Evaluation of the Shared Decision Making (SDM) & Medication Management (MM) Health Care Innovation Awardees

Second Annual Report

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EXECUTIVE SUMMARY

This report contains updated findings for the evaluation of the Centers for Medicare & Medicaid Services (CMS) Health Care Innovation Awards (HCIA) Round One recipients, who received awards for implementing shared decision making (SDM) or medication management (MM) programs. These awards are provided to organizations implementing promising new ideas for obtaining better health outcomes, improving care, and lowering medical expenditures for beneficiaries enrolled in Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). The SDM awardees include Welvie, LLC (Welvie), Trustees of Dartmouth College (Dartmouth) and MedExpert International (MedExpert). The MM awardees include Carilion New River Valley Medical Center's Improving Health for At-risk Rural Patients (IHARP), University of Southern California (USC), University of Pennsylvania's HeartStrong program (HeartStrong), Pharmacy Society of Wisconsin (PSW), the University of Tennessee's SafeMed program (SafeMed), and the University of Hawaii at Hilo's Pharm2Pharm program (Pharm2Pharm).

This second annual report on the Round One HCIA SDM and MM awardees provides updated information reflecting new qualitative and quantitative findings conducted from August 2014 through August 2015. The qualitative findings are presented for all awardees, and are based on interviews with program staff, awardee site visits, documentation provided by the awardees, and progress reports provided by the Lewin Group in its role as the implementation contractor. The quantitative analyses of program effects were conducted for Medicare Fee for Service (FFS) and Medicare Advantage (MA) beneficiaries participating in Welvie, MedExpert, IHARP, USC, and Pharm2Pharm programs. Difference-in-difference estimations were used to compare outcome changes in the intervention groups relative to controls, and results were assessed at the 5% level of statistical significance.

Based on analyses conducted over the past year, the project team identified the following key findings related to the program and implementation effectiveness of the HCIA SDM programs:

- The Welvie intervention, which was conducted as a randomized controlled trial, was associated with statistically significant reductions in the first quarter following program enrollment in total medical expenditures, inpatient expenditures, and several other categories of expenditures among Medicare fee-for-service (FFS) beneficiaries in Ohio; across all seven post-intervention quarters, however, the intervention was not associated with statistically significant cumulative reductions in total medical expenditures.
- Additionally, Welvie was associated with both cumulative and quarterly reductions in various surgery-related categories of expenditures among Medicare Advantage beneficiaries in Ohio.

- There is preliminary evidence that two of the SDM programs, Welvie and MedExpert, may be associated with significant reductions in mortality and in some types of inpatient readmissions.
- Cumulatively across the study period, neither Welvie nor MedExpert were associated with statistically significant reductions in health service resource use measures such as inpatient admissions or ER visits, although Acumen observed some significant reductions in resource use measures for each program in individual quarters.
- SDM awardees are making efforts to conduct outreach well before treatment decisions need to be made with the aim to improve patient engagement in their intervention
- SDM models that had fewer external dependencies experienced fewer implementation challenges than more complex SDM models.
- Sustainability of the intervention with the current SDM intervention populations following the end of the HCIA award is not confirmed for any of the awardees.

Based on analyses conducted over the past year, the project team identified the following key findings related to the program and implementation effectiveness of the HCIA MM programs:

- There is no evidence that the MM programs had a significant effect on medication adherence.
- The analysis of the effects of interventions on measures of health service resource use was inconclusive.
- Expenditure data were available for only one awardee, and the intervention was associated with increases in expenditures.
- There is weak evidence that the MM programs lowered mortality rates and no evidence that they had an effect on reducing rates of inpatient readmissions.
- Over the past year, awardees deployed multiple strategies to boost program enrollment and patient agreement to participate in the program, including the use of physician referrals and the leveraging of medication reviews as recruitment strategies.
- Awardees encountered challenges associated with integrating MM programs into existing dispensing workflows of community pharmacies.
- Awardees pursued funding from health plans and health system partners to sustain their programs following the end of HCIA funding, but the results of these sustainability strategies have been mixed.

The results of our quantitative analysis have several limitations. First, with the exception of Welvie, the HCIA awardees' interventions were not designed to provide data on randomized control groups, and as a result, Acumen generally used propensity score matching on variables appearing in Medicare claims to select control groups. The evaluation is therefore subject to the limitations of a non-randomized study design as well as the limitations of using administrative claims data to capture predictive variables to create well-matched comparison groups. Acumen

cannot rule out in our results the influence of unobserved baseline differences and differential trends in unobserved characteristics between the intervention and control groups. Second, the number of enrollees remains below expectations for some of the MM programs, limiting our ability to assess program effectiveness both qualitatively and quantitatively. Consequently, for awardees with limited numbers of participants available for inclusion in analysis, non-significant findings may be driven by limited statistical power. Third, the Medicaid claims data needed to assess the effectiveness of awardees' programs is currently generally unavailable. Fourth, several programs have enrolled primarily non-Medicare participants, which limits Acumen's ability to quantitatively assess program effects, given that Medicare claims are the primary source of available patient-level data. Finally, analyses presented in this report for MedExpert, USC, and Pharm2Pharm do not account for potential program effects on expenditures or resource use in non-inpatient care settings for MA beneficiaries. With the exception of Welvie, which provided MA encounter data, Acumen only has access to Medicare enrollment, demographics and inpatient service use data for MA beneficiaries at this time. While Acumen used the Anthem MA claims data provide by Welvie to present analyses of program effects for the Welvie Ohio cohort in this report, Welvie informed Acumen that the Humana MA claims data sent to Acumen were incomplete at the beneficiary level for the Welvie Texas cohort and thus analyses of program effects could not be included for this cohort.

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1 INTRODUCTION

Acumen, LLC ("Acumen") and its partner, Westat, Inc., are contracted by the Centers for Medicare & Medicaid Services (CMS) to conduct a mixed-methods evaluation of nine programs implementing shared decision making (SDM) or medication management (MM) innovations. The nine programs are awardees of CMS's Health Care Innovation Awards (HCIA) Round One funding. CMS provided the awards to organizations with compelling new ideas for improving health, delivering better care, and reducing expenditures for individuals enrolled in Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). Round One HCIA awardees began enrolling participants in 2012. Acumen is evaluating the effects of the nine awardees' innovations on beneficiaries' health status, resource use, and health care expenditures, among other outcomes. As part of the evaluation, Acumen is also identifying factors that have contributed to awardee implementation successes and challenges. This second annual report presents updated or new findings for all nine HCIA awardees based on analyses conducted between August 2014 and August 2015. Section 1.1 below provides an overview of the awardees, while Section 1.2 describes our data sources and evaluation methods.

1.1 Overview of Awardees

The three SDM and six MM HCIA awardees aim to improve patient health, reduce health care resource use, and lower health care expenditures through novel patient-level care interventions. SDM encourages patients to become fully informed about the risks and benefits of available medical treatments and to participate in selecting the most appropriate treatments or care management options for their individual needs. SDM provides patients with decision aids and other information to encourage decision making based on the best scientific evidence available and on the patient's values and preferences. The HCIA SDM programs provide patients with advice on how to effectively communicate with their health care providers, as well as unbiased information on their medical conditions and treatment options, in an effort to reduce preference-sensitive procedures, reduce expenditures, and improve health outcomes and quality of care. The three SDM awardees are:

(1) Welvie LLC (Welvie),

(2) MedExpert International (MedExpert), and

(3) Trustees of Dartmouth College (Dartmouth).

MM programs aim to reduce medication-related adverse events and improve patient outcomes through improved medication use. The HCIA MM programs conduct medication reviews, work to improve care coordination and transition, and communicate with patients,

physicians, and other health care providers through a range of means, including phone, in-person meetings, and health information technology (HIT). The six MM awardees are:

(1) Carilion New River Valley Medical Center's Improving Health for At-risk Rural Patients (IHARP),

(2) University of Southern California (USC),

(3) The Trustees of the University of Pennsylvania (UPenn),

(4) The Pharmacy Society of Wisconsin (PSW),

(5) The University of Hawaii at Hilo's (UHawaii) Pharm2Pharm program, and

(6) The University of Tennessee Health Science Center's (UTHSC) SafeMed program.

The target populations and intervention, enrollment figures, and geographic reach of the SDM and MM awardees are described in greater detail in Section 2 and Section 3 respectively.

1.2 Data and Methods

Our mixed methods evaluation will focus on addressing the following overarching research questions:

(1) Which innovative approaches reduced health care costs while improving or maintaining the standard of care, patient health, and quality of life?

(2) Which contextual factors and mechanisms contributed to an intervention's success?

To comprehensively address these overarching research questions, Acumen is examining each awardee program across five evaluation categories. These five key research categories are: (i) innovation components, (ii) implementation effectiveness, (iii) program effectiveness, (iv) workforce issues, and (v) context. The first evaluation category, innovation components, provides a comprehensive description of the key components of the innovation, including the target population(s), theory of action, and theory of change driving the innovation. The second evaluation category, implementation effectiveness, focuses on identifying the factors associated with successful operational launch of the program and uptake by target populations. The third evaluation category, program effectiveness, examines the overall success of the intervention in improving patient health outcomes and quality of care and reducing resource use and medical expenditures. The fourth category, workforce issues, explores the innovation's impact on workforce training, staff size, skills development, and provider satisfaction. The fifth category, context, assesses the extent to which external policy and health system factors, and endogenous organizational factors influence program impacts. Table 1-1 details the key research questions that address each evaluation category and further highlights the research questions addressed by this evaluation report.

Table 1-1: Evaluation Framework and Key Research Questions

Evaluation Framework		
Evaluation Category	**Evaluation Dimension**	**Key Research Questions**
Innovation Components	Target Complexity	• How is the innovation designed to reduce expenditures or improve care quality? • Who does the intervention target? Which priority population(s) does the intervention target? Does it target individuals, organizations, or both? • What are the key components of the innovation? • To what extent is the innovation viewed as a "plug in" versus a fundamental and major change within the implementing organization?
Implementation Effectiveness	Fidelity Reach Dosage Overall Effectiveness Implementation Process	• Was the intervention delivered as intended to the target population in doses associated with effectiveness? • What were key successes in implementing the innovation as designed and factors associated with success? • What were the challenges in implementing the innovation as designed? • What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures? • Did the innovation use internal evaluation findings to inform the implementation process, when necessary?
Program Effectiveness	Health Cost Resource Use Care Quality	• What are the effects of the innovation on participants' health outcomes? • What are effects of the innovation on healthcare expenditures and health service resource utilization? • What is the impact of the innovation on quality of care? • If the innovation has positive effects with respect to health, cost, resource use, or care quality, how long are these changes sustained? • If the innovation has positive effects, what are the innovation components that are driving the change? • Does the innovation reduce disparities in care quality or health service utilization by race, ethnicity, gender, age or geographical location that are not attributable to differences in health status? • Do program effects on expenditures or utilization differ by subpopulation (e.g., priority populations, complex care patients, dual eligibles)?
Workforce Issues	Development and Training Deployment Satisfaction	• Did the innovation contribute in filling health care workforce gaps? • What type and level of workforce training does the innovation provide? • What type of support structure is available for staff? • What type of support structure is effective for staff deployment? • How does the innovation affect staff satisfaction? • Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem? • What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?

Evaluation Framework		
Evaluation Category	**Evaluation Dimension**	**Key Research Questions**
Context	Leadership Engagement Team Characteristics Organization Capacity Sustainability Scalability	• What endogenous (e.g., organizational) and exogenous (policy and environmental) factors affect implementation? • How is senior management structured, and how does it lead and communicate innovation changes to implementers? How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants? • Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future? • To what extent does the innovation duplicate practices or programs that are already existent? • How can successful innovation components be scaled and replicated in other settings?

Note: This evaluation framework is based on evaluation domains, dimensions, and research questions recommended in "CMS Innovation Center Health Care Center Innovation Awards: Evaluation Plan" (Rand, 2013) and CMS feedback during the evaluation process.

1.2.1 Qualitative Analysis

This second annual report presents new or updated qualitative findings for all nine HCIA awardees based on analysis conducted from August 2014 through August 2015, unless otherwise noted. The qualitative findings address four of the five above evaluation categories: innovation components, implementation effectiveness, workforce issues, and context. As part of our qualitative analysis, the Acumen team identified cross-cutting themes that were common across the SDM and MM awardees.

To obtain the qualitative information presented in this report, the Acumen team conducted quarterly in-depth telephone interviews with program leaders, staff, and providers. In addition, our group reviewed a number of secondary materials, including narrative reports prepared by each awardee and submitted to the Lewin Group; quarterly progress reports on the awardees developed by the Lewin Group; and supplemental information provided by each awardee (e.g., program policy and training documents, participant recruitment and educational material). For our interviews, our group developed an interview protocol designed to capture information consistently across awardees to address the research questions in the four qualitative evaluation categories listed in Table 1-1.

As part of the qualitative data collection for the fourth quarterly report, the Acumen team also conducted one- or two-day site visits with most awardee programs. During the site visits, the Acumen team observed day-to-day implementation and management of the interventions and spoke with innovation program staff about their efforts to implement the programs, including specific strategies which have worked well, implementation challenges, and factors which may affect program sustainability and scalability. The site visits entailed semi-structured interviews with program staff and organizational leadership and, when appropriate, the collection of

supplemental program materials from the sites. The semi-structured interviews used a subset of the questions from the full interview protocol used in the evaluation and included in our February 2015 HCIA Evaluation Design Report. These questions were tailored to reflect the current status of the innovation. The evaluation team worked with the individual awardees and CMS to select the locations for the site visits and determine the agenda and participants for the visits.

1.2.2 Quantitative Analysis

This report presents quantitative analysis for two SDM programs, Welvie and MedExpert, and three MM programs, IHARP, USC, and Pharm2Pharm, which were able to provide sufficient participant-level program data in time for inclusion in this report. Acumen conducted single difference and difference-in-differences (DiD) analyses of mortality, inpatient readmissions, resource use, and medical expenditures for Medicare beneficiaries targeted by awardee innovations primarily using intervention data and Medicare claims, and also using electronic health record (EHR) data in some cases, to address the evaluation category of program effectiveness. For our DiD analyses, Acumen used randomized control groups provided by the awardee in the case of Welvie or created propensity-score-matched comparison groups in the case of MedExpert, IHARP, USC, and Pharm2Pharm.

