial SSP being limited to individuals purchasing commercial insurance through Vermont's health insurance exchange—hence the small numerator as compared to the total population of commercially insured. Vermont aspires to involve self-insured plans and other group plans in the commercial SSP in the future; but as of 2016 that had not occurred.
- As of December 2016, 933 providers were participating in the Medicare ACO SSP.

---

[92] It should be noted that the ACO attribution used for the numerator count requires 10 or more months enrollment during the year, a restriction that was not applied to the total population denominator.

Figure F-1. Providers and populations reached by Vermont's SIM Initiative-related delivery system and payment models



Active SIM Initiative-related models

Participating providers and populations reached, December 2016

	Payers	Participating Providers	Population Served
Accountable Care Organization SSPs	Medicaid	996	46%
	Commercial	1,105	13%
	Medicare	933	44%
Blueprint for Health	Participating Payers	795 (43%)	--
	Medicaid	--	70%
	Commercial	--	37%
	Medicare	--	59%

-- Not available () Percentage of Count SSP = shared savings program

Vermont state population by insurance type

Commercial	Medicaid	Medicare	Other/ uninsured
56%	23%	20%	1%

Notes on reported data: When participation is reported by payer type, an unduplicated count of participating providers is unavailable since some physicians or providers participate with multiple payers. Percentages of participating providers are only given for all payer counts.

- Modifications to ACO networks in 2016 resulted in decreases to the Medicare population served. The number of Medicare beneficiaries served by ACOs in Vermont in 2016 totaled 55,487, representing 48 percent of the total Medicare population in Vermont and 50 percent of the state's goal.
- The number of providers who were participating in a Blueprint for Health PCMH as of December 2016 was 795. The low percentage (43 percent) is the result of the numerator being restricted to primary care physicians, whereas the denominator is the state's entire physician population.
- The Blueprint for Health model had the greatest percentage reach in 2016 among the Medicaid population, serving 102,919 beneficiaries or 70 percent of the state's total Medicaid population. Vermont's Blueprint for Health served 44 percent of the Medicare population (74,366 beneficiaries) and 37 percent of the commercially insured population (129,419 individuals).

Impact of the Medicaid Shared Savings Program after 2 years (2014–2015). To assess the impact of Vermont's Medicaid Shared Savings Program (SSP), we conducted a difference-in-differences, within-state regression analysis comparing Vermont Medicaid beneficiaries attributed to an ACO participating in the Medicaid SSP to Vermont Medicaid beneficiaries who were eligible but were not attributed because their provider was not in an ACO participating in the Medicaid SSP. The analysis featured four utilization and expenditure outcomes and eight outcomes used in Vermont ACO payment and reporting. The intervention period of the analysis was the first 2 years of the Medicaid SSP (2014–2015); the pre-period corresponded to the 3 years preceding it (2011–2013). We found three statistically significant results, all in the desired direction, for Medicaid SSP-attributed Medicaid beneficiaries: (1) average per member per month payments decreased at a greater rate, (2) emergency department (ED) visits that did not lead to a hospitalization decreased by a greater amount, and (3) likelihood of developmental screenings in the first 3 years of life increased at a greater rate. All data and a brief discussion of these results appears in ***Section F.4*** of this appendix, with detailed methods available in ***Sub-appendix F-2***. ***Figure F-2*** depicts the time periods covered by different analyses in this report, with implementation analysis reported in ***Section F.3*** and interim impact analysis reported in ***Section F.4***.

Figure F-2. Time periods covered by different analyses in this report

F.2 Overview of the Vermont SIM Initiative

Vermont's SIM Initiative, known as the Vermont Health Care Innovation Project (VHCIP), aims to develop a high-performance health system that achieves full coordination and integration of care throughout a person's lifespan, ensuring better health care, better health, and lower cost for all Vermonters (CMS, 2015). Throughout the SIM Initiative, Vermont has focused on five major areas: (1) creation and implementation of value-based payment models for all Vermont payers; (2) practice transformation that supports integrated care delivery and management; (3) improved health data infrastructure to support care delivery, payment reform, and population health management; (4) project evaluation to ensure that program goals are being met; and (5) program management to ensure organization of the activities under the SIM Initiative.

Vermont launched its major SIM Initiative delivery system reforms in 2014 with a Medicaid SSP and commercial SSP. These one-sided risk models for ACOs built on the Medicare SSP, which had been operational in Vermont since 2013, prior to launch of the SIM

Initiative. As implementation progressed, Vermont sought to align the SSP models with the state's other major delivery model, the pre-SIM Blueprint for Health, a statewide multi-payer (Medicaid, Medicare, and commercial) initiative mainly focused on supporting PCMHs and multidisciplinary community health teams.[93] Early alignment efforts included Regional Collaborations between ACO and Blueprint leadership in each of the health service areas (HSAs) and efforts to align quality measures across all programs.

Continuing its delivery system reform and building on lessons learned from its SIM Initiative ACO SSP experiences, Vermont designed its All-Payer ACO Model, which features an all-inclusive population payment to be paid by each payer to a risk-bearing ACO. Vermont and CMS successfully concluded negotiations on the 6-year model in 2016. Vermont began Year 0 of the All-Payer ACO Model's staggered implementation in January 2017, launching its first year of the Vermont Medicaid Next Generation ACO program in four communities and conducting planning and pre-implementation activities for the next year. SIM-related work in developing this model sustained Medicare's participation in Vermont's reform efforts. Although Medicare's direct contributions to Blueprint for Health–participating PCMHs ended with the completion of Medicare's Multi-Payer Advanced Primary Care Practice Demonstration in December 2016, the All-Payer ACO Model Agreement includes one-time startup funding related to Blueprint for Health care coordination and community-based collaboration efforts.

Vermont's SIM Initiative practice transformation efforts concentrate on community-level action. Key efforts include the Integrated Communities Care Management Learning Collaboratives, which focus on improving cross-organization care management for high-risk populations, and the provider Subgrant Program, which supported capacity-building and tested provider- or community organization–led innovation.

Finally, to further support its payment models and practice transformation, Vermont's SIM Initiative invested in multiple health IT and data infrastructure projects. Early efforts focused on connectivity to the state's health information exchange. Recent SIM-funded activities include the development of a clinical data repository for designated mental health agencies and Specialized Service Agencies, data quality enhancements to improve data usability, the implementation of an event notification system, and the piloting of two telehealth initiatives.

The activities supported with SIM Initiative funding through spring 2017 are shown in ***Table F-1***.

---

[93] The Blueprint for Health is also known as the Advanced Primary Care Medical Home Initiative. Medicare joined as a participant in 2011 through the Multi-Payer Advanced Primary Care Practice Demonstration. The Blueprint for Health's key components include multi-payer (Medicaid, Medicare, and commercial) payments to National Committee for Quality Assurance–recognized PCMHs; support for practice facilitators and professionals trained in quality improvement and change management; financing for community health teams and professionals charged with care coordination and connection to services; and development and support of the Hub-and-Spoke Health Home program, which targets opioid addiction.

Table F-1. Summary of SIM Initiative activities in Vermont, through Spring 2017

Activity type	Activity	Payers	Provider types	Dates	Supporting policies (if any)
Delivery/Payment System	ACO Shared Savings Programs (SSPs)	Medicaid and commercial (Blue Cross Blue Shield of Vermont Exchange plans); Medicare (pre-SIM)	Three ACOs: Community Health Accountable Care (CHAC), OneCare Vermont (OCV), and Vermont Collaborative Physicians (VCP)	Medicare implemented an SSP 01/2013; Medicaid and commercial implemented SSPs 01/2014; Medicaid SSP ended 12/2016 and transitioned to a risk-based ACO program in the All-Payer ACO model	Medicaid SSP SPA 1115 waiver Green Mountain Care Board implementation authority under state law (Act 48 of 2011)
	All-Payer ACO Model	Medicaid, Medicare, and commercial	ACO: in 2017 OneCare Vermont (OCV) participating in Medicaid risk-based ACO program	Medicaid program implemented in four communities in Vermont in 2017; Medicare and commercial programs will launch in 2018	Medicare waiver and 1115 Medicaid waiver State law (Act 113 of 2016)[a]
	Blueprint for Health / Pay-for-Performance (P4P) Incentives	Medicaid, Medicare, Vermont's three largest commercial insurers, and a subset of smaller commercial insurers	Primary care	Medicaid and commercial Blueprint for Health pilot implemented 2008; Medicare joined through the MAPCP Demonstration in 07/2011; MAPCP ended 12/2016, Medicare is funding 2017 only via the All-Payer ACO Model Agreement. P4P incentive payments began 01/2016 to date	State law 1115 waiver
	Hub and Spoke Initiative (Health homes for Medicaid beneficiaries with opioid addiction)	Primarily Medicaid and commercial; limited payment by Medicare (Spokes)	Mental health and substance use disorder; Primary care	Implemented 01/2013 through the Blueprint for Health	ACA Section 2703 Health Home State Plan Amendment
	Medicaid Value-Based Purchasing (Medicaid Pathway)	Medicaid	Mental health and substance abuse; Disability and long-term services and supports (DLTSS)	Feasibility study and development began Fall 2015; initial legislative report due January 15, 2017 and annually for 5 years thereafter	State law (Act 113 of 2016)[a]

(continued)

Table F-1. Summary of SIM Initiative activities in Vermont, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates	Supporting policies (if any)
Delivery/Payment System Population Health	Accountable Communities for Health (ACHs)	N/A	Community-level organizations, public health programs, social service providers	Research and design in 2015; Model exploration launch of ACH Peer Learning Lab in 2016; transitioned to Regional Collaborations 03/2017 to date	
Practice transformation	Integrated Communities Care Management Learning Collaborative	N/A	Patient-facing care providers (e.g., nurses, care coordinators, social workers, mental health clinicians, physicians)	Initial webinar 11/2014; transitioned to Regional Collaborations 01/2017	
	Regional Collaborations	N/A	Medical and nonmedical providers (e.g., DLTSS and community providers); Blueprint for Health and ACO leadership	Leadership meetings began in 11/2014; implemented 06/2015 to date	
	Core Competency Trainings (including Disability Awareness)	N/A	Case managers and care coordinators	Initial training 03/2016; transitioned to Regional Collaborations 01/2017 to date	
	Provider Subgrant Program and Technical Assistance (TA)	N/A	Provider and community-based organizations selected through competitive process	Round 1 awarded 04/2014; Round 2 awarded 10/2014; TA initiated 01/2015; project concluded 12/2016	

(continued)

Table F-1. Summary of SIM Initiative activities in Vermont, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates	Supporting policies (if any)
Health IT	Expand Connectivity to Health Information Exchange (HIE)—Gap Analyses and Gap Remediation	N/A	ACO providers; DLTSS providers	ACO analysis in 2014, remediation efforts 03/2015–01/2016; DLTSS analysis in 2015, remediation efforts 01/2016–06/2017	
	Expand Connectivity to HIE—ACO Gateways (Enabling Data Extracts)	N/A	Three ACOs—OCV, CHAC, and VCP	Implemented: OCV 2014–2015; CHAC 2015; VCP 2016	
	Data Quality Improvement	N/A	ACOs and Designated Mental Health Agency (DA) providers	03/2015–12/2016	
	Electronic Medical Record Expansion	N/A	Providers at Specialized Service Agencies (SSAs) and state hospital, non-EHR Incentive Program-eligible	01/2015–06/2016	
	Data Warehousing, including Vermont Care Partners (VCP) Data Repository (behavioral health data) and Blueprint for Health Clinical Registry	N/A	DA and SSA providers; Blueprint for Health providers	Vendor contract executed 09/2015 for VCP Data Repository, 04/2017 all agencies connected; 2016 Blueprint for Health Clinical Registry Migration to VITL infrastructure completed	
	Care Management Tools—Shared Care Plan, Universal Transfer Protocol (UTP)	N/A	Long- term care, mental health, home care, and specialist providers	Technical analyses conducted in 2015; UTP dissemination in 2016 via learning collaboratives completed	
	Care Management Tools—Event Notification System	N/A	Statewide, open to all providers	Project initiated in 04/2014; launched statewide in 2016 to date	SIM subsidized 70% of costs for 12 months

(continued)

Table F-1. Summary of SIM Initiative activities in Vermont, through Spring 2017 (continued)

Activity type	Activity	Payers	Provider types	Dates	Supporting policies (if any)
Health IT	Telehealth Pilots	N/A	Home health, primary care, and specialists; substance abuse	Strategic plan developed in 2015; two pilot projects launched in 2016 and ended 06/2017	State law

ACO = Accountable Care Organization; EHR = electronic health record; health IT = health information technology; MAPCP = Multi-Payer Advanced Primary Care Practice; N/A = not applicable; SSP = shared savings program; SPA = State Plan Amendment; VITL = Vermont Information Technology Leaders (vendor).

[a] State of Vermont Act 113 of 2016, An act relating to implementing an all-payer model and oversight of accountable care organizations, signed May 16, 2016. Available at http://legislature.vermont.gov/bill/status/2016/H.812

F.3 Implementation of the SIM Initiative in Vermont After 3.5 Years of the Test Period

This section synthesizes finding on SIM Initiative implementation in Vermont after 3.5 years of the test period, based on several sources of qualitative data, described here and in more detail in ***Sub-appendix F-1***:

- Stakeholder interviews conducted in multiple towns in Vermont March 13–17, 2017.[94] Interviewees gave their perspective on the overall impact of the SIM Initiative on health care system transformation, strategies that facilitated success, major challenges, and efforts to sustain positive impacts at the end of the SIM Initiative.

- Focus groups conducted with providers and consumers involved with some aspect of the SIM Initiative. The providers selected for focus groups were ACO-affiliated physicians or nurse practitioners; a total of 27 participated in four focus groups. The consumers were Medicaid-only beneficiaries or Medicare-Medicaid beneficiaries; a total of 29 participated in four focus groups. The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health IT, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to the state's SIM Initiative.

- Document review, including state-developed reports and local news articles.

- Telephone conversations with state officials used to gather more in-depth information on select topics and to review other evaluation-related news.

Table F-2. Key informant interviews conducted in Vermont, March-April, 2017

	Number of interviews
State officials	7
Payers	2
Providers, provider associations, and accountable care organizations	11
Consumer advocacy groups	4
Total	24

---

[94] Because of a blizzard during the March site visit, three interviews were held by telephone in April 2017.

F.3.1 What progress has Vermont made in testing new delivery system and payment models?

KEY INSIGHTS

- Vermont's own analyses indicated varied results from the second year of SSP implementation, depending on payer, population served, and maturity of the ACO. According to the state's analyses, quality scores over this period improved for two of three participating ACOs. One ACO achieved modest savings in the Medicaid SSP for the second consecutive year, but none of the ACOs in the commercial SSP earned shared savings.
- After nearly a year of negotiation, Vermont began implementation of its All-Payer ACO Model, the next evolution of Vermont's payment reform efforts. The model marks a significant negotiation between Vermont and the federal government to achieve an aligned multi-payer strategy inclusive of Medicare, Medicaid, and commercial payers, with incremental adoption of a statewide multi-payer model expected to roll out through 2019.
- Real and perceived challenges with operational readiness and financial solvency to take on risk inhibited some providers from adopting risk-bearing payment models.
- Although competition persists, the SIM Initiative enabled Vermont to make strides in breaking down silos between providers and programs.

Between April 2016 and May 2017, Vermont's payment and delivery reform efforts primarily focused on (1) development and launch of the state's All-Payer ACO Model, and (2) close of the third year of operation of the ACO SSPs for Medicaid and commercial payers. Vermont also continued operation of its Blueprint for Health program and began planning for future integration of the Blueprint into the All-Payer ACO Model, by taking steps to align care coordination efforts and considering potential ways in which ACOs could be involved in Blueprint for Health pay for performance incentives. The state also developed a strategic framework, known as the Medicaid Pathway, for a systematic review of all Medicaid providers and services to identify ways in which the state could enact meaningful reforms (e.g., new payments models, provider incentives, benefit reforms) to lower cost and improve efficiency of its Medicaid program. Initial planning related to the Medicaid Pathway indicated that Vermont's first areas of focus would be mental health and substance abuse services, followed by long-term services and supports (LTSS). Vermont solicited information on the Medicaid Pathway from all SIM stakeholders in September 2016. In January 2017, in coordination with the new Governor's administration, Vermont began an internal process to review the work done under the Medicaid Pathway and determine whether it aligned with the new Governor's priorities, including addressing opioid addiction in the state.

The SSPs completed their third year in December 2016, with different results for the ACOs depending on the population they serve and experience operating as an ACO. In Vermont's SSPs, the ACOs agree to be tracked on total costs and quality of care for the patients they serve, in exchange for the opportunity to share in any savings achieved through better care management. If savings are realized, they are shared between the ACO and the payer. The amount of savings earned by an ACO is calculated based on the actual savings achieved and the ACO's quality score on a set of metrics (Vermont Health Care Innovation Project, 2014). In September 2016, Vermont released results from the second year of the Medicaid and Commercial SSPs (calendar year 2015). ***Table F-3*** summarizes the participating ACOs, their key characteristics and Medicare SSP experience, and overall results from calendar year 2015. Community Health Accountable Care (CHAC) was the only ACO to earn savings in 2015, achieving them through the Medicaid SSP.

Table F-3. ACOs, their characteristics, and calendar year 2015 SSP results

ACO	Key characteristics	Medicaid SSP	Commercial SSP
OneCare Vermont	Hospital-based; largest ACO Medicare SSP since 2013	Improved quality	Improved quality Above PMPM cost target
Community Health Accountable Care	Mostly FQHCs Medicare SSP since 2014	Improved quality Modest savings	Improved quality Above PMPM cost target
Vermont Collaborative Physicians	Mostly independent providers Medicare SSP 2013—early 2015	Chose not to participate	Consistently high quality Above PMPM cost target

ACO = accountable care organization; FQHC = federally qualified health center; PMPM = per member per month; SSP = shared savings program.

State officials suggested that differences in population makeup and "maturity of program" were some of the factors influencing SSP results. State officials lauded continued improvement in data collection and analytics, care management, and population health as key achievements of the SSP participants (Vermont Health Care Innovation Project, 2016c). As further detailed later in this appendix, in 2017, OneCare Vermont will begin transition into the All-Payer ACO Model; CHAC will continue to operate as an SSP ACO; and VCP will no longer participate as an ACO.

The All-Payer ACO Model is described by state officials as the next step in the "evolution" of Vermont's ACO efforts. The All-Payer ACO Model is envisioned as a means through which Vermont will promulgate integrated and coordinated delivery systems and population-based payments statewide. Establishment of the All-Payer ACO Model is governed in partnership between CMS, the Governor, Vermont Agency of Human Services (AHS), and the Green Mountain Care Board (GMCB), a legislatively established independent board whose purpose is to regulate, innovate, and evaluate Vermont's payment and delivery reforms.

Beginning in January 2016, Vermont worked in close collaboration with CMS leadership, especially leadership within Center for Medicare and Medicaid Innovation (CMMI), on design of the state's All-Payer ACO Model. Vermont also worked closely with individuals at the Center for Medicaid and CHIP Services to ensure that Vermont's 1115 Medicaid waiver, originally set to expire in December 2016, could be modified and extended to support the All-Payer ACO Model. Negotiations continued through October when the final agreement was signed by CMS, the Chair of GMCB, and the Governor.

In April 2016, Vermont issued an RFP seeking ACOs to participate in a Vermont Medicaid Next Generation ACO model program, a step toward its planned All-Payer ACO Model. In May 2016, the Governor signed Act 113, which charged the GMCB with the creation of a permanent regulatory and certification system for ACOs. The Act also increased Administrative oversight of Vermont's ACOs, mandating that GMCB approve the budget for any ACO with more than 10,000 attributed lives. Once the tentative all-payer ACO Model Agreement between Vermont and CMS was released in October 2016, the state quickly organized a series of seven public meetings throughout the state to solicit stakeholder feedback on the model. In February 2017, the Department of Vermont Health Access finalized a contract with OneCare Vermont, its largest SSP ACO, for participation in the Vermont Medicaid Next Generation ACO program for the 2017 pilot year. In this new ACO model, OneCare Vermont will transition from being a one-sided risk bearing ACO, to one bearing two-sided risk.

The first phase of implementation of the All-Payer ACO Model kicked off in January 2017 with a pilot year, when the state and OneCare Vermont launched the Vermont Medicaid Next Generation ACO program. It is anticipated that Medicare and commercial payers will offer similar risk-based ACO payment models in 2019. During the 2017 pilot year, OneCare Vermont focused on the population of the four participating risk-bearing communities—Burlington, Central Vermont, Middlebury, and St. Albans—encompassing approximately 30,000 patients and 2,000 unique providers. Meanwhile, per Act 113, the GMCB worked on an ACO certification process which, a Board member noted, will be largely built from what was structured for the Vermont Medicaid Next Generation ACO program. It had been envisioned that CHAC may fully merge with OneCare Vermont as the Vermont Care Organization in 2019. In the interim, in 2017 CHAC and OneCare Vermont were operating in tandem, with both ACOs working in coordination with the state to identify opportunities for coordination that may facilitate an eventual merger.[95]

State officials expected that, in future years, the risk-bearing ACO will further integrate its payment and delivery reform initiatives with state initiatives including the Blueprint for Health as it increases the number of attributed lives.

---

[95] This report conveys information and planning as of Spring 2017. However, in October 2017 CHAC announced it would end operations as an ACO effective January 1, 2018. http://www.communityhealthaccountablecare.com/uploads/2/5/7/8/25784137/chac_board_decision_10-18-17.pdf

Diversity of provider types, resources, and needs posed an ongoing barrier to adoption of a risk-bearing payment model. Early conceptualization of the All-Payer ACO Model coincided with discussions among Vermont's three ACOs—OneCare Vermont, CHAC, and VCP—to potentially merge into one unified ACO, the Vermont Care Organization (VCO). However, differences in the capacities, provider composition, and patient population of the ACOs hindered the ability of the entities to easily blend into one ACO. For example, highlighting particular concerns over budget margins typical to safety-net providers, CHAC exhibited some hesitation in moving toward participation in a risk-bearing ACO model. For 2017, CHAC opted to continue participating in the Medicare SSP and Vermont's commercial SSP, through which providers may have a chance at savings. VCP did not officially participate in any ACO model in 2017, noting concerns over the ability of ACO models to sufficiently support primary care, a key interest of its participating providers. Beyond concerns over payment structures, providers and payers also reported concerns over the ability of diverse providers to build and maintain the infrastructure necessary to participate in the model. The governing board of the VCO, which includes federally qualified health centers (FQHCs), independent providers, and critical access hospitals, continued to pursue efforts to align around common clinical best practices.

Parallel to supporting ACO development, the state planned through its Medicaid Pathway initiative how to use its purchasing power in Medicaid to support integrated care by expanding value-based payment models across its array of services. Vermont continued to work on reforming Medicaid payments and data systems in a way that can best support the movement of all providers (including those not in an ACO) toward integrated care. A key emphasis of that work was the Medicaid Pathway, a strategic planning process which involved a systematic review of all providers and services that receive Medicaid funding for operational readiness and technical assistance needs to enable adoption of integrated care models. Work done under the Medicaid Pathway in 2016 helped identify key challenges and opportunities for the development of value-based payment models across all Medicaid services in the future. In July 2016, state officials presented to stakeholder work groups their initial Medicaid Pathway proposals for a suggested wraparound payment for the All-Payer ACO Model to cover mental health, substance abuse, developmental, and LTSS. The recent change in Vermont's administration may affect if and to what extent recommendations from the Medicaid Pathway are implemented.

SIM Initiative funding supported discrete projects to foster delivery system innovation. Beyond the payment reform initiatives described above, Vermont leveraged SIM Initiative funding to finance a variety of discrete projects to promote efficiency and quality of its care delivery systems. This include projects funded through the Subgrant Program (described in ***Section F.3.7***) and the Frail Elders Project, which studied the needs of home-bound older adults, issuing several recommendations on strategies that could help reduce ED admissions among this population. Findings from these projects were reported to Vermont's work groups throughout the reporting period. Findings have and will inform ongoing efforts of the state to achieve lower cost and higher quality care.

The SIM Initiative accelerated Vermont's capacity to reform payment and delivery systems, although prior efforts laid the foundation necessary for the state to achieve success. Prior to the SIM Initiative, Vermont had already laid significant groundwork toward the advancement of statewide delivery and payment reforms. Such early groundwork included establishment of the Blueprint for Health, initially piloted in 2008; passage of Act 48 in 2011, which established the GMCB and charged the state with strategic exploration of health care reform, including integrated care; and ACO participation in the Medicare SSP beginning in 2013. These building blocks were pivotal to Vermont's achievements to date. One ACO executive, for example, credited the work of the Blueprint for Health in creating a "foundation" from which providers could understand certification processes necessary to qualify for a new payment model and payment flow in the context of delivery system and payment reform. Operation of the Medicare SSP, prior to the SIM Initiative, enabled Vermont to identify key components necessary for the operationalization of a coordinated care model, such as improved communication and data-sharing systems, provider training, and venues for fostering partnerships with community organizations and agencies—all activities that Vermont later supported with SIM funds to accelerate ACO adoption. Moreover, participation in the SIM-supported SSPs prompted ACO providers to develop systematic changes to their care delivery systems to facilitate their capacity to participate in coordinated care. For example, CHAC established a new system by which providers were trained to use and report on evidence-based guidelines. These investments now form the underpinnings that enable Vermont to transition to the All-Payer ACO Model.

Incentive payments provided support and motivation to engage in reforms, but may not be sufficient to sustain engagement. A few providers raised concerns that the financing structure created under Vermont's payment reform strategies do not enable providers to effectively engage in coordinated care models, or even to remain competitive in the state. The examples providers cited were indicative of common systematic challenges of health care delivery (e.g., perverse incentives for providers to overprescribe services, lack of incentive to spend time with patients, payment structures that prohibit collaboration across organizations, and funding disparities that inhibit "underresourced" providers from keeping pace with reforms) suggesting that Vermont's reforms may not go far enough in both their design and adequacy of payments to address challenges that prohibit adoption of coordinated care. One ACO executive noted that the value of participating was not to "make money," but rather it was a means to engage in health care reform and to receive some support to improve its capacity for data and analytics.

Others raised concerns specific to the ability of community providers to keep pace with reforms. To illustrate, one provider spoke of the need for both hospitals and behavioral health facilities to hire social workers. However, behavioral health providers cannot offer salaries competitive with what is available through a hospital, disadvantaging the ability of behavioral health providers to staff their offices effectively for participation in a coordinated care model.

In contrast, some providers indicated support for even incremental steps taken by the state to shift payment models. This sentiment seemed especially pervasive among providers participating in the Medicaid SSP, who noted the benefits of incentive payments received as a result of the program. One provider especially emphasized the importance of such payments to providers that primarily work with Medicaid populations and operate with budgets "close to the margin." Incentive payments were used to support many elements important to the maintenance of their practices, from infrastructure investments (e.g., technology) to staff bonuses used to incentivize and retain staff.

Looking forward, some providers expressed concern over the All-Payer ACO Model, especially in its intent to move providers toward a risk-bearing model. As noted by one ACO representative, by national standards, Vermont is a "low-cost, high-quality state," giving providers little margin with which to take on risk. Members of the VHCIP Steering Committee (described in ***Section F.3.3***) raised concerns that inability of the ACOs in the SSPs to yield significant savings may indicate challenges with sustaining the All-Payer ACO Model. Concerns were also raised over participation of commercial payers in the All-Payer ACO Model, especially because the state lacks authority to mandate participation from self-funded plans. Others questioned Medicaid's ability to maintain sufficient payments, especially with the potential that the state could initiate Medicaid cuts as one means of balancing the overall state budget. To address the Medicaid payment sufficiency issue, Vermont and CMS included within the All-Payer ACO Model Agreement a requirement that the GMCB report to CMS annually on the payer differential rate and how it affects ACOs. Additionally, as the GMCB reports regularly to the legislature on the All-Payer ACO Model, any issues related to the payer differential will be publicly available to all interested parties via posted documents.

Although competition persists, the SIM Initiative enabled Vermont to make strides in breaking down silos between providers and programs. Silos between delivery systems and other providers of services have long existed, partly perpetuated by competition over limited resources, lack of communication channels, and basic lack of understanding of the purpose of each "silo." However, several interviewees noted a palpable shift in Vermont toward greater inclusivity and cooperation across providers, attributing the change to efforts instigated under the SIM Initiative. As the SIM Initiative evolved, Vermont placed increasing emphasis on the need to adopt community-based approaches to delivery transformation. To facilitate this cooperation, Vermont focused on opening communication between providers and organizations who had not previously been connected, such as between hospitals, primary care providers, behavioral health providers, long-term service providers, and even social services (e.g., housing, food shelters). As described by one provider, these efforts marked a "huge educational step," enabling greater understanding of how and why provider types operate differently, while unifying providers under the realization that they ultimately "are caring for the same people." The improved communication, enabled through Vermont's learning collaboratives and stakeholder efforts, enabled providers to consider how they could mutually support, rather than compete with, one another. These efforts have also resulted in greater convergence between Vermont's reform initiatives. For example, there has been increased collaboration between Vermont's ACOs and the Blueprint for Health toward the development of unified care coordination standards, which have been disseminated through OneCare Vermont's publicly available Care Coordination Toolkit. One ACO executive described this "general consciousness raising [as the] best net investment from the SIM Initiative."

An all-payer model is not possible without dedicated engagement with CMS; however, federal negotiations take time and may isolate stakeholders. Negotiations over the model lasted nearly 10 months, over which time Vermont and CMS officials worked through a funding and risk arrangement appropriate for an ACO model that would include Medicaid, Medicare, and commercial payers. Several state officials noted the importance of "collaborative discussions" with CMS leadership to advance the model and the engagement of CMMI staff, who came to discussions well informed of Vermont's health reform landscape.

However, the prolonged and closed discussions between state officials and CMS fostered some uncertainty in the state—which delayed contracts for 2017 until close to the end of the year. One advocate stated that lack of transparency of the negotiations with CMS fostered "anxiety" among consumer groups and expressed sentiments that "opportunities were missed" to include certain populations in the ACO design. Although Vermont provided some opportunity for stakeholders to provide feedback on the final model when it was released in October, to have contracts in place by January the feedback period was limited to less than 1 month. The Department of Vermont Health Access (DVHA) proactively laid groundwork for the model, releasing solicitation for the Vermont Medicaid Next Generation ACO program in April 2016, and publicly publishing its initial terms sheet in January 2016 for the All-Payer ACO Model to give providers and stakeholders a sense of where Vermont aimed to go with the model. The ACO solicitation and publication of the terms sheet prior to CMS approval of the model enabled DVHA to quickly execute a contract with OneCare Vermont, once the model negotiations were finalized, so that the new model could begin in January 2017.

F.3.2 How did providers respond to the SIM Initiative in Vermont?

KEY INSIGHTS

- SIM-supported collaborations—via meetings and work groups or Learning Collaboratives—encouraged provider involvement in the local community, strengthened relationships between groups that provide or coordinate care, and changed care delivery.
- Provider adoption of new technologies, such as expanded use of electronic health records (EHRs) and event notification systems, was spurred by the SIM Initiative and was critical in creating a common platform for coordinating care.
- Providers most directly involved in patient care were often the least knowledgeable on SIM-related efforts to encourage transformation of health care delivery.

In focus groups, ACO-affiliated providers described the level of support they received from their ACOs, their adoption and use of health IT, and use of SIM-funded projects to improve patient care. From the perspective of providers in the focus groups and as interviewees (both individual providers and provider organization representatives), some SIM Initiative activities, such as the Learning Collaboratives, were successful in encouraging a lasting behavior change within practices. A major success that is likely attributable to the SIM Initiative was the creation of a "we're all in this together" attitude, as described by a state official, which interviewed providers echoed. Still, although the interconnectedness under the SIM Initiative has improved, providers consider health reform in Vermont as a work in progress.

Collaborations fostered by the SIM Initiative have had a lasting effect on practices' efforts to improve patient care. Through SIM-related collaborations, such as stakeholder meetings and work groups, providers noted strengthened community relationships and that progress was made in having people think differently about the way they deliver care. One provider suggested that the Integrated Communities Care Management Learning Collaboratives had a lasting effect on their behavior, in that the provider's practice is building care coordination and training plans that will help sustain their work in the future. Because of the Learning Collaborative, this provider's practice is more deliberate about who among their patients should be eligible for the team-based care approach, and more practice staff are confident in their ability to do teamwork. Another provider reiterated this sentiment, noting that the focus on learning collaboratives helped create better communication within their organization and better thinking about shared community engagement around complex issues. A leader of a health center said that community collaborations and stakeholder work groups that were part of the SIM Initiative have been working to expand communication with local FQHCs and the hospital, characterizing the SIM Initiative's effect as "adding caffeine to the process"; the primary benefit was in helping bring people together.

Providers have adopted new health IT funded by the SIM Initiative. The support of Vermont's leadership for expanding EHR use was critical in creating a common platform that providers said probably would not have happened without the SIM Initiative. A leader of a provider organization applauded the expansion of the statewide health IT capacity, including the rollout of VITLAccess, which connects providers to the state health information exchange. Use of admission, discharge, and transfer alerts has accelerated since the formal launch of the Patient Ping event notification system in April 2016. Providers seem to be more widely using event notification systems, either the SIM-funded Patient Ping or their own EHR's, than the evaluation team observed in April 2015. Furthermore, some SIM funding was used within the past year by an ACO through its infrastructure subgrant to support telemonitoring for Medicare patients with chronic conditions. Although the ACO deemed its telemonitoring project successful in increasing "touches" to patients and saving Medicare money, the ACO chose to end it because there were too few affected patients to justify its continued costs.

Providers most directly involved in patient care were often the least knowledgeable on SIM-related efforts to encourage transformation of health care delivery. A major awareness gap existed between those in top-level positions and providers who directly give care to patients. Most focus group participants said that they had at least heard of the SIM Initiative or VHCIP, as it is known, but when asked about whether they received more support in terms of funding, additional staff, or care coordination, they gave comments such as "I honestly can't say" or "I don't have perception of if there's any financial support at all for that," or proceeded into more familiar topics such as the Blueprint for Health. A few focus group participants were even unaware of being in an ACO, with one noting that "physicians don't really understand how they end up on their list." In the context of the awareness gap, one pediatrics provider who was interviewed believed the SIM Initiative to be very important but stated that "because it hasn't been identified as being behind the various initiatives, people may not be aware of what it has done."

Indeed, provider organization leaders expressed the greatest understanding of Vermont's SIM Initiative. One interviewee attributed improvement in quality measures to the practice's participation in the ACO. Another described a SIM provider subgrant to examine unnecessary medical testing for the Choosing Wisely program as a very successful investment that led to positive outcomes. From the perspective of independent providers, a focus on population health is new, and they have seen a shift in more learning and developing skills related to quality improvement processes. Independent practices note that they are generally doing more in both population health and quality improvement processes now than before the SIM Initiative, such as having the ability for panel management and showing improvements in quality measures; however, they say they have not seen a decrease in the rate of rising health care costs.

Providers were most motivated to participate in SIM activities by the desire to improve care for their patients, rather than earning potential shared savings. Putting the patient's best interests first was perceived as a major benefit to adopting the reform efforts. Furthermore, beliefs that a traditional fee-for-service (FFS) payment model is not sustainable helped attract providers to reform efforts. In the context of planning and implementing care delivery projects, state leadership's outreach to clinicians, most notably through the provider Subgrant Program, was a positive strategy for encouraging participation. Subgrants funded by the SIM Initiative enabled clinicians to share their views and identify problems and solutions.

Potential shared savings are intended as an incentive for providers to participate in an ACO, yet they do not always materialize. In the case of the Medicaid SSP, shared savings were earned in 2014 (by both participating ACOs), and these payments were noted as very helpful for providers who received them. For one pediatric practice, the money from the shared savings was used as a bonus for staff. More often, the SSPs did not result in any shared savings (commercial and Medicare). Overall, the incentives in place for providers were not viewed as enough, but for these participants, their reason for joining was often that "something is better than nothing." One provider organization interviewee noted that the SSPs have not proven to be a huge motivator for clinicians to drastically disrupt the status quo, positing that fixed payments (via the All-Payer ACO Model) would unlock a lot of change. In contrast, some interviewees stated that having no downside risk was an attractive feature for their participation. Separately, quality reporting was perceived as a disincentive by some providers, in the context of the number of measures that might not be relevant for primary care physicians and in the amount of time required on quality reporting, which was often noted as "unnecessary work" and the workload as "the damning future of almost all these initiatives."

The SIM Initiative is viewed as a catalyst for health reform in Vermont, but costs providers time. The majority of providers viewed the SIM Initiative as highly significant for bringing people together from different perspectives. To a degree, the SIM Initiative did well at supporting state-sponsored activities to reach consensus across payers, to help the state move away from a FFS payment model, and to apply a greater focus on population health and determinants of health. A leader of a provider organization referred to the SIM Initiative as a "catalyst" for moving toward a unified ACO and All-Payer ACO Model adoption. Providers we spoke to were able to use SIM-related forums, such as the learning collaboratives or work group meetings, to find commonality with other provider groups and identify barriers that were prohibiting or limiting their collective ability to provide high-quality care. The main challenge cited by providers was finding the time to work on SIM activities, whether it was the administrative reporting or attendance at decision-making meetings. Providers expressed that they were constantly faced with multiple priorities, and when the assured benefit to their patients is not greater than the cost of the provider's time and effort to initiate a change, then participating in SIM activities becomes a challenge.

F.3.3 How were stakeholders engaged in Vermont's SIM Initiative?

KEY INSIGHTS

- Stakeholders have been actively engaged in Vermont's SIM Initiative since its inception in 2013, primarily through the regular convening of topic-based work groups. Over time, Vermont adapted its work group structure in response to changing needs and priorities of the SIM Initiative.
- Although operation of the work groups required significant resources, the work group structure enabled Vermont to engage a wide breadth of stakeholders, largely perceived as a highlight of Vermont's work under the SIM Initiative.
- However, a few work group participants perceived lack of transparency and clarity over the SIM Initiative's governance structure, to their consternation.

Since the end of 2013, key stakeholders have been engaged in the SIM Initiative, primarily through stakeholder work groups that met monthly. The stakeholder governance designated a Core Team to make funding decisions and set project priorities and a Steering Committee to guide the Core Team's decisions based on recommendations from the work groups. In 2013, Vermont launched work groups specifically focused on Disability and Long Term Services and Supports (DLTSS), Payment Models, Quality and Performance Measures, Health Information Exchange, Population Health, and Care Models and Care Management. An existing work group, the Health Care Work Force Work Group (established by Executive Order in 2013), also provided stakeholder input for the SIM Initiative. In 2014 the state also launched a website specifically dedicated to the VHCIP, which contains meeting minutes and reference materials for all work groups. At the end of 2015, Vermont reevaluated its work group structure in the context of how the SIM Initiative had evolved since its first year. As a result, the state decided to consolidate and reframe the focus on several work groups to better align with the SIM Initiative's key focus areas.

From the early days of the SIM Initiative, these work groups brought key players to the table, including Medicaid, commercial payers, ACOs, the GMCB, the medical society, the hospital association, Vermont Legal Aid, the Office of the Health Care Advocate, and some community provider organizations. One criticism of the work group structure noted that patient-facing providers for the most part did not participate because the meetings were held during standard working hours. Most of the work group activity concluded in December 2016 as the state transitioned into its final months of the SIM Initiative, although the Health Care Work Force work group will continue as mandated by Executive Order, and ACOs and the GMCB may continue some of the substantive work group discussions. The state maintains a VHCIP electronic mailing list, through which it can continue to communicate with stakeholders. Upon recent evaluation of the list, state officials realized that it is one of the most comprehensive contact lists related to health care stakeholders of any state agency in Vermont. Because of the extensive nature of the list's contacts, it is recognized as an important tool for communication about future reform efforts with interested stakeholders.

An inclusive stakeholder process facilitated valuable discussion among different types of providers and interest groups, but mediation by state officials left some individuals unsatisfied with the process. The opportunity for stakeholders to voice their opinion was often regarded as a SIM Initiative strength. Open-access meetings and work group sessions were used as an avenue for providers to express their input. The openness allowed for diverse perspectives to be included, but some providers shed light on the consequences of large groups. One provider organization director noted that the stakeholder process had too many people and that minority opinions were “swept away by the momentum of majority opinions.” The interviewee mentioned that the majority opinion was also more heavily influenced by state personnel than by provider perspectives. This sentiment was reflected by another leader of a provider organization who experienced difficulties in reaching a consensus process in crowds that were over 25 people, deeming that the state leaders were listening to the loudest voices. A pediatric practice reiterated the need to include pediatric input for state decision making on health care, a highlight during the 2015 round of site visits also. Finally, with regard to stakeholder participation, providers noted that they need to be reimbursed or financially incentivized to attend SIM-related meetings or work groups. Providers from various practices indicated that the time and effort required to participate in engagement strategies was a tremendous burden to them, with one independent practice organization calling it “so demoralizing when you do this work and get nothing out of it.”

The diversity of populations and interests creates natural challenges to instituting statewide reform, and the state helped facilitate compromise between diverse interests in the development of a statewide reform strategy. For example, while one consumer advocate raised concerns that Vermont’s reforms do not do enough to address disability, one provider indicated that the state’s reforms place too much emphasis on “high-utilizers.” The state, as a governing body, plays an important role in its capacity to engage across stakeholders and promulgate reforms that may benefit the interests of the state as a whole. Ultimately, the state-led Core Team made decisions in line with the overall goals for reform (as opposed to in response to discrete interests).

Lack of transparency and clarity over process led to frustration among some participants. A few work group participants noted a lack of transparency over how recommendations from the work groups and Steering Committee were ultimately used. The lack of transparency led to confusion among some participants about activity the state was actively pursuing under the SIM Initiative. Similarly, one participant reported an instance of frustration where the Core Team made a decision without consulting the topic-appropriate work group. Another expressed uncertainty over whether Vermont was actively ignoring certain recommendations, or whether “ignored” recommendations were just a result of compromises the state developed in the interest of appealing to the many diverse stakeholders it was attempting to engage. The perceived closed-door nature of the Core Team resulted in some angst over how much the state appreciated the value of partnerships fostered through the work groups.

Similarly, several participants expressed lack of clarity over the SIM Initiative itself. Although they recognized the importance of the SIM Initiative, many lacked confidence in being able to definitively describe Vermont's goals for the SIM Initiative, or even major components of the Initiative. As exemplified by one provider, "We were part of one of the SSPs, I had no idea that was SIM [supported]." Another expressed a lack of confidence that the state was operating toward a coherent vision and set of goals. As in many states, the SIM Initiative is a complex project. However, the comments from stakeholders expressed during our interviews, suggest that more engagement is required if Vermont does wish to convey and receive buy-in for a unified and statewide vision for reform.

Flexibility in work group structure allowed stakeholder engagement to evolve with the priorities of the project. As one state official described, "stakeholder engagement has a life cycle." The process began with total engagement, with many interested parties coming to the table to create a shared understanding of Vermont's goals under the SIM Initiative. In forming topic-based work groups, Vermont was able to draw in experts from around the state to focus on issues of greatest relevance to their areas of expertise. The early meetings focused on developing specific technical and operational strategies that would facilitate implementation of the state's SIM Initiative. However, as the SIM Initiative evolved, Vermont streamlined the stakeholder engagement process by combining work groups and tying them to specific SIM Initiative milestones. By combining some of the work groups, the state was able to cut down on unnecessary and repetitive meetings as the state moved from implementation to full operation of its SIM Initiative reforms. Stakeholders noted that the broader structure was necessary to begin the initial heavy lift of their SIM Initiative work, but as the work progressed the structure benefitted from a redesign. Fewer groups and meetings also helped to keep stakeholders focused on core concepts like practice transformation and population health.

Stakeholder engagement requires significant dedicated resources, even in a "small" state. Originally, the state dedicated one full-time employee to direct its stakeholder engagement. However, between the responsibilities of preparing for more than 20 hours of monthly public meetings and keeping the health care innovation website up to date, including the posting of webinars of some meetings, Vermont increased staffing to three full-time equivalent staff. As one state official noted, "Vermont's appetite for having work groups exceeded its ability to properly staff them." One state official suggested that understaffing of the work groups may have resulted in less time to devote to soliciting feedback from participants in implementation issues and led to more focus on "reporting out" versus engagement.

Work group members expressed positive feedback on opportunities to give input on specific issues related to design and implementation and valued less the report-outs from the state. Various individuals who participated in Vermont's work groups described that, in early years, work group participants were actively engaged in the design and implementation of the SIM Initiative, valuing the opportunity to work with the state and to learn from other stakeholders. However, as the award period progressed, the state required less input on implementation and focused more on operation of various SIM Initiative programs. As a result, the work groups became less a forum for discussion and more a forum for the state to report updates, which led participants to feel less engaged with the Initiative. Work group members expressed the most positive feedback on where they had been actively engaged in planning and design of reforms under the SIM Initiative.

F.3.4 How was behavioral health services integration with primary care tested in Vermont?

KEY INSIGHTS

- The state is using behavioral health–related quality measures and a gradual inclusion of related services in the ACO payment model to integrate behavioral health with medical and surgical care delivery. Behavioral health is also among the first target areas identified for the Medicaid Pathway.
- Federal privacy protections around sharing substance abuse treatment information without patient consent, under 42 CFR part 2, continue to hinder optimal integration of services. However, Vermont's new governor has identified substance use as a priority issue, which may foster future attention to these issues.

Vermont has sought to ensure the inclusion of behavioral health in the many health care transformation efforts the state has engaged in via the SIM Initiative. Vermont's efforts to promote behavioral health integration include the following:

- support for health data infrastructure needs for behavioral health providers;
- an assessment of mental health and substance use spending across the state, to help shape future payment reform efforts;
- strategic planning to integrate the Hub-and-Spoke initiative, which links general medical settings with specialty addiction treatment programs, into Vermont's delivery transformation efforts;
- support for quality improvement and training efforts for the state's PCMHs; and
- a focus on Medicaid payment reforms for mental health and substance use providers via the Medicaid Pathway.

The state is using behavioral health–related quality measures and a gradual inclusion of related services in the ACO payment model to integrate behavioral health and medical/surgical care delivery. At a high level, the medical/surgical and behavioral health sectors operate in silos nationwide; in Vermont there are upwards of 32 separate funding sources coming from eight departments and agencies to pay for mental health and substance use disorder services, complicating the state's efforts to pursue full integration. Throughout Vermont's SIM Initiative, there has been growing recognition across stakeholders of the need to engage behavioral health providers in any coordinated care effort while also recognizing the challenges in fully integrating these providers in health care transformation. In an attempt to balance these interests, the state included behavioral health measures—such as treatment offerings, treatment engagement, and follow-up after ED visits—as part of the quality framework for its All-Payer ACO Model Agreement. The Agreement also includes a provision that the Vermont AHS develop a plan to integrate LTSS, substance use disorder, and mental health services by the third year of the model. The inclusion of these details demonstrates an attempt by the state to involve providers across physical and behavioral health settings in the model. A GMCB member noted that this type of integration will create accountability for behavioral health care management, seen as critical to achieving success for the All-Payer ACO Model.

Federal law governing the transfer of certain types of health information continues to hinder optimal integration across health services. A major factor affecting the integration of behavioral health services into primary care is 42 CFR part 2, a federal regulation that places strict privacy protections on patient records from substance abuse treatment providers. The SIM Initiative's health data infrastructure work attempted to advance the use of EHR and a data repository for mental health agencies, which Vermont perceived as critical to enable the integration of these providers into the larger health care system as EHR advancement will allow for data sharing among physical and behavioral health providers. From a systems perspective, the data infrastructure is now in place for data sharing; however, the state cannot currently connect the mental health data to the larger system (its health information exchange) because 42 CFR part 2 requires specific types of patient consent prior to sharing patient records from substance abuse treatment providers. Mental health agencies can nonetheless share information within their own network for common patients, which is a preliminary step in fully integrating behavioral health into primary care. The state team also noted that misconceptions around the ability of mental health providers to interact with other care team members for purposes of care coordination have posed challenges to the integrated team-based care model supported by the Integrated Communities Care Management Learning Collaborative.

Vermont's new governor has identified substance use as a priority issue, which may foster future attention to these issues. Governor Phil Scott, who took office in January 2017, has specifically called out substance use and addiction treatment as a priority for his agenda. State officials expressed that the Governor's public prioritization of this issue might help prioritize movement toward integrated care in the state. Legislation is also pending on a global budget combined with bundles for behavioral health services. State officials expressed that the main barrier that prohibits momentum of these efforts is state personnel capacity to support ongoing transformation efforts related to behavioral health and substance abuse.

F.3.5 How were quality measurement and reporting strategies tested in Vermont?

KEY INSIGHTS

- Strong stakeholder engagement was key to developing, refining, and aligning the ACO SSP quality measures. Vermont took what it learned from developing these measures to assist in the negotiations with CMS for selecting the All-Payer ACO Model measures, which contributed to a smoother process.
- The large number of ACO SSP quality measures and the lack of available, standardized data is an ongoing barrier to performance measurement.

In 2014, Vermont's Quality and Performance Measures Work Group (later redesigned as the Payment Models Design and Implementation Work Group) developed recommendations for the state's measure set for Medicaid and commercial ACO SSPs. In 2015 and early 2016, conversations took place between agencies and SIM work groups to consider how measures could be streamlined to fit into the broader picture of reform. The work group made small tweaks to the ACO SSP measures, mostly to align existing measures with language or definitions used for national clinical guidelines. Additionally, the work group added outcome measures to the payment set in 2015. In 2016, the measures remained stable as quality measurement work was focused on preparing for implementation of the All-Payer ACO Model.

Strong stakeholder engagement was essential to developing, refining, and aligning the ACO SSP quality measures. One state official explained that the SIM Initiative got the cross-organizational dialog going, pulling in quality measurement experts from the GMCB, the Department of Vermont Health Access, and the Department of Health, and also involving the ACO and Blueprint stakeholders to help select the core measures. A state official explained that, "Every measure requires an inordinate amount of conversation." A provider explained that a lot of time went into which of the measures would be reported and used for the SSPs. A state official reported that discussions even got contentious. Feedback was solicited from physicians, hospitals, and community providers to assess which measures were valuable to them and what they would want to see part of a quality improvement program. At the end of the process, one state official said,

> *I've worked in state government since [date redacted] and I've never seen it quite like this where people are interacting with each other. Experiencing successes and challenges together. Just learning!"… "The relationships built through [the] SIM [Initiative] have led to alignment and interaction across organizations.*— State official

The number of ACO SSP quality measures caused some stakeholders to feel overwhelmed and confused. Despite strong stakeholder involvement that was solicited during the development and refinement of the measures, some felt that there were too many measures to actually allow providers to make improvements. One provider observed that although there was some alignment in quality measures, it still felt to practices that there were "a million different measures." A state official corroborated, stating that it may have been better to pick a few measures to focus on and that even after adjusting the measures midstream there was still a lack of understanding. Another state official remarked that providers can only do so many quality improvements at one time and that the selection of which measures to focus on is being driven in each community by ACO-created clinical priorities.

The lack of available, standardized, and "capturable" data is an ongoing barrier to performance measurement. As during previous years, stakeholders expressed concerns over the lack of data available in the Vermont Health Information Exchange (VHIE) and data that support performance measures. One state official reported that only 61 percent of available and "capturable" data was in the VHIE. Another ongoing challenge heard was the need to standardize and transfer data to increase its use for quality measurement purposes. A state official estimated that 20 percent or less is actually ready for performance measurement analytics.

Vermont used the experience and knowledge it acquired from developing the ACO SSP measures to assist in the negotiations with CMS for selecting the All-Payer ACO Model measures. Based on the ACO SSP measure process, the state knew what was important to its stakeholders and the benefit of soliciting their feedback. Thus, Vermont brought in primary care providers, state leaders, and consumers to obtain their input on the All-Payer ACO Model measures. One state official explained that the input the stakeholders provided was "excellent" and played a large role in the negotiations of the measures with CMS.

Table F-4 shows the quality payment measures that Vermont is working on across the different delivery system and payment models. For the ACO SSP model, some reporting measures that were included combined commercial and Medicaid patient experience outcomes derived from CHAC and OneCare Vermont patient experience surveys. Several of the measures align across the models, such as Adolescent Well-Care Visit; Follow-up After Hospitalization for Mental Illness, 7 day; Initiation and Engagement of Alcohol and Other Drug Dependence Treatment; Hypertension; and Diabetes.

Table F-4. Payment measures for Vermont's commercial and Medicaid ACO Shared Savings Programs and All-Payer ACO Model

Measure	Commercial SSP	Medicaid SSP	All-payer ACO model
All-Cause Readmission	✓	✓	
Adolescent Well-Care Visit[a]	✓	✓	✓
Follow-up After Hospitalization for Mental Illness, 7 day[b]	✓	✓	✓
Initiation and Engagement of Alcohol and Other Drug Dependence Treatment[b]	✓	✓	✓
Avoidance of Antibiotic Treatment for Adults With Acute Bronchitis	✓	✓	
Chlamydia Screening in Women	✓	✓	
Developmental Screening in the First Three Years of Life		✓	
Rate of Hospitalization for Ambulatory Care-Sensitive Conditions: PQI Composite	✓	✓	
Hypertension: Controlling High Blood Pressure[c]	✓	✓	✓
Diabetes HbA1c poor control (Stand-Alone)[c]	✓	✓	✓
Population-level Health Outcomes Targets			
Substance Use Disorder			✓
Suicide			✓
Chronic Conditions			✓
Access to Care			✓
Health Care Delivery System Quality Targets			
Follow-up after discharge from the emergency department for alcohol or other drug dependence[b]			✓
Mental Health and Substance Abuse-related emergency department visits[b]			✓
Getting Timely Care, Appointments, and Information[d]			✓
Process Milestones			
Prescription Drug Monitoring Initiative Utilization[e]			✓
Medication-assisted Treatment Utilization[e]			✓
Screening for Clinical Depression[f]			✓
Tobacco Use Assessment and Cessation Intervention[g]			✓
Medication Management for People with Asthma[g]			✓
Medicaid Beneficiaries Aligned to a Scale Target ACO Initiative[a]			✓

ACO = Accountable Care Organization; SSP = Shared Savings Plan.