Acumen restricted intervention cohorts to beneficiaries enrolled in their respective interventions on September 30, 2014 or earlier. For all five awardees, Acumen uses Medicare claims data through December 31, 2014, and in the case of USC, Acumen also uses EHR data through December 31, 2014. For Welvie, MedExpert, USC, and Pharm2Pharm Acumen conducted analysis on Medicare Fee-for-Service (FFS) and Medicare Advantage (MA) beneficiaries. For Welvie's MA Texas cohort, Humana claims data received from Welvie were incomplete at the beneficiary level and thus while enrollment and payer mix information are reported, quantitative analysis findings for this MA cohort are not provided in this report. For MedExpert, beneficiaries enrolled through the intervention's partnership with Segal Consulting Group were excluded from the analysis due to concerns about prior exposure to the intervention, as described in Section 5.3. For IHARP, Acumen limited analysis to the FFS population since the MA cohort did not have an adequate number of beneficiaries for analysis. The quantitative data sources, comparison group selection, study inclusion criteria, analytic method, and outcome measures are further described below.

Data Sources

Acumen's quantitative analyses used participant-level intervention data obtained from awardees, Medicare data drawn from Acumen's CMS data holdings, and MA claims and EHR data provided by awardees when available. Using intervention data provided by awardees, Acumen obtained identifiers, program start dates, and other intervention data as available for

individual beneficiaries and linked them to their claims data files for analysis. Acumen also linked control group beneficiaries—who were either identified by awardees or selected by Acumen via non-experimental methods as described in the next section—to their Medicare data for analysis.

Acumen's in-house Medicare data were used to conduct analyses of all five awardees included in the quantitative analysis. The datasets utilized included Enrollment Database, Medicare Part A, B, and D claims, and Risk Adjustment and Payment System (RAPS) data. Acumen's claims data on Medicare FFS beneficiaries included diagnostics, health care service use, and expenditure data across care settings, which were used to create beneficiary-level longitudinal health profiles for analysis. For most of the awardees whose populations included MA beneficiaries, Acumen used the EDB, RAPS data, and inpatient claims data for the analysis of inpatient health service use and outcomes; note that none of these data sources provide information about expenditures.

Additionally, Acumen used data sources specific to individual awardees. Welvie provided encounter data for Anthem MA beneficiaries in Ohio and Humana MA beneficiaries in Texas who were in their intervention or control groups. However, since the Humana MA claims files received from Welvie were incomplete at the beneficiary level, only enrollment and payer mix information for this cohort are included in this report. EHR data, including utilization data, were used to construct a comparison group for the USC analyses and were pulled from AltaMed's NextGen EHR system (AltaMed is the network of community clinics where the USC innovation is implemented).

Comparison Groups

To conduct quantitative analyses, Acumen generally constructed propensity-score-matched comparison groups. Welvie's intervention, uniquely, was run as a randomized controlled trial, and Welvie provided a comparison group constructed from its randomization. In all other cases (MedExpert, IHARP, USC, and Pharm2Pharm), Acumen had to construct comparison groups by matching beneficiaries participating in the intervention to beneficiaries who were not intervened upon, using a variety of observable characteristics derived from the datasets that were described in the previous section. For this propensity score matching, Acumen matched each intervention group beneficiary to a control using scores constructed to reflect the beneficiaries' propensity to receive the awardee's intervention. These scores were generally based on predictive Medicare claims data variables including measures of sociodemographics, medical conditions, pre-enrollment health service use, prescription drug use, and medical expenditures and patterns. Acumen also leveraged program-specific information on intervention group characteristics and selection criteria to identify the appropriate set of variables to include in the propensity score matching model.

The matching model works by estimating the probability that a beneficiary will enroll in the intervention given observed covariates *X*. That is, if *D* = 1 for beneficiaries in the intervention group, and *D* = 0 for beneficiaries in the comparison group who do not receive an intervention, $\Pr(D_i = 1|X_i)$ is calculated using logistic regression, as per the following formula:

$$\Pr(D_i = 1|X_i) = \frac{e^{\lambda X_i}}{1 + e^{\lambda X_i}}$$

where X_i represents binary and continuous terms of the X covariates, and λ represents a vector of estimation parameters including a constant. Once the propensity score is calculated for both intervention group beneficiaries and potential controls, Acumen's approach is to match beneficiaries using both the propensity score and the values of X variables believed to be particularly important for predicting analysis outcomes. This ensures that covariate balance is achieved over a large variety of health-related covariates while also ensuring particularly close matches on critical covariates like age, baseline Medicare costs, and hospitalizations. The exact variables used varied based on intervention characteristics and data available, but the general process was as follows. Each intervention group beneficiary was first matched to a set of control group beneficiaries using exact matching on highly important categorical variables, especially important health utilization covariates like the presence of a recent hospitalization, and sociodemographic characteristics such as gender, race, dual eligibility and disability status. Among control beneficiaries who exactly matched on these variables, caliper matching was used to select control beneficiaries with propensity scores within 0.2 standard deviations of the propensity score from the intervention beneficiary as potential matches. Finally, a Mahalanobis-metric matching process was used to select for each intervention beneficiary the control beneficiary who was closest on a variety of key continuous variables, such as age and inpatient cost. Thus, each intervention beneficiary was matched to a control beneficiary who was highly similar on a variety of important prognostic characteristics. Intervention group beneficiaries without a matched comparison group member were excluded from the analysis.

Study Inclusion Criteria

Program participants and comparison groups are included in the quantitative portion of the analysis only if they have complete claims or encounter data beginning with a one-year pre-enrollment period (pre-enrollment period) through the intervention quarter of interest after entering the program (post-enrollment period). As such, Welvie, MedExpert, IHARP, USC, and Pharm2Pharm program participants and comparison groups are included in the analysis only if they are continuously enrolled in Medicare over this period. Beneficiaries who are continuously enrolled in Medicare but switch between FFS and MA are included in Acumen's MA analyses; Acumen uses the lowest common denominator of available data (inpatient utilization data for the MA population) to make sound comparisons over time. Additional exclusion criteria are applied

as appropriate to each analysis. Quantitative analyses on the three MM awardees, IHARP, USC, and Pharm2Pharm, are limited to Medicare Parts A and B or MA beneficiaries who were also continuously enrolled in Medicare Part D during the one year pre-intervention baseline period through the intervention quarter of interest. This restriction enables Acumen to include variables based on Part D prescription drug event data in the propensity score matching model. As mentioned above, the MedExpert analysis excludes beneficiaries recruited via the intervention's partnership with UHC, given these beneficiaries' prior exposure to MedExpert and their receipt of services not provided to other beneficiaries enrolled in the intervention.

Analytic Method

Acumen evaluated quarterly and cumulative program effects using single difference and DiD estimates measuring changes in the intervention groups relative to control from the pre-enrollment period to the quarter of interest in the post-enrollment period. As awardees enrolled beneficiaries into their programs on a rolling basis since program launch, Acumen used each beneficiary's enrollment date as a reference for defining the pre- and post-enrollment periods.

For the DiD estimates, Acumen first calculated average changes in health outcomes, quality of care, health service use, and medical expenditures for intervention group beneficiaries in the period after program enrollment compared with the pre-enrollment period, and then calculated the corresponding changes for comparison groups over the same period. For each outcome measure, Acumen subtracted the average change in the comparison group from that in the intervention group to obtain the DiD estimate, and calculated heteroskedastic-consistent standard errors for each estimate.

To show quarterly program effects, Acumen reports estimates for outcomes independently in each quarter after program enrollment in a non-cumulative fashion. For example, the DiD estimate for Medicare expenditures in the first quarter after program enrollment (Q1) reflects the difference between the intervention group and the control group in Q1 compared with the difference in per-person Medicare expenditures between the intervention group and the control group during the entire pre-enrollment year, scaled to one quarter (divided by four). Similarly, the DiD estimate for the second quarter after enrollment (Q2) reflects the difference between the intervention and control groups in Q2 compared again with the difference between the groups in the pre-enrollment year, scaled to one quarter. For example, if the Q2 DiD estimate for total inpatient expenditures was -$100, this would indicate that participation in the intervention was associated with a $100 decrease in expenditures in Q2 compared to the baseline period, relative to the comparison population.

To show cumulative program effects, Acumen reports one estimate for each outcome representing the effect of the program from the start of the intervention through the final quarter of available data for the awardee. This cumulative estimate is generated by producing a linear

sum of the coefficients from the quarterly effects regression coefficients and conducting a test of the significance of the joint coefficients. Acumen calculates the cumulative estimates in accordance with methodologies specified by the team overseeing the HCIA meta-evaluation to ensure that the results are able to support the meta-evaluation. A statistically significant cumulative estimate for a given outcome would indicate that the intervention was associated with a change of that magnitude across all quarters of the intervention compared to the baseline period, relative to the comparison population.

Acumen assessed statistical significance of estimated program effect on each outcome for all awardees at the 5% level. Cumulative results for each outcome are presented in tables that also show the 95 % confidence internals (CI) and p value. Quarterly key results are illustrated in figures showing plots of single difference or DiD estimates along with their 95% CI for each quarter after enrollment. In the results figures presented in Sections 4.4, 4.5, 5.4, 7.4, and 8.4 of this report, a statistically significant increase in an outcome is illustrated by a 95% CI that lies above the solid horizontal line representing null or zero effect, while a statistically significant decrease is depicted by a 95% CI that falls below this line. The effect estimate itself is represented by the midpoint of the 95% CI interval.

Outcome Measures

Acumen used CMS-recommended measures of health outcomes and quality-of-care indicators, health service use, and medical expenditures, and also constructed program-specific measures as relevant to evaluate program effects. For Medicare FFS beneficiaries in the Welvie, MedExpert, and IHARP programs, Acumen analyzed rates of mortality, 30-day readmissions (all-cause and unplanned), inpatient admissions (all-cause and unplanned), days spent in a hospital, emergency room (ER) visits, total Medicare expenditures, and categorical Medicare expenditures (inpatient, outpatient ER, outpatient non-ER, carrier/PB, skilled nursing, durable medical equipment, home health, and hospice). Acumen reports additional program-specific measures for Medicare FFS beneficiaries in Welvie (e.g., all-cause and preference-sensitive surgery rates and costs). Acumen is able to assess the full set of outcomes for Welvie MA beneficiaries because the awardee provided MA encounter data across care settings. However, since Acumen's available MA data is primarily inpatient utilization data, outcomes for MA beneficiaries in MedExpert include only mortality, 30-day readmissions, inpatient admissions, and number of hospital days. Acumen assesses this same limited set of outcomes for IHARP, USC and Pharm2Pharm, as the USC and Pharm2Pharm analyses combine Medicare FFS and MA beneficiaries into single cohorts, and the IHARP analysis evaluates Medicare FFS beneficiaries.

Quarterly trends on the meta-evaluation measures for Welvie, MedExpert, IHARP, USC, and Pharm2Pharm are reported in Appendix G of this report. The four meta-evaluation measures

include: total Medicare expenditure per person, ER visit rate, inpatient admission rate, and 30-day readmission rate. Detailed definitions of all outcomes measures, including the meta-evaluation measures, are provided in Appendix A.

For this second annual report, program effects on medication adherence measures have been calculated for three of the medication management interventions—IHARP, USC, and Pharm2Pharm. The medication adherence measure utilized the Pharmacy Quality Alliance (PQA) proportion of days covered (PDC) metric assessing the proportion of days with prescription coverage for particular drug classes; this metric has been endorsed by the National Quality Forum (NQF). The average per-person PDC was measured for a single drug or multiple drugs within each of the five therapeutic classes listed below in the year after enrollment. The PDC threshold is established at 80 percent based on clinical study results as the level above which the medication has a reasonable likelihood of achieving the most health benefit. Adherence rates were assessed as the percentage of beneficiaries who met the 80 percent PDC threshold for each of these five therapeutic drug classes. Adherence was measured for the following drug classes:

(1) Renin Angiotensin System (RAS) Antagonists (ACEI/ARB/Direct Renin Inhibitors)
(2) Cholesterol Medications (HMG-CoA inhibitors – Statins)
(3) Diabetes Medications (biguanides, DPP-IV inhibitors, sulfonylureas, thiazolidinediones)
(4) Beta-Blockers
(5) Calcium-Channel Blockers

The remainder of the report is structured as follows: Sections 2 and 3 summarize SDM and MM group-level findings, respectively. Sections 4 through 12 focus on each of the nine awardees and describe the major quantitative and qualitative evaluation findings through August 2015, unless noted otherwise.

2 SHARED DECISION MAKING AWARDEE GROUP SUMMARY

SDM encourages patients to become fully informed about the risks and benefits of available medical treatments and to participate in selecting the most appropriate treatments or care management options for their individual needs. SDM provides patients with decision aids and other information to encourage decision making that is based on the best scientific evidence available and on the patient's values and preferences. According to a Cochrane Database Systematic Review,[1] patients who receive specific, unbiased information about their treatment options tend to receive lower-intensity services compared to patients who do not receive such information.

Based on analyses conducted over the past year, the project team identified the following key findings related to the program and implementation effectiveness of the HCIA SDM programs:

- The Welvie intervention, which was conducted as a randomized controlled trial, was associated with statistically significant reductions in total medical expenditures, inpatient expenditures, and several other categories of expenditures among Medicare fee-for-service (FFS) beneficiaries in the first quarter following program enrollment.
- Additionally, Welvie was associated with both cumulative and quarterly reductions in various surgery-related categories of expenditures among Medicare Advantage beneficiaries.
- There is preliminary evidence that two of the SDM programs, Welvie and MedExpert, may be associated with significant reductions in mortality and in some types of inpatient readmissions.
- Cumulatively across the study period, neither Welvie nor MedExpert were associated with statistically significant reductions in health service resource use measures such as inpatient admissions or ER visits, although Acumen observed some significant reductions in resource use measures for each program in individual quarters.
- SDM awardees are making efforts to conduct outreach well before treatment decisions need to be made with the aim to improve patient engagement in their intervention
- SDM models that had fewer external dependencies experienced fewer implementation challenges than more complex SDM models.
- Sustainability of the intervention with the current SDM intervention populations following the end of the HCIA award is not confirmed for any of the awardees.