[a] Access to Care Milestone

[b] Suicide and Substance Use Disorder Target

[c] Chronic Conditions Target

[d] Access to Care Target

[e] Substance Use Disorder Milestone

[f] Suicide Milestone

[g] Chronic Conditions Milestone

F.3.6 How were health IT and data analytic infrastructure implemented in Vermont?

KEY INSIGHTS

- The SIM-supported Vermont Care Partners Data Repository addresses the need for storing and accessing protected behavioral health data.
- Vermont's health information exchange efforts funded by the SIM Initiative have progressed from connectivity to improving the quality of data. State officials and providers perceive the usefulness of these data differently.
- Vermont's ACO providers attest that EHR systems improve care coordination, but that lack of interoperability between their own EHRs, other health systems' EHRs, and the VHIE limits their impact.

Throughout the SIM Initiative, Vermont has funded health IT infrastructure projects to support provider readiness for payment and delivery model reform. Early initiative efforts focused on ACO connectivity to the VHIE to allow data inflows and the creation of secure connections to ACOs to allow data extracts from the VHIE. The latter activity was completed in July 2016 for the third and final participating ACO. Expanding data collection and storage to providers outside the primary care and specialist networks was another major work strand. Those efforts included EHR procurements for providers that were not eligible for either the Medicare or Medicaid EHR Incentive Program and the establishment of the Vermont Care Partners Data Repository described below. Following initial data collection, the focus has shifted to improving data quality. SIM funding also supported another data warehousing activity—the migration of the Blueprint for Health's Clinical Registry to Vermont Information Technology Leaders (VITL), the state's entity that developed and manages the VHIE. Among its care management tool SIM activities, the state launched Patient Ping, its event notification system. Lastly, Vermont implemented two telehealth pilots in its final performance year.

Not funded by the SIM Initiative, but important for monitoring the results of the SIM-supported All-Payer ACO Model, is the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES)—Vermont's all payer claims database, which provides comprehensive data to assist the state in health care cost and delivery analytics. In March 2016, the U.S. Supreme Court ruled against Vermont in its *Gobeille v. Liberty Mutual* decision, determining that states may no longer require self-funded plans to submit claims data—that action is preempted by ERISA. A GMCB representative reported that there was a substantial drop in all commercial payers submitting to VHCURES since the ruling. That person noted, however, that one commercial insurer in Vermont, proactively reached out to its self-insured employer groups and many will voluntarily begin submitting claims again. Having a robust VHCURES strengthens Vermont's ability to guide and monitor its health reform progress going forward.

Vermont began implementation of two pilots that test using telehealth technologies to improve health care and access. In one pilot, a visiting nurse organization is connecting its telemonitoring system to patient EHRs and the VHIE. The connection between the telemonitoring system to these services will enable the home health team, the primary care physician, and other providers in the network to share clinical information in a timely manner for patients with chronic conditions (Visiting Nurse Association, 2017). In the second pilot, a major mental health and substance abuse center is using telehealth technology to expand access to medication-assisted treatment for patients with opioid dependence. Eligible patients are using "Med-O-Wheels," secure tamper-resistant dispensing wheels of buprenorphine or methadone, and videotaping themselves by cell phone taking a single dose at home each day to allow for compliance monitoring by clinicians. This innovative program hopes to reduce time and transportation barriers to treatment for patients who would otherwise be required to visit the center daily for medication. Both pilots launched mid-2016 and will conclude by June 2017.

Vermont's ACO providers attest that EHR systems improve care coordination, but that lack of interoperability between their own EHRs, other health systems' EHRs, and the VHIE limits their impact. The majority of providers participating in Vermont's Blueprint for Health and ACO SSP payment models had already acquired EHR systems through the Medicare and Medicaid EHR Incentive Program by adopting, implementing, using, and demonstrating meaningful use of EHRs. Vermont completed its SIM-funded EHR expansion efforts in 2016, procuring systems for providers not eligible for the Medicare or Medicaid incentive program, at five Specialized Service Agencies (SSAs) and the State Psychiatric Hospital. Most, but not all, providers at our focus groups use EHRs and credited them with helping to manage patients' care:

> *I think it has improved our care, to have somebody proactively use the computer to access everybody, to make sure they have had an eye exam, a foot exam, a hemoglobin A1c, ... they can see that ... and call the patient.*—Provider

The providers noted that the EHRs worked well for coordinating care for patients within the same network. However, EHRs were also described as silos. Many specialists, including mental health providers, noted that they use more than one system because of lack of interoperability between each network's system: "I use three different EHR systems right now … one in the nursing home, one in my Stowe office, and a different one in the Burlington office …." Provider frustration with multiple systems also influenced their assessment of VITLAccess, the link to the VHIE: "They have 60 percent of the data of the state sitting [there], but there's no access. … it's just another sign in, another log in and I don't think anybody is going to really use it."

Vermont spent SIM resources to improve the quality of data in the VHIE, available to providers through VITLAccess, but state officials and providers perceived the usefulness of these data differently. Considerable SIM resources were focused on improving the quality of the data flowing into the VHIE and transforming the data into a uniform structure so that it could be extracted and used with data analytic software. As an early step, VITL personnel met with provider organizations to understand their EHR capabilities and how and what data they were entering. Repeated provider training on submitting complete and consistent data was identified as a necessary component. To make data in the VHIE usable for metrics and analytics, the data needed to be standardized. One issue identified by VITL personnel, for example, was the inability of analytic software to recognize the comparability of *hemoglobin A1c* and *HA1c*. VITL created coding to improve data standardization issues like the example noted of HA1c. Although data quality efforts are ongoing and will need to be sustained, state officials were positive about the progress and expanded use of VITLAccess. As described earlier in focus group comments and expressed in stakeholder interviews, the provider community was less enthusiastic: "The completeness of data in the system, didn't make data we saw useful." The state and VITL recognize that the VHIE is a work in progress and the complexity of the task will continue to keep the pace slow.

The SIM-supported Vermont Care Partners Data Repository addresses the need for storing and accessing protected behavioral health data. Because of 42 CFR Part 2 privacy restrictions, substance abuse data could not be stored in the VHIE. The SIM Initiative funded the creation of a centralized repository for data submitted by Designated Mental Health Agencies (DAs) and SSAs. Efforts on this task in 2016–2017 focused on improving data quality and the creation of analytic dashboards for member agencies. Expanding the reach of health IT to these specialty providers is a key accomplishment in systemwide health care reform in Vermont. Several stakeholder interviewees commented on its importance as illustrated with this quote:

> *Our repository is phenomenal—having the ability to pull and aggregate the data from all 16 agencies, develop dashboards and analytics, to use to educate and demonstrate value, to look at where we need to improve on our service delivery, and how we can share in acceptance of failures and learning amongst our network.*—Stakeholder

A provider organization leader noted how the project's influence extended beyond the data repository and its data analytics:

> *Those discussions have now pushed us … to purchase a unified EMR for our network, not part of [the] SIM Initiative but as a result of [it]. Pushed the entire delivery system to think about how do we work more efficiently … internally within our silos of care and then how do we look at how we work together at the state level and regionally.*—Provider

Patient Ping, an event notification system, was important for CHAC and other less connected providers in supporting their care coordination efforts. Following 2 years of SIM-funded planning and discovery and the selection of a vendor, Vermont launched the Patient Ping event notification system in April 2016 and has been expanding it throughout the past year. The system notifies providers of hospital admissions, discharges, and transfers. The cost to providers for Patient Ping is subsidized by the SIM Initiative during Vermont's period of performance (through June 2017). Although it is available to all providers, Patient Ping's targeted expansion is to providers whose EHR systems do not already include these notifications, such as FQHCs, visiting nurse associations, DAs, SSAs, and skilled nursing facilities. CHAC, the ACO comprising mostly FQHCs, cited Patient Ping as one of the SIM Initiative successes and was appreciative of the cost subsidization. In the context of its importance beyond the ACO aspect for several of its practices, CHAC observed, "It was a tool they found so valuable they wanted to make sure they have it in their toolbox for all patients, not just ones ACO flagged."

Medicaid beneficiaries participating in focus groups responded favorably to health IT investments. Most participants expressed that their physicians knew if they had been to the ED or had an inpatient admission—an indication that providers were using Patient Ping or a comparable event notification system. One Medicaid-Medicare participant stated, "Usually my doctor or someone from there [patient's health center] would come and see me right at the hospital." Another Medicaid-only beneficiary described her experiences: "After I get discharged, I always get a phone call from the Community Health Center like, 'Hey, we know that you were just in the ED. They want us to do a follow-up appointment with you.'" Medicaid beneficiaries had mixed responses to whether their provider knew of their medications. Most responded favorably: "Their system is all integrated with the medical center, so if I get prescribed new it automatically gets updated in the health center. They usually have a pretty good idea of what I'm taking, and the dosage, and all that." Patients were also supportive of patient portals; these were not a SIM Initiative focus but are connected to the Blueprint for Health. A Medicaid beneficiary shared this positive feedback:

> *…it's been really helpful because it basically allows you to access the same information that your doctor can access so that way if you are trying to remember what happened at an appointment that you had 6 months ago, you can go into My Health Connect and actually pull up the visit summary from that appointment … The computer changes have helped the doctors, but it's really helping me as a patient. I feel like I'm being a better patient because I am able to go in and be like, 'I noticed that my levels were this for my blood work. What can we do?'*—Medicaid beneficiary

Time and costs are continuing barriers to provider adoption of health IT activities. As discussed earlier in this report, provider focus group respondents explained that the time involved in learning new systems, entering data, or accessing data can be overwhelming. The required reporting within various initiatives compounds provider frustration.

> *… I have to document it in three different ways in order for it to be compliant. And, I'm doing my notes at home at the end of the day at 9:30 at night. …The only way to get money is to jump through these hoops and to check these boxes but I see fewer patients in any day so I'm providing less care to needy patients and I'm burning out.*—Provider

Multiple providers expressed the desire for a single powerful statewide EHR system; but without a mandate or funding, practices and systems will continue to use the technology that fits their budget.

Vermont plans to continue most of its ongoing health IT activities. VITL's data quality efforts to improve the data's usefulness will be sustained. State officials and providers expressed strong support for the Vermont Care Partners Data Repository. As one DA director stated, "The data repository is growing and everyone is committed to moving that forward." The Patient Ping event notification system will no longer be subsidized. Individual providers or practices will determine if they wish to cover its costs.

F.3.7 How were workforce development and practice transformation strategies implemented in Vermont?

KEY INSIGHTS

- Vermont's Learning Collaboratives curated a productive curriculum and fostered collaboration and learning across different sectors of health care and social services providers; stakeholders noted this work as a successful investment of the SIM Initiative.
- Community building and resource sharing promoted by the Learning Collaborative led to improved coordination and engagement across providers. Additionally, direct "from provider" and "train-the-trainer" models of learning appeal across a range of provider types and organizations.

Vermont's practice transformation activities were designed to directly support the health care reform efforts being advanced under the SIM Initiative, including development of an Integrated Communities Care Management Learning Collaborative, support for Vermont's Regional Collaborations, which brought together ACO and Blueprint leadership to support clinical and quality improvement at the local community level; a series of subgrants providers could use to fund discrete needs to advance health transformation; and workforce analytics projects to assess current and future workforce needs. These initiatives help providers get ready to optimize performance under alternative payment methodologies and to accept higher levels of risk and accountability. Vermont also used its Practice Transformation Work Group to monitor existing health care workforce development activities and to recommend mechanisms for ensuring consistency and coordination across the initiatives.

Vermont's Learning Collaborative work was especially noted as a successful investment of the SIM Initiative for curating a productive curriculum and fostering collaboration and learning across different sectors of health care and social services providers. The SIM Initiative financed Vermont's Integrated Communities Care Management Learning Collaborative (Learning Collaborative), a rapid-cycle quality improvement initiative operating in local communities. The Learning Collaborative focused on improving cross-organization care management for at-risk populations. When the Learning Collaborative program began in 2014, it operated in three initial pilot communities; it has since grown to 12 HSAs statewide. The Learning Collaborative has since merged with the state's Regional Collaborations. (The Regional Collaborations were formed through the Blueprint for Health and originally known as United Community Collaboratives.) The Regional Collaborations became the local community forum by which the Blueprint for Health teams, ACOs, AHS, and community organizations worked together to align their payment and delivery reform model efforts and prioritize local needs and goals. In January 2017, Vermont's SIM Initiative transitioned authority of the Learning Collaborative over to the Regional Collaborations under ACO and Blueprint for Health leadership (Vermont Health Care Innovation Project, 2017c).

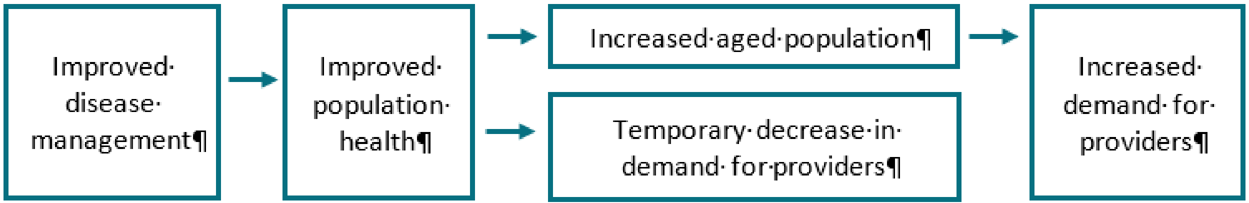
The Learning Collaborative provided a forum for providers and other stakeholders to gain the capacity, knowledge base, and operational readiness needed to participate in health transformation efforts, including payment reforms. Vermont hired subject matter experts to conduct and design curricula for the monthly Learning Collaborative sessions focused on strategic improvement of cross-organizational care coordination, management, and integration. Topics of the Learning Collaborative sessions included care coordination, shared care plans, root-cause analysis, and hot-spotting. Additionally, the state videotaped all of the sessions and posted them in digestible segments on the Blueprint for Health website (n.d.). According to one state official, the ACOs have already begun to pick up the work of the Learning Collaborative. They have used the curriculum to revise their shared care plan and create a care management toolkit for their participants.

Community building and resource sharing promoted by the Learning Collaborative led to improved coordination and engagement across providers. The Learning Collaborative was called out by several interviewees as one of the SIM Initiative's most successful investments. State officials noted success in the ability of the Learning Collaborative to attract a diverse set of provider types, especially from smaller organizations and practices that may lack resources to otherwise invest themselves in training programs. Part of the success was attributed to relationships fostered between providers and organizations that participated in the program, resulting in "more integrated care delivery and understanding of resources." One provider described that the Learning Collaborative "created a slightly more advantageous way of thinking about shared community engagement around complex issues…I would like to think that translated into, not only how do we work more collaboratively with our community partners, but also how we communicate within our organization."

Direct “from provider” and “train-the-trainer” models of learning appeal across a range of provider types and organizations. The Learning Collaborative intended to engage a diversity of provider and organization types in six required full-day sessions (Vermont Health Care Innovation Project, 2016a). Participants included nurses, social workers, community health professionals, and people working in housing developmental services. The wide range of participants posed a significant challenge for the state to design a curriculum that would be perceived as valuable to all, and worth the time spent away from day-to-day work. Vermont found success in designing a Core Competency curriculum highly based on participants learning directly from fellow providers (Vermont Health Care Innovation Project, n.d.). As shared by one provider, “You can have handouts and PowerPoints until the cows come home, but having real people in the room” is crucial to establishing a meaningful connection with participants that keeps them engaged. Additionally, participants appreciated use of the “train-the-trainer” model in which care managers were able to develop the skills necessary to teach others about care management. The trainings include Disability Competency components, which were based on a series of disability awareness briefs developed by the SIM DLTSS work group and informed in part by one of the provider subgrants. As an advocate for the disabled population commented, “We got really positive feedback from the training. … people had been feeling anxiety when working with our population and needed basic information….” State officials were heartened that OneCare Vermont is applying lessons learned from the Learning Collaborative into its care coordination model, supported by a care coordination toolkit, and a web-based care management platform featuring a shared care plan. Looking toward the future, one state official remained hopeful that the All-Payer ACO Model may offer flexibility to compensate providers for attending practice transformation efforts in the future, one way to motivate further dissemination.

Other Practice Transformation and Workforce Development Activities:

- **The Subgrant Program—**The Subgrant Program awarded 14 grants to 12 provider and community-based organizations that directly enhance provider capacity to engage in payment and delivery transformation activities. Collectively, Vermont estimates that the Subgrant Program touched more than 14,000 providers and nearly 340,000 lives.
- **Regional Collaborations—**Initially formed under the Blueprint for Health, the Regional Collaborations operate in the Blueprint's 14 HSAs. The Collaborations are composed of medical and nonmedical providers (e.g., disability and LTSS providers and community providers) that are dedicated to supporting the introduction and extension of new service models. In 2017, work of the Regional Collaborations will focus on implementation of the Vermont Medicaid Next Generation ACO program; many Collaboration participants have expressed interest in the model, acknowledging a likelihood that they will participate in similar payment models in the near future. Also, the Regional Collaborations have transitioned to be the post-SIM continuing entity that will encompass the Learning Collaboratives and the Accountable Communities for Health (described in ***Section F.3.8***).
- **Workforce Analysis—**Vermont commissioned a health care demand micro-simulation model that the state could use to identify provider workforce needs of the state. Among its findings when simulating the effect of health reform efforts was a long-term increase in demand for providers because of improved disease management and subsequently, a longer-living, healthier, aging population (Vermont Health Care Innovation Project, 2017a):



F.3.8 What approach did Vermont take to address population health in its SIM Initiative?

KEY INSIGHTS

- Vermont's efforts to advance statewide goals for payment and delivery reform have drawn greater focus over the role of population health to effect change statewide.
- Vermont's approach attempted to balance the need to set some statewide goals and metrics with the need for population health to be rooted within communities. For example, Vermont intentionally designed its Population Health Plan at a high level to serve as a guideline for how population health should be more intentionally included in other reform efforts.
- Similarly, the Accountable Communities for Health (ACHs) Peer Learning Lab enabled communities to determine readiness to participate in the model within the scope of broadly defined core elements.

Similar to the approach taken with behavioral health integration, Vermont has included population health components across many of the activities advanced under the SIM Initiative. In this section, we report on two key efforts Vermont focused on in the previous year—development of its population health plan and implementation of the Accountable Communities for Health Peer Learning Lab. Moving forward, the All-Payer ACO Model will require the ACO to focus on population-based metrics and the AHS to develop models of care that support population health and holistic models of care across its Medicaid-supported services.

Focus on statewide goals for health system transformation has fostered greater attention to the role of population health. As Vermont has worked across stakeholders to advance integrated and coordinated care efforts through its payment and delivery reform efforts, there has been greater attention paid by many stakeholders to the provision of "whole-person directed care," which focuses on the needs and goals of individuals and employs approaches to care that consider social determinants of health. SIM Initiative work group conversations, including on quality measure development, and the Learning Collaborative's efforts supported the state's focus on population health. One provider described that Vermont is still in "infancy" in having providers understand these issues, while one advocate noted "[these issues are] way more understood than [they were] in the beginning of [the] SIM [Initiative]."

Vermont developed its population health plan as a strategic document to set basic principles for population health improvement that can be integrated into other health reform efforts. The population health plan is a high-level document that identifies five principles for population health improvement: (1) use of population-level data to identify priorities and target action; (2) focus on prevention, wellness, and well-being at all levels; (3) addressing multiple contributors to health outcomes; (4) integrating clinical care with community prevention; and (5) creating sustainable funding models to support population health. The plan is written broadly but seeks to leverage and build on Vermont's State Health Improvement Plan and other state initiatives. The goal is for the plan to serve as a reference to help individuals inside and outside of state government think about population health as a more intentional part of health reform. A draft of the population health plan was completed and presented to work groups in October 2016; the draft was approved by the VHCIP Core Team in December 2016.

Core elements of ACH model

1. Mission
2. Multisectoral Partnership
3. Integrator Organization
4. Governance
5. Data and Indicators
6. Strategy and Implementation
7. Community Member Engagement
8. Communications
9. Sustainable Financing

Recognizing interest in newly evolving ACH models, Vermont invested in supporting providers and community teams to understand and assess readiness for the model. In June 2016, Vermont kicked off an ACH Peer Learning Laboratory (Learning Lab), which sought to bring together multidisciplinary teams from communities across the state to increase their capacity and readiness across the nine broadly defined core elements of the ACH model. The Learning Lab included 10 regional teams that participated in three learning sessions to discuss the model in June 2016, September 2016, and January 2017. Participants represented a broad spectrum of health care providers including community and social services providers, mental health providers, substance abuse providers, Area Agencies on Aging, SASH teams, hub-and-spoke participants, public health providers, and disability services providers. Vermont ultimately envisions that ACHs could help catalyze population health efforts by aligning programs and strategies related to integrated care and services for individuals with community-wide prevention efforts to improve health outcomes within a geographic community.

Communities appreciate balancing a framework for reform with flexibility to adapt goals in line with the needs of specific communities. State officials reported that the nine core elements of the ACH were a helpful tool in aiding Learning Lab participants to decide whether and how they could adopt an ACH-style model. However, one reported benefit of their approach has been the freedom given to potential ACHs to design their programs according to community needs and resources. State officials indicated that this approach enables potential ACHs to more easily build on what they may already have "in motion" and allow for local approach to integration.

F.3.9 How will elements of the SIM Initiative in Vermont be sustained?

KEY INSIGHTS

- Vermont considers the All-Payer ACO Model its overarching sustainability focus.
- Sustainability can occur outside of state decisions.
- Stakeholder engagement, a key SIM Initiative success, will be sustained.

Vermont engaged a contractor and convened a Sustainability Subgroup (including Core Team members, work group co-chairs, ACO representatives, and other stakeholder participants) to inform and develop its sustainability plan. The process involved a stakeholder survey sent to more than 300 SIM Initiative participants and additional stakeholder interviews. The draft version of the plan was released in November 2016 (Vermont Health Care Innovation Project, n.d.). Following discussions by work groups, the Steering Committee, and the Core Team, Vermont's SIM project staff and contractor expect to finalize the sustainability plan by June 2017 (***Table F-5***).

Table F-5. Vermont draft Sustainability Plan recommendations for key components

SIM focus areas and work streams	One-time investment *will not be sustained*	Ongoing investments *state-supported*	Ongoing investments *private sector*	Proposed lead entity
Payment Model Design and Implementation				
ACO Shared Savings Programs (SSPs)		✓	✓	GMCB
Pay-for-Performance (Blueprint for Health)		✓	✓	AHS/ACO
Health Home (Hub & Spoke)		✓	✓	AHS
Accountable Communities for Health		✓	✓	Blueprint/ACO
Medicaid Pathway		✓	✓	AHS
All-Payer ACO Model		✓	✓	GMCB
Practice Transformation				
Learning Collaboratives		✓	✓	Blueprint/ACO
Subgrant Program		pending	pending	AHS
Regional Collaborations		✓	✓	Blueprint/ACO
Workforce—Care Management Inventory	✓			AHS/VDH
Workforce—Demand Data Collection and Analysis ; Supply Data Collection and Analysis		✓		AOA
Health Data Infrastructure				
Expand Connectivity to HIT—Gap Analysis	✓			
Expand Connectivity to HIT—Gap Remediation		✓	✓	AOA
Expand Connectivity to HIT—Data Extracts from HIE	✓			
Improve Quality of Data Flowing into HIE		✓	✓	AOA
Telehealth—Strategic Plan	✓			
Telehealth—Implementation		✓	✓	AOA
Electronic Medical Record Expansion		✓	✓	AOA
Data Warehousing		✓	✓	AOA
Care Management Tools—Event Notification System			✓	AOA
Care Management Tools—Shared Care Plan		✓	✓	AOA
Payment Model Design and Implementation				
ACO Shared Savings Programs (SSPs)		✓	✓	GMCB
Care Management Tools—Universal Transfer Protocol	✓			
General Health Data—Data Inventory		✓		AOA
General Health Data—HIE Planning	✓			
General Health Data—Expert Support	✓			

ACO = accountable care organization; AHS = State of Vermont Agency for Human Services; AoA = State of Vermont Agency of Administration; Blueprint = Blueprint for Health; GMCB = Green Mountain Care Board; HIE = health information exchange; HIT = health information technology; SSP = Shared Savings Program; VDH = State of Vermont Department of Health.

Vermont considers the All-Payer ACO Model its overarching sustainability focus. As detailed throughout this appendix, Vermont has established its All-Payer ACO Model as the value-based payment and delivery model to move the state beyond SIM-supported activities into the next 6 years (through 2022). SIM Initiative health data infrastructure improvements and practice transformation efforts that were needed for provider readiness and ongoing support for the SSPs were retained in the sustainability plan to strengthen the ongoing model. The Learning Collaboratives, ACH planning, core competency trainings, and other practice transformation activities have converged into the Regional Collaborations, which will involve key participants in each HSA including Blueprint for Health and risk-bearing ACOs.

Sustainability can occur outside of state decisions. SIM Initiative participants noted that some elements of reform they tested or developed via provider subgrants would be sustained through their own organization's funding. One ACO described a telehealth initiative that was successful, but too expensive to continue in its existing form. The ACO found a way to integrate the activities and hire appropriate staff to continue the program's goals under its localized structure. As another example, an organization's subgrant included developing training materials for working with a high needs subpopulation. Because of uncertainty in whether the training will be sustained by Vermont post-SIM Initiative, the organization has made it a priority to find the resources to continue to operate the training program.

Stakeholder engagement, a key SIM Initiative success, will be sustained. As one site visit interviewee noted, echoing the sentiments of nearly all participants:

> *The SIM project, by having work groups, even though it was a complex project and resource intensive, created mechanisms for bring[ing] representatives of diverse groups together to talk about significant issues and recommendations to take.*—Stakeholder

The project's draft Sustainability Plan recommends sustaining the functions of the SIM Initiative governance, which brought about "unprecedented collaboration, shared learning, and cross-program innovation."

F.4 Did the Medicaid Shared Savings Program Have an Impact on Key Outcomes After 2 Years of Test Period in Vermont?

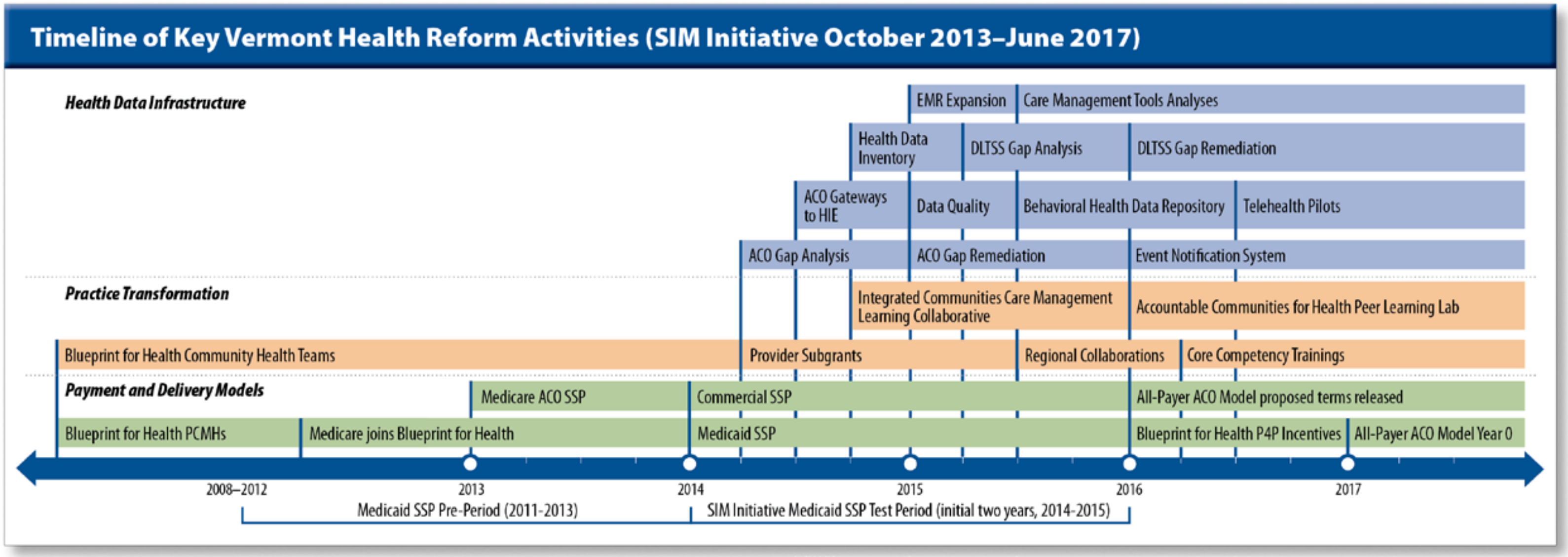
As described in the preceding sections, Vermont implemented two new models through the SIM Initiative in January 2014: the Medicaid Shared Savings Program (SSP) and the commercial SSP. These models were designed to encourage accountable care organizations (ACOs) to better coordinate care to both improve the efficiency of care (thus achieving savings through mitigating cost growth) and the effectiveness of care (as measured through quality metric performance).

The two new models complemented Vermont's existing multi-payer health reform efforts. Two of Vermont's three ACOs were already participating in the Medicare ACO SSP in 2013. Further, the Blueprint for Health, Vermont's patient-centered medical home (PCMH) model first piloted in 2008, serves Medicaid, commercial, and Medicare populations.

This quantitative analysis focuses on the Medicaid SSP only. Of the three SSPs in Vermont (Medicaid, commercial, Medicare), the Medicaid SSP has the greatest reach—both in terms of the total participant counts (67,515 beneficiaries) and the percentage of population served by payer (46 percent). (See ***Figure F-1*** and its synopsis for more details.) Medicaid-only beneficiaries with full benefits and at least 10 months enrollment in the calendar year were eligible to be attributed to an ACO and thus comprise our sample.

Throughout its SIM Initiative, Vermont implemented several programs in support of ACOs and broader full-population health care transformation. ***Figure F-3*** provides a timeline illustrating Vermont's pre-SIM health reform initiatives and when each of its SIM Initiative activities since 2014 began, which are all described more fully in ***Section F.3*** of this report. Many of Vermont's SIM activities in the period of this analysis (2014–2015) supported infrastructure.

Figure F-3. Timeline of Key Vermont Health Reform Activities (SIM Initiative October 2013–June 2017)



KEY
INSIGHTS

- In the first 2 years of Vermont's Medicaid ACO Shared Savings Program (SSP) implementation, relative to the comparison group, ACO beneficiaries had a statistically significant:
  - **Greater decrease in total per beneficiary per month (PBPM) expenditures**
  - **Greater decrease in outpatient emergency department (ED) visits**
  - **Greater increase in the likelihood of developmental screenings**
- These **results align with the ACOs' focus** on providing care at the appropriate setting, reducing higher cost utilization, and achieving quality targets.
- The faster declines in total PBPM expenditures and ED visits are particularly notable because many of the SIM Initiative activities during the time period of this analysis had limited early reach or were focused on ACO infrastructure support. Therefore, we may see a greater impact of the Medicaid SSP by Year 3 of implementation (2016).
- Moreover, these are conservative estimates because:
  - There were spillover effects in the comparison group because 25–30 percent of the comparison group are beneficiaries whose provider is participating in the commercial SSP but not the Medicaid SSP.
  - Many of Vermont's SIM activities are not limited to the ACOs.
  - Both groups had a large percentage of beneficiaries who participate in Vermont's PCMH model, the Blueprint for Health.

Vermont background related to Medicaid SSP quantitative analysis. Although this quantitative analysis focuses on Medicaid-covered patients attributed to ACOs participating in the Medicaid SSP, Vermont's payment model reform efforts are multi-payer. ***Table F-6*** identifies the three ACOs in Vermont and the SSPs and years in which each ACO has participated. Two ACOs participated in the Medicaid SSP. OneCare Vermont had previous SSP experience having begun its participation in the Medicare SSP in 2013. Community Health Accountable Care (CHAC) began its participation in all three SSPs in 2014. The third ACO, Vermont Collaborative Physicians (VCP), participated in the commercial SSP and for a limited time in the Medicare SSP. VCP did not participate in the Medicaid SSP.

Table F-6. Vermont ACOs

ACO	Medicaid SSP	Commercial SSP	Medicare SSP
OneCare Vermont	2014–2016	2014–ongoing	2013–ongoing
Community Health Accountable Care (CHAC)	2014–2016	2014–2017	2014–2017
Vermont Collaborative Physicians (VCP)	Chose not to participate	2014–2016	2013–early 2015

ACO = accountable care organization; SSP = Shared Savings Program.

In addition to the SSPs, other efforts to change health care delivery could be influencing outcomes for both the test and comparison groups, but likely do not affect differences found between the groups. Vermont's Blueprint for Health, its statewide all-payer PCMH initiative, has focused community health teams (CHTs) on improving care coordination. To help providers better care for high-risk populations, Vermont's SIM Initiative launched the Integrated Communities Care Management Learning Collaborative (ICCMLC). The pilots began in three regions in late 2014 and involved a variety of participants, including primary care practice staff, mental health providers, visiting nurse and home health agencies, and CHTs. The ICCMLC expanded steadily reaching 11 of the 14 health service areas by late 2015. Vermont also began a provider subgrant program in 2014 to foster innovation. The 14 award grants spanned a wide array of providers and innovations, including projects targeted to high-risk populations, community-wide public health, screening and interventions, and surgical variation and lab ordering.

Many of Vermont's SIM activities in the period of this analysis (2014–2015) supported infrastructure. Two of the provider subgrants were capacity-building grants for the two smaller ACOs—one of which is in the test group (CHAC) and the other in the comparison group (VCP). In the context of health information technology, Vermont conducted an ACO Gap Analysis in 2014 to evaluate the electronic health record capability, interface capability, and quality of data transmitted specifically to produce ACO Program quality measure data. The ACO Gap Remediation project begun in 2015 focused on addressing the identified gaps in connectivity and clinical data quality for SSP measures among the ACOs. In tandem, another SIM ACO-related project enabled ACOs to extract data from the Vermont Health Information Exchange for their attributed beneficiaries—these ACO "gateways" were completed for OneCare Vermont in March 2015 and CHAC in December 2015 (test group) and for VCP in 2016 (comparison group).

To earn shared savings through Vermont's Medicaid SSP, ACOs must realize savings by not exceeding cost targets and achieve a specified level on quality measures. (See ***Table F-3*** in ***Section F.3.5*** for the quality metrics used for payment.) An increased emphasis on care coordination and care management should result in fewer avoidable hospitalizations, fewer inpatient readmissions, and fewer emergency department (ED) visits leading to inpatient admissions. Depending on the level of these potential utilization decreases, overall costs could decrease. In support of care management and care coordination, the ACOs have both structural components (e.g., governing body that includes ACO provider participants and consumer member representatives; quality improvement committees) and processes (e.g., systems for identifying beneficiaries who need care management and the services needed; collaboration with providers and partner organizations to integrate medical care, substance use care, mental health care, and long-term services and supports). In addition to within-ACO activities, such as targeting specific measures for improvement or developing disease management strategies for specific populations, ACO representatives began meeting regularly in 2015 in Regional Collaborations that also involved Blueprint for Health and local participants to strengthen cross-organization care coordination care management efforts. If these ACO care coordination or care management efforts are an additional impetus or provide alternative approaches to reform initiatives that would apply to Medicaid beneficiaries, we would expect to see reduced utilization and improved performance on quality measures in the test group.

To assess the effects of Vermont's Medicaid SSP for care coordination, utilization and expenditures, and quality of care, we addressed the following research question:

- How did trends in key outcomes for care coordination, utilization, expenditures, and quality of care change in the ACO-attributed Medicaid population after the SIM implementation of the Medicaid SSP relative to the comparison group?

To address the research question, we used a difference-in-differences (D-in-D) quasi-experimental design, incorporating a comparison group to control for underlying changes in the health care environment in Vermont. To derive eligibility information and claims-based outcomes for Medicaid beneficiaries in our analytic sample, we used Medicaid claims data provided by the Department of Vermont Health Access (DVHA). In this report, we used data from 2011 to 2015 to examine the 3 years before (2011–2013) and the 2 years after (2014–2015) the start of the Medicaid SSP. The intervention group comprises beneficiaries who were attributed to providers associated with either of the two ACOs participating in the shared savings program—OneCare and CHAC. The comparison group comprises the remaining attributed beneficiaries who were assigned to either the remaining ACO not participating in the Medicaid shared savings program—VCP—or to unaffiliated independent physicians. The inclusion of the VCP-associated beneficiaries in the comparison group may limit the ability of this analysis to distinguish the effects of Medicaid SSP participation. In Vermont's state-reported commercial SSP results, VCP had the highest quality scores of the three ACOs but was farthest from attaining cost targets. Therefore, we may expect to see a smaller distinction between the test group and comparison group in quality measures that overlap the commercial and Medicaid SSPs and a greater distinction in total per beneficiary per month (PBPM) costs. Following comparison group selection, we constructed annual person-level propensity score weights to balance the Medicaid SSP group and comparison group on individual and county characteristics. The intervention group and weighted comparison group were similar at baseline on key demographic characteristics (***Table F-7***). A summary of the analytic methods is included below, and the methods are detailed in ***Sub-appendix F-2***.

Methods Snapshot for Impact Analysis

- **Study design:** D-in-D quasi-experimental design using an unbalanced longitudinal panel.
- **Population**: The intervention group comprised Medicaid beneficiaries attributed to ACO providers participating in the Medicaid SSP in 2014 or 2015. The comparison group comprised similar beneficiaries attributed to providers who did not participate in the Medicaid SSP.
- **Data:** Medicaid claims data provided by the DVHA. In this report, we used data from 2011 to 2015 to examine the 3 years before (2011–2013) and the 2 years after (2014–2015) the start of the Medicaid SSP.
- **Sample:** Nondual Medicaid beneficiaries enrolled annually for 10 or more months. Utilization and expenditures measures included the full sample. Denominators varied for care coordination and quality of care measures.
- **Measures:** Care coordination (annual percent), quality of care (annual percent and quarterly rate), utilization (quarterly rate), and expenditures (quarterly per member per month in dollars).
- **Statistical analysis:** Logistic regression (binary) and ordinary least squares (expenditures) models weighted by the propensity score times the fraction of time the person was enrolled in Medicaid. Standard errors were clustered at the provider level to account for beneficiary correlation within provider. The models adjusted for demographic and health status variables, practice-level variables, and socioeconomic county-level variables.

Table F-7. Weighted means and standardized differences prior to Medicaid SSP implementation, Medicaid SSP and comparison groups, 2013

	Medicaid SSP	Comparison Group	Standardized difference[a]	p-value
N	61,318	61,624		
Sociodemographic characteristics				
10+ months of Medicaid eligibility, %	4.3	4.5	1.1	0.22
11+ months of Medicaid eligibility, %	5.9	6.1	0.8	0.36
12+ months of Medicaid eligibility, %	89.8	89.4	1.4	0.12
10+ months of Medicaid eligibility in year prior to attribution, %	78.3	77.2	2.8	0.002
Attributed via claims-based algorithm[b], %	79.4	79.5	0.2	0.78
Attributed to Blueprint for Health initiative[c], %	82.4	82.3	0.3	0.67
Interaction of claims-based attribution indicator and Blueprint for Health initiative indicator, %	68.9	68.8	0.1	0.93
Child (age <21) and not disabled, %	52.7	51.6	2.1	0.02
Adult (age 21+) and not disabled, %	33.1	34	1.9	0.03
Disabled (all ages), %	14.3	14.4	0.4	0.70
Age	22.6	22.7	0.8	0.38
Age (squared)	818.1	820.9	0.3	0.77
CDPS Risk Score	1.3	1.3	1.0	0.22
Female, %	53.1	53.7	1.3	0.13
At least 1 month of long-term care coverage, %	0.1	0.1	0.3	0.71
Enrolled in VT Chronic Care Initiative (VCCI)[d], %	16.4	16.9	1.2	0.17
County level characteristics				
Federal Poverty Level (FPL)[e]	66.7	65.8	1.3	0.10
RUCA Code	5.4	5.5	2.3	0.010

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program; RUCA = Rural Urban Commuting Area.

[a] Absolute standardized differences are expressed as percentages.

[b] Vermont's attribution method occurred either through a claims-based algorithm or through the affiliation of the beneficiary's assigned primary care provider.

[c] The Vermont Blueprint for Health supports Patient Centered Medical Homes, Community Health Teams, Support and Services at Home (SASH), the Hub & Spoke program for opioid addiction treatment, the Women's Health Initiative, Self-Management and Healthier Living workshops, and a series of learning labs for providers and community teams. http://blueprintforhealth.vermont.gov/.

[d] VCCI targets Medicaid members at risk for adverse health outcomes for short-term, holistic, intensive case management and social support services. http://dvha.vermont.gov/for-providers/vermont-chronic-care-initiative-vcci.

[e] FPL of 100.00% indicates that the member was living at the FPL; values above and below 100.00% indicate that the member was living above or below, respectively, the federal poverty level.

F.4.1 Did care coordination change among Medicaid ACO-attributed beneficiaries?

KEY INSIGHTS

- When comparing Medicaid beneficiaries in Vermont's Medicaid SSP with the comparison group, we found **no statistically significant differences** in the first 2 years for care coordination outcomes.
- Although greater increases in care coordination were expected among ACO participants, we did not observe significant care coordination results in the early Medicaid SSP implementation period covered in this analysis because ACOs were focused on startup activities.

In ***Table F-8***, we present the results of the D-in-D regression analyses for the following care coordination outcomes: the percentage of 7- or 30-day follow-ups following a mental health hospitalization and the percentage of adults with acute bronchitis not prescribed antibiotic treatment. We report annual regression adjusted D-in-D estimates individually for the first 2 years after the implementation of the Vermont Medicaid SSP, along with an overall D-in-D estimate for both years combined.

- There were no statistically significant differences between ACO-attributed beneficiaries and the comparison group in the **change in the likelihood of a follow-up following a hospitalization for mental health**. Among both groups of beneficiaries, the likelihood of 7-day follow-ups appeared to increase while the likelihood of 30-day follow-ups remained fairly stable.
- There were no statistically significant differences between ACO-attributed beneficiaries and comparison beneficiaries in the change in **the likelihood of adults with acute bronchitis avoiding antibiotic treatment**. The likelihood appeared to increase in comparable ways for both sets of beneficiaries.
- We would expect to observe greater increases in care coordination outcomes among ACO participants. However, it is not surprising that we did not find significant results in the early Medicaid SSP implementation period covered in this analysis because ACOs were focused on startup activities. Each year ACOs have expanded their organizational efforts related to clinical and quality improvements. We may observe changes with an additional year of data.

Table F-8. Difference in the pre-post change in care coordination outcomes for Vermont Medicaid ACO-attributed beneficiaries relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015)

	Pre-Period Adjusted Mean, ACO	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, ACO	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	N
Follow-up within 7 days of discharge from hospitalization for mental illness (%)								3,410
Year One	49.85	56.96	63.89	65.48	5.46 (−1.15, 12.07) (0.31, 10.61)	11.0	0.174	
Year Two	49.85	56.96	60.29	64.67	2.52 (−5.50, 10.55) (−3.73, 8.78)	5.1	0.605	
Overall	49.85	56.96	61.93	65.07	3.86 (−1.45, 9.17) (−0.28, 8.00)	7.7	0.231	
Follow-up within 30 days of discharge from hospitalization for mental illness (%)								3,410
Year One	79.55	83.30	81.63	83.38	2.02 (−2.92, 6.96) (−1.83, 5.87)	2.5	0.502	
Year Two	79.55	83.30	81.11	80.60	4.63 (−2.60, 11.86) (−1.00, 10.27)	5.8	0.292	
Overall	79.55	83.30	81.35	81.99	3.44 (−1.09, 7.98) (−0.09, 6.98)	4.3	0.212	
Avoidance of antibiotic treatment for adults with acute bronchitis (%)								4,174
Year One	19.30	16.06	30.74	28.17	−2.06 (−10.07, 5.94) (−8.30, 4.17)	−10.7	0.672	
Year Two	19.30	16.06	26.96	28.24	−5.81 (−14.16, 2.53) (−12.32, 0.69)	−30.1	0.252	
Overall	19.30	16.06	28.45	28.21	−4.34 (−10.30, 1.62) (−8.98, 0.31)	−22.5	0.231	

ACO = accountable care organization; CG = comparison group; D-in-D = difference-in-differences.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in the likelihood of a care coordination event in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in the likelihood of a care coordination event in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of any care coordination event. The estimates are multiplied by 100 to obtain percentage probabilities. The regression-adjusted D-in-D estimates represent the average treatment effect *on the treated*, whereas the regression-adjusted means represent the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. For the subpopulations included in these analyses, some covariates had standardized differences greater than 10%, although all were less than 25%. All covariates included in the propensity score model are also included in the regression model, so the results are adjusted for this imbalance. For the mental health follow-up within 7 (30) days of discharge, there were 3,410 weighted discharge-years included in the sample; for the antibiotic treatment for adults with acute bronchitis measure, there were 4,174 weighted person-years included in the sample.

Data source: RTI analysis of DVHA Medicaid data, 2011–2015.

F.4.2 Did utilization change among Medicaid ACO-attributed beneficiaries?

KEY INSIGHTS

In the first 2 years of the Vermont Medicaid Shared Savings Program:

- The **rate of outpatient ED visits declined statistically significantly more** for beneficiaries attributed to Medicaid ACO providers relative to the comparison group.
- Changes in **inpatient admission and 30-day readmission rates were not statistically significantly different** between ACO-attributed Medicaid beneficiaries and the comparison group.
- We would expect to see the observed decrease in the ED visit rate among beneficiaries attributed to ACOs where efforts such as improving care management are present.
- ACO representatives specifically identified reducing ED visits and reducing hospital readmissions as targets of their Medicare SSP efforts. Although we would expect those ED visit–related activities to carry over somewhat to their Medicaid populations, we would not expect hospitalization readmissions-related activities to carry over to their Medicaid populations.

In ***Table F-9***, we present the results of the D-in-D regression analyses for inpatient admissions, outpatient ED visits, and 30-day readmissions per 1,000 beneficiaries. We report quarterly regression adjusted D-in-D estimates individually for the first 2 years after the implementation of the Vermont Medicaid SSP, along with an overall D-in-D estimate for both years combined.

- **Regression adjusted inpatient admission rates** slightly decreased between the pre- and test periods for both ACO-attributed beneficiaries and comparison beneficiaries, although group differences in those decreases were not statistically significant.
- **Regression adjusted outpatient ED visits rates** decreased between the pre- and test periods for both groups. However, the decrease among ACO attributed beneficiaries was slightly larger (about 3 percent), resulting in 4.5 fewer visits per 1,000 Medicaid beneficiaries ($p < 0.001$). Similar effects were seen in both years of implementation.
  - This decrease in the ED visit rate is what we would expect to see from ACO efforts. It could indicate that improved care management by ACOs is resulting in fewer serious exacerbations of medical conditions or appropriate care is being provided in lower cost settings or both.
  - In site visit interviews, ACO representatives specifically identified reducing ED visits and reducing hospital readmissions as targets of their *Medicare* SSP efforts. We would expect those ED visit–related activities to carry over somewhat to their Medicaid populations. Hospitalization readmissions for the Medicare population likely have different patterns than those of the Medicaid population and thus ACO intervention actions might differ for the two populations.
- **Regression adjusted 30-day readmission rates** decreased overall between the pre- and test periods for both groups. However, the two groups were not statistically different in terms of their rates of decrease.

Table F-9. Difference in the pre-post change in utilization for Medicaid beneficiaries enrolled in ACOs in Vermont and the comparison group, first 2 years of SIM implementation (January 2014 through December 2015)

Outcome (per 1,000 beneficiaries)	Pre-Period Adjusted Mean, ACO	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, ACO	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	Total Weighted N
Inpatient admissions								1,777,508
Year One	17.37	16.64	16.40	15.07	0.65 (−0.08, 1.39) (0.08, 1.23)	4.5	0.143	
Year Two	17.37	16.64	16.68	16.39	−0.35 (−1.12, 0.42) (−0.95, 0.25)	−2.4	0.454	
Overall	17.37	16.64	16.55	15.71	0.10 (−0.44, 0.64) (−0.32, 0.52)	0.7	0.755	
Emergency department visits not leading to hospitalization								1,777,508
Year One	134.06	124.86	115.16	112.73	−5.92 (−7.90, −3.94) (−7.47, −4.38)	−4.5	0.000	
Year Two	134.06	124.86	116.19	113.31	−3.33 (−5.62, −1.04) (−5.11, −1.54)	−2.5	0.017	
Overall	134.06	124.86	115.73	112.04	−4.50 (−6.04, −2.95) (−5.70, −3.30)	−3.4	0.000	
30-day readmissions								22,818
Year One	104.57	101.09	78.79	77.81	−1.76 (−18.10, 14.58) (−14.49, 10.97)	−1.7	0.859	
Year Two	104.57	101.09	99.38	105.12	−8.43 (−32.23, 15.36) (−26.98, 10.11)	−8.1	0.560	
Overall	104.57	101.09	88.61	89.54	−4.94 (−19.15, 9.26) (−16.01, 6.13)	−4.7	0.567	

ACO = accountable care organization; CG = comparison group; D-in-D = difference-in-differences.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payments or in the rate in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payments or in the rate in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain quarterly estimates of the differences in probability of any utilization. Yearly estimates are a weighted average of the four quarterly estimates for the given year. The probability estimates are multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries/discharges. For binary outcomes estimated using nonlinear models, the regression-adjusted D-in-D estimates represent the average treatment effect *on the treated*, whereas the regression-adjusted means represent the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The following sample sizes represent weighted person-quarters included in the regression model for the entire study period: inpatient admissions and emergency department visits not leading to hospitalizations (N = 1,777,508). For the 30-day readmissions outcome, 22,818 weighted discharge-quarters were included in the model.

Data source: RTI analysis of DVHA Medicaid data, 2011–2015.

F.4.3 Did total expenditures change among Medicaid ACO-attributed beneficiaries?

KEY INSIGHTS

In the first 2 years of the Vermont Medicaid Shared Savings Program:

- Average PBPM Medicaid payments decreased overall. **Mean total payments among Medicaid ACO-attributed beneficiaries decreased by $16.51 PBPM more relative to comparison beneficiaries**. This finding was **statistically significant**.
- This could indicate that ACO care management and care coordination efforts are reducing the rate at which costs are increasing by providing care in lower cost settings or reducing the need for additional visits.

In ***Table F-10***, we present the results of the D-in-D regression analyses for total PBPM expenditures. We report regression adjusted D-in-D estimates individually for the first 2 years after the implementation of the Vermont Medicaid SSP, along with an overall D-in-D estimate for both years combined. In ***Figures F-4 and F-5***, we present the individual and cumulative estimates for the first eight quarters of the Medicaid SSP, respectively.

- **Total PBPM expenditures decreased at greater rates** for ACO-attributed beneficiaries relative to comparison group beneficiaries in the first 2 years of SIM implementation. This is evidenced by the negative D-in-D estimates of $12.86 in Year One, $19.83 in Year Two, and $16.51 overall.
  - All three estimates were **statistically significant** (p = 0.026; p = 0.001; p = 0.000) and a moderate magnitude (3 percent change overall), indicating that there is an association between ACO participation and cost decreases.
  - This could indicate that ACO care management and care coordination efforts are reducing per beneficiary costs by providing care in lower cost settings or reducing the need for additional visits.
- All quarterly D-in-D estimates were negative. The largest occurred in the first quarter of Year One and in the last quarter of Year Two. These two quarters—along with the first quarter of Year Two—are the only quarters to date where quarterly D-in-D estimates were statistically significant.
  - When taken together, the quarterly estimates in Year Two appear to suggest a downward trend in the difference in expenditures for ACO beneficiaries relative to the comparison group over time (***Figure F-4***).
  - When viewed cumulatively, the Medicaid SSP’s impact on total Medicaid expenditures remained consistently negative over time (***Figure F-5***).

Table F-10. Difference in the pre-post change in total PBPM payments for Vermont Medicaid ACO-attributed beneficiaries relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015)

Outcome ($)	Pre-Period Adjusted Mean, ACO	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, ACO	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value
Total payments (PBPM)							
Year One	501.66	529.42	475.05	515.16	−12.46 (−21.66, −3.27) (−19.63, −5.30)	−2.5	0.026
Year Two	501.66	529.42	461.50	509.08	−19.83 (−29.72, −9.94) (−27.54, −12.13)	−4.0	0.001
Overall	501.66	529.42	467.60	512.20	−16.51 (−23.35, −9.68) (−21.84, −11.19)	−3.3	0.000

ACO = accountable care organization, CG = comparison group; D-in-D = difference-in-differences; PBPM = per beneficiary per month.