This section provides a group-level summary for the HCIA SDM awardees, including descriptions of the interventions and findings of the evaluation as of August 2015, unless

[1] Dawn Stacey et al., "Decision Aids for People Facing Health Treatment or Screening Decisions," Cochrane Database of Systematic Reviews, 10 (2011).

otherwise noted. Section 2.1 provides an overview of the HCIA SDM portfolio: the core components of each of the innovations, enrollment, and geographic reach. Section 2.2 summarizes SDM group-level evaluation findings for the evaluation categories of implementation successes and challenges; factors affecting sustainability and scale-up; health outcomes and quality of care; health service resource use; and medical expenditures.

2.1 HCIA SDM Program Overview

The SDM interventions provide an alternative source of information about treatment options, patient safety, and clinical guidelines that can support or fill gaps in patient education traditionally delivered by a physician, nurse, or other health care provider. The HCIA SDM program portfolio consists of three SDM awardees: Welvie, MedExpert, and Dartmouth. All three SDM awardees provide interventions directly to individuals as SDM program participants.

(i) *Welvie* offers education, health information, and decision-making resources regarding preference-sensitive surgeries to Medicare beneficiaries with the goal of enhancing patient experiences, increasing surgery literacy, improving surgical outcomes, and reducing the incidence of inappropriate surgeries. Surgery decision aids are primarily accessed through a web-based tool or paper equivalent format and are also available by phone.

(ii) *MedExpert* offers Medicare beneficiaries educational information, physician advice, and assistance interpreting health benefits and treatment options primarily over the phone—all with the goal of increasing transparency, improving health care quality, and reducing health care costs.

(iii) *Dartmouth* offers decision aids and other support for patients considering hip, knee, or spine surgery and for complex patients with diabetes or congestive heart failure. The goal of the innovation is to improve patient engagement and decision-making and thereby increase care quality and align treatment choices with patients' preferences. Services related to the intervention's shared decision-making focus are offered primarily in person or over the phone by health coaches.

The remainder of this section details various aspects of the SDM programs: (i) core components of the innovations, (ii) enrollment, and (iii) geographic reach.

2.1.1 Core Components of the Innovations

The Welvie and MedExpert innovations have relatively simple designs with respect to eligibility criteria, patient identification processes, intervention components, and staffing, while the Dartmouth intervention is considerably more complex. Welvie and MedExpert are population-based interventions that use a limited number of eligibility criteria (e.g., insurance eligibility, age), which allow them to reach a broad set of beneficiaries who may benefit from the interventions. By contrast, the Dartmouth innovation targets patients with specific health conditions by using multiple eligibility criteria, such as specific diagnoses, procedure codes, and age. MedExpert and Welvie also used centralized processes for patient identification, which has

allowed them to identify large groups of patients to target for the intervention. Conversely, Dartmouth relied on health care providers and administrative staff at each site to refer individual patients to the intervention on an ongoing basis. Welvie and MedExpert each had one core SDM intervention used by all participants, while Dartmouth's intervention included decision aids targeted to five conditions—with multiple decision aids available for some conditions—and health coaching. One result of these model design differences is that Welvie and MedExpert required far fewer staff than Dartmouth for program implementation. Further implications of these differences in innovation design are discussed below in Section 2.2.1.

All SDM awardees offer varying levels of intervention intensity (e.g., high dose, low dose). The goals of using different dosages are to improve beneficiary satisfaction with the interventions and to improve efficiency by allocating resources to beneficiaries most in need. Two of the SDM awardees, Welvie and MedExpert, allow beneficiaries to opt into a higher intensity level depending on their needs. For example, Welvie provides its low-dose intervention—educational outreach mailings with limited information on medical decision-making—to all beneficiaries, and those beneficiaries can choose to access the high-dose intervention, a six-step decision aid providing more comprehensive information. Similarly, beneficiaries may choose to continue engaging with MedExpert's intervention on a repeated basis, and MedExpert classifies four or more discussions about the same medical topic as a high-intensity intervention. Dartmouth is in the process of defining high, medium, and low doses of SDM interventions, which will vary in educational content and in the extent of follow-up by a health coach. MedExpert and Dartmouth vary the frequency of their follow-up efforts with participants. Welvie also allows repeated use of its decision aid. All three awardees collect information on the value of different dosages to better meet the SDM needs of participants and to inform their sustainability plans.

SDM awardees use different types of staff and technology to deliver the SDM interventions. Dartmouth utilizes health coaches, who may be clinical (e.g., RNs) or non-clinical staff, to help patients understand treatment options and clarify their personal goals. The Dartmouth implementation is also supported by physicians and other clinical staff who may refer patients to the SDM program. Moreover, Dartmouth provides patients with video-based decision aids, either web-based or DVD, as well as paper equivalents. MedExpert uses physicians or nurses to deliver and help interpret the key SDM information for patients. The Welvie innovation is delivered mostly online or in paper format. Nurses deliver the Welvie SDM innovation for less than one percent of participants.

The specific components of each of the SDM programs are described in the two tables below. Table 2-1 describes enrollment criteria, while Table 2-2 outlines other key features of the programs.

Table 2-1: Innovation Eligibility Criteria and Process for Identifying Eligible Patients

Core Components	Welvie	MedExpert	Dartmouth
Summary of Eligibility Criteria	Medicare FFS and MA beneficiaries, regardless of health condition, excluding nursing home residents Age-related eligibility criteria varied by implementation partner: • Medicare FFS: 65 years or older • Anthem BCBS Ohio: 65 years or older, expanded to include under 65 years in spring 2015 • Humana Texas: all beneficiaries regardless of age	Medicare FFS and MA beneficiaries, regardless of age or health condition;	All patients who are candidates for preference-sensitive hip replacement, knee replacement, or spine surgery and beneficiaries with congestive heart failure (CHF) or diabetes.
Process for Identifying Eligible Patients	Insurance eligibility files are filtered to include Medicare beneficiaries who meet the intervention eligibility criteria.	Insurance eligibility files are filtered to include Medicare beneficiaries who meet the intervention eligibility criteria.	Processes for patient identification at site visit locations include, but are not limited to: • Provider referrals • Administrative staff identification of eligible participants using diagnosis codes and/or appointment types Unable to assess for locations not included in site visits

Table 2-2: Innovation Components and Key Features

Core Components	Welvie	MedExpert	Dartmouth
Key Program Components	• "Low dose": Welvie sends outreach mailings to the randomized intervention group that provide information related to surgery decision-making, patient safety, and clinical guidelines (e.g., when to get a second opinion, colonoscopy guidelines). The mailings include information on how to access Welvie's six-step decision aid. • "High dose": Beneficiaries in the randomized intervention group can choose to use Welvie's six-step decision aid, which can be completed online, on paper, or by phone. The decision aid is designed to educate patients about potential risks, benefits, treatment alternatives, and expectations related to surgery.	• MedExpert's staff of Medical Information Coordinators (MICs) and physicians use the MedExpert International Guidance System (MIGS), an information-harvesting and report-generating system that incorporates clinical guidelines, medical research, and other evidence-based health information, to provide evidence-based information on around 22,000 medical conditions to beneficiaries. • MedExpert defines two levels of engagement: o An "encounter" is defined as one discussion or contact o An "episode" is considered a higher level of engagement often involving multiple discussions about the same health or care assistance topic. • MedExpert also offers a range of patient advocacy and administrative services and consults with world experts on complex cases that require additional professional judgment.	• The SDM components of the Dartmouth innovation include: o Web-based and DVD video and other decision aids (e.g., paper versions) about: hip or knee joint replacement surgery; spine surgery; implantable cardio-defibrillator (ICD) surgery or chronic disease management of CHF or diabetes. o Health coaching, during which a health coach meets with the patient to explain treatment options, discuss the patient's personal values and certainty about the treatment decision, and help plan next steps. • Some sites are working to develop different levels of health coaching intensity (i.e., high, medium, low) to help sustainably allocate health coach resources.

Core Components	Welvie	MedExpert	Dartmouth
Types of Staff Used for the Innovation	• IT technicians/specialists • Management or administrative staff • Registered nurses	• Care coordinators/case managers/patient navigators • IT technicians/specialists • Management or administrative staff	• Health educators/health coaches • IT technicians/specialists • Management or administrative staff • Registered nurses • Physicians
Program Implementation Start Date	September 2012	February 2013	March 2013
Program Length	Undefined	Undefined	Undefined
Setting Where Services Delivered	Community; ambulatory care (starting in June 2015)	Community	Ambulatory care; hospital

2.1.2 Enrollment

The SDM awardees have been enrolling patients on a rolling basis since 2012.

Table 2-3 lists each awardee's cumulative enrollment, based on participant-level program data provided by the awardees to Acumen. Welvie and MedExpert each have a large number of individuals in their intervention group—235,081 and 325,121, respectively—and over 90% of them are either enrolled in Medicare Parts A and B or MA. Dartmouth's participant population was substantially smaller, with 10,860 SDM participants, and about 48% of these were enrolled in Medicare Parts A and B or MA. Moreover, about 48% of Dartmouth's participants were either not enrolled in Medicare on the day they entered the program or did not have sufficient identifiers to be linked to Medicare data. Note that this report only considers individuals in the Dartmouth intervention who specifically participated in SDM programs; more than 30,000 Medicare beneficiaries participated in other patient engagement activities funded through the grant but not in SDM programs, and these beneficiaries are not included in this report.

Table 2-3: SDM Enrollment and Payer Mix

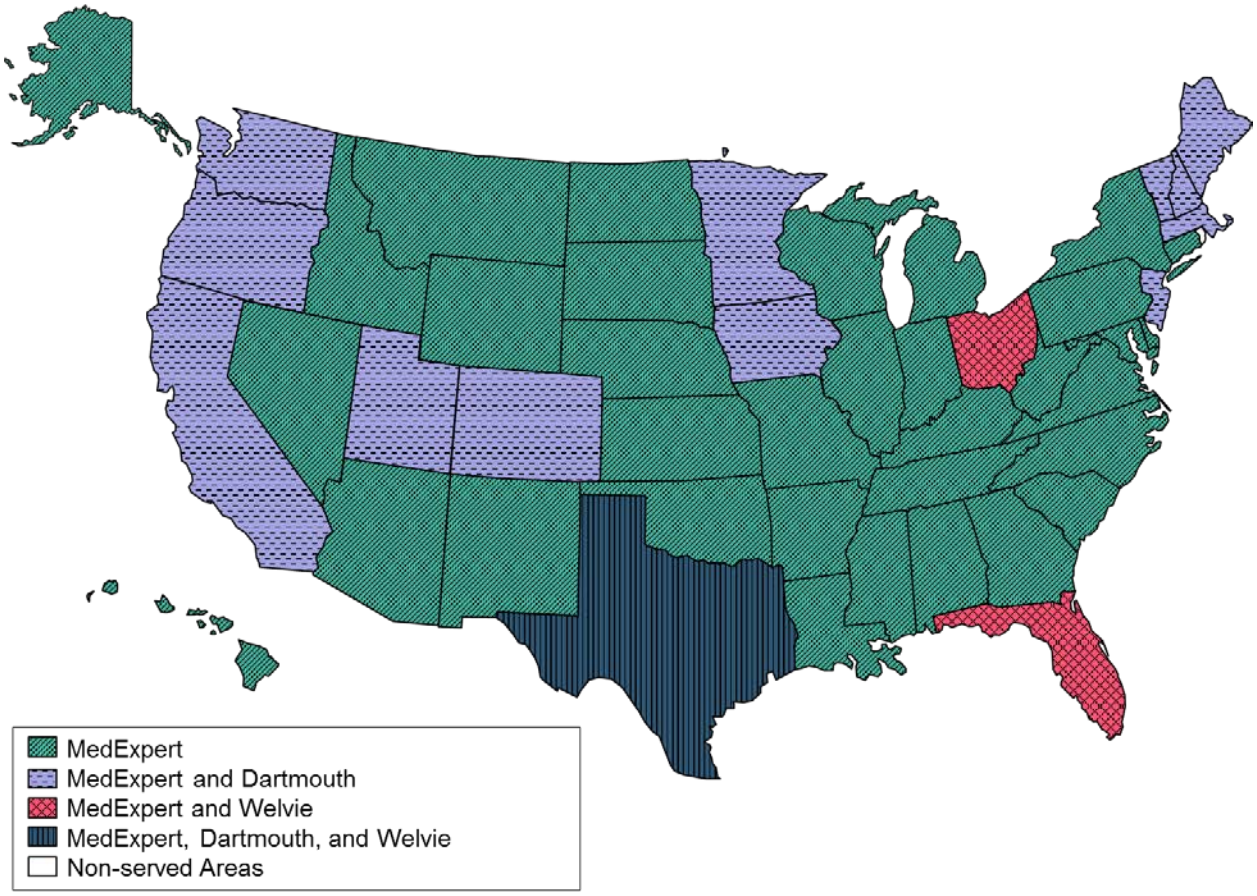
Awardee	Earliest Enrollment Date	Latest Enrollment Date	Medicare Parts A and B (FFS)		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled / Unknown		Total
Dartmouth	1/2/2013	4/4/2015	4,519	42%	601	6%	481	4%	5,259	48%	10,860
MedExpert	2/20/2013	3/31/2015	86,975	27%	213,685	66%	6,066	2%	18,395	6%	325,121
Welvie (Total)	9/7/2012	2/20/2015	66,352	28%	160,336	68%	5,998	3%	2,395	1%	235,081
Welvie (Ohio)	9/7/2012	2/20/2015	66,338	37%	106,564	59%	5,995	3%	2,391	1%	181,288
Welvie (Texas)	5/16/2014	8/1/2014	14	0%	53,772	100%	*	*	*	*	53,793

Source: Participant-level program data provided by awardees to Acumen.
Notes: "Medicare Parts A and B" and "Medicare Advantage" may include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part D.
Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.
"Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

2.1.3 Geographic Reach

The geographic reach of SDM HCIA awardees is shown in Figure 2-1. Welvie continues to serve participants in Ohio and Texas, and started implementing provider referrals to its program through Humana-owned practices in Florida beginning in June 2015. MedExpert has offered its services primarily to individuals in California, Texas, Nevada, Idaho, Kentucky, Washington, and a smaller number of individuals in other states. Dartmouth provides services in multiple states spread across the country.

Figure 2-1: Geographic Reach of SDM Awardees



Source: Lewin Quarterly Awardee Progress Reports (January-March 2015)

2.2 Evaluation Findings

This section provides an overview of updated group-level evaluation findings for the SDM HCIA awardees, reflecting new analytic results from August 2014 through August 2015, unless noted otherwise. Quantitative analysis findings on program effects based on an analysis of Medicare claims data for Welvie and MedExpert are summarized in Sections 2.2.1, 2.2.2 and 2.2.3. The quantitative evaluation of the Welvie program was limited to the Medicare FFS and MA cohorts in Ohio. MA claims data received from Welvie for its Humana MA cohort in Texas were incomplete at the beneficiary level and thus quantitative analysis of program effects are not provided in this report. Although Acumen has received data on Dartmouth program participants, at the time this report was written, Acumen and CMS had not finalized the scope and methodology to be used for a quantitative analysis of Dartmouth's program effectiveness. The quantitative analyses found statistically significant decreases in mortality and particular types of hospital readmissions in both the Welvie and MedExpert intervention groups relative to their

respective comparison groups cumulatively across the evaluation period.[2] Statistically significant effects on resource use and expenditures outcomes were generally limited to one or two individual quarters after program enrollment for both programs; however, cumulative effects in a few categories of expenditures were statistically significant for both the Welvie and MedExpert interventions. Qualitative findings for all three SDM awardees on common trends, lessons learned, and challenges across the three SDM HCIA awardees are summarized in Sections 2.2.4 and 2.2.5. SDM awardees are making efforts to conduct outreach well before treatment decisions need to be made with the aim to improve patient engagement in their intervention, and SDM models that had fewer external dependencies experienced fewer implementation challenges than more complex SDM models. These findings are based on a review of available HCIA awardee progress reports and program documents, site visits and in-depth telephone interviews with awardees.

The quantitative analysis findings on SDM program effects may be subject to some limitations. Welvie FFS and MA cohorts in Ohio were followed for seven quarters after program enrollment, and MedExpert FFS and MA cohorts were followed for six quarters after program enrollment. Changes in certain outcomes many only be observable on a longer time horizon than that included in the present report, and Acumen will continue to examine appropriate outcomes for additional quarters in subsequent reports as additional data become available. Claims data on expenditures and non-inpatient resource use outcomes were not available for the MedExpert MA cohort, and thus potential effects of the program on such outcomes could not be assessed for the MA cohort. While our intention-to-treat analysis of the Welvie program utilizes randomized intervention and comparison groups provided by the awardee, randomized comparison groups were not available for MedExpert. Consequently, Acumen matched comparison groups drawn from Medicare files to the MedExpert intervention group based on demographic and health status variables available in Medicare data. The MedExpert results may thus be subject to unobserved differences between the comparator groups. The MedExpert treatment and comparison populations are well-matched on observable characteristics, and Acumen will continue refining the comparison group matching model for future reports.

2.2.1 Mortality and Inpatient Readmissions

Both the Welvie and MedExpert interventions were associated with statistically significant decreases in mortality, and both programs were also associated with reductions in certain types of hospital readmissions. The remainder of this section describes these results in detail.

[2] Outcomes were assessed at the five percent level of statistical significance.

The Welvie and MedExpert intervention groups had statistically significant decreases in mortality in their Medicare FFS intervention groups relative to their respective control groups; however, statistically significant mortality effects were generally not observed for their MA cohorts. Cumulatively over the seven quarters after program enrollment, there was a statistically significant decrease of 808 deaths—or about 2 deaths per 1,000 beneficiary-quarters—among the 62,531 Medicare FFS beneficiaries who received the Welvie intervention for at least one quarter. The MedExpert intervention was also associated with a statistically significant decrease of 235 deaths—or about 1 death per 1,000 beneficiary-quarters—cumulatively over the six quarters after program enrollment among the 48,778 Medicare FFS beneficiaries who received the intervention for at least one quarter. These cumulative estimates are generally consistent with statistically significant mortality decreases observed in multiple individual quarters for FFS beneficiaries for both interventions. Among MA beneficiaries, however, the Welvie and MedExpert interventions were not associated with statistically significant effects on mortality cumulatively over the study period, although a statistically significant decrease of about 1 death per 1,000 beneficiaries was observed in the second quarter for the MedExpert MA cohort.

The MedExpert intervention was associated with statistically significant decreases in hospital readmissions following all-cause inpatient admissions for the MA cohort but not for the FFS cohort. Cumulatively over the six quarters after program enrollment, there was a statistically significant decrease of 156 hospital readmissions following all-cause inpatient admissions—or about 9 readmissions per 1,000 beneficiary-quarters—for 14,352 MedExpert MA beneficiaries with an inpatient stay relative to controls. When examining quarterly fixed effects, however, MedExpert had no statistically significant effect on readmissions following all-cause inpatient admissions among MA beneficiaries in any of the six quarters after program enrollment. The intervention had no statistically significant effect on all-cause inpatient readmissions for FFS beneficiaries at either the cumulative or quarterly level.

The Welvie intervention was associated with statistically significant decreases in readmissions following surgery-related hospital admissions for the Medicare FFS Ohio cohort, but results were inconclusive for the MA cohort. This outcome was included in Welvie's evaluation because Welvie's SDM intervention includes guidance on recovery after surgery and aims to improve surgical outcomes. Cumulatively over the seven quarters after program enrollment, the Welvie intervention was associated with statistically significant decreases of 118 readmissions following any inpatient surgery—or about 13 readmissions per 1,000 beneficiary-quarters—among 7,861 FFS beneficiaries who had an inpatient surgery stay during this study period relative to controls. There was also a statistically significant decrease of 56 readmissions following inpatient preference-sensitive (PS) orthopedic surgery—or about 26 readmissions per 1,000 beneficiary-quarters—among 176 FFS beneficiaries who had this surgery cumulatively over this period, compared with controls. The quarterly fixed effects analysis for Welvie also

showed statistically significant decreases of 50 readmissions per 1,000 beneficiaries following inpatient surgery and 66 readmissions per 1,000 beneficiaries following inpatient PS orthopedic surgery for FFS beneficiaries in the third and seventh quarters, respectively, and non-significant decreases in most of the other quarters. For MA beneficiaries, there were no statistically significant cumulative effects on readmissions, although there was a statistically significant increase of 71 readmissions following inpatient PS orthopedic surgery per 1,000 beneficiaries observed in the sixth quarter.

2.2.2 Health Service Resource Use

The impact of Welvie and MedExpert on inpatient admissions and ER visits was generally inconclusive. At the cumulative level, neither program had statistically significant effects on inpatient admissions based on the available quarters of data following program enrollment. At the quarterly level, Welvie did not have statistically significant effects on inpatient admissions in any of the individual quarters for the FFS or MA Ohio cohorts. Among MA beneficiaries, MedExpert was associated with a statistically significant decrease of 3 inpatient admissions per 1,000 beneficiaries in the second quarter after program enrollment, but there were no significant results for this outcome in other individual quarters. For both programs, cumulative effects on ER visits were not statistically significant. At the quarterly level, the Welvie FFS intervention group had a statistically significant decrease of 6 ER visits per 1,000 beneficiaries in the third quarter after program enrollment, while the MedExpert FFS intervention group had a statistically significant decrease of 10 ER visits per 1,000 beneficiaries in the first quarter.

Results on the effects of the Welvie intervention on surgeries are also generally inconclusive for the FFS and MA Ohio cohorts. Surgery rates are included as an outcome for Welvie's evaluation as the SDM intervention is focused on helping beneficiaries make appropriate decisions regarding preference-sensitive surgeries. The Welvie intervention was not associated with statistically significant effects on surgeries for any of the cohorts in the cumulative analysis, and only a small statistically significant decrease in surgeries (of about 2 inpatient surgeries per 1,000 beneficiaries) was found in Q3 for the MA Ohio cohort.

2.2.3 Medical Expenditures

The Welvie and MedExpert interventions were not associated with cumulative decreases in total Medicare expenditures over the study period. However, the two programs did have significant effects on individual expenditure categories or in individual quarters after program enrollment. The remainder of this section describes these findings in detail.

MedExpert did not have a statistically significant effect on total Medicare expenditures across the study period, but it was associated with statistically significant decreases and increases in expenditures for certain types of services for the FFS cohort. There was a statistically

significant decrease of $2,456,864 in home health expenditures—or about $14 per 1,000 beneficiary-quarters—cumulatively over the six quarters after program enrollment among 48,778 FFS beneficiaries who received the MedExpert intervention for at least one quarter. However, there was also a statistically significant increase of $3,022,104 in outpatient non-ER expenditures—or about $17 per 1,000 beneficiary-quarters— cumulatively over this same period in that population. At the quarterly level, the only statistically significant effect observed was a decrease in ER expenditures of around $8 per beneficiary for the FFS cohort, but this was only observed in the first quarter after program enrollment.

Welvie did not have cumulative statistically significant effects on total Medicare expenditures or inpatient expenditures for the FFS Ohio and MA Ohio cohorts, but the intervention was associated with decreases in medical expenditures in individual quarters. Among FFS Ohio beneficiaries, Welvie was associated with a statistically significant decrease in total medical expenditures of $107 per beneficiary in the first quarter after program enrollment relative to controls. For the Welvie MA Ohio cohort, there were statistically significant decreases in inpatient expenditures of $47 per beneficiary and skilled nursing facility expenditures of $13 per beneficiary in the third and fourth quarters, respectively. There were non-significant reductions in these outcomes in most of the other quarters for the Welvie MA Ohio cohort.

Additionally, there were statistically significant cumulative decreases in total surgery expenditures and outpatient surgery expenditures for the Welvie MA Ohio intervention group relative controls. Cumulatively over the seven quarters after program enrollment, there were statistically significant decreases in total surgery expenditures of $14,855,286 and outpatient surgery expenditures of $4,123,856 among 92,341 MA Ohio beneficiaries who were enrolled in the Welvie intervention for at least one quarter. There was also a statistically significant reduction in total surgery expenditures of $35 per beneficiary in the third quarter after enrollment, and statistically significant per-beneficiary reductions in outpatient surgery expenditures of $15 and $12, respectively, in the first and fourth quarters for the MA Ohio cohort.

2.2.4 Implementation Successes and Challenges

Key themes regarding SDM implementation successes and challenges during the August 2014 through August 2015 timeframe include:

- **SDM models that had fewer external dependencies experienced fewer implementation challenges and reached maturity faster than more complex SDM models.** The Welvie and MedExpert innovations are simpler "plug-in" innovations that are implemented in partnership with health insurance plans. The major dependencies in the Welvie and MedExpert implementations occurred early in the projects and included establishing formal legal partnerships and obtaining data from partners. Once these

dependencies were met, Welvie and MedExpert independently carried out major implementation tasks, including patient identification, outreach, and SDM service delivery. The implementation of these projects is fully mature, and they are in the maintenance phase of implementation. In contrast, the Dartmouth innovation is the most complex of the SDM innovations, and as of July 2015, eight of the fourteen[3] Dartmouth implementation sites had enrolled patients in the SDM innovation. The Dartmouth innovation depends on sites to enact major changes to clinical workflow, informatics infrastructure, and resource commitments, and sites reported challenges with many aspects of the implementation. The Dartmouth Project Management Office provided additional support to implementation sites, as needed, and successful implementation sites are beginning to share best practices on a variety of topics, including provider engagement and use of the local EHR to support SDM in facilitating implementation at less mature sites.

- **For many health conditions, SDM awardees are conducting outreach well before treatment decisions need to be made to improve engagement in and, possibly, effectiveness of the interventions.** SDM innovations are time-sensitive because beneficiaries' treatment decisions are often made shortly after initial diagnosis or consultation. Leadership from all three SDM awardees reported that early outreach improved the effectiveness of many interventions, and as a result, each of the SDM awardees has developed strategies to deliver timely SDM information. For example, for some sites, Dartmouth moved its decision aids upstream in the patient's experience (e.g., providing them incident to a physical therapy session instead of a surgical specialty visit, or during a primary care clinic visit instead of a specialty visit) to engage patients before surgery-related decisions are made. Additionally, MedExpert and Welvie conduct regularly scheduled, population-based outreach to build awareness of their services so that beneficiaries can access the SDM interventions when needed. Welvie also reviews regional health care utilization patterns and schedules mailed outreach to arrive before periods of increased surgery utilization. As part of its research activities, Welvie found that surgery-focused materials resonated with patients too late in disease progression (e.g., after an emergency room visit) to be optimally effective. As part of its Ohio implementation, Welvie revised its cardiac-related outreach materials to focus on disease management in efforts to increase early program participation among patients with or at risk of a cardiac condition. The revised outreach materials were distributed to the Anthem cardiac population in Ohio only, and Welvie observed increased response rates. As a result, the revisions to the cardiac materials were made available to other non-Anthem populations. Dartmouth reported that early outreach was not appropriate for only one of its SDM interventions, SDM for spine surgery, because eligibility was based on a consultation with a spine surgeon, and thus outreach could not be moved earlier in care.
- **MedExpert and Welvie report multiple best practices in direct outreach to Medicare beneficiaries.** Welvie's outreach is primarily conducted by mail with phone

[3] In addition to the fourteen sites implementing HCIA-funded SDM and patient-engagement programs, the HVHC included four additional collaborative partners: Hawaii Pacific Health, Sinai Health System, The Dartmouth Institute, and UC San Diego Health System.

follow-up. Welvie reports that the following outreach strategies have been effective in engaging beneficiaries in the program and generating better response rates: (i) providing incentives; (ii) mailing outreach materials followed by a telephone reminder; (iii) mailing envelopes, as compared to postcards, with the CMS or Department of Health and Human Service logo; and (iv) delivering outreach materials to beneficiaries on Monday, as compared to later in the week. Welvie also reports improved response rates among cardiac patients using outreach materials that focus on chronic disease management rather than on heart surgery. MedExpert's outreach is primarily conducted by phone with a limited number of mailings. MedExpert reports that its phone-based direct outreach has been successful, and it attributes this success to a natural-sounding, low-pressure approach during phone-based outreach. Both interventions offered multiple ways to verify that the service was legitimately associated with CMS (e.g., 800-MEDICARE; CMS website).