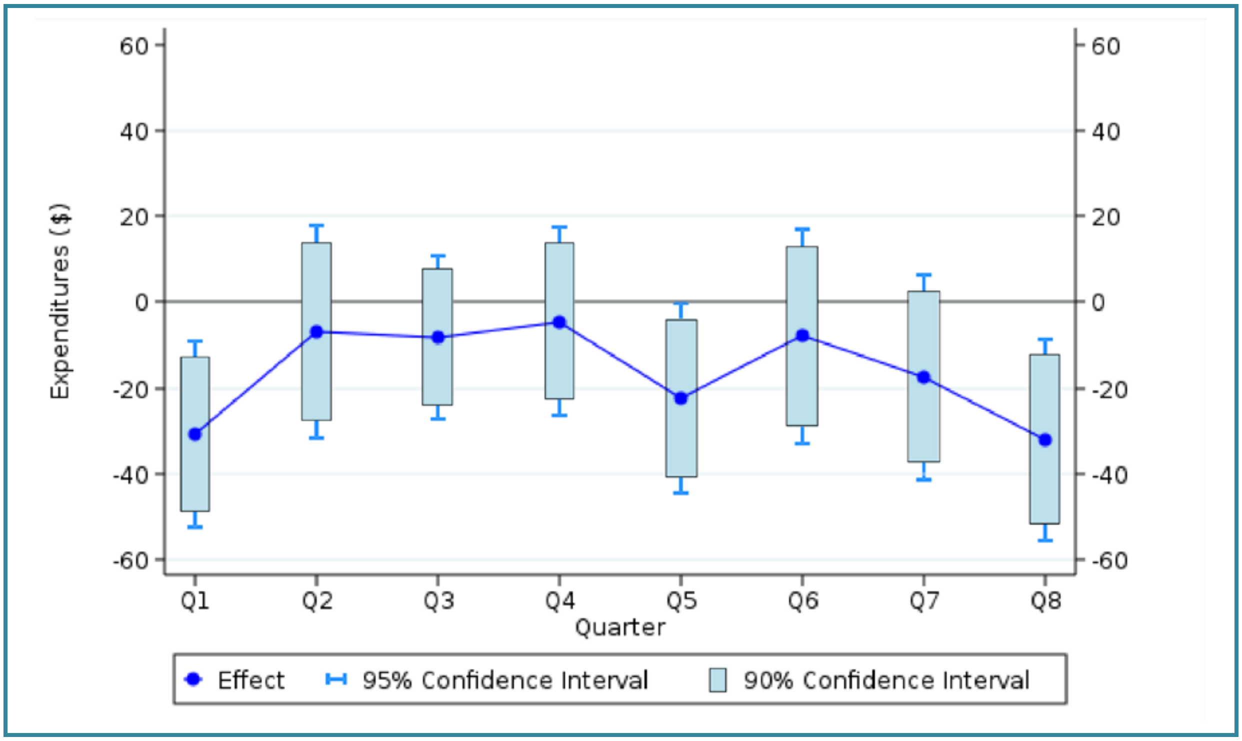
Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in payment in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in payment in the intervention group relative to the comparison group. The regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: An ordinary least squares regression model was used to estimate the impact on expenditures calculated on a quarterly basis. Yearly estimates are a weighted average of the four quarterly estimates for the given year. Each beneficiary's quarterly expenditure values were converted to per beneficiary per month by dividing by 3 so that the outcome could be interpreted as the estimated impact on monthly expenditures. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. The weighted person-quarters included in the regression model for the entire study period for this measure is 1,777,508.

Data source: RTI analysis of DVHA Medicaid data, 2011–2015.

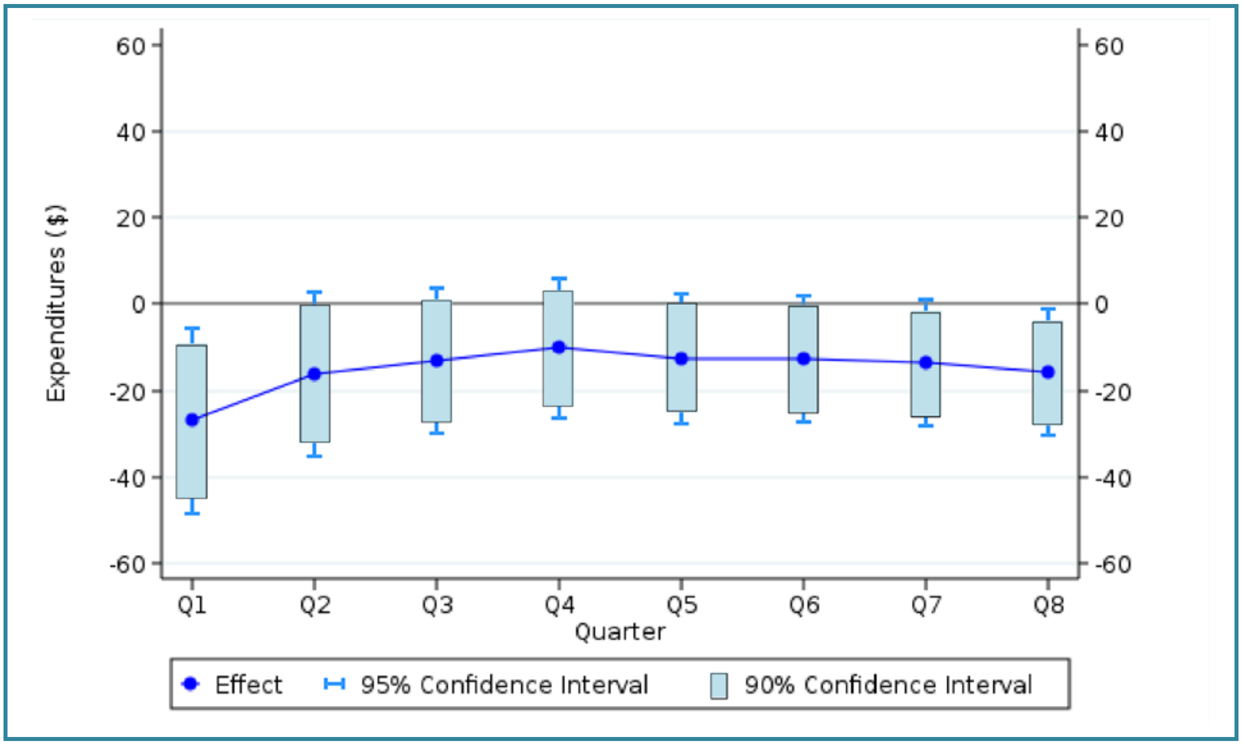
Figure F-4. **Quarterly treatment effect of Medicaid SSP implementation on total PBPM payments, first quarter of 2015 through fourth quarter 2015**



PBPM = per beneficiary per month; SSP = Shared Savings Program.

Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure F-5. Cumulative difference in the pre-post change in total PBPM expenditures for Medicaid ACO-attributed beneficiaries and the comparison group, first 8 quarters of Medicaid SSP implementation



ACO = accountable care organization; PBPM = per beneficiary per month; SSP = Shared Savings Program.

Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

F.4.4 Did quality of care change among Medicaid ACO-attributed beneficiaries?

KEY INSIGHTS

In the first 2 years of the Vermont Medicaid Shared Savings Program:

- The likelihood of **developmental screenings increased among ACO-attributed beneficiaries** while remaining fairly stable in the comparison group, resulting in a **statistically significant** relative increase in screenings for ACO beneficiaries. This positive finding could be associated with increased focus on this measure by ACOs because this is the only payment measure in the Medicaid SSP and not also in the commercial SSP.
- The trends in **other quality of care measures** such as chronic Prevention Quality Indicator (PQI) admissions or adolescent well-care visits **were not statistically different** between intervention and comparison group beneficiaries.

In ***Table F-11***, we present the results of the D-in-D regression analyses for our quality of care measures. We report regression adjusted D-in-D annual estimates individually for the first 2 years after the implementation of the Vermont Medicaid SSP, along with an overall D-in-D estimate for both years combined.

- In both years of SIM implementation, the **likelihood of developmental screenings in the first 3 years of life increased** by a larger amount among ACO-attributed child beneficiaries relative to the comparison group. Overall, this contributed to a net increase of approximately 9 percentage points in the probability of developmental screening (or a relative difference of 28.5 percent) among intervention beneficiaries. This finding is **statistically significant** ($p < 0.001$).
  - This measure included beneficiaries ages 0–3 years as of December 31 of the measurement year who were continuously enrolled in Medicaid for 12 months prior to their first, second, or third birthday (***Sub-appendix F-2***).
  - This measure had the greatest pre-period difference between the two groups, with the likelihood of developmental screenings for the ACO-attributed beneficiaries beginning at a much lower rate.
  - This measure was included in the initial core set of children's quality measures for voluntary reporting in 2010, and in subsequent years of the Medicaid Child Core Set.[96]
  - The improvement for the ACO group presents evidence for the importance of measure selection in that the focus on a single metric targeted to the Medicaid child subpopulation may have enabled Medicaid SSP providers to concentrate efforts and more efficiently implement actions. Additionally, this is the only payment measure in the Medicaid SSP and not also in the commercial SSP, reducing the spillover effects of commercial SSP ACO participation in the comparison group.
- There were increases observed in the likelihood of **hospitalizations for ambulatory care sensitive conditions** based on chronic PQI admissions among all beneficiaries, but the trend did not statistically differ between the intervention and comparison beneficiaries.
  - This measure includes the Medicaid population ages 18 and older who are residents of Vermont (***Sub-appendix F-2***).

---

[96] For more about Medicaid's work to define children's health care quality measures, please see: https://www.medicaid.gov/medicaid/quality-of-care/performance-measurement/child-core-set/index.html

Table F-11. Difference in the pre-post change in quality of care outcomes for Medicaid beneficiaries enrolled in Vermont Medicaid ACOs relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015)

	Pre-Period Adjusted Mean, ACO	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, ACO	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	N
Initiation of treatment after episode of alcohol and other drug dependence (%)								13,115
Year One	25.98	26.91	25.05	26.44	−0.45 (−3.34, 2.45) (−2.70, 1.81)	−1.7	0.800	
Year Two	25.98	26.91	25.85	28.75	−1.85 (−5.95, 2.25) (−5.04, 1.34)	−7.1	0.457	
Overall	25.98	26.91	25.48	27.49	−1.19 (−3.76, 1.37) (−3.19, 0.81)	−4.6	0.444	
Engagement of treatment after episode of alcohol and other drug dependence (%)								13,115
Year One	16.64	18.41	16.98	19.64	−0.76 (−3.50, 1.97) (−2.90, 1.37)	−4.6	0.646	
Year Two	16.64	18.41	17.45	20.31	−0.90 (−4.10, 2.31) (−3.39, 1.60)	−5.4	0.646	
Overall	16.64	18.41	17.23	19.95	−0.83 (−2.97, 1.30) (−2.50, 0.83)	−5.0	0.520	
Hospitalizations for ambulatory care sensitive conditions based on chronic PQI per 1,000 beneficiaries								213,962
Year One	2.57	2.53	5.06	5.20	−0.16 (−1.18, 0.87) (−.95, 0.64)	−6.0	0.804	
Year Two	2.57	2.53	4.58	4.52	−0.0093 (−0.96, 0.95) (−0.75, 0.73)	−0.4	0.987	
Overall	2.57	2.53	4.79	4.86	−0.072 (−0.77, 0.63) (−0.62, 0.47)	−2.8	0.865	
Developmental screenings (%)								93,590
Year One	30.93	43.54	40.73	44.96	8.46 (3.95, 12.97) (4.95, 11.98)	27.4	0.002	
Year Two	30.93	43.54	41.71	45.66	9.10 (2.89, 15.30) (4.26, 13.93)	29.4	0.016	
Overall	30.93	43.54	41.26	45.29	8.80 (4.86, 12.75) (5.73, 11.88)	28.5	0.000	

(continued)

Table F-11. Difference in the pre-post change in quality of care outcomes for Medicaid beneficiaries enrolled in Vermont Medicaid ACOs relative to the comparison group, first 2 years of SIM implementation (January 2014 through December 2015) (continued)

	Pre-Period Adjusted Mean, ACO	Pre-Period Adjusted Mean, CG	Test-Period Adjusted Mean, ACO	Test-Period Adjusted Mean, CG	Regression-adjusted difference-in-differences (90% confidence interval) (80% confidence interval)	Relative difference (%)	p-value	N
Adolescent well care visits (%)								33,059
Year One	51.70	56.85	44.92	48.51	1.61 (−0.10, 3.32) (0.28, 2.94)	3.1	0.122	
Year Two	51.70	56.85	45.37	49.91	0.66 (−1.23, 2.55) (−0.81, 2.13)	1.3	0.564	
Overall	51.70	56.85	45.16	49.20	1.10 (−0.19, 2.39) (0.09, 2.10)	2.1	0.162	

ACO = accountable care organization; CG = comparison group; D-in-D = difference-in-differences; PQI = Prevention Quality Indicator.

Note:

How to interpret the findings: A *negative* value corresponds to a *greater decrease* or a *smaller increase* in the likelihood of a quality of care event in the intervention group relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in the likelihood of a quality of care event in the intervention group relative to the comparison group. The relative difference is the D-in-D estimate as a percentage of the intervention group's baseline period adjusted mean.

Methods: A logistic regression model was used to obtain annual estimates of the differences in probability of any quality of care event. The estimates are multiplied by 100 to obtain percentage probabilities, or in the case of a PQI admission, multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. The regression-adjusted D-in-D estimates represent the average treatment effect *on the treated*, whereas the regression-adjusted means represent the average treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. Standard statistical practice is to use confidence intervals of 90% or higher. Eighty percent confidence intervals are provided here for comparison purposes only. For the subpopulations included in these analyses, some covariates had standardized differences greater than 10%, although all were less than 25%. All covariates included in the propensity score model are also included in the regression model, so the results are adjusted for this imbalance. The following sample sizes represent weighted person-years included in the regression model for the entire study period: initiation of treatment and engagement of treatment after episode of alcohol and other drug dependence (N = 13,115); chronic PQI admissions (N = 213,962); developmental screens (N = 93,590); adolescent well-care visits (N = 33,059).

Data source: RTI analysis of DVHA Medicaid data, 2011–2015.

- There was little change observed in the **likelihood of initiation or engagement of alcohol or drug treatment** while the **probability of adolescent well-care visits declined minutely** overall. However, there were no statistically significant differences between intervention and comparison beneficiaries for any of these trends.
  - The initiation and engagement of alcohol or drug treatment measures included beneficiaries 13–64 years old with at least one qualifying episode during the intake period (***Sub-appendix F-2***).
  - The adolescent well-care visit measure included beneficiaries 12–21 years old (***Sub-appendix F-2***).
- As noted earlier in the care coordination section, it is not surprising that we found only one significant quality of care result in the early Medicaid SSP implementation period covered in this analysis. In these years ACOs were more focused on startup activities and developing quality improvement processes. Additionally, many of the early ACO efforts targeted *Medicare* SSP quality measures, such as prevention of falls, which might not align with the Medicaid SSP quality measures.

F.4.5 Discussion and limitations

The ACO SSP payment and delivery model hopes to affect health care payments and utilization in multiple ways. One hypothesis is that ACOs can help shift patient care away from ED settings toward less expensive primary care settings. Another is that by increasing performance on certain quality of care and coordination measures, the rates of inpatient admissions and readmission can be reduced. Success on any of these measures should lead to reduced health care payments across the beneficiary population.

In our analyses of the first 2 years of Vermont’s Medicaid SIM Initiative, we observed a potential impact on total PBPM expenditures among Medicaid beneficiaries attributed to ACOs participating in its SSP. Compared to beneficiaries attributed to providers not participating in the Medicaid SSP, intervention beneficiaries experienced greater rates of decrease in total Medicaid payments. One possible explanation for this is the pattern in ED utilization observed during the same period. Although ED utilization decreased between pre- and post-intervention periods for both the intervention and comparison groups, utilization among SSP attributed beneficiaries appeared to decrease at a faster rate. Thus, the ACO efforts to provide care management by ACOs is either resulting in fewer serious exacerbations of medical conditions or appropriate care is being provided in lower cost settings or both.

Although we observed changes in total Medicaid payments and ED utilization, we did not observe significant differences between SSP-attributed and comparison Medicaid beneficiaries in the ways that inpatient admission and readmissions rates changed over time. Similarly, we did not find any significant differences either with respect to most of the quality of care and care coordination measures studied in this report. The one exception to this was in the rate of developmental screenings in the first 3 years of life.

We observed an increase in developmental screening rates during the intervention period among Medicaid SSP-attributed beneficiaries relative to the comparison group. This relative improvement may be partially explained by the fact that—unlike the other quality of care measures studied—the developmental screenings measure is unique to the Medicaid SSP and therefore unlikely to be affected by the influence of ACO participation in the commercial SSP in the comparison group. Moreover, improvement in this measure illustrates the importance of measure selection. In the design of Vermont's SIM Initiative SSPs, the aim for including measures in several domains for which quality improvement was desired had to be balanced with concerns of provider burden in quality reporting. The developmental screening measure was the only SSP payment measure specific to young children. The Medicaid SSP-attributed beneficiary group had pre-period rates much lower than the comparison group and as noted had strong statistically significant improvement during the first 2 years of the SIM Initiative. Even though the pediatric stakeholder community expressed regret that there were not enough child measures in the SIM Initiative SSPs, it could be that having a single quality measure to focus on enabled ACO providers to more deliberately change their care patterns for their young Medicaid patients. This could indicate that targeting fewer key measures and building on successful changes in those metrics before cycling in new measures could be an effective way to improve health and health care delivery.

This analysis has several limitations. As noted above, the comparison group includes beneficiaries who are attributed to physicians participating in a commercial SSP ACO, so they could be benefiting from spillover effects, which would bias our results to the null. In contrast, though, Vermont's SIM Initiative supported providers' desire to develop ACOs specific to their needs (i.e., independent physicians vs. federally qualified health centers vs. hospital networks). Thus, physicians who chose not to align with any of the three ACOs may have been different and would bias our results away from the null. Another study limitation is the length of the test period. Two years of implementation data may not be enough to observe the full impact of the Medicaid SSP, particularly because many of the SIM Initiative infrastructure investments were made late in or after the analysis period included in this report. When looking at results, it is also important to remember that the Medicaid SSPs are not the only providers who were incentivized to reform how they deliver care as part of the SIM Initiative, nor was the SIM Initiative the only initiative incentivizing providers in Vermont. In addition, although the comparison group was balanced on observed characteristics, there may be unobserved characteristics that influence the results. For example, physician characteristics could vary, such as length of practice, connections to specialists, or awareness of community resources.

To expand on the impact that we have observed in the first 2 years of the Vermont SIM Initiative, we are proposing additional quantitative analyses for our next report, including adding an additional year of data for the Medicaid SSP analysis. We will conduct sensitivity analyses to examine differences in results both in the intervention group (breakouts by the two Medicaid SSP ACOs) and the comparison group (isolating the never in an ACO group from the commercial SSP participants). For the latter sensitivity analysis, we are limited to 2014 status for identification of the ACO participation. From 2015 on, beneficiary attribution for the comparison group was identified only as not attributed to the Medicaid SSP. We will also conduct a trend analysis of Vermont's SIM-implemented commercial SSP within our statewide commercial analysis.

F.5 References

Blueprint for Health, Department of Vermont Health Access. (n.d.). *Integrated Communities Care Management Learning Collaborative Toolkit.* Available at http://blueprintforhealth.vermont.gov/about-blueprint/integrated-communities-care-management

Centers for Medicare & Medicaid Services (CMS). (2015). *State Innovation Model Progress Report.* Available at http://healthcareinnovation.vermont.gov/sites/hcinnovation/files/Resources/Q4-2015.Progress.Report.to_.CMMI_.pdf

Centers for Medicare & Medicaid Services (CMS). (2017). *State Innovation Model Progress Report.* Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/Q1%202017%20QPR%20Submitted.pdf

Green Mountain Care Board (2016, October). *All-Payer Accountable Care Organization Model Agreement.* Available at http://gmcboard.vermont.gov/sites/gmcb/files/files/payment-reform/All%20Payer%20Model%20ACO%20Agreement.pdf

RTI International. (2017, September). *State Innovation Models (SIM) Initiative Evaluation: Model Test Year Three Annual Report*. Prepared for the Centers for Medicare & Medicaid Services. Available at https://downloads.cms.gov/files/cmmi/sim-rd1mt-thirdannrpt.pdf

State of Vermont Agency of Human Services (2016a, December). *Report to the Vermont Legislature: Medicaid Pathway 2016 Report, Act 113, Section 11.* Available at http://legislature.vermont.gov/assets/Legislative-Reports/Act-113-Sec-11-Medicaid-Pathway-Report-12-30-16.pdf

State of Vermont Agency of Human Services (2016b, December). *Report to the Vermont Legislature: Medicaid Pathway 2016 Report, Act 113, Section 12.* Available at http://legislature.vermont.gov/assets/Legislative-Reports/Act-113-Sec-12-Medicaid-Pathway-Report-12-30-16.pdf

Vermont Health Care Innovation Project (2014, July). *Overview of Shared Savings Programs (SSPs) and Accountable Care Organizations (ACOs) in Vermont*. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/July%202014%20-%20Overview%20of%20Shared%20Savings%20Programs%20%28SSPs%29%20and%20Accountable%20Care%20Organizations%20%28ACOs%29%20in%20Vermont.pdf

Vermont Health Care Innovation Project (2016a, December). *Core Competency Training Materials*. Available at http://healthcareinnovation.vermont.gov/core-competency-training-materials

Vermont Health Care Innovation Project (2016b, November). *Vermont State Innovation Model (Draft) Sustainability Plan*. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/Vermont%20SIM%20Sustainability%20Plan%20DRAFT%2011%2014%202016.pdf http://healthcareinnovation.vermont.gov/webinars/vhcip-sustainability-plan-webinar

Vermont Health Care Innovation Project (2017a, May). *Vermont Health Care Innovation Project Health Care Workforce Work Group Meeting Agenda for May 17, 2017*. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/05-17-17%20WFWG%20Meeting%20Materials.pdf

Vermont Health Care Innovation Project (2017b, April). *VHCIP Project Status Reports April 2017*. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/VHCIP%20Status%20Reports%20for%20April%202017.pdf

Vermont Health Care Innovation Project (2017c, March). *VHCIP Project Status Reports Practice Transformation Focus Area March 2017*. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/VHCIP%20Status%20Reports%20for%20March%202017%20-%20PT%20Focus%20Area.pdf

Vermont Health Care Innovation Project (n.d.). *Core Competency Training*. Available at http://healthcareinnovation.vermont.gov/areas/practice-transformation/projects/core-competency-training

Vermont Health Care Innovation Project (n.d.). *VHCIP Sustainability Plan Webina*r. Available at http://healthcareinnovation.vermont.gov/webinars/vhcip-sustainability-plan-webinar

Vermont Health Care Innovation Project. (2016c, October). *Vermont's Year 2 Medicaid and Commercial ACO Shared Savings Program Results*. VHCIP Webinar series. Available at http://healthcareinnovation.vermont.gov/sites/vhcip/files/documents/VHCIP%20Webinar%202015%20SSP%20Results_10-28-16%20FINAL.pdf

Visiting Nurse Association (2017, March). *Health Care Reform Update from VNA President and CEO Judy Peterson*. Available at https://www.vnacares.org/health-care-reform-update-vna-president-ceo-judy-peterson/

Sub-appendix F-1. Methods for Qualitative Data Collection and Analysis

The Vermont SIM Initiative Round 1 Evaluation team collected and analyzed a wide range of qualitative data in the fourth year of the federal SIM Initiative evaluation. These sources include information obtained from in-person site visits during which we conducted interviews with key informants and gathered data in provider and consumer focus groups, from a review of relevant documents, and from regular evaluation calls with the state officials leading the state's SIM Initiative.

F-1.1 Site visit key informant interviews

The RTI/NASHP evaluation team conducted interviews with a variety of SIM Initiative stakeholders in Vermont, usually in person but sometimes by telephone. In the interviews, we focused on implementation successes, challenges, lessons learned, and model sustainability. Discussion topics included (1) policy impacts, (2) stakeholder participation, (3) health care delivery transformation, (4) payment system reform, (5) quality measurement and reporting, (6) population health, (7) health information technology and other infrastructure investments, (8) workforce and practice transformation, and (9) overall outcomes and lessons learned.

Stakeholders interviewed included the state's SIM Initiative teams, other state officials, commercial payers, providers and provider associations, accountable care organization (ACO) leaders, mental health agency representatives, and consumer advocates. We solicited suggestions from the state SIM team for interview candidates and identified additional candidates from review of relevant documents. We contacted interview candidates by e-mail or phone to offer them the opportunity to participate. Final lists of site visit interviewees were not shared with the state SIM Initiative team or CMS staff; the list remained confidential.

We held interviews in the offices or locations of the interview participant. All interviews were conducted by at least two evaluation team members. The interview lead used discussion guides to structure each interview, and a designated note taker recorded feedback from each session. We also audio-recorded each of the interviews to confirm the notes' accuracy and to clarify areas in the notes that were unclear; however, we did not transcribe the recordings. Prior to audio recording, we obtained permission from all interview participants and instructed them that recordings could be stopped at any time.

Different discussion guides were used for each major type of stakeholder and tailored for Vermont. The interviews were interactive; participants were encouraged to share feedback most relevant to their particular roles in the Vermont SIM Initiative. To encourage candid discussion, we were clear that we would not identify the specific interview participants or attribute specific

comments to individuals in subsequent reporting. Specific interview sessions typically lasted no more than 1 hour.

The Vermont team conducted 24 total interviews in March and April 2017. (Because a blizzard occurred during our March site visit, three interviews were rescheduled and conducted as phone interviews in April.) ***Table F-1-1*** provides a distribution of the completed interviews by interviewee type.

Table F-1-1. Key informant interviews conducted in Vermont, March-April, 2017

	Number of interviews
State officials	7
Payers	2
Providers, provider associations, and accountable care organizations	11
Consumer advocacy groups	4
Total	24

F-1.2 Focus groups

SIM team members conducted four consumer and four provider focus group discussions in Vermont March 14–17, 2017. These focus groups were the third and final groups conducted for the SIM Round 1 evaluation.

Table F-1-2 provides an overview of the 2017 focus groups. The consumer groups comprised two groups of Medicaid beneficiaries (not dually eligible) and two groups of Medicare-Medicaid eligible individuals. The provider groups comprised health care providers (physicians and nurse practitioners) who were affiliated with an ACO.

Table F-1-2. Overview of focus group participants

Group	Location	No. of participants	Type of participants
1	Burlington	3	Providers affiliated with an ACO
2	Burlington	8	Providers affiliated with an ACO
3	Montpelier	8	Providers affiliated with an ACO
4	Rutland	8	Providers affiliated with an ACO
5	Burlington	5	Medicaid beneficiaries (not dually eligible)
6	Burlington	8	Medicare-Medicaid beneficiaries
7	Rutland	8	Medicaid beneficiaries (not dually eligible)
8	Rutland	8	Medicare-Medicaid beneficiaries
Total	8	56	

ACO = Accountable Care Organization.

Recruitment. For the consumer focus groups, participants were selected through samples of adult Vermont Medicaid-only and Medicare-Medicaid eligible beneficiaries, which were provided by the Department of Vermont Health Access. The samples included only beneficiaries from the counties in which the focus groups took place: Chittenden County, Rutland County, and Washington County. We excluded enrollees who had not been continuously enrolled for 6 months prior to recruitment, along with enrollees who were not receiving unrestricted benefits and institutionalized enrollees. The Henne Group screened participants via phone to confirm eligibility. We aimed to recruit 40 total consumers spread across four focus groups.

For the provider focus groups, we used a multipronged approach to recruit participants. Because we were recruiting specifically from health care providers who were affiliated with an ACO, the leaders of each ACO sent an e-mail to inform their providers of our study and provided our contact details for them to participate. The Henne Group then followed up via phone with providers through ACO provider lists that were either retrieved on the ACO website or received directly from the ACO. We aimed to recruit 40 total providers spread across four focus groups.