- **Dartmouth and Welvie continue to address challenges to provider referrals to SDM, such as concerns over increased workload.** To address some providers' concerns about workload, Dartmouth has shared feedback from other providers who report that SDM did not increase appointment time and instead helped to focus appointment conversations by providing patients with most of the information needed to make care decisions. Welvie launched its provider referral project in June 2015 and has similar plans to leverage positive feedback from the first cohort of providers participating in its intervention. Welvie hopes that these early adopters will convince other providers of the value of the Welvie SDM intervention.
- **All SDM awardees use shared learning to facilitate implementation and train new staff.** Dartmouth is developing brief articles that highlight successes and lessons learned at its successful implementation sites and disseminating the articles to all project partners. At MedExpert, staff physicians lead weekly meetings with Medical Information Coordinators (MICs) to discuss approaches to common call topics (e.g., back pain). MICs reported that these meetings with the physicians are highly valuable and help the nurses conducting the initial calls to capture and record the information the physician may need when reviewing the case for follow up. MICs also reported that MedExpert's most useful training was shadowing/observing a more experienced MIC before fielding calls independently. As noted above, Welvie plans to use initial findings from the provider referral project to educate new providers in the future.
- **Nursing staff who were interviewed report high levels of satisfaction from delivering SDM interventions to patients.** During site visits to Dartmouth implementation sites and MedExpert's call center location, nursing staff were among the strongest supporters of SDM and viewed SDM and health coaching as core competencies of nursing. Dartmouth nurses whose practice did not involve health coaching prior to the HCIA award reported increased job satisfaction. Similarly, MedExpert MICs with a nursing background reported that job satisfaction increased for staff who enjoy engaging with beneficiaries and building relationships.
- **The Welvie and MedExpert innovations leverage beneficiaries' friends and family as partners in the interventions.** If Welvie participants decide to undergo surgery, the last three steps of the Welvie decision aid help them prepare for surgery and recovery in

part by engaging "friends and family buddies," who are expected to play a key support role before, during, and after surgery. The decision aid provides buddies with tools, such as pre-surgery checklists and medication trackers. For MedExpert participants with severe conditions, MedExpert staff may obtain the beneficiary's consent to work with a "communicator," who is a designated family member or friend who communicates directly with MedExpert and relays the information to the beneficiary. MedExpert reports that communicators are especially useful in cases when the beneficiary is overwhelmed with coping with his or her illness and with processing a high volume of information.

- **The SDM awardees' implementation partners sought to align chronic disease-focused SDM interventions with other care management programs.** Welvie has revised its intervention's information on CHF to better align with a chronic disease management program offered by Anthem in partnership with the Cleveland Clinic. The latter's program is an evidence-based chronic disease management program designed to stop or reverse the progression of heart disease. Cardiac patients who use the Welvie decision aid will have the opportunity to participate in ongoing chronic disease management offered through Anthem's partnership. Similarly, MedExpert continues to work closely with its partner, United HealthCare (UHC), to integrate its intervention with the insurer's existing disease management services. As of February 2015, approximately 30 beneficiaries have participated in UHC disease management programs after referral from MedExpert. At many of Dartmouth's implementation sites, health coaching for diabetes and CHF was integrated into existing chronic disease management programs.
- **Changes in Medicare policy supported sustainability of the Dartmouth and Welvie interventions.** Starting in January 2015, Dartmouth implementation sites that use qualifying clinical staff as health coaches were able to bill for diabetes and CHF health coaching under the new CMS Chronic Care Management fee schedule. Dartmouth reports that this rule change is helping sites financially sustain health coaches with clinical backgrounds. A separate CMS rule change in January 2015 that allows MA plans to offer incentives for health improvement programs facilitated Welvie's partnerships with additional MA plans beyond those involved in the HCIA project.

Additional successes, challenges, and lessons learned for each individual awardee are discussed in Sections 4, 5, and 6.

2.2.5 Factors Affecting Sustainability and Scale Up

Common trends and challenges on sustainability and scale up across the three SDM HCIA awardees are summarized below:

- **Sustainability with the current SDM intervention populations is not confirmed for any of the awardees.** Both Welvie and MedExpert are engaged in discussions with current partners to continue services after award funding ends. Welvie is operating under a no-cost extension for the innovation population until December 2015. MedExpert did not receive an extension and is developing policies regarding temporary services for existing innovation participants. In contrast, the Dartmouth innovation is co-funded by partner organizations, and as a result, key components of the intervention may remain operational at the discretion of the implementation sites. Dartmouth is working with its

implementation sites to understand how the SDM innovation will be maintained at each site. Dartmouth has received some contract funds to continue dissemination of HCIA findings and is awaiting decisions on federal grant applications that would fund qualitative work related to the HCIA implementation.

- **Welvie is successfully scaling up its intervention to include new MA beneficiaries in multiple regions of the country.** In 2014 and 2015, Welvie added new Medicare Advantage partners, including Wellcare, BCBS of Michigan, and BCBS of Rhode Island. Welvie scaled its innovation to 600,000 additional Medicare beneficiaries (not included in the HCIA project), with little to no changes in workforce or innovation components.

  Additional sustainability findings for each awardee are summarized below in Table 2-4.

Table 2-4: Sustainability and Scale Up

Sustainability and Scale Up	Welvie	MedExpert	Dartmouth
Status of No-Cost Extension	6-month extension Extension funds to be used for: • Ongoing outreach and enrollment • Local community beneficiary events • Beneficiary recruitment through provider practices	No extension.	One-year extension Extension funds to be used for: • Access to decision aids for an additional 6 months • Ongoing evaluation of the HCIA project, including access to CMS data, for 12 months
Key Sustainability Strategies Pursued	• Welvie is engaged in discussions with Anthem and Humana to maintain and/or expand existing partnerships. • In 2014 and 2015, Welvie added new Medicare Advantage partners, including Wellcare, BlueCross BlueShield (BCBS) of Michigan, and BCBS of Rhode Island. • Welvie is in discussions with Cigna regarding new contracts.	• MedExpert is engaged in discussions with United Healthcare (UHC) and Segal Consulting to maintain and expand existing partnerships.	• Dartmouth received funding from the LJ Arnold Foundation to support ongoing dissemination of HCIA findings. • The Dartmouth CEO is meeting with partner site CEOs to obtain ongoing support for HVHC activities.
Status of Innovation	• There is no change to services for beneficiaries in the existing intervention group. • Provider referrals have launched in selected Humana practices in Florida.	• Services to FFS beneficiaries concluded on June 30, 2015. • Services to the Segal Group will continue pro bono. • As of June 2015, MedExpert was developing new policies regarding service delivery to existing United Healthcare beneficiaries.	• The Dartmouth data infrastructure is being supported, in part, through the no-cost extension, and will be sustained by the HVHC thereafter. • Dartmouth is working with its implementation sites to understand how the SDM innovation will be maintained. • Some implementation sites are sustaining their health coaches by expanding the health coach role to include additional tasks.

3 MEDICATION MANAGEMENT AWARDEE GROUP SUMMARY

MM programs aim to optimize therapeutic outcomes and reduce adverse events through improved medication use. The HCIA MM awardees' interventions involve conducting in-depth medication reviews, improving care coordination and transitions, and communicating with patients, physicians, and other health care providers to resolve medication-related problems using phone calls, in-person meetings, and health information technology (HIT).

Based on analyses conducted over the past year, the project team identified the following key findings related to the program and implementation effectiveness of the HCIA MM programs:

- There is no evidence that the MM programs had a significant effect on medication adherence
- The analysis of the effects of the interventions on measures of health service resource use was inconclusive.
- Expenditure data were available for only a small subset of awardees, and among those with available data the interventions were associated with either expenditure increases or non-significant changes.
- There is weak evidence that the MM programs had a significant effect on lowering mortality rates and no evidence that they had an effect on reducing rates of inpatient readmissions.
- Over the past year, awardees deployed multiple strategies to boost program enrollment and patient agreement to participate in the program, including the use of physician referrals and the leveraging of medication reviews as recruitment strategies.
- Awardees encountered challenges associated with integrating MM programs into existing dispensing workflows of community pharmacies.
- Awardees pursued funding from health plans and health system partners to sustain their programs following the end of HCIA funding, but the results of these sustainability strategies have been mixed.

The remainder of this section provides a group-level summary of the HCIA MM awardees, including descriptions of the interventions and evaluation findings. Section 3.1 provides an overview of the HCIA MM portfolio, including an outline of the core components of each innovation and information on enrollment and the geographic regions covered by the innovations. Section 3.2 details the MM group-level findings for the evaluation categories of mortality and inpatient readmissions; health service resource use; medical expenditures; successes and challenges of implementation; and factors affecting sustainability and scale-up.

3.1 HCIA MM Program Overview

The HCIA MM portfolio includes six awardees: IHARP, USC, UPenn, PSW, UHawaii, and UTHSC. The awardees partner with primary care physicians, hospital pharmacists, community pharmacists, and other health care staff to improve medication use. The programs seek to improve health conditions, reduce unnecessary hospitalizations, and reduce unnecessary emergency department use.

(i) *The IHARP* program uses hospital and community pharmacists, and primary care pharmacists who are integrated into the medical teams of primary care and specialty clinics, to offer medication and disease management, care coordination, counseling, and education to high-risk patients to improve care quality, reduce unnecessary hospitalizations and emergency department use, and prevent medication-related problems.

(ii) *The USC* program integrates pharmacy teams into safety net clinics, offering medication and disease management, counseling, and education to high-risk patients to improve care coordination and to reduce unnecessary hospitalizations and emergency department use.

(iii) *UPenn's HeartStrong* program uses GlowCap pill bottles, phone reminders, and incentives to monitor and improve patient adherence to cardioprotective medication in the year after acute myocardial infarction.

(iv) *The PSW* program accredits pharmacies and trains pharmacists to deliver comprehensive medication reviews and point-of-sale medication therapy management (MTM) services to chronically ill patients.

(v) *UHawaii's Pharm2Pharm* program aims to develop a formal "hospital-pharmacist-to-community-pharmacist" care coordination model designed to address medication management risks during transitions of care and for up to a year post-discharge.

(vi) *The UTHSC's SafeMed* program offers MTM care coordination services to post-discharge patients, focusing on intensive community-based outreach and follow-up calls and home visits.

The remainder of this section details various aspects of the MM programs: (i) core components of the innovations, (ii) enrollment, and (iii) geographic reach.

3.1.1 Core Components of the Innovations

In general, eligibility criteria for MM awardees focus on chronic conditions, medication use, and health care utilization. All awardees have criteria related to chronic conditions. HeartStrong requires that patients have a diagnosis of acute myocardial infarction (AMI), IHARP requires that patients have two or more chronic conditions, and the remaining MM awardees require that patients have one chronic condition. Even for this latter set of awardees, however, qualitative feedback indicates that in practice many enrollees have at least two chronic conditions and that patients with multiple conditions are a focus of their programs. With respect to medication-related eligibility criteria, four MM awardees—IHARP, USC, Pharm2Pharm, and

SafeMed—require that patients use multiple medications, with specific requirements ranging from four or more medications to 15 or more. Finally, three MM awardees—Pharm2Pharm, SafeMed, and HeartStrong—have utilization-related criteria. HeartStrong's utilization criteria are the most specific, requiring that eligible patients have a hospital stay lasting between two and 180 days for AMI. Pharm2Pharm and SafeMed consider an acute care episode or hospitalization as possible inclusion criteria. With the exception of Pharm2Pharm, all MM awardees use health information technology (HIT) systems to identify eligible patients, though most—IHARP, USC, Pharm2Pharm, and PSW—have supplemented these systems with physician or other staff referrals.

The features of the innovations differ substantially across awardees, but with the exception of HeartStrong, all MM awardees include a comprehensive or in-depth medication review as a component of their innovations. However, the settings in which the awardees deliver services vary greatly. Three MM awardees—IHARP, SafeMed, and Pharm2Pharm—deliver services in the inpatient setting. Moreover, SafeMed, IHARP, and Pharm2Pharm continue providing services to patients when they transition out of the inpatient setting. HeartStrong and USC do not provide services in the inpatient setting, but they both target recently discharged patients in an effort to optimize medication management following hospitalization. Two MM awardees—USC and IHARP—primarily provide services in the primary care settings, and IHARP, PSW, and Pharm2Pharm all deliver services in the community pharmacy setting. Both HeartStrong and SafeMed provide services in the home setting. Three MM awardees' programs— Pharm2Pharm, PSW, and HeartStrong—are one year in duration. IHARP and USC do not have a fixed duration for their interventions, which continue for however long it takes to address patient needs and reach patient goals. SafeMed's program is one and a half months, though patients have the choice to continue with the program for an additional three months.

All MM awardees except HeartStrong use pharmacists as key workforce for their innovations. The pharmacists are responsible for providing in-depth and ongoing medication management services, including interventions such as medication history reviews, medication reconciliation, assistance with adherence, chronic disease state and comprehensive medication management, and preventive services. Two awardees, USC and SafeMed, also use pharmacy technicians. PSW encourages but does not require community pharmacies to use pharmacy technicians to support pharmacists in providing medication management services. Moreover, IHARP reported that it is actively attempting to integrate pharmacy technicians into its care model. HeartStrong uses social workers and research coordinators as its key workforce, and SafeMed uses nurses (registered, advance practice, and licensed practical) in addition to pharmacists and technicians.

The specific components of each of the MM awardees innovations are described in the two tables below.

Table 3-1 describes enrollment criteria, while Table 3-4 outlines other key features of the program.

Table 3-1: Innovation Eligibility Criteria and Process for Identifying Eligible Patients

Awardee	Eligibility Criteria	Process for Identifying Eligible Patients
IHARP	• Two or more chronic conditions • **AND** 4 or more medications to manage chronic diseases • **AND** participating Carilion primary care provider	• Daily review of EHR-generated eligibility lists • Referral from primary care physicians and office staff
USC	• "High risk" and "high need" patients who have 4 or more chronic conditions • **OR** are taking 8 or more medications • **OR** have a poorly controlled chronic condition • **OR** poor adherence with drug therapy for a chronic disease • **OR** taking warfarin	• Daily review of EHR-generated eligibility reports • Daily review of hospital discharge report for managed care patients • Referral from primary care physicians
HeartStrong	• Diagnosis of AMI • **AND** discharge from the hospital with a length of stay between 1 and 180 days • **AND** 2 or more of the following types of medications: Aspirin, Beta Blocker, Platelet Blocker, Statin	• Weekly review of partner insurer data feeds of eligible patients
Pharm2Pharm	• New diagnosis of targeted chronic condition and discharge home on new medication regimen • **OR** high number of medications or use of medications with high incidence of adverse event • **OR** inpatient episode related to drug therapy problem • **OR** 2 or more acute care visits within past 3 months related to chronic condition • **OR** hospitalization within past year related to chronic condition • **OR** 5 or more of the following (<65 years old) or 4 or more of the following (>65 years): o 5 or more medications o 3 or more chronic conditions o Acute care episode in last year o 1 or more medication with narrow therapeutic index o 1 or more medication commonly causing hospitalization	• Daily review of hospital admissions • Direct referral from hospital-based providers • Direct referrals from outpatient physicians
PSW	• Payer participating in WPQC program • **AND** 1 of the following conditions: o Diabetes o CHF o Asthma o Geriatric syndrome	• Periodic review of electronic system that contains list of eligible patients • Pharmacist identification of eligible patients • Physician and health system referrals (less frequent)

Awardee	Eligibility Criteria	Process for Identifying Eligible Patients
SafeMed	• One or more targeted chronic or mental health conditions • **OR** 6 or more medications • **OR** 2 or more hospital admissions • **OR** 1 hospital admission and 2 or more ED visits within past six months • **OR** targeted chronic condition primary driver for inpatient or ED utilization	• Daily review of EHR-generated eligibility reports

Table 3-2: Innovation Components and Key Features

Awardee	Key Program Components	Settings	Types of Staff	Awardee Start Date/ Program Length
IHARP	• Inpatient medication reviews by hospital pharmacists • Ongoing outpatient medication management by a primary care clinical pharmacists consisting of visits occurring approximately every three months • In-depth chronic disease state services by pharmacists based on program-developed chronic disease state management protocols • Telephone follow up by pharmacists to assess ongoing needs • Supplemental medication management services by community pharmacists	• Hospital • Primary care practices • Community pharmacies	• Hospital pharmacists • Primary care clinical pharmacists • Community pharmacists	• Jan 2013 • Varies by patient
USC	• In-depth medication management services by pharmacists and pharmacy residents based on clinical protocols • Telephone follow up by pharmacy technicians during program enrollment • Telephone follow by pharmacy technicians following program discharge to assess ongoing needs	• Primary care practices	• Pharmacists • Pharmacy residents • Pharmacy technicians • Medical assistants	• Oct 2012 • Varies by patient
HeartStrong	• Pill bottles that alert patients to take medications • Financial incentives through lottery system for patients who take medications • Automated reminders to patients who do not take medications • Follow up to patients who do not take medications after reminders • Notification of friends/family if patient continues to not take medications	• Home	• Program Advisors (social workers and research coordinators) • Device Manager	• Mar 2013 • One year

Awardee	Key Program Components	Settings	Types of Staff	Awardee Start Date/ Program Length
Pharm2Pharm	• In-depth inpatient medication reviews by hospital pharmacists • Post-discharge telephone follow up by hospital pharmacists and handoff to community pharmacists • Ongoing medication therapy management by community pharmacists consisting of approximately 12 visits over one year	• Hospital • Community pharmacies	• Hospital consulting pharmacists • Community consulting pharmacists	• Dec 2012 • One year
PSW	• Accreditation of participating pharmacies • Certification of participating pharmacists, technicians, and students • "Point of sale" medication management services • In-depth medication management services involving initial and follow-up appointments with pharmacists	• Community pharmacies	• Regional Implementation Specialists • Clinical manager • Operations managers • Community pharmacists • Community pharmacy technicians	• Mar 2013 • One year
SafeMed	• Inpatient medication management by SafeMed pharmacists • Case management and discharge support by registered nurse (RN), advance practice nurse (APN), and social worker • Home visits and telephone follow up by outreach workers • Post-discharge comprehensive medication review and ongoing medication management by SafeMed pharmacists • Group support sessions	• Hospital • Home • Hospital outpatient center	• APN • RN • Social worker • Outreach workers (licensed practical nurses and pharmacy technicians)	• Feb 2013 • 45 days with optional 3 months

3.1.2 Enrollment

The MM awardees began enrolling patients in mid-2012. Table 3-3 lists each awardee's cumulative enrollment, as well as payer mix for participants. As the table shows, the programs vary widely in size. SafeMed has the fewest number of enrollees, while PSW has more than 28,000 participants. The counts in the table below are based on beneficiary-level program data provided by IHARP, USC, Pharm2Pharm, and SafeMed as well as enrollment counts provided directly by HeartStrong. Beneficiary-level data for PSW were provided by WI DHS.

Table 3-3: MM Enrollment and Payer Mix

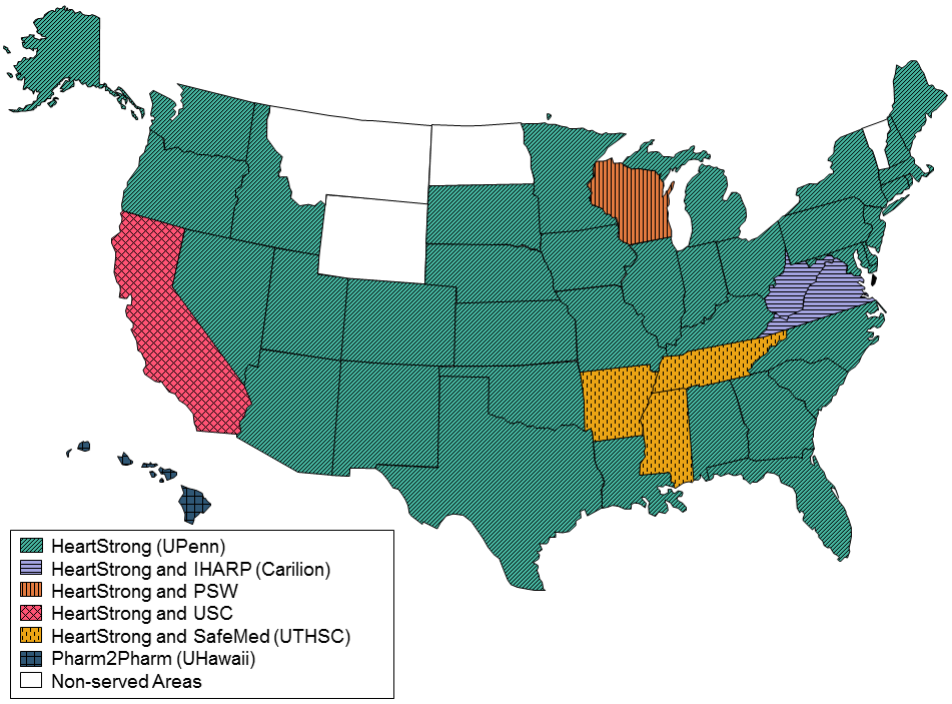
Awardee	Earliest Enrollment Date	Latest Enrollment Date	Medicare Parts A and B (FFS)		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
IHARP	1/9/2013	12/31/2014	1,127	48%	461	19%	41	2%	738	31%	2,367
USC	10/10/2012	12/31/2014	285	5%	811	15%	91	2%	4,313	78%	5,500
HeartStrong	n/a	n/a	37[a]	2%	586	39%	n/a	n/a	878	58%	1,501
Pharm2Pharm	3/12/2013	11/29/2014	590	36%	596	36%	69	4%	379	23%	1,634
PSW	10/26/2012	3/27/2015	4,103	15%	3,015	11%	55	0%	20,929	74%	28,102
SafeMed	2/5/2013	3/30/2015	149	*	85	*	*	*	123	*	*

Notes: "Medicare Parts A and B (FFS)" and "Medicare Advantage" may include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part D. Enrollment dates for HeartStrong are marked as "n/a" as payer mix provided by the awardee did not include this information. All PSW participants in this table, including those enrolled in Medicare FFS or Medicare Advantage, are enrolled in WI DHS health plans.
Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.
"Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
Data sent by IHARP for the present report were missing about 200 participants, and these participants are not included in the above table.
[a] HeartStrong counts under "Medicare Parts A and B (FFS)" include all beneficiaries enrolled in Medicare FFS, including those enrolled only in Medicare Part A.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

3.1.3 Geographic Reach

The MM awardees differ greatly in geographic reach, as shown in Figure 3-1. SafeMed serves patients in Tennessee, Arkansas, and Mississippi; IHARP serves patients in Virginia and West Virginia; PSW serves pharmacies and patients in Wisconsin; the Pharm2Pharm program is available in Hawaii; and USC provides services in clinics in Southern California. HeartStrong initially operated only in Pennsylvania and New Jersey, but it eventually expanded to a total of 45 states in an effort to increase enrollment.

Figure 3-1: Geographic Reach of MM Awardees



Source: Lewin Quarterly Awardee Progress Reports (January-March 2015)

3.2 Evaluation Findings

This section provides an overview of recent group-level evaluation findings for the MM HCIA awardees, reflecting new analytic results from August 2014 through August 2015, unless noted otherwise.

Quantitative analysis findings are based on an analysis of beneficiary-level intervention data linked with Medicare claims data, and are summarized in Sections 3.2.1, 3.2.2, and 3.2.3. Small sample sizes of Medicare beneficiary populations participating in the innovations have created a significant challenge to finding statistically significant, measurable effects on health and quality of care outcomes. Some innovations showed evidence of lowering mortality rates either cumulatively across the study period or in individual quarters after program enrollment. However, some programs were also associated with increases in resource use and expenditure outcome measures. Some of these increases may be due to programs that motivate participants with relatively low prior service utilization to be more proactive in taking care of their health, and intended changes in these outcomes may only be observable on a longer time horizon than that included in the present report.

The qualitative findings are based on a review of available awardee progress reports and other materials, and on in-depth interviews with all six MM awardees. They are summarized in Section 3.2.5 and 3.2.6.

3.2.1 Mortality and Inpatient Readmissions

Acumen measured mortality and inpatient readmissions for IHARP, USC, and Pharm2Pharm, the three MM awardees that provided data with adequate sample size for analysis of program effectiveness. Cumulatively across post-implementation quarters, the only intervention associated with a statistically significant reduction in mortality was IHARP. Across the five post-implementation quarters, there were 48 fewer deaths among the 592 Medicare FFS beneficiaries who received the intervention relative to controls—or 24 deaths per 1,000 beneficiary-quarters. When examined at the quarterly level, IHARP's FFS cohort and the Pharm2Pharm Medicare cohort experienced statistically significant reductions in mortality in the first quarter after enrollment: 71 and 40 fewer deaths per 1,000 Medicare beneficiaries compared to controls respectively. There were no other significant reductions in mortality in other quarters for these beneficiaries, nor were there significant results in any quarter for the remaining awardees. Given the non-randomized design of the interventions and limitations of using Medicare data to construct comparison groups, Acumen cannot rule out the influence of unobservable selection effects in the significant reductions in mortality for IHARP and Pharm2Pharm. For example, IHARP's enrollment criteria include a requirement that enrollees have six months or greater life expectancy. Consequently, intervention group beneficiaries may have greater longevity than comparison group beneficiaries, despite the similarity of the groups based on characteristics observable through Medicare claims.

Acumen also assessed the impact of the MM innovations on all-cause hospital readmissions, but found no significant reductions in readmissions for any of the three awardees when examining the outcome at the cumulative or the quarterly level.

3.2.2 Health Service Resource Use

Estimated impacts of the MM interventions on resource use varied across the three MM awardees included in the analyses of program effectiveness. IHARP and Pharm2Pharm were associated with increases in a number of resource use measures. Results for USC did not include any statistically significant effects on resource use. The remainder of this section describes these findings in detail.

Both IHARP and Pharm2Pharm were associated with increases in resource use. Cumulatively over the five quarters after IHARP program enrollment, there was a statistically significant increase of 169 inpatient admissions among the 592 Medicare FFS beneficiaries—or 86 admissions per 1,000 beneficiary-quarters—who received the IHARP intervention for at least one quarter. For Pharm2Pharm, there was an increase of 127 admissions among the 577 beneficiaries—or 81 admissions per 1,000 beneficiary-quarters—included in the analysis. IHARP was also associated with a cumulative increase of 679 hospital days for its 592 FFS beneficiaries over the post-intervention quarters, while Pharm2Pharm had no significant

cumulative effect on the number of hospital days, but did produce a statistically significant increase at the quarterly level – of 851 days per 1,000 beneficiaries in the third quarter after enrollment. Given the non-randomized design of the intervention and limitations of using Medicare data to construct comparison groups, Acumen cannot rule out the influence of unobserved baseline differences and differential trends in unobserved characteristics between the two groups. As mentioned in Section 3.2.1, unobservable selection bias may result in intervention group beneficiaries that are healthier than comparison group beneficiaries, despite the similarity of the groups based on characteristics observable through Medicare claims.

The USC Medicare cohort was not associated with any significant decreases or increases in resource use measures. The non-significant findings may be driven by the small sample size (702) of the intervention cohort, which limits statistical power.

3.2.3 Medical Expenditures

Acumen assessed the impact of the MM interventions on medical expenditures for the IHARP cohorts Measures of medical expenditures are not available in MA claims data, and therefore expenditure outcomes cannot be measured for the other intervention cohorts that include MA beneficiaries.

The analysis found statistically significant increases in medical expenditures. Across the five quarters after program enrollment, the IHARP intervention was associated with cumulative, statistically significant increases in total medical and drug expenditures as well as increases in a number of other expenditure categories, including inpatient, outpatient non-ER, and physician/carrier costs. Cumulatively over the five quarters after IHARP program enrollment, there was a statistically significant increase in total Medicare Parts A, B, and D payments of $2,151,961 —or $1,094 per 1,000 beneficiary-quarters—and an increase in inpatient expenditures of $1,126,631—or $573 per 1,000 beneficiary-quarters—relative to controls. Examining outcomes at the quarterly level shows that the significant cumulative increases can be attributed primarily to Q1 of the intervention period: Acumen identified significant findings in Q1 for a number of expenditure outcomes but few significant findings in subsequent quarters. However, there is no clear mechanism through which one would expect the program to increase inpatient admission expenditures. The treatment and comparison populations are well-matched on observable characteristics, and Acumen plans to leverage additional data as it becomes available to refine matching models in future iterations of the analysis to limit the chance that results are due to differences in observables across the two populations. However, Acumen cannot eliminate the possibility that the significant result may be due to differences in unobservable characteristics between treatment and control beneficiaries.