Methods. Prior to the start of the group, all participants were required to sign a consent form that outlined the purpose of the discussion, how the information from the discussion would be used, and stated that the discussions would be audio-recorded. We used a semistructured moderator guide, audio-recorded the discussions, took notes during the groups for analysis purposes, and had the audio recordings transcribed verbatim. The consumer focus groups lasted 90 minutes and the provider groups lasted 1 hour. At the conclusion of the group, we provided $75 to each consumer and $300 to each provider as a gesture of appreciation for their time.

The purpose of the focus groups was to understand consumers' and providers' current experience and reflections of care delivery during the SIM Initiative and changes they have observed over time. To capture this, the moderator's guide addressed consumer and provider perspectives on quality of care, care coordination, use of health information technology, and provider reaction to opportunities for participation in new delivery systems, payment models, or other infrastructure supports (e.g., training and technical assistance) related to Vermont's SIM Initiative.

F-1.3 Document review

We used Vermont's quarterly and annual reports, operational plans, and other state documents to obtain updated information on their implementation progress during the current analytic period of April 2016–April 2017. To supplement these documents, we collected relevant news articles on the Vermont SIM Initiative activities and related initiatives, and we searched reform-oriented websites that the state maintains.

In addition, we obtained numbers of providers and payers participating in and populations served by the different innovation models from reports Vermont submits to CMMI in conjunction with its quarterly reports. We provide Vermont's reported figures in both ***Chapter 2*** and ***Appendix F***.

The estimated number of providers participating in ACOs serving Medicaid beneficiaries, commercially insured beneficiaries, and Medicare beneficiaries was reported by the state (CMS, 2016), as was the estimated number of providers participating in Blueprint for Health (personal communication, June 9, 2017). To calculate the total percentage of providers in the state participating in Blueprint for Health, we used the denominator for the number of active patient care physicians in the 2015 State Physician Workforce Data Book (AAMC, 2015). Active patient care physicians are federal and nonfederal physicians with a Doctor of Medicine (MD) or a Doctor of Osteopathic Medicine (DO) who are licensed by a state, work at least 20 hours per week, and whose self-reported type of practice is direct patient care.

Counts of population reached for ACOs and Blueprint for Health, used as the numerators for percentages, are state-reported numbers provided via e-mail for fourth quarter 2016 (personal communication, June 9, 2017). Denominators used to compute the percentage of the population reached are *adjusted* from population estimates based on the Census Bureau's March 2016 Current Population Survey (Kaiser Family Foundation, 2017). This adjustment was necessary to align the definition of the numerator and denominator. The state-reported source for numerators categorizes Medicare-Medicaid enrollees under the total Medicare population, but Kaiser Family Foundation categorizes Medicare-Medicaid enrollees under the total Medicaid population. To further clarify accurate denominator counts for the Vermont Medicaid population, we held a conference call with the Vermont SIM Initiative leadership and representatives from Vermont's Department of Vermont Health Access. To avoid overestimating the percentage of Medicare beneficiaries served by Vermont's models, and underestimating the percentage of Medicaid beneficiaries, we used a state-provided resource for the Medicaid denominator (DVHA, 2017) and CMS's Medicare enrollee data (which includes Medicare-Medicaid enrollees) for 2016 (CMS, 2017), shifting the denominators used for both the Medicare and Medicaid populations. For the Vermont Medicaid denominator, we excluded Medicaid enrollees with limited benefits.

We used the most recent Census Bureau estimates for Vermont's 2016 total state population (USCB, 2017). This allowed the total population to align with the different payer denominators and enabled the population by payer type to include counts for the Other/Uninsured category.

This recalculation of the denominators allowed for a more accurate calculation of estimated population reached by the ACO and Blueprint for Health models. Note that percentages in this report are not comparable to percentages in previous reports because of the recategorization of Medicare-Medicaid enrollees.

F-1.4 State evaluation calls

The RTI/NASHP evaluation team for Vermont, the state's SIM Initiative team, and the state's CMMI project officer typically attended each state evaluation call. The purpose of the calls was to review interim evaluation findings with the state (as available), discuss any outstanding federal evaluation data or other needs, review and discuss state implementation and self-evaluation updates, and gather more in-depth information on select topics of interest for the evaluation. The Vermont evaluation team held 11 calls with Vermont between April 2016 and April 2017, the analytic period of this report.

For each meeting used to collect additional information and perspective from state officials leading the SIM Initiative in Vermont, the evaluation team prepared a list of state-specific questions—including the status of related policy levers and implementation successes, challenges, and lessons learned. We first reviewed relevant state documents for answers to our questions. When we did not find answers in the document or needed further clarification, we sent the questions to the state ahead of the call and asked the state to have knowledgeable state officials available to answer the questions during the call.

F-1.5 Analysis

The RTI/NASHP evaluation team conducted thematic analysis of each source of qualitative data and then synthesized across information gleaned from site visits, focus groups, document review, and state evaluation calls. For example, for the focus group data, the team examined the transcripts of each focus group to identify emerging themes for consumer and provider groups and produced an internal topline report to guide further state analyses. Members of the state team who were present at the groups reviewed the topline reports and provided feedback. Using the final topline reports from the focus groups and other qualitative data collection activity, the team produced the synthesized analysis contained in this report.

F-1.6 References

Association of American Medical Colleges (AAMC). (2015, November). *2015 State Physician Workforce Data Book*. Available at https://www.aamc.org/data/workforce/reports/442830/statedataandreports.html

Centers for Medicare & Medicaid Services (CMS). (2016). *Vermont State Innovation Model Progress Report, Quarter 4 2016*. Supplied by CMS.

Centers for Medicare & Medicaid Services (CMS). (2017). *October 2017 Release of Medicare Enrollment Dashboard Data File (2016 Hospital and Medical Yearly Counts)*. Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/CMSProgramStatistics/Dashboard.html

Department of Vermont Health Access. (2017). *Budget Document State Fiscal Year 2018.* Available at http://dvha.vermont.gov/budget-legislative/budget-document-state-fiscal-year-2018-final-print-2-13-2017.pdf

Kaiser Family Foundation. (2017). *Health Insurance Coverage of the Total Population*. Available at http://kff.org/other/state-indicator/total-population/

United States Census Bureau. (2017). *QuickFacts Vermont.* (July 1, 2016 estimate). Available at https://www.census.gov/quickfacts/fact/table/VT/PST045216

Sub-appendix F-2. Methods and Measures for Interim Impact Analysis

To estimate the impact of the Medicaid Shared Savings Program (SSP) in Vermont, we conducted difference-in-differences (D-in-D) regression analyses using Medicaid claims data provided by the Department of Vermont Health Access (DVHS). In Appendix F, ***Section F-3***, we present D-in-D analyses for outcomes across three evaluation domains: (1) care coordination, (2) service utilization and expenditures, and (3) quality of care. This sub-appendix details the methods we used for this analysis.

The Medicaid SSP in the context of Vermont Medicaid. From 2014 to 2016, Vermont partnered with existing accountable care organizations (ACOs) to implement an alternative payment model called the Shared Savings Program. With support from the SIM Initiative, Vermont's SSPs allowed participating ACOs to share in savings based on achieving cost and quality targets among their attributed beneficiaries. Vermont's payment reforms included both state and commercial payers; however, the quantitative impact analysis in Appendix F, ***Section F-3***, focuses only on the performance of Medicaid SSP beneficiaries.

Medicaid in Vermont is a combination of fee-for-service and primary care case management with approximately 60 percent of beneficiaries reached by Blueprint for Health in 2014. Through its Global Commitment to Health waiver, the state acts as the managed care entity (CMS, 2016b). Thus, no Medicaid beneficiaries were excluded from the analysis because they were in commercial managed care. The start of the Medicaid SSP in Vermont coincided with the expansion of Medicaid eligibility in 2014 under the Patient Protection and Affordable Care Act (ACA). Although Vermont already provided expanded Medicaid coverage or subsidies prior to the ACA through the Vermont Health Access Plan (Medicaid) and Catamount Health (subsidies for private insurance), the expansion still resulted in a significant number of first-time Medicaid enrollees participating in the SSP beyond those who transitioned from the two aforementioned expansion programs (Vermont Digger, 2016). Between July and September 2013 and December 2015, Medicaid enrollment in Vermont increased by approximately 18 percent (CMS, 2016a).

Profile of participating ACOs. The level of intervention in Vermont's SSP is at the ACO. Vermont currently has three ACOs—OneCare Vermont, Community Health Accountable Care (CHAC) and the Vermont Collaborative Physicians (VCP). Although all three ACOs participated in the commercial SSP, ultimately, only CHAC and OneCare chose to participate in the Medicaid SSP. VCP chose not to participate in the Medicaid SSP because of its prior experience with the Medicare ACO SSP.

The three ACOs differ somewhat in terms of their provider network. The majority of OneCare's network includes hospitals and hospital-owned physician practices along with some independent physicians. The CHAC network consists primarily of physicians at federally health qualified centers across the state. VCP—the ACO that did not participate in the Medicaid SSP—represents providers working at physician-owned practices throughout the state.

Vermont's Medicaid agency conducted the attribution and provided us with lists of both the beneficiaries attributed to the intervention ACOs (CHAC, OneCare) and beneficiaries attributed to either VCP or to unaffiliated providers (the comparison group). Outside of the nature of their ACO, we have limited information with which to compare providers in the intervention and comparison groups.

Profiles of intervention and comparison groups. Medicaid restricted beneficiary attribution in the SSP to members with full, unrestricted benefits who were not enrolled in Medicare. Beneficiary attribution occurred on an annual basis, and to be eligible members had to have been enrolled for at least 10 months in the year of attribution. Attribution occurred either through a claims-based algorithm or through the affiliation of the beneficiary's assigned primary care provider.

Because attribution took place yearly, both intervention and comparison groups contain beneficiaries whose first attribution occurred after the start of the SSP in 2014. However, the proportion of beneficiaries in our analysis in 2014 who were not attributed until 2015 is similar between the intervention and comparison groups (23 vs. 19 percent, respectively).

Our analysis compares pre- and post-periods for the intervention and comparison groups using a longitudinal design with an unbalanced panel. This means we included beneficiaries who were eligible for Medicaid for the first time in the year of their attribution. The rationale for an unbalanced panel—as opposed to using a balanced panel approach—is to provide estimation of the program's impact encompassing the entire population of attributed beneficiaries—not a subset based on prior eligibility. The disadvantage of an unbalanced design, however, is the inclusion of beneficiaries without baseline observational data prior to their attribution. Even so, 50 percent of the sample does have a full panel of data. In addition, as shown below, we pass the parallel trends test in the baseline period. And finally, as shown in the balance tables by year, average beneficiary characteristics do not differ substantially year to year within the intervention group or within the comparison group, suggesting that even though some beneficiaries may not have baseline data, the characteristics of the sample are not changing over time (with the exception of being an expansion enrollee).

Balancing intervention and comparison groups. Using the list of beneficiaries attributed in 2014 and 2015 provided by the state, we selected as our potential comparison group all beneficiaries who were never attributed to a CHAC or OneCare provider. We then estimated propensity score weights to balance the intervention and comparison groups on many individual and county-level characteristics. To account for the impact of Medicaid expansion, we included in our model an indicator 10 or months enrollment in the previous year. Propensity score weighting rather than matching was used to avoid dropping any beneficiaries from the final analysis. After propensity score weighting, the standardized differences between the weighted comparison group means and intervention group means were all well under the standard 10 percent threshold. More information on propensity score weighting is available in ***Sections F-2.3*** and ***F-2.4.***

Regression-adjusted difference-in-differences (D-in-D) outcomes. Analyses used ordinary least squares for spending outcomes and logistic regression for binary outcomes and all analyses used clustered standard errors to account for repeated observations of beneficiaries within providers over time. More information on the regression model is available in ***Section F-2.5***.

F-2.1 Data sources

Medicaid Data. To derive eligibility information and claims-based outcomes for our analytic sample, we used Medicaid claims data provided by Vermont's Department of Vermont Health Access (DVHA). In this report, we used data from 2011 to 2015 to examine the 3 years before (2011–2013) and the 2 years after (2014–2015) the start of the Medicaid SSP. The DVHA data included three linkable files containing monthly enrollment and coverage information along with inpatient, outpatient, and pharmaceutical claims. DVHA includes all Medicaid beneficiaries in the state, but for this report we subset the analytic sample to beneficiaries ages 0 through 64 and excluded Medicare-Medicaid enrollees.

Attribution file. We received a list from the DVHA of all Medicaid beneficiaries attributed to providers participating in the Medicaid SSP in 2014 or 2015. Included on those lists were beneficiaries identified during the state's attribution process as being attributed to providers not participating in the SSP. Beneficiaries in this second group form the comparison group for our analysis. Provider attribution was independent across years, and we received separate lists from the state for 2014 and 2015. Beneficiaries included in these attribution lists were linked using a unique member ID number to the DVHA enrollment and claims data to form the analysis sample. Only beneficiaries attributed at least once (to SSP or comparison providers) are included in our analysis.

Area Health Resource File. The AHRF comprises data collected by the Health Resources and Services Administration from more than 50 sources containing more than 6,000 variables related to health care access at the county level. We used information on health professions supply, hospital bed supply, and population characteristics and economic data to select the comparison group and to use as covariates in the analysis.

F-2.2 Outcome measures

F-2.2.1 Care coordination

To evaluate the impact of the Medicaid SSP in Vermont on care coordination, we report the following care coordination measures. The measures were calculated annually for all eligible beneficiaries in the test group and comparison group.

- **Percentage of mental illness–related acute inpatient hospital admissions with a mental health follow-up visit within 7 and 30 days.** This is the number of acute inpatient hospital admissions with a primary diagnosis for a mental health disorder (ICD-9 and ICD-10 diagnosis codes in the HEDIS measure Follow-Up After Hospitalization for Mental Illness (FUH)) followed by a visit to a provider for a mental health outpatient visit, intensive outpatient encounter, or partial hospitalization (identified by the CPT, HCPCS, Place of Service, UB Revenue codes specified in the HEDIS measure) within 7 or 30 days of discharge date, divided by total number of acute inpatient hospital admissions with a primary diagnosis for a mental disorder. Admissions followed by a readmission to an acute or other facility within 7 or 30 days are excluded from the respective denominators. Discharges because of death are also excluded from the respective denominators. The denominators were limited to patients 6 years or older as of the date of discharge.

For both indicators, 7-Day Follow-Up and 30-Day Follow-Up, any of the following meet the criteria for a follow-up visit using codes specified in the HEDIS measure FUH:

- A visit with a mental health practitioner
- A visit to a behavioral health care facility
- A visit to a nonbehavioral health care facility with a mental health practitioner
- A visit to a nonbehavioral health care facility with a diagnosis of mental illness
- Transitional care management services, where the date of service on the claim is 29 days after the date the patient was discharged with a principal diagnosis of mental illness

The following meets the criteria for only the 30-Day Follow-Up indicator:

- Transitional care management services, where the date of service on the claim is 29 days after the date the patient was discharged with a principal diagnosis of mental illness

In addition, we report the following medication management care coordination measure:

- **Percentage of patients ages 18–64 years with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription.** This is the percentage of patients identified with acute bronchitis who did not have an antibiotic prescription dispensed to them during the year. To identify patients with acute bronchitis, the patient had to be 18–64 years old, have a diagnosis for acute bronchitis (ICD-9 diagnosis code 466.0; ICD-10 diagnosis codes J20.3–J20.9), and have at least one of the following three episodes during the intake period (January 1–December 24 of the measurement year):

i. At least one emergency department (ED) visit with acute bronchitis as a diagnosis (CPT code = 99281–99285 or Revenue Code = 045x, 0981)

ii. At least one observation visit with acute bronchitis as a diagnosis (CPT code = 99217–99220)

iii. At least one outpatient visit with acute bronchitis as a diagnosis (CPT code = 99201–99205, 99211–99215, 99241–99245, 99341–99345, 99347–99350, 99381–99387, 99391–99397, 99401–99404, 99411, 99412, 99420, 99429, 99455, 99456 or HCPCS code = G0402, G0438, G0439, G0463, T1015 or Revenue Code = 051x, 0520–0523, 0526–0529, 0982, 0983)

The episode with the earliest start date was identified as the index episode.

Patients diagnosed with HIV, malignant neoplasms, emphysema, Chronic Obstructive Pulmonary Disease (COPD), cystic fibrosis, and other comorbid conditions in the year prior to the index episode were excluded from the denominator (identified by the ICD-9 and ICD-10 diagnosis codes in the following Value Sets in the HEDIS measure Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis: HIV, Malignant Neoplasms, Emphysema, COPD, Cystic Fibrosis, and Comorbid Conditions).

Patients diagnosed with pharyngitis or another competing diagnosis 30 days prior to 7 days after the index episode (inclusive) were excluded from the denominator (identified by the ICD-9 and ICD-10 diagnosis codes in the following Value Sets in the HEDIS measure: Pharyngitis, Competing Diagnosis).

Patients who had a new or refill prescription for an antibiotic medication in ***Table F-2-1*** filled on or 30 days prior to the index episode were excluded from the denominator.

For individuals who met the above acute bronchitis criteria, we flagged whether they were dispensed at least one prescription for one of the antibiotic medications in ***Table F-2-1*** on or within 3 days after the index episode during the measurement year and calculated the inverted percentage [1 – (number of individuals dispensed at least one prescription for an eligible antibiotic medication/eligible population)]. A higher percentage indicates appropriate treatment of adults with acute bronchitis.

Table F-2-1. Antibiotic medications list

Description	Prescription		
Aminoglycosides	• Amikacin • Gentamicin	• Kanamycin • Streptomycin	• Tobramycin
Aminopenicillins	• Amoxicillin	• Ampicillin	
Antipseudomonal penicillins	• Piperacillin		
Beta-lactamase inhibitors	• Amoxicillin-clavulanate • Ampicillin-sulbactam	• Piperacillin-tazobactam	• Ticarcillin-clavulanate
First generation cephalosporins	• Cefadroxil	• Cefazolin	• Cephalexin
Fourth generation cephalosporins	• Cefepime		
Ketolides	• Telithromycin		
Lincomycin derivatives	• Clindamycin	• Lincomycin	
Macrolides	• Azithromycin • Clarithromycin	• Erythromycin • Erythromycin ethylsuccinate	• Erythromycin lactobionate • Erythromycin stearate
Miscellaneous antibiotics	• Aztreonam • Chloramphenicol • Dalfopristin-quinupristin	• Daptomycin • Erythromycin-sulfisoxazole • Linezolid	• Metronidazole • Vancomycin
Natural penicillins	• Penicillin G benzathine-procaine • Penicillin G potassium	• Penicillin G procaine • Penicillin G sodium	• Penicillin V potassium • Penicillin G benzathine
Penicillinase resistant penicillins	• Dicloxacillin	• Nafcillin	• Oxacillin
Quinolones	• Ciprofloxacin • Gemifloxacin	• Levofloxacin • Moxifloxacin	• Norfloxacin • Ofloxacin
Rifamycin derivatives	• Rifampin		
Second generation cephalosporin	• Cefaclor • Cefotetan	• Cefoxitin • Cefprozil	• Cefuroxime
Sulfonamides	• Sulfadiazine	• Sulfamethoxazole-trimethoprim	
Tetracyclines	• Doxycycline	• Minocycline	• Tetracycline
Third generation cephalosporins	• Cefdinir • Cefditoren • Cefixime	• Cefotaxime • Cefpodoxime • Ceftazidime	• Ceftibuten • Ceftriaxone
Urinary anti-infectives	• Fosfomycin • Nitrofurantoin • Nitrofurantoin macrocrystals	• Nitrofurantoin macrocrystals-monohydrate • Trimethoprim	

F-2.2.2 Utilization

Utilization measures are reported as rates per 1,000 covered lives (or discharges for readmissions). For each measure, we first calculate the probability of any use. To calculate the probability, the numerator was an indicator of having had at least one event (inpatient admission or ED visit that did not lead to a hospitalization) and the denominator is the number of eligible plan members (or discharges) in the state enrolled during the period. We multiplied the probability of use by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the probability by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because only a small percentage of beneficiaries had counts exceeding one for any of the utilization measures. Events are included in a period's total if discharge or service date on the claim was during the period.

- **Probability of having any inpatient use:** This is a dichotomous variable indicating beneficiaries with at least one admission to an acute-care hospital in the observation period. Acute admissions were identified through claims where place of service indicated the admission was to an inpatient hospital (bill type = 11 or 12). Admissions representing transfers between facilities were collapsed into a single admission. An admission was counted as a facility transfer when the time between the discharge date of the index claim and the admission date of the subsequent claim was no more than one day.
- **Probability of having any ED visits that did not lead to a hospitalization (outpatient ED) use:** This is a dichotomous variable indicating beneficiaries with at least one visit to the ED that did not result in an inpatient hospital admission. Outpatient ED visits (including observation stays) are identified in the outpatient services file through claims with a revenue center line item equal to 045X, 0981 (ED care) or 0762 (treatment or observation room, thus including observation stays in the overall count). If the procedure code on every line item of the ED claim equaled 70000–89999 and no line items had a revenue center code equal to 0762, that claim was excluded (thus excluding claims for which only radiology or pathology/laboratory services were provided unless they were observation stays). Multiple ED visits on a single day were counted as a single visit.
- **Probability of having a readmission within 30 days of hospital discharge:** This is a dichotomous variable indicating beneficiaries with at least one hospital readmission within 30 days of a live discharge. This measure was only created for individuals who were 18 years or older. An index hospital discharge is identified as an inpatient stay with a discharge date within the given measurement period (12 months) minus 30 days from the end of the period. We excluded admissions if the beneficiary died during the hospitalization or did not have 30 days of postdischarge enrollment.

F-2.2.3 Expenditures

- **Total PBPM**. Weighted average total Medicaid expenditures were calculated on a per beneficiary per month (PBPM) basis. They represent overall net payment amounts from all inpatient and outpatient (facility and professional) claims. For each individual, PBPM payments were estimated as one-third of his or her quarterly payments. Averages include all individuals enrolled during the period, so that the figures also reflect the presence of individuals with zero medical costs. The payments were not risk adjusted[97] or price standardized across geographic areas. Negative payments on claims were set to zero for total expenditures. Depending on the type of claim, claims were included in a period's total if discharge or service date on the claim was during the period.

F-2.2.4 Quality of care

To evaluate the impact on quality of care, we report the following quality measures. The measures were calculated annually for all eligible beneficiaries in the Test state and comparison group.

- **The percentage of adolescent and adult patients ages 13–64 years with a new episode of alcohol and other drug (AOD) dependence who initiated treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter, or partial hospitalization within 14 days of the diagnosis.** This is the percentage of adolescent and adult patients with a new episode of AOD dependence who initiated treatment within 14 days of the diagnosis. To identify patients, the patient had to be 13–64 years old and have at least one of the episodes listed below during the intake period (January 1–November 15 of the measurement year). Episodes were identified using Value Sets in the HEDIS measure Initiation and Engagement of Alcohol and Other Drug Dependence Treatment (IET).
  - At least one outpatient visit, intensive outpatient encounter, or partial hospitalization with a diagnosis of AOD
  - At least one detoxification visit
  - At least one ED visit with a diagnosis of AOD
  - At least one acute or nonacute inpatient discharge with either a diagnosis of AOD or an AOD procedure code

  The episode with the earliest start date was identified as the index episode.

  Patients who had a claim with any diagnosis of AOD during the 60 days prior to the index episode were excluded from the denominator.

  For individuals who met the above new episode of AOD criteria, we flagged whether they fulfilled initiation of AOD treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of

---

[97] Although the expenditures were not formally risk adjusted, the comparison groups were weighted by the propensity score (see ***Section F-2.3***), which includes some risk adjustment measures.

the diagnosis and calculated a percentage (number of patients who initiated AOD treatment/number of index episodes).

If the index episode and the initiation treatment event occur on the same day, they must have been with different providers for the initiation treatment event to count. If the index episode was an inpatient discharge, the inpatient stay is considered initiation of treatment. If the index episode was an outpatient, intensive outpatient, partial hospitalization, detoxification, or ED visit, the patient must have at least one of the episodes listed below within 14 days of the index episode. Episodes were identified using Value Sets in the HEDIS measure.

- At least one acute or nonacute inpatient discharge with a diagnosis of AOD
- At least one outpatient visit, intensive outpatient encounter, or partial hospitalization with a diagnosis of AOD

Patients with an initiation treatment event of an inpatient stay with a discharge date after December 1 of the measurement year were excluded from the denominator.

- **The percentage of adolescent and adult patients ages 13–64 years with a new episode of AOD dependence who initiated treatment and who had engaged in two or more additional services with an AOD diagnosis within 30 days of the initiation visit.** This is the percentage of adolescent and adult patients with a new episode of AOD dependence who initiated treatment within 14 days of the diagnosis and who had two or more additional services with an AOD diagnosis within 30 days of the initiation visit. To identify patients, the patient had to meet the same new episode of AOD criteria included in the AOD measure above.

For individuals who met the above new episode of AOD criteria, we flagged whether they fulfilled the following engagement of AOD criteria and calculated the percentage (number of patients who initiated AOD treatment *and* had two or more AOD engagement visits/number of index episodes):

- Initiated treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter, or partial hospitalization within 14 days of the diagnosis as stipulated in AOD initiation measure above. Patients with an initiation treatment event of an inpatient stay with a discharge date after December 1 of the measurement year were excluded from the denominator.
- Had two or more inpatient admissions, outpatient visits, intensive outpatient encounters, or partial hospitalizations with any AOD diagnosis, beginning on the day after the initiation treatment event through 29 days after the initiation treatment event (29 days total). Multiple engagement visits may occur on the same day, but they must have been with different providers to count as unique engagement visits. Visits were identified using Value Sets in the HEDIS measure IET.

- **Probability of having an admission for an Ambulatory Care Sensitive Condition based on the Prevention Quality Indicators (PQI) composite of chronic conditions (Agency for Healthcare Research and Quality, 2016):** The denominator includes the Vermont non-dual Medicaid population ages 18 and older. The numerator includes discharges that meet the inclusion and exclusion rules for any of the nine conditions in the PQI Chronic Composite (PQI #92) (Agency for Healthcare Research and Quality, 2016, September).

  - PQI #01 Diabetes Short-Term Complications Admission Rate
  - PQI #03 Diabetes Long-Term Complications Admission Rate
  - PQI #05 Chronic Obstructive Pulmonary Disease or Asthma in Older Adults Admission Rate
  - PQI #07 Hypertension Admission Rate
  - PQI #08 Heart Failure Admission Rate
  - PQI #13 Angina Without Procedure Admission Rate
  - PQI #14 Uncontrolled Diabetes Admission Rate
  - PQI #15 Asthma in Younger Adults Admission Rate
  - PQI #16 Rate of Lower-Extremity Amputation among Patients with Diabetes

- **Percentage of children ages 1–3 years screened for risk of developmental, behavioral, and social delays using a standardized screening tool in the 12 months preceding their first 3 years of life.** This is the percentage of members ages 1–3 years during the year who had at least one screening for risk of developmental, behavioral, and social delays using a standardized tool during the 12 months preceding their first 3 years of life. A screening counts as a screening for risk of developmental, behavioral, and social delays if the claim includes a CPT code of 96110 (developmental testing, with interpretation and report).