3.2.4 Medication Adherence

For the IHARP, USC, and Pharm2Pharm innovations, results showed no statistically significant increases in medication adherence rates for five therapeutic drug classes in the year following program enrollment. Assessed drug classes include beta blockers, calcium channel blockers, diabetes medication, RAS antagonists, and statins. The adherence measure was based on the Pharmacy Quality Alliance's measures on proportion of days covered (PDC), explained in further detail in Section 1.2.2.

3.2.5 Implementation Successes and Challenges

Key themes regarding MM implementation successes and challenges during August 2014 through August 2015 include:

- **Awardees deployed multiple strategies to boost program enrollment and patient agreement to participate in the program.** In the previous year, all MM awardees except PSW were substantially below enrollment projections. Over the past year, all made progress in overcoming this shortfall and reached enrollment levels at or near projected targets. Awardees reported that implementing and encouraging referrals from a physician or trusted provider was important to increasing enrollment. IHARP originally did not allow physician referrals; however this later became a significant source for patient enrollment. USC also noted that referrals from physicians were much more successful than "cold calls" to eligible patients. Both Pharm2Pharm and PSW began allowing physician or health system referrals and undertook efforts to increase the volume of these referrals. Awardees also reported that using a medication review as a recruitment technique was an effective patient engagement strategy. When pharmacists detected problems during the review, patients realized the benefits of having a pharmacist involved in their care. Using personalized invitations that demonstrate knowledge of patients' unique needs during recruitment was cited as another strategy. Additional strategies included cobranding the innovation with organizations familiar to patients, avoiding technical jargon, using recruitment scripts with general information but tailoring talking points to appeal to patients' individual needs, and using multiple follow-up methods at different times of day (evenings and weekend).
- **Using an "opt-out" approach seems to be a promising patient engagement strategy.** This past year, HeartStrong conducted an "opt-out" experiment in which eligible patients received their electronic pill bottles (GlowCaps) upfront by mail along with a full package of information. Based on interviews with staff, this approach led to higher overall program participation rates. This finding aligns with previously reported feedback from other MM awardees that opt-out approaches improved patient acceptance of services. PSW reported that automatically scheduling beneficiaries for visits for in-depth medication management services unless they explicitly decline was an effective strategy, and Pharm2Pharm reported that sending a letter to a non-responsive patient with a scheduled date and time for an appointment with the community pharmacist helped to re-engage patients who stopped participating after hospital discharge.
- **Awardees had mixed feedback about the use of financial incentives to promote patient engagement.** Two awardees (HeartStrong and SafeMed) used financial

incentives to promote patient participation. Heart Strong indicated that providing participants a $25 incentive first for enrollment and again upon setting up the GlowCaps was an effective engagement strategy. SafeMed provided a $50 incentive to participants to attend group support sessions and comprehensive medication reviews. In spring 2015, SafeMed conducted a pilot test to discern the impact of eliminating this incentive. Program leaders reported that attendance dropped once SafeMed removed the financial incentive, but they believe other factors, such as poor weather, may have affected attendance. Though results were inconclusive, SafeMed team members strongly supported removing the incentive because they felt those who attended the sessions only to receive the incentive did not fully participate.

- **Using algorithms for a systematic review of EHR data to support enrollment can lead to efficiency, but these systems need to be implemented carefully.** As noted above, all MM awardees except Pharm2Pharm and HeartStrong use algorithm-based review of EHR data to identify eligible patients. Awardees reported the need to continually review the underlying logic or algorithms that support the systematic review of EHR data and the importance of having a knowledgeable staff member review the patient eligibility lists generated from these algorithms as an additional step to ensure the patients are appropriate candidates for the program. Most awardees indicated that using an algorithm-based review of EHR data for enrollment created process efficiencies, though SafeMed staff reported ongoing inaccuracies with the EHR-generated eligibility lists. In this case, the lists produced only a small number of patients who were actually eligible and led to staff spending significant time screening patients. Also, most awardees (IHARP, USC, Pharm2Pharm, and PSW) supplemented this approach with physician or other staff referrals.
- **There are challenges associated with integrating MM programs into existing dispensing workflows of community pharmacies.** MM awardees with a community pharmacy component (IHARP, PSW, Pharm2Pharm) all reported encountering difficulty with implementing MM services, particularly in-depth or comprehensive medication reviews, in this setting. Community pharmacists have had difficulty incorporating these services into their workflow and balancing the time needed to provide the services with their existing dispensing responsibilities. Feedback from awardees indicates that successful provision of these services requires a culture change and staff models that allow pharmacists dedicated time to provide services. Additionally, using pharmacy technicians and other staff to support pharmacists in the delivery of these services has been another useful strategy for overcoming these challenges.
- **Fitting MM services into existing health care workflows helps ongoing patient engagement.** MM awardees generally emphasized the importance of having face-to-face interactions with patients, particularly for initial visits that involve in-depth medication reviews; however, patients sometimes struggle to attend these visits, especially when they have multiple medical appointments or transportation barriers. Awardees reported that co-scheduling in-depth medication review visits with other health care services, such as appointments with primary care providers, lab work, or medication pick-ups at pharmacies, has increased patient willingness to attend in-depth medication reviews.

- **Physician/prescriber engagement has been important in MM program implementation, and awardees have used multiple approaches to increase buy-in of these individuals.** Staff of the MM programs interact with physicians and other prescribers as part of the innovations, whether for patient referrals or to provide recommended modifications to patients' medication regimens. Obtaining physician/prescriber buy-in to the program underlies these activities and is an important precursor for successful program implementation. Awardees reported several strategies for securing physician/prescriber buy-in to the programs including highlighting potential time savings and improvements on quality measures, proactively seeking physician input, and convening one-on-one meetings with providers. Awardees reported that having physician champions endorse the program to their peers has been another effective way to get broader buy-in. Awardees emphasized that getting physician buy-in and building trust with these individuals takes time but can be an important factor for optimizing MM program implementation.
- **Many awardees experienced some tension between ensuring fidelity to their model and tailoring their model to address patients' needs.** During site visits, program staff directly involved in implementing the intervention for several programs voiced concerns about the challenge of balancing a need to provide standardized services while effectively managing and addressing patient needs. According to these staff, a "one size fits all" approach is not always best for meeting patient needs; some program staff indicated that having flexibility to use their clinical judgment to determine the need for and frequency of follow-up services would be ideal, since some patients do not need all services and some need more. At the same time, staff members also recognized the need for standardized services for evaluation purposes. Some MM awardees explored allowing more flexibility in the approaches they use to provide services to patients. For example, IHARP program leaders allowed primary care clinical pharmacists to determine the frequency and length of follow up calls to patients who were enrolled in the program in 2015 outside the HCIA evaluation period. Similarly, Pharm2Pharm program leaders considered allowing flexibility in the timing of the handoff between hospital and community pharmacist; however, program leaders and pharmacists were not able to reach consensus about or formalize the criteria for the timing of the handoff. As a result, they kept the standardized post-discharge handoff.
- **Pharmacy technicians can contribute to the efficient implementation of MM models.** Both USC and SafeMed programs rely on expanded roles for pharmacy technicians that were developed specifically for their interventions. USC and SafeMed program leaders have indicated these roles have been integral to the implementation of their overall models. Similarly, PSW includes pharmacy technicians in its certification process, providing them with training that allows them to support pharmacists by helping to identify eligible participants and providing an expanded set of medication management services. Based on feedback from pharmacists, IHARP is similarly pursuing strategies for more effectively using pharmacist technicians to assist with pharmacist workflow and responsibilities and enhance pharmacist productivity.
- **MM awardees have found that certain aspects of training are particularly useful for program implementation.** Some MM awardees provided additional training over the past year. A few MM awardees (Pharm2Pharm, SafeMed, and IHARP) reported that

motivational interviewing has been useful since it helps MM workforce develop the skills necessary to assist patients with making behavioral and lifestyle changes. MM workforce also overwhelmingly reported that hands on training and having the opportunity to shadow experienced providers were extremely useful.

- **MM workforce largely expressed satisfaction with their roles in the innovations.** Program staff who were interviewed during site visits reported being generally satisfied with their roles. They reported that, for the most part, their roles in the innovations matched their expectations and skill sets. They appreciated the ability to provide an expanded set of services and felt their positions were having a positive effect on patients and the health care delivery system. MM staff members generally had a clear sense of their roles and responsibilities, though in some cases this clarity improved over time, especially in cases where the role was newly created for the innovation.
- **A patient-centered medical home structure has been important factor for acceptance of MM innovations in primary care.** Both USC and IHARP, the two MM awardees mainly based in the primary care setting, implemented programs in primary care practices with an underlying patient-centered medical home model. Both awardees indicated this model, which emphasizes team-based care, has been an important foundation for the acceptance of the MM innovations and fostering teamwork between pharmacists/pharmacy team members and clinic physicians and staff members.
- **Health IT and health information exchange (HIE) have generally streamlined communication and documentation processes for MM programs.** USC and IHARP both reported that the system-wide EHRs of their partnering health systems, AltaMed and Carilion, respectively, have greatly facilitated implementation by allowing communication between team members and across settings. Pharm2Pharm has leveraged the statewide Hawaii Health Information Exchange to give pharmacists access to medical and pharmacy fill history information for some Pharm2Pharm participants, and this has streamlined pharmacist workflow and similarly enhanced implementation.
- **Awardees view collaborative practice agreements as having great potential for their innovations, but these agreements are challenging to implement and require trust between physicians and pharmacists.** MM program leaders and staff interviewed during site visits highlighted the importance of collaborative practice agreements between pharmacists and physicians. These agreements, which can allow pharmacists to act upon observations and recommendations in real time and modify drug therapies without physician approval, were viewed as having great potential to improve pharmacist efficiency and productivity and optimize MM program implementation. Awardees underscored that these agreements require a high level of trust between physicians and pharmacists and that programs must be sufficiently mature to establish this foundational trust, which takes time and effort to build. USC was the only MM awardee to implement formal, written collaborative practice agreements with physicians. PSW developed a collaborative practice agreement toolkit to support its participating pharmacies in implementing these agreements. IHARP program leaders indicated they planned to pursue these agreements, and Pharm2Pharm focused on improving relationships with high-volume physicians who serve its participants as a precursor for building collaborative practice agreements.

Additional successes, challenges, and lessons learned for each individual awardee are discussed in Sections 7 through 12.

3.2.6 Factors Affecting Sustainability and Scale Up

PSW was the only MM awardee that did not receive a no-cost extension of its HCIA grant funds. IHARP received a nine-month no-cost extension, and the remaining MM awardees received one-year no cost extensions. Common trends and challenges related to sustainability and scale-up across the six MM HCIA awardees are summarized below:

- **MM awardees that partnered with health systems to implement their programs pursued health system funding as a primary sustainability strategy, though this funding materialized in only one of three cases.** IHARP, USC, and SafeMed all pursued financial support from their partnering health systems to fund the innovations following the end of the HCIA grant. Though all health systems offered some preliminary commitment to provide ongoing financial support, only IHARP was successful in securing this support for its HCIA innovation model. As a result, IHARP is continuing to provide and expand services with the support of Carilion Health System. USC's partnering health system, AltaMed, approved a drastically modified version of the program that includes providers who can autonomously bill (e.g., physician assistants), since pharmacists do not have federal recognition as Medicare Part B health care providers. Though hospitals within SafeMed's partnering health system, Methodist LeBonheur Healthcare, expressed interest in integrating SafeMed staff into existing hospital-based readmission reduction teams, these efforts did not come to fruition. As a result, program leaders reported in May 2015 that both the SafeMed and USC innovations as implemented and tested under the HCIA grant would end on June 30.
- **MM awardees also pursued partnerships with health plans to support the ongoing funding of pharmacy services.** PSW has retained and reported intentions to continue to add insurer partners that have agreed to reimburse for pharmacist services, though the uncertain funding status for the health information technology tool that pharmacies use to support the delivery of services will impact pharmacies' abilities to provide the innovation to Wisconsin Medicaid (Wisconsin Department of Health Services) beneficiaries. Pharm2Pharm reported it was aligning with an insurer's existing pay-for-performance initiative that allows providers to earn revenue for achieving quality goals, including those pertaining to medication. Additionally, SafeMed pursued grant funds from a health plan to sustain the program; however, this sustainability activity did not materialize.
- **Awardees had mixed feedback about whether out-of-pocket fees are a feasible sustainability approach.** In May 2015, Pharm2Pharm reported that it planned to launch a pilot program to test beneficiary out-of-pocket fees for Pharm2Pharm services in July 2015. Program leaders thought this would generally be a feasible model for the program since patient experience ratings have been very positive but expressed uncertainty about whether population in counties with lower socioeconomic status would be able to support an out-of-pocket model. Though program leaders included revenue generation through billing and co-payment collection in the program's sustainability plan, IHARP pharmacists and Carilion office staff all stated that requiring patients to pay for IHARP

services was questionable as a model for sustaining or scaling the program despite high patient satisfaction with the program, since IHARP's patient population struggles with office visit co-payments. They indicated that introducing additional fees may deter patients from seeking care and that even patients who could afford these payments would likely be hesitant to invest in pharmacy services.

- **MM awardees reported that the lack of recognition for pharmacists as health care providers has adversely impacted the sustainability and scalability of their innovations.** Many MM program leaders and staff indicated that they have been challenged to sustain and scale their innovations, which largely represent pharmacy services-centered models, since federal policies do not recognize pharmacists as Medicare Part B health care providers. These policies severely limit how and when pharmacists can receive reimbursement for services, which impedes their ability to generate revenue to support their programs on an ongoing, long-term basis.

Additional factors related to sustainability and scalability for each individual awardee are discussed in Table 3-4.