- **Percentage of adolescents 12–21 years of age who had at least one comprehensive well-care visit with a primary care practitioner (PCP) or OB/GYN practitioner.** This is the percentage of adolescents ages 12–21 years during the year who had at least one comprehensive well-care visit with a PCP or OB/GYN practitioner during the year. A visit counts as a well-care visit if the claim includes a well-care visit CPT, HCPCS, or diagnosis code (CPT code = 99381–99385, 99391–99395, 99461 or HCPCS code = G0438, G0439 or ICD-9 diagnosis code = V20.2, V20.31, V20.32, V70.0, V70.3, V70.5, V70.6, V70.8, V70.9, or ICD-10 diagnosis code = Z00.00, Z00.01, Z00.110, Z00.111, Z00.121, Z00.129, Z00.5, Z00.8, Z02.0–Z02.6, Z02.71, Z02.79, Z02.81, Z02.82, Z02.83, Z02.89, Z02.9).

F-2.3 Comparison group and propensity score weighting

For the impact analysis, we are using a pre-post comparison group design, in which the comparison group provides an estimate of what would have happened among Medicaid SSP beneficiaries absent the Medicaid SSP. The difference in the changes over time from the pre-period to the intervention period between SSP beneficiaries and their comparison group provides an estimate of the impact of the Medicaid SSP. The comparison group should be similar to the intervention group on all relevant dimensions (e.g., demographic, socioeconomic, political, regulatory, and health and health systems) except for the policy change being tested.

In the following section, we detail the procedures we used to select the comparison group for the Medicaid SSP in Vermont.

F-2.3.1 Selection of comparison group

In 2014 and 2015, as part of their Medicaid ACO program the DVHA assigned eligible Medicaid beneficiaries to primary care providers using a specifically designed attribution algorithm. This algorithm was run for all ACO-eligible Medicaid beneficiaries in the state. In this analysis, the intervention group comprises beneficiaries who were attributed to providers associated with either of the two ACOs participating in the shared savings program—OneCare and CHAC. The comparison group comprises the remaining attributed beneficiaries who were assigned to either the remaining ACO not participating in the Medicaid shared savings program—Vermont Collaborative Physicians—or to unaffiliated independent physicians. Because attribution is performed independently each year, beneficiaries attributed to OneCare or CHAC in either 2014 or 2015 belong to the intervention group. Thus, beneficiaries who were attributed but never to OneCare or CHAC represent the comparison group.

F-2.3.2 Calculation of person-level weights

To balance the population characteristics for the claims-based analyses, we estimated propensity scores for all individuals from the comparison group. A propensity score is the probability that an individual is in the intervention group rather than the comparison group.

The objective of propensity score modeling is to create a weighted comparison group with characteristics equivalent to those for the Medicaid ACO population. To the extent that these characteristics are correlated with expenditure, utilization, and quality outcomes, propensity weighting will help balance pre-intervention levels of the outcomes as well.

There are other methods to apply propensity scores to an analysis. Aside from weighting, one frequently used method is matching, whereby an intervention beneficiary is matched to a comparison group beneficiary who has a similar propensity score. Although we considered this method, we decided not to pursue matching for several reasons. First, propensity score weighting has been shown to produce less biased estimates, less modeling error (e.g., mean squared error, type 1 error), and more accurate variance estimation and confidence intervals when modeling dichotomous outcomes; and this analysis includes many dichotomous utilization and quality of care outcomes. Second, matching may exclude many comparison group beneficiaries from the analysis if a good match cannot be found. Weighting has the advantage of preserving sample size.

Person-level characteristics

The initial step in the process was to select person-level characteristics to be used in each propensity score model. ***Table F-2-2*** shows the characteristics we used grouped by whether they control for demographics, enrollment, attribution, or beneficiary health status.

Table F-2-2. Covariates for propensity score logistic regressions

Covariates
Demographic characteristics
Gender
Age (age and age squared)
Adult Non-Disabled
Child Non-Disabled
Disabled
Federal Poverty Level
Rural-Urban Continuum Code
Enrollment
Enrolled previous year[a]
Current enrollment length (10, 11, or 12 months)
Enrolled as part of Medicaid expansion
Attribution
Attributed to Blueprint Medical Home
Attributed via CPT codes (vs. selection or auto-assignment)
Health status measures
Chronic Illness and Disability Payment score (count of major comorbidities)
Long-Term Care Coverage
Vermont Chronic Care Initiative[b]

[a] Enrollment in previous year is counted if member was eligible for 10 or more months.

[b] A Vermont Medicaid program that targets members at risk for adverse health outcomes. It provides case management and social support services to improve their health and reduce costs.

Estimation and weighting procedures

Using the characteristics listed in ***Table F-2-2***, we estimated propensity models by logistic regression, in which the outcome was one for beneficiaries attributed to a Medicaid ACO provider and zero for the comparison group. Separate models were estimated for 2011, 2012, 2013, 2014, and 2015 data.

We set propensity weights to 1 for all individuals in the intervention group. The propensity weight for a comparison individual was a function of his or her predicted propensity score—where weight = p/(1-p), with p the predicted propensity. Our procedure typically includes trimming weights that are either less than 0.05 or greater than 20, although in this analysis no weights needed trimming.

F-2.4 Propensity model evaluation

We evaluated several aspects of the propensity score models. First, we examined plots of predicted probabilities to ensure sufficient overlap in the distributions of the intervention and comparison groups. This feature, known as common support, is critical because it provides the basis for inferring effects from group comparisons (***Figure F-2-1*** to ***F-2-5***).

In all years, we found the comparison group passed the common support assumption ($P(D = 1|X) > 0$) for almost the entire range of the intervention group's propensity scores. The only exceptions were in the uppermost percentiles of the intervention group's distribution [above the 99th percentile]. These plots provide ample evidence that the common support assumption is upheld.

Second, we compared the logistic results of the models to see which variables had the greatest impact on the propensity score weights. We found that the major differences between the groups were in their age, their socioeconomic status, and their proportion of beneficiaries attributed to Blueprint medical homes. Overall, we found that intervention beneficiaries were much more likely to be attributed to Blueprint medical homes, were somewhat more likely to be adults, and on average had lower incomes and resided in relatively more rural areas. We found these differences to be fairly consistent and stable over time.

Finally, we compared unweighted and propensity-weighted means for the characteristics in the model. As expected, we found that, after weighting, the comparison group means were within a few percentage points of the values for the intervention group.

Figure F-2-1. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2011

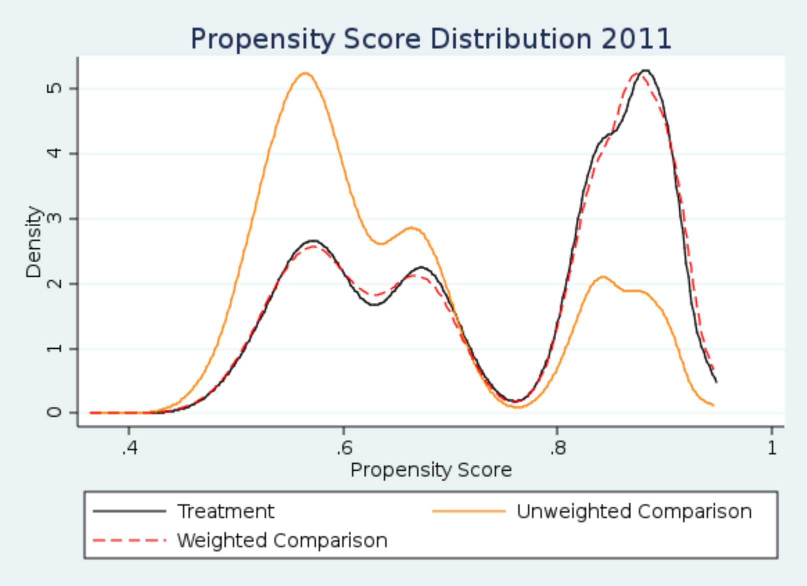


Figure F-2-2. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2012

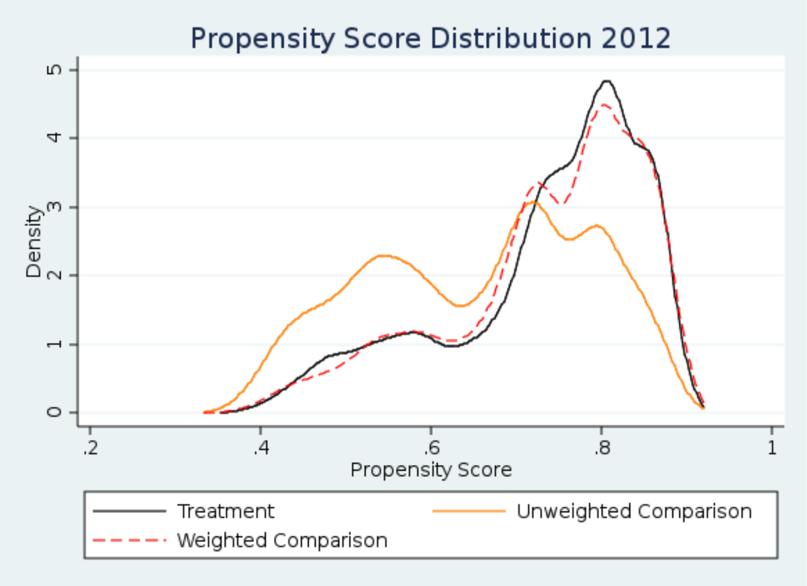


Figure F-2-3. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2013

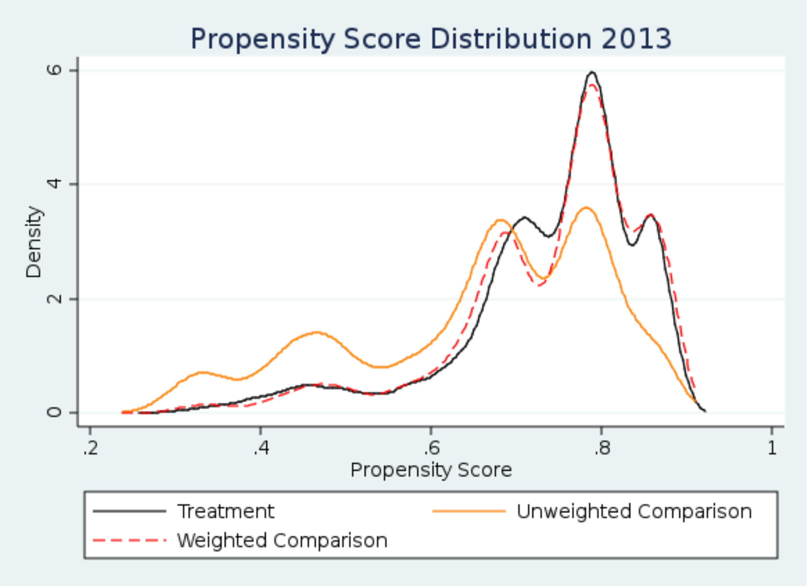


Figure F-2-4. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2014

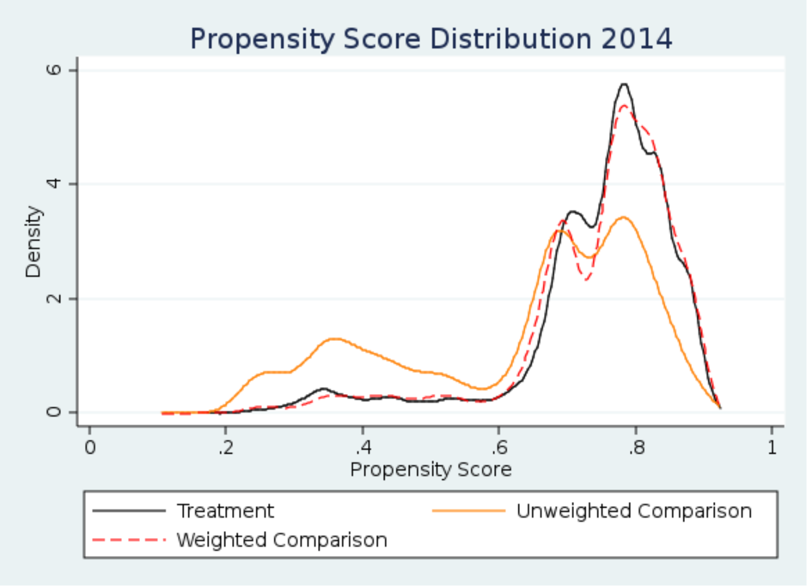
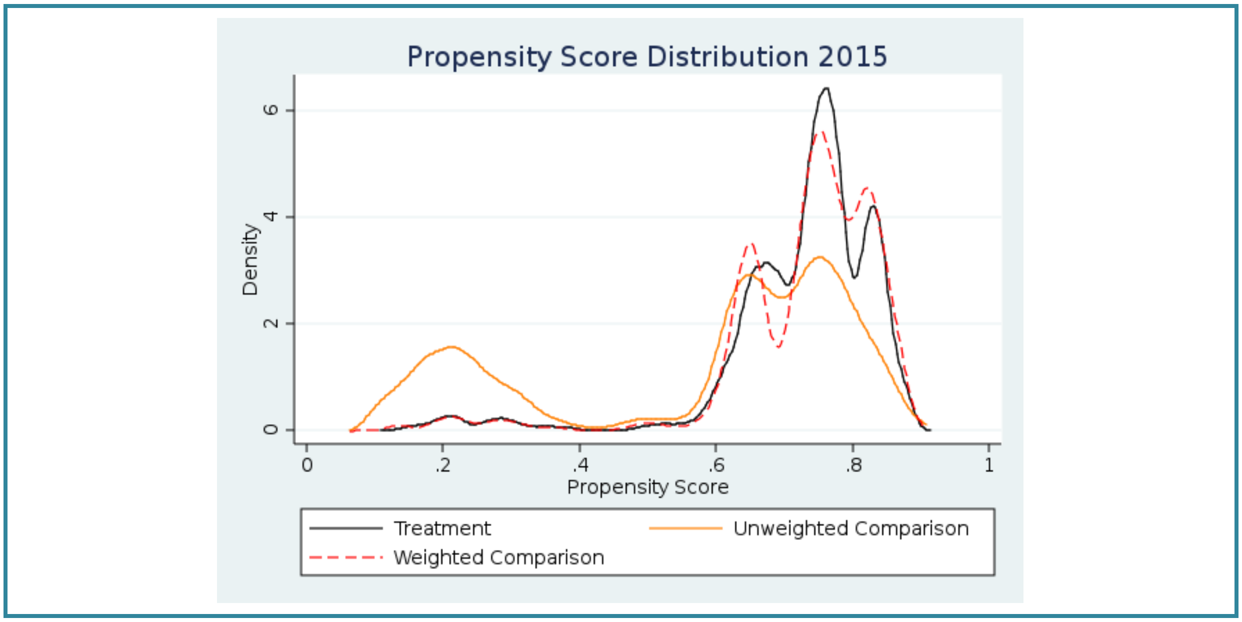


Figure F-2-5. Weighted and unweighted propensity score density plots for the intervention and comparison groups, 2015



Tables F-2-3 to ***F-2-7*** show unweighted and (propensity score) weighted means/proportions for 2011–2015. The notable group differences in the unweighted samples—age, attribution and socioeconomic factors—are substantially mitigated post-weighting as evidenced by the minimized standardized differences. We also assessed the balance for the subgroups included for quality and care coordination measures (beneficiaries initiating alcohol and other drug treatment, beneficiaries over the age of 18 for the PQI measure, adolescents, young children for developmental screenings, adults seeking acute bronchitis treatment, and mental health hospitalizations). We found that the standardized difference was larger than 10 percent (although still under 25 percent) for a few variables across each subpopulation except for adults for the PQI measure. For the adult population, only one county-level variable was above 10 percent, which is not surprising given the smaller effective sample size for county-level covariates. When comparing the actual values, the county-level variables were also quite similar. In addition, a threshold of a standardized difference less than 25 percent is acceptable in smaller sample sizes, and the sample size of the subgroup analyses is substantially smaller than the overall analysis. Given the very small sample size of the subsamples (with the exclusion of the adults for the PQI measure), it is not surprising that more covariates had larger standardized differences. Moreover, all covariates included in the propensity score model are also included in the regression model, so the results are adjusted for this imbalance.

Table F-2-3. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2011

	Unweighted			Weighted			
	Comparison group	Medicaid SSP group	Standardized difference[a]	Comparison group	Medicaid SSP group	Standardized difference[a]	P Value
N	16,085	41,327		41,563	41,327		
Current Eligibility—10 Months	3.3	3.7	2.7	4	3.7	1.3	0.31
Current Eligibility—11 Months	5	5.4	1.5	5.4	5.4	0.1	0.96
Current Eligibility—12 Months	91.7	90.9	2.9	90.6	90.9	0.8	0.51
Claims Attribution	81.7	79.8	4.7	80	79.8	0.4	0.73
Blueprint Attribution	21.4	53.7	70.7	54.2	53.7	1.0	0.36
Claims Attribution and Blueprint Attribution (Interaction)	19.1	44.9	57.4	45.1	44.9	0.6	0.64
General Child	69.7	58	24.4	57.8	58	0.4	0.72
General Adult	19.4	27	18.1	27.1	27	0.2	0.85
Disabled (All Ages)	10.9	15	12.1	15.1	15	0.3	0.80
Age	16.5	20.3	23.6	20.2	20.3	1.0	0.39
Age (Squared)	515.7	705	20.7	690.2	705	1.5	0.20
CDPS	1.2	1.2	0.7	1.3	1.2	2.2	0.04
Female	52.3	53.4	2.2	54.2	53.4	1.6	0.16
Long-Term Care	0.1	0.1	0.9	0.1	0.1	0.7	0.58
Chronic Care	24	28.3	9.9	28	28.3	0.6	0.63
Federal Poverty Level	76.8	66.1	15.7	63.8	66.1	3.5	0.001
Rural/Urban Continuum	5.1	5.4	15.7	5.4	5.4	1.0	0.40

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program.

[a] Absolute standardized differences are expressed as percentages.

Table F-2-4. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2012

	Unweighted			Weighted			
	Comparison group	Medicaid SSP group	Standardized difference[a]	Comparison group	Medicaid SSP group	Standardized difference[a]	P Value
N	21,034	52,227		52,085	52,227		
Current Eligibility—10 Months	4.1	4.3	1.4	4.7	4.3	1.6	0.11
Current Eligibility—11 Months	5.9	6	0.2	6.1	6	0.6	0.49
Current Eligibility—12 Months	90	89.7	1.1	89.2	89.7	1.6	0.11
Prior Eligibility >= 10 Months	71.6	73.5	4.2	72.2	73.5	2.9	0.002
Claims Attribution	81.7	79.6	5.2	79.8	79.6	0.6	0.56
Blueprint Attribution	47.5	72.4	52.6	72	72.4	1.0	0.19
Claims Attribution and Blueprint Attribution (Interaction)	41.3	60.1	38.3	59.7	60.1	0.6	0.48
General Child	65.1	55	20.8	54	55	2.1	0.03
General Adult	23.8	30.8	15.8	31.8	30.8	2.2	0.02
Disabled (All Ages)	11.1	14.2	9.3	14.2	14.2	0.0	>0.99
Age	18.2	21.6	20.1	21.7	21.6	0.5	0.58
Age (Squared)	592.3	763.5	18.0	763.9	763.5	0.0	0.97
CDPS	1.2	1.3	0.9	1.3	1.3	1.0	0.26
Female	52.9	53.6	1.4	54.7	53.6	2.2	0.02
Long-Term Care	0.1	0.1	0.3	0.1	0.1	0.3	0.73
Chronic Care	11.8	13.6	5.3	14	13.6	1.3	0.19
Federal Poverty Level	76.2	66.7	13.8	65.3	66.7	2.1	0.02
Rural/Urban Continuum	5.1	5.4	15.3	5.4	5.4	1.2	0.22

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program.

[a] Absolute standardized differences are expressed as percentages.

Table F-2-5. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2013

	Unweighted			Weighted			
	Comparison group	Medicaid SSP group	Standardized difference[a]	Comparison group	Medicaid SSP group	Standardized difference[a]	P Value
N	24,333	61,318		61,624	61,318		
Current Eligibility—10 Months	4.0	4.3	1.3	4.5	4.3	1.1	0.22
Current Eligibility—11 Months	5.3	5.9	2.5	6.1	5.9	0.8	0.36
Current Eligibility—12 Months	90.7	89.8	2.8	89.4	89.8	1.4	0.12
Prior Eligibility >= 10 Months	79.3	78.3	2.3	77.2	78.3	2.8	0.002
Claims Attribution	81.6	79.4	5.7	79.5	79.4	0.2	0.78
Blueprint Attribution	61.8	82.4	47.2	82.3	82.4	0.3	0.67
Claims Attribution and Blueprint Attribution (Interaction)	52.9	68.9	33.1	68.8	68.9	0.1	0.93
General Child	62.9	52.7	20.9	51.6	52.7	2.1	0.02
General Adult	25.7	33.1	16.3	34	33.1	1.9	0.03
Disabled (All Ages)	11.4	14.3	8.6	14.4	14.3	0.4	0.70
Age	19.3	22.6	19.7	22.7	22.6	0.8	0.38
Age (Squared)	643.4	818.1	17.6	820.9	818.1	0.3	0.77
CDPS	1.2	1.3	0.9	1.3	1.3	1.0	0.22
Female	52.5	53.1	1.1	53.7	53.1	1.3	0.13
Long-Term Care	0.1	0.1	1.0	0.1	0.1	0.3	0.71
Chronic Care	14.6	16.4	5.1	16.9	16.4	1.2	0.17
Federal Poverty Level	77.4	66.7	15.3	65.8	66.7	1.3	0.10
Rural/Urban Continuum	5.1	5.4	15.3	5.5	5.4	2.3	0.010

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program.

[a] Absolute standardized differences are expressed as percentages.

Table F-2-6. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2014

	Unweighted			Weighted			
	Comparison group	Medicaid SSP group	Standardized difference[a]	Comparison group	Medicaid SSP group	Standardized difference[a]	P Value
N	32,706	82,134		82,198	82,134		
Current Eligibility—10 Months	4.8	4.3	2.2	4.8	4.3	2.1	0.005
Current Eligibility—11 Months	3.6	3.5	0.5	3.7	3.5	1.1	0.15
Current Eligibility—12 Months	91.6	92.1	2.0	91.5	92.1	2.3	0.002
Prior Eligibility >= 10 Months	73.2	73.8	1.4	72.3	73.8	3.3	<0.001
Claims Attribution	79.0	75.9	7.4	75.9	75.9	0.0	0.99
Blueprint Attribution	58.5	81.7	52.4	81.5	81.7	0.5	0.45
Claims Attribution and Blueprint Attribution (Interaction)	50.4	68.7	37.9	68.5	68.7	0.4	0.63
Medicaid Expansion	17.1	24.0	17.1	24.0	24.0	0.1	0.86
General Child	55.5	46.3	18.6	45.6	46.3	1.4	0.06
General Adult	33.1	40.4	15.3	41.3	40.4	1.7	0.03
Disabled (All Ages)	11.4	13.3	5.9	13.2	13.3	0.4	0.64
Age	22.1	25.1	17.0	25	25.1	0.3	0.67
Age (Squared)	789.9	949	14.9	940.7	949	0.8	0.33
CDPS	1.2	1.2	0.5	1.2	1.2	0.7	0.32
Female	52.5	52.1	0.8	52.6	52.1	1.2	0.12
Long-Term Care	0.1	0.1	0.7	0.2	0.1	0.6	0.43
Chronic Care	14.9	16.4	4.2	16.7	16.4	0.7	0.35
Federal Poverty Level	80.1	70.5	12.2	69.4	70.5	1.5	0.03
Rural/Urban Continuum	5.1	5.4	15.1	5.4	5.4	1.4	0.07

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program.

[a] Absolute standardized differences are expressed as percentages.

Table F-2-7. Unweighted and weighted means and standardized differences, Medicaid SSP and comparison groups, 2015

	Unweighted			Weighted			
	Comparison group	Medicaid SSP group	Standardized difference[a]	Comparison group	Medicaid SSP group	Standardized difference[a]	P Value
N	36,354	76,859		77,641	76,859		
Current Eligibility—10 Months	0.9	0.9	0.4	1.0	0.9	0.8	0.28
Current Eligibility—11 Months	1.7	1.8	1.3	2.0	1.8	1.2	0.12
Current Eligibility—12 Months	97.4	97.3	0.9	97.0	97.3	1.5	0.06
Prior Eligibility >= 10 Months	84.9	86.3	3.9	85.1	86.3	3.5	<0.001
Claims Attribution	78.6	75.3	7.9	75.1	75.3	0.5	0.47
Blueprint Attribution	58.6	83.5	57.2	83.4	83.5	0.5	0.44
Claims Attribution and Blueprint Attribution (Interaction)	51.1	71.5	42.7	71.3	71.5	0.3	0.65
Medicaid Expansion	28.8	33.2	9.4	34.3	33.2	2.3	0.002
General Child	53.8	46.5	14.7	44.7	46.5	3.5	<0.001
General Adult	35.9	41.7	11.8	43.3	41.7	3.3	<0.001
Disabled (All Ages)	10.2	11.8	5.0	11.9	11.8	0.3	0.69
Age	23	25.4	13.5	25.7	25.4	2.0	0.008
Age (Squared)	831.6	967.7	12.5	980.6	967.7	1.2	0.13
CDPS	1.2	1.2	0.1	1.2	1.2	0.7	0.34
Female	52.4	51.4	1.9	52.0	51.4	1.2	0.10
Long-Term Care	0.1	0.2	1.3	0.2	0.2	0.2	0.82
Chronic Care	14.2	14.9	2.0	15.0	14.9	0.2	0.75
Federal Poverty Level	76.1	69.5	8.2	68.3	69.5	1.5	0.04
Rural/Urban Continuum	5.1	5.5	17	5.5	5.5	3.4	<0.001

CDPS = Chronic Illness and Disability Payment System; SSP = Shared Savings Program.

[a] Absolute standardized differences are expressed as percentages.

F-2.5 Statistical analysis

F-2.5.1 Regression model

The underlying assumption in D-in-D models estimating the impact of the Medicaid SSP is that trends in the test group would be similar to that of the comparison group in the absence of the initiative (i.e., that the two were on "parallel paths" prior to the start of the Medicaid SSP).

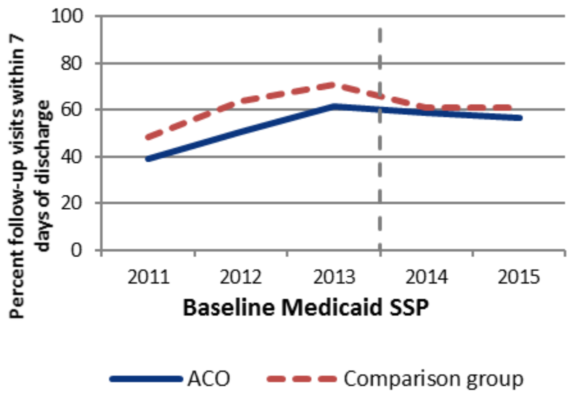
To assess the parallel assumption's validity more empirically, we modeled care coordination, core expenditure and utilization, and quality of care outcomes during the baseline period with a linear time trend interacted with a dichotomous variable indicating that the beneficiary was attributed to an ACO provider in the Medicaid SSP (i.e., the "test" group). The following section describes the baseline analysis we conducted to inform the D-in-D model.

To examine descriptively whether the trends in the test and comparison groups are parallel, we present graphs of annual and quarterly, unadjusted averages for ACO-attributed beneficiaries, and the comparison group for the baseline period (2011–2013) and the first 2 years of the implementation (2014 and 2015).

Figures F-2-6 to ***F-2-8*** provide the unadjusted averages of the care coordination measures by year.

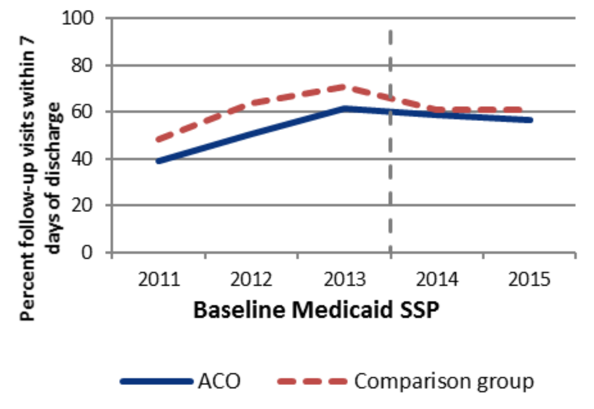
- The baseline trends were parallel for **7-day follow-ups following a mental health hospitalization** and **adults with acute bronchitis not prescribed antibiotic treatment**, but not parallel for **30-day follow-ups following a mental health hospitalization**.

Figure F-2-6. Percentage of Medicaid beneficiaries with a follow-up visit within 7 days of discharge from hospitalization for mental illness, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



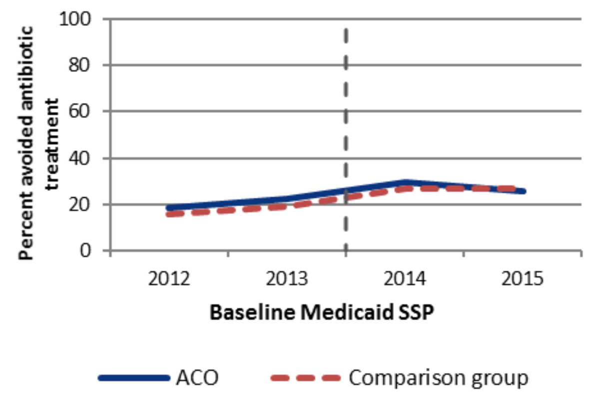
The percentage of **7-day follow-ups following a mental health hospitalization** trended slightly upward during the baseline period and remained steady during the Medicaid SSP implementation period among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries (***Figure F-2-6***). The comparison group consistently had slightly higher percentages than the ACO-attributed group throughout the baseline and implementation periods.

Figure F-2-7. Percentage of Medicaid beneficiaries with a follow-up visit within 30 days of discharge from hospitalization for mental illness, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The percentage of **30-day follow-ups following a mental health hospitalization** among ACO-attributed Medicaid beneficiaries trended upward during the baseline period and remained stable during the implementation period. The percentage among comparison group beneficiaries remained steady throughout the baseline and implementation period (***Figure F-2-7***).

Figure F-2-8. Percentage of Medicaid adult beneficiaries with acute bronchitis who avoided antibiotic treatment, 2012 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The percentage of **adults with acute bronchitis not prescribed antibiotic treatment** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-8***). In both groups, the baseline trend was parallel and trending slightly upward, while the percentage remained steady during the implementation period.

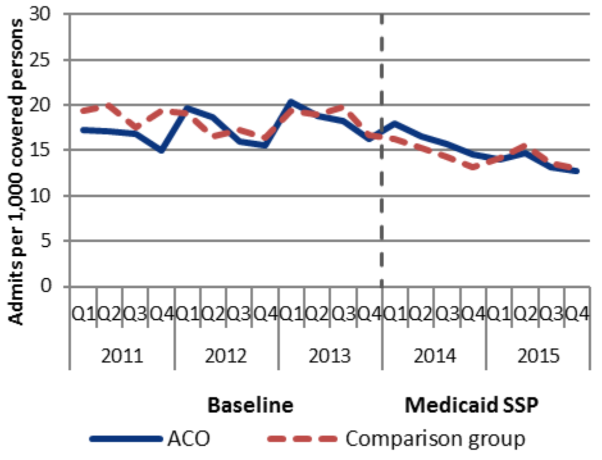
Figures ***F-2-9*** to ***F-2-11*** provide unadjusted quarterly averages of inpatient admissions, outpatient ED visits, and 30-day readmissions per 1,000 Medicaid beneficiaries by quarter, respectively.[98]

- The baseline trends were parallel for **acute inpatient admission** and outpatient ED visit rates, but not parallel for the rate of **30-day readmissions**.

---

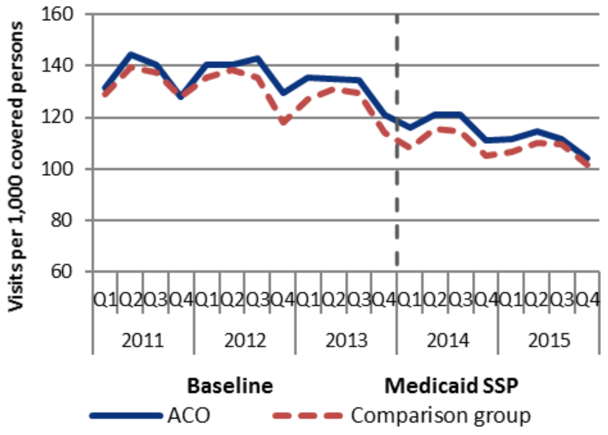
[98] The quarterly averages were weighted by the product of two factors: (1) the fraction of the quarter during which the beneficiary was eligible for the analyses (the eligibility fraction) and (2) the beneficiary's propensity score. Because the weighted quarterly averages are not adjusted for the covariates included in the regression model, the magnitude and direction of the trends in the weighted quarterly averages may differ from the regression-adjusted averages shown in the D-in-D tables.

Figure F-2-9. All-cause acute inpatient admissions per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



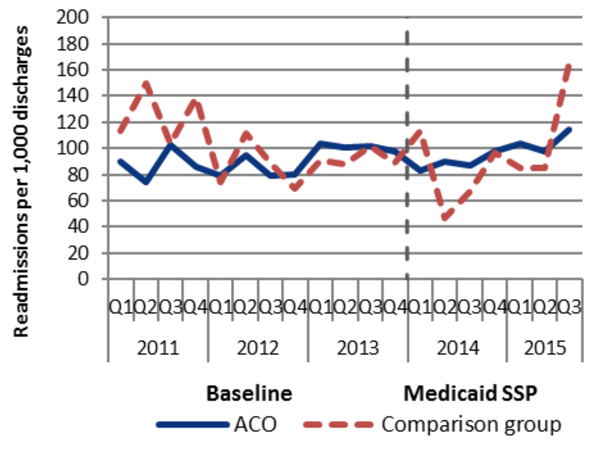
The rate of **acute inpatient admissions** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods. The admission rate remained steady during the baseline period and trended slightly downward during the implementation period for both groups (***Figure F-2-9***).

Figure F-2-10. Emergency department visits that did not lead to a hospitalization per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The rate of **outpatient ED visits** among ACO-attributed Medicaid beneficiaries and comparison beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-10***). The ED visit rate showed seasonal fluctuations and trended downward for both groups throughout the baseline and implementation periods.

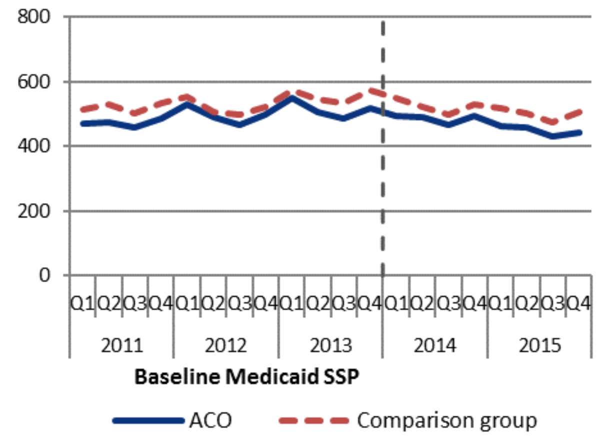
Figure F-2-11. Discharges with a readmission within 30 days per 1,000 Medicaid beneficiaries, first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The rate of discharges with a **readmission within 30 days** among ACO-attributed Medicaid beneficiaries remained steady through the baseline and trended slightly upward during the implementation period (***Figure F-2-11***). The rate among comparison group beneficiaries fluctuated throughout the baseline and implementation periods.

Figure F-2-12 provides unadjusted quarterly averages of total PBPM payments.

Figure F-2-12. Average total PBPM payments for first quarter 2011 through fourth quarter 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group

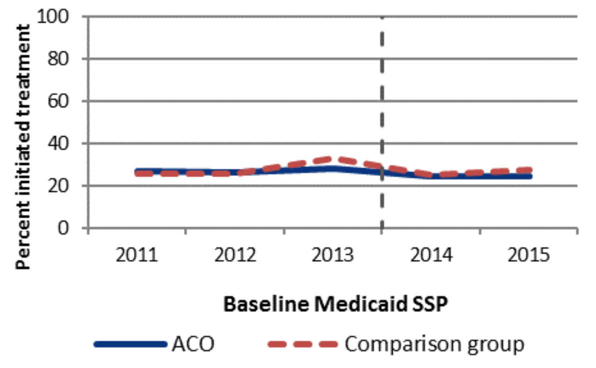


For Medicaid beneficiaries, average **total PBPM payments** trend was parallel and remained fairly constant over the baseline and Medicaid SSP implementation periods for the ACO-attributed group and the comparison group (***Figure F-2-12***). The comparison group consistently had slightly higher total PBPM payments than the ACO-attributed group throughout the baseline and implementation periods.

Figures F-2-13 to ***F-2-17*** provide the unadjusted averages of the quality of care measures by year.

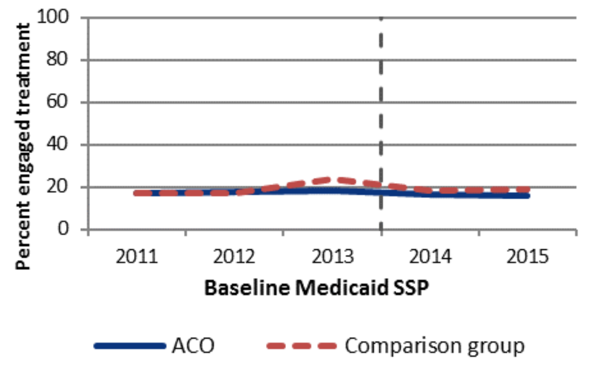
- The baseline trends were parallel for **initiation of treatment after episode of alcohol and other drug dependence**, **engagement of treatment after episode of alcohol and other drug dependence**, **hospitalizations for ambulatory care sensitive conditions based on chronic PQI**, and **adolescent well care visits,** but not parallel for **developmental screenings**.

Figure F-2-13. Percentage of Medicaid beneficiaries who initiated treatment after an episode of alcohol and other drug dependence for 2011 through 2015, ACO and comparison group



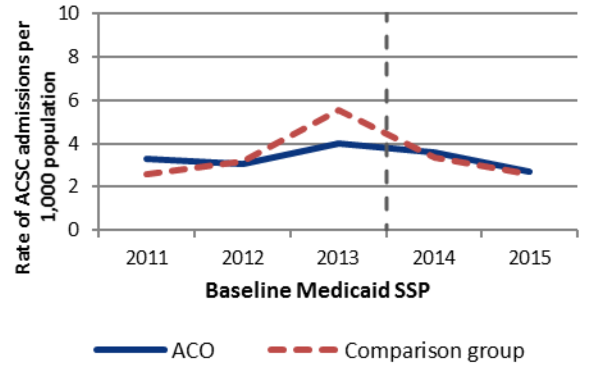
The percentage of **initiation of treatment after episode of alcohol and other drug dependence** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-13***). The percentage for both outcomes trended slightly upward during the baseline period and remained steady during the Medicaid SSP implementation period.

Figure F-2-14. Percentage of Medicaid beneficiaries who engaged treatment after an episode of alcohol and other drug dependence, 2011 through 2015, Vermont ACO-attributed beneficiaries and comparison group



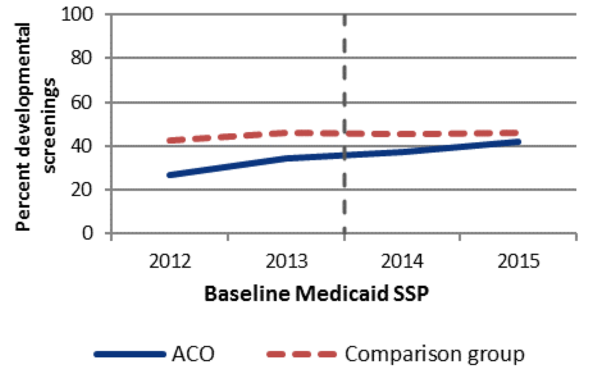
The percentage of **engagement of treatment after episode of alcohol and other drug dependence** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-14***). The percentage for both outcomes trended slightly upward during the baseline period and remained steady during the Medicaid SSP implementation period.

Figure F-2-15. Rate of admissions for ambulatory care sensitive conditions per 1,000 population, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



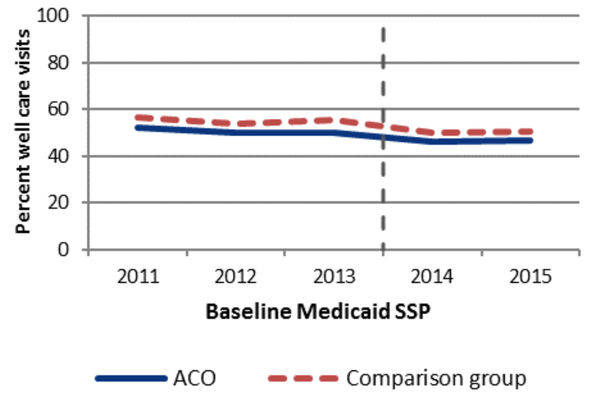
The rate of **hospitalizations for ambulatory care sensitive conditions based on chronic PQI** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries trended upward during the baseline period and trended slightly downward during the implementation period (***Figure F-2-15***).

Figure F-2-16. Percentage of Medicaid beneficiaries who had a developmental screening, 2012 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The percentage of **developmental screenings** among ACO-attributed Medicaid beneficiaries trended upward during the baseline period and remained stable during the Medicaid SSP implementation period. Among comparison group beneficiaries, the percentage remained stable throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-16***).

Figure F-2-17. Percentage of Medicaid beneficiaries who had an adolescent well care visit, 2011 through 2015, Vermont Medicaid ACO-attributed beneficiaries and comparison group



The percentage of **adolescent well care visits** among ACO-attributed Medicaid beneficiaries and comparison group beneficiaries was similar throughout the baseline and Medicaid SSP implementation periods (***Figure F-2-17***). The percentage for both outcomes trended slightly downward during the baseline period and remained steady during the Medicaid SSP implementation period.

A quarterly fixed-effects model considered for the evaluation is shown in ***Equation F-2.1***:

$$\gamma = \alpha_0 + \alpha_1 I + \sum \beta_n Q_{n,b} + \sum \phi_t Q_{t,p} \bullet ACO + \delta X + \mu \qquad \text{(F-2.1)}$$

where

y = a performance measure (e.g., total PBPM cost per quarter) for the *i*-th beneficiary in the *j*-th group (test or comparison), in period t (i,j,t subscripts suppressed).

I = a 0,1 indicator (0 = comparison group, 1 = test group).

X = a vector of patient and demographic characteristics.

$Q_{n,b}$, $Q_{t,d}$ = 0,1 indicator of the *n*-th or *t*-th calendar quarter in the base (*b*) or post (*p*) period (*n* starts counting at first baseline period, whereas *t* starts with first SIM Model quarter).

ACO = a 0,1 indicator (1 = test beneficiary is currently attributed to an ACO, 0 = test beneficiary is not currently attributed to an ACO or beneficiary is part of the comparison group).

μ = error term.

The model in ***Equation F-2.1*** assumes that, except for an intercept difference α_1, the outcomes for beneficiaries in the intervention group and beneficiaries in the comparison groups followed a similar growth trend during the baseline period. We investigated whether the baseline period before the start of SIM activities satisfied the baseline trend assumptions of the D-in-D model in ***Equation F-2.1***—that is, whether the outcome trends for beneficiaries in intervention and in the comparison group were similar during this period. Because we have 12 baseline quarters, it is possible to assess whether baseline outcome trends were, in fact, similar across groups.

One option for testing the assumption that SIM participants and the comparison group had similar baseline trends is to estimate the model in ***Equation F-2.1*** for the baseline period only and expand the model by including a set of interactions between I_j (the Test indicator) and the indicators for the baseline quarters on the right side of the model. Statistically significant interaction coefficients would indicate whether the outcome difference between the test and the comparison group increased or decreased in particular baseline quarters. However, it is difficult to make a judgment about a trend on the basis of a large number of interaction coefficients because it is not clear how to interpret the many sequences of significant and insignificant coefficients that could arise.[99]

---

[99] For example, suppose that the interactions coefficients for quarters 2, 5, and 8 are statistically significant. From such a pattern, it would be difficult to conclude whether outcome trends during the baseline period were similar.

As an alternative, simpler approach to testing the similarity of baseline trends, we used a model with a linear trend during the baseline period. We tested whether this trend differed for SIM participants relative to comparison group participants. Specifically, the model for the outcomes may be written as follows:

$$y = \alpha_0 + \alpha_1 I + \theta \bullet t + \lambda I \bullet t + \delta X + \mu. \qquad \text{(F-2.2)}$$

In ***Equation F-2.2***, *y, I,* X, and μ are defined as in ***Equation F-2.1***. The variable *t* is linear time ranging from 1 to 12. The linear time trend in the comparison group is θ•*t*, whereas for Test group beneficiaries (*I*=1) it is (θ+λ)*t. Hence, λ measures the difference in linear trends and the *t*-statistic for this coefficient can be used to test the null hypothesis of equal trends (λ=0). In other words, rejecting the null hypothesis would suggest that the assumption of equal trends underlying our outcome models is not met.

The parameters of ***Equation F-2.2*** were estimated using weighted least-squares regression models for 12 key outcomes. The weights are a function of the eligibility fraction and propensity scores. For each outcome, we report estimates and standard errors of the difference between the baseline trend in the test and the comparison groups (λ).

Tables F-2-8 show estimates of the baseline trend differences for the following outcomes:

- Total Medicare expenditures
- Probability of an acute inpatient stay
- Probability of an outpatient ED visit
- Probability of readmission within 30 days after an inpatient discharge
- Probability of follow-up within 7 days of a discharge from a mental health hospitalization
- Probability of follow-up within 30 days of a discharge from a mental health hospitalization
- Probability of avoidance of antibiotic treatment for adults with acute bronchitis
- Probability of initiation of treatment after episode of alcohol or drug dependence
- Probability of engagement in treatment after episode of alcohol or drug dependence
- Probability of a hospitalization for ambulatory care sensitive conditions based on chronic PQIs
- Probability of a developmental screening within the first 3 years of life
- Probability of adolescent well-care visit

Table F-2-8. Differences in average expenditure, utilization, care coordination, and quality of care outcomes during the baseline period, Medicaid ACO beneficiaries and comparison group beneficiaries

Parameter estimate	Total PBPM ($)	Any inpatient	Any outpatient ED visit	Any 30-day readmission	7-day mental health follow-up	30-day mental health follow-up
Test–CG trend difference	−0.11	.0002*	.0005	0.006***	−0.011	0.033
	(1.52)	(.0001)	(.0004)	(0.002)	(0.042)	(0.035)

	Antibiotic avoidance	Mental health treatment initiation	Mental health treatment engagement	Chronic PQI admission	Develop-mental screening	Adolescent well-care visit
Test–CG trend difference	0.003	−0.016	−0.022	−0.001	0.043*	−0.009
	(0.049)	(0.023)	(0.019)	(.0007)	(0.023)	(0.007)

ACO = Accountable Care Organization; CG = comparison group; ED = outpatient emergency department; PBPM = per beneficiary per month; PQI = Preventive Quality Indicator.

Baseline is the period January 2011–December 2013. The trend (slope) is the quarter-to-quarter change in the outcome variable. Standard errors are given in parentheses. *p < 0.10; **p < 0.05; ***p < 0.01.

Relative to the comparison group, there was no statistically significant difference in the baseline trend for total PBPM expenditures. Statistical significance was absent for most other measures except for inpatient admissions, 30-day readmissions, and developmental screens. In those cases, the test group's trend increased faster relative to the comparison group. Those differences were relatively minor with respect to inpatient admissions and 30-day readmissions, while the difference in developmental screenings was more substantial. However, based on the overall results, we concluded that in general beneficiaries in the Medicaid SSP were on a similar trajectory with comparison beneficiaries prior to the SIM Initiative, and thus the parallel trend assumption of the D-in-D model was satisfied.

D-in-D regression model. The D-in-D model is shown in ***Equation F-2.3***. The model is a quarterly fixed effects model as shown in ***Equation F-2.1.*** As in ***Equation F-2.1***, Y_{ijt} is the outcome for individual i (test or comparison group) in state j in quarter t; I_{ij} (=0,1) is an indicator equal to 1 if the individual is in the test group and 0 if the individual is in its comparison group; Qn is a series of quarter dummies for the baseline period (quarters 1 to 12); and Q_t is a series of quarter dummies for the post quarters (quarters 13 to 17). The interaction of the test group indicator and Q_t ($I_{ij} * Q_t$) measures the difference in the pre-post change between the test group and its comparison states.

$$Y_{ijt} = \alpha_0 + \beta_1 I_{ij} + \sum \beta_2 Q_n + \sum \alpha_2 Q_t + \sum \gamma ACO_{ijt} * Q_t + \lambda X_{ijt} + \varepsilon_{ijt} \tag{F-2.3}$$

Table F-2-9 illustrates the interpretation of the D-in-D estimate from this model. The coefficient β_1 in ***Equation F-2.3*** is the difference in the measure between test beneficiaries and comparison beneficiaries at the start of the baseline period, holding constant other variables in the equation. The β_2 and α_2 coefficients are for the quarterly fixed effects and capture differences over time for each baseline and post quarter, respectively. The coefficient of the interaction term between Q_t and ACO (I) measures any differences for the test group relative to the comparison group in the post quarters relative to baseline quarters. Thus, in the post period, the comparison group mean is captured by $\alpha_0 + \alpha_2$, whereas the test group mean is captured by $(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$. In other words, the between-group difference changes from β_1 during the baseline years to $\beta_1 + \gamma$ during the post period. The D-in-D parameter, γ, shows whether the between-group difference increased (γ>0) or decreased (γ<0) after the Medicaid Shared Savings Program was implemented. Using the quarterly fixed effects model, we calculated yearly and overall estimates by taking linear combinations of the quarterly estimates.

Table F-2-9. Difference-in-differences estimate

Group	Pre period	Post period	Pre-post difference
Test	$\alpha_0 + \beta_1 + \beta_2$	$(\alpha_0 + \beta_1) + (\alpha_2 + \gamma)$	$\alpha_2 + \gamma$
Comparison	$\alpha_0 + \beta_2$	$\alpha_0 + \alpha_2$	α_2
Between group	β_1	$\beta_1 + \gamma$	γ

The models for total PBPM Medicaid payments and the probabilities of inpatient admissions and ED outpatient visits were estimated with the beneficiary quarter as the unit of analysis. Models for unplanned readmissions and mental health follow-ups were estimated at the quarter-admission level and annual-admission level, respectively. All other outcomes were estimated with the beneficiary year as the unit of analysis.

The outcome model for total Medicaid PBPM payments was estimated using ordinary least squares. To show the adjusted means in the pre- and post-periods for the intervention and comparison groups, we used a linear model that allows for the calculation of means that will sum to the D-in-D estimate. Although this model has strong assumptions of normality of the outcome, the OLS model still produces unbiased estimates even when the normality assumptions is violated as long as errors are uncorrelated and have a constant variance (Gauss-Markov Theorem). However, we can and do control for the correlation and variance in errors with clustered standard errors. Additionally, the model yields estimates that are readily interpretable in dollars and do not require additional transformation.

For all other outcomes, we converted utilization counts into binary outcomes (1 = any use) and used weighted logistic regression models. Count models are not appropriate because of the low occurrence of most types of utilization for individual beneficiaries in any quarter;

however, we multiplied the marginal effect from the logistic regression models by 1,000 to obtain approximate rates of utilization per 1,000 beneficiaries. Multiplying the marginal effect by 1,000 does not produce an exact rate of utilization per 1,000 beneficiaries because it assumes that no person has more than one visit or admission per quarter. However, we concluded that this is a reasonable approximation because only a small percentage of beneficiaries had counts exceeding 1 for any of the utilization measures. For expenditure outcomes, we used weighted generalized linear models with a normal distribution and identity link.

Control Variables. In all models we controlled for the following variables:

- Beneficiary type (child nondisabled, adult nondisabled or adult/child disabled)
- Age (and age squared)
- Gender
- Beneficiary's classification on the Chronic Illness and Disability Payment System
- Beneficiary's receipt of long-term care
- Beneficiary's participation in the Chronic Care Initiative
- Number of months beneficiary was Medicaid eligible during year (minimum of 10)
- If beneficiary was Medicaid eligible 10 or more months in previous year
- Attribution method of beneficiary (claims-based or choice/auto-assigned)
- If beneficiary was attributed to a Vermont Blueprint for Health medical home
- If beneficiary was eligible through Medicaid expansion
- Federal Poverty Level
- Classification of beneficiary's county of residence on the rural/urban continuum

Weighting and Clustering. All of the regression models were estimated using weighted regressions and weighted by the propensity score times the eligibility fraction. In addition, standard errors were clustered at the highest level (provider) to account for both clustering of beneficiaries within providers and repeated observations within beneficiaries.

F-2.6 References

Agency for Healthcare Research and Quality. (2016). *Prevention Quality Indicators Overview*. Available at https://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx

Centers for Medicare & Medicaid Services (CMS). (2016a). *Medicaid & CHIP: December 2015 Monthly Applications, Eligibility Determinations and Enrollment Report*. Available at https://www.medicaid.gov/medicaid/program-information/downloads/december-2015-enrollment-report.pdf

Centers for Medicare & Medicaid Services (CMS) (October, 2016b). *Vermont Global Commitment To Health, Section 1115 Demonstration Fact Sheet*. Available at https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Waivers/1115/downloads/vt/vt-global-commitment-to-health-fs.pdf

Vermont Digger (March 6, 2016). *Medicaid by the Numbers: Reforms, Demographic Changes Drive Up Enrollment*. Available at https://vtdigger.org/2016/03/06/medicaid-by-the-numbers-reforms-demographic-changes-drive-up-enrollment/#.Wgig1FKZPow

[this page intentionally left blank]