Table 3-4: Sustainability and Scale Up

Awardee	No-Cost Extension Status	Sustainability Strategies	Changes to the Innovation since June 30, 2015
IHARP	Nine-month extension Extension funds to be used for: • Concluding evaluation for HCIA grant	• Program leaders were successful in securing Carilion Health System's financial support of the program. • Program leaders are exploring mechanisms for incident to physician billing.	• Patients enrolled in IHARP under the HCIA grant received the same innovation services until June 30, 2015. • IHARP began enrolling patients outside the HCIA grant starting in 2015. IHARP services for these individuals are largely the same except that follow-up calls happen at a frequency determined by the primary care pharmacist
USC	One-year extension Extension funds to be used for: • Supporting and expanding the telehealth component	• USC's primary strategy was to have AltaMed fund the program. • The AltaMed Board of Directors considered approving a budget to support the innovation but decided to fund a vastly modified version of the care model	• USC stopped enrolling patients from AltaMed clinics in May 2015 and reported it would cease all in-patient services after June 30, 2015. • A team of three pharmacists and three pharmacy technicians will continue to provide telehealth services. • AltaMed will launch a vastly modified version of the innovation among participating clinics using three pharmacists, three pharmacy technicians, and eight mid-level providers.

Awardee	No-Cost Extension Status	Sustainability Strategies	Changes to the Innovation since June 30, 2015
HeartStrong	One-year extension Extension funds to be used for: • Ongoing delivery of the innovation to enrolled participants • Concluding evaluation for HCIA grant.	• None. Innovation was designed to be a discrete "proof of concept" activity.	• Through December 2015, HeartStrong will continue to follow and provide services to patients enrolled in the program.

Pharm2Pharm	One-year extension
	
	Extension funds to be used for:
	• Concluding evaluation for HCIA grant
	• Ongoing delivery of the innovation to enrolled participants
	• Conducting pilot tests of sustainability strategies
		• Program leaders are in discussions with numerous payers to explore sustainability options and advocate for reimbursement of Pharm2Pharm services.
		• Pharm2Pharm is piloting an out-of-pocket fee schedule and aligning pilots with the existing pay-for-quality program at BlueCross BlueShield of Hawaii.
		  • Program leaders are considering mechanisms for incident to physician billing.
			• Through December 2015, Pharm2Pharm will continue to provide services to patients enrolled in the program.
			  • Pharm2Pharm will also focus on its out-of-pocket fee and pay-for-quality pilots described above.

PSW	No extension	• Participating payers have agreed to continue reimbursing for innovation services and PSW continues to seek additional payers. • Program leaders were pursuing additional funding to support the technology platform used for the innovation. • PSW is participating in a SIM grant and is also considering dues for participating pharmacies.	• As of May 2015, program leaders reported that they planned to continue to accredit pharmacies and certify pharmacy staff to provide innovation services. • Program leaders were considering ways to significantly streamline the innovation, as well as PSW's supports and infrastructure. • According to program leaders finding funding to support the technology platform used for the innovation would greatly influence ongoing sustainability of the program.

Awardee	No-Cost Extension Status	Sustainability Strategies	Changes to the Innovation since June 30, 2015
SafeMed	One-year extension Extension funds to be used for: • Concluding evaluation for HCIA grant • Continuing program dissemination efforts	• SafeMed's primary strategy was to have SafeMed staff become part of individual hospital-based readmission reduction teams within the Methodist system. • Though hospitals expressed interest, none acted. • Program leaders pursued health plan funding, but this did not come to fruition	• SafeMed stopped enrolling patients in May 2015 and reported it would cease all program services after June 30, 2015.

4 EVALUATION OF THE WELVIE, LLC HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the Welvie, LLC ("Welvie") innovation, reflecting new analytic results produced from July 2014 through August 2015. Section 4.1 provides an overview of the key findings—both qualitative and quantitative—for Welvie. Section 4.2 highlights the awardee's innovation components, and Section 4.3 summarizes the most recent information available on the evaluability of the Welvie program, including enrollment and payer mix, based on the latest program data provided by Welvie. The remaining sections provide detailed descriptions of the findings summarized in Section 4.1. Sections 4.4 and 4.5 provide highlights of updated quantitative findings on Welvie's program effectiveness, based on an analysis of CMS claims data for the innovation's Medicare beneficiaries. The former provides the results of an intent-to-treat (ITT) framework, while the latter includes the results of an instrumental variable (IV) analysis designed to evaluate the effects of receipt of a high dose of the Welvie intervention on outcomes of interest (For more comprehensive quantitative results, see Appendix B.). Finally, Sections 4.6, 4.7, and 4.8 highlight, respectively, updated findings on the evaluation categories of implementation effectiveness, workforce, and context.

4.1 Key Findings

The primary quantitative analyses, utilizing an intention-to-treat (ITT) framework described in Section 4.4, show that the Welvie intervention was associated with reductions in mortality and surgery-related hospital readmissions for Medicare FFS beneficiaries in Ohio but results were inconclusive for the MA cohort. A statistically significant decrease of 808 deaths was observed cumulatively over the seven quarters after program enrollment among the 62,531 Medicare FFS beneficiaries who were in the Welvie intervention group for at least one quarter, relative to controls. This cumulative result was consistent with statistically significant mortality reductions observed in multiple individual quarters for the Medicare FFS cohort. [4] The Welvie intervention was also associated with statistically significant decreases in readmissions following some surgical admissions for Medicare FFS beneficiaries. This outcome was included in Welvie's evaluation because Welvie's SDM intervention includes guidance on recovery after surgery and aims to improve surgical outcomes. Cumulatively over the seven quarters after program enrollment, the Welvie intervention was associated with statistically significant decreases of 118 readmissions following any inpatient surgery among 7,861 FFS beneficiaries who had an inpatient surgery stay during this study period, relative to controls. There was also a

[4] Statistical significance for all results are assessed at the five percent level.

statistically significant decrease of 56 readmissions following inpatient preference-sensitive (PS) orthopedic surgery among 176 FFS beneficiaries who had this surgery cumulatively over this period, compared with controls. The quarterly fixed effects analysis also showed statistically significant decreases in readmissions following inpatient surgery and PS orthopedic surgery for FFS beneficiaries in the third and seventh quarters, respectively, and non-significant decreases in these readmissions in most of the other quarters.

For the Medicare FFS Ohio cohort, the Welvie intervention was associated with statistically significant decreases in total Medicare expenditures, inpatient expenditures, and a number of surgery expenditure categories in the first quarter after program enrollment, although statistically significant effects on these outcomes were not observed cumulatively over the seven quarters after program enrollment. The FFS Ohio intervention group was associated with a statistically significant decrease in total Medicare Part A and B (medical) expenditures of $107 per beneficiary in the first quarter after program enrollment relative to controls, which appeared driven by statistically significant decreases of $84 per beneficiary in inpatient expenditures and $57 per beneficiary in both total surgery expenditures and inpatient surgery expenditures in the same quarter. There were smaller non-significant changes in these outcomes in most of the other quarters, with increases observed in some quarters and decreases observed in others for the Welvie FFS cohort.

For Welvie's Anthem MA beneficiaries in Ohio, the intervention was associated with statistically significant cumulative and quarterly decreases in total surgery expenditures and outpatient surgery expenditures over the study period, and statistically significant decreases in inpatient expenditures and skilled nursing facility expenditures in individual quarters. Cumulatively over the seven quarters after program enrollment, there were statistically significant decreases in total surgery expenditures of $14,855,286 and outpatient surgery expenditures of $4,123,856 among 92,341 beneficiaries who were enrolled in the intervention for at least one quarter relative to controls. There was also a statistically significant reduction in total surgery expenditures of $35 per beneficiary in the third quarter after enrollment, and statistically significant per-beneficiary reductions in outpatient surgery expenditures of $15 and $12, respectively, in the first and fourth quarters for the MA Ohio cohort. Statistically significant decreases in inpatient expenditures of $47 per beneficiary and skilled nursing facility expenditures of $13 per beneficiary were also found in the third and fourth quarters, respectively. There were non-significant reductions in these outcomes in most of the other quarters.

Among beneficiaries who received a high dose of the Welvie intervention, an instrumental variable analysis (described in Section 4.5) found statistically significant decreases in total Medicare expenditures and in inpatient and surgical expenditures, relative to control groups. Beneficiaries who completed at least one of the six steps of the Welvie decision aid were

considered part of the high-dose intervention group. Although the magnitude of estimated decreases in expenditures was larger in the instrumental variable analysis of the high-dose intervention group, statistically significant reductions were generally limited to a single quarter after program enrollment as in the primary ITT analyses. For the FFS high-dose intervention group, there was a $5,600-per-beneficiary decrease in total Parts A, B, and D expenditures and a $2,700-per-beneficiary decrease in total surgery expenditures relative to controls in the first quarter after program enrollment. Similarly, for the Welvie MA Ohio high-dose intervention group, there was a statistically significant decrease of $2,264 per person in total Medicare parts A and B expenditures, and a $1,300 per person decrease in total surgery expenditures in the third quarter, relative to controls.

This report does not include quantitative analysis results for the MA Humana Texas cohort due to incomplete MA claims data at the beneficiary level. Results for the MA Humana Texas cohort will be included in future reports as more complete data become available.

With respect to intervention recruitment efforts, Welvie reported an increase in response rates among cardiac patients after distributing outreach materials that focus on chronic disease management, rather than cardiac surgery. As part of the Ohio implementation, Welvie collaborated with Anthem to revise cardiac information in the decision aid to better align with the "Dr. Dean Ornish Program for Reversing Heart Disease" offered by Anthem in partnership with the Cleveland Clinic. The Dean Ornish program is an evidence-based chronic disease management program designed to stop or reverse the progression of heart disease. The Welvie decision aid was revised to include additional information about preventing cardiac illness and managing chronic illness through diet, exercise, and stress management. Cardiac patients who use the Welvie decision aid will have the opportunity to qualify for and engage in ongoing chronic disease management through the Anthem-Dean Ornish Program partnership. Welvie also revised its outreach materials for Anthem patients with or at risk of a cardiac condition to focus on disease management in efforts to increase program participation among this population. The new Anthem outreach materials complement revisions to the Welvie decision aid. The revised outreach materials were distributed to the Anthem cardiac population in Ohio, and Welvie observed increased response rates among this cohort. As a result, the revisions to the cardiac materials were made available to other non-Anthem populations.

Welvie reports that in-person learning events may be an effective complement to the online decision aid program. In late 2014 through early 2015, Welvie expanded its outreach efforts to include peer-to-peer learning webinars and in-person events, and Welvie reported positive feedback from attendees. Welvie reported that all attendees described the event as extremely or very informative, and more than 60% of attendees volunteered to host future events or serve as a surgery buddy to future Welvie participants. Welvie also suggested that these in-

person events are cost-effective only if there are at least 25 attendees per seminar. Welvie is currently planning in-person events in communities with a high density of Medicare beneficiaries, and as a result, learning from in-person events may be limited to urban and suburban populations. Welvie plans to continue to refine the content of the peer-to-peer presentations and provide additional technical support for online events.

The provider referral pilot of the Welvie program generated early insights on factors influencing health-care providers' willingness to engage in SDM programs. Among health care organization leadership, one perceived risk of SDM is that it may reduce rates of surgery-related services, which in turn reduces payments to providers in a FFS billing arrangement. Welvie reported that practices that perceived minimal financial risk from SDM, because of capitated payments or participation in financial risk arrangements, were more receptive to participating as Welvie provider referral sites. For example, Welvie found that practices in Florida perceived less financial risk from SDM than practices in Texas, and as a result, the pilot implementation was moved to Florida. Providers also expressed concerns that referrals to the Welvie program would result in more consults and second opinions. Welvie has plans to leverage positive feedback from the first cohort of providers participating in its intervention. Welvie hopes that these early adopters will convince other providers of the value of the Welvie SDM intervention. The pilot implementation of provider referrals from Humana-owned practices went live in June 2015. As of July 2015, two referrals were made, but neither referred beneficiary accessed the decision aid.

Welvie made efforts to better engage health care providers in Humana-owned clinics and simplify the process for referring patients to the Welvie program with the goal of increasing provider referrals. Welvie leveraged its relationship with practice leadership to gain buy-in from providers in the pilot project. Welvie is also working with the Florida practices to simplify the patient eligibility criteria for the provider referral process. Providers will be able to refer patients to the Welvie program for any condition, rather than a limited list of conditions as originally planned. Providers can refer beneficiaries to Welvie regardless of health insurance carrier, and Welvie will honor the referral. Welvie has contracts with Humana and WellCare, two of the largest MA insurance carriers in the Florida market; therefore, Welvie anticipates most referrals will be covered under the HCIA project or other contracts.

Welvie is operating under a no-cost extension for the innovation population until December 2015 and is engaged in discussions with current partners, Anthem and Humana, to continue services after HCIA funding ends. Beyond the HCIA project, Welvie is successfully scaling up its intervention to include new MA beneficiaries in multiple regions of the country. In 2014 and 2015, Welvie added new Medicare Advantage partners, including WellCare, Blue Cross Blue Shield (BCBS) of Michigan, and BCBS of Rhode Island. Welvie scaled its

innovation to 600,000 additional Medicare beneficiaries (not included in the HCIA project), with little to no changes in workforce or innovation components.

4.2 Innovation Components

Welvie provides beneficiaries with information regarding preference-sensitive surgeries and their alternatives. The Welvie SDM innovation seeks to enable patients to make informed decisions about preference-sensitive surgeries and procedures (e.g., surgeries of the knee, spine, heart, and eye). The innovation aims to enhance patient experience, increase patients' surgical literacy, improve surgical outcomes, and reduce the incidence of inappropriate surgical procedures. Welvie also helps patients obtain the right diagnosis by helping them communicate effectively with their health care providers, which may improve care quality.

Welvie's intervention targets Medicare FFS and MA beneficiaries who are candidates for preference-sensitive surgery. Welvie uses a limited number of eligibility criteria (e.g., insurance eligibility, age), which allows it to reach a broad set of beneficiaries who may benefit from the intervention. All beneficiaries in the randomized intervention group, regardless of health condition, receive outreach materials and are offered the opportunity to use Welvie's decision aid, described below. Welvie's implementation in Ohio with Anthem originally included Medicare beneficiaries 65 years of age or older and expanded to include Medicare beneficiaries of all ages in spring 2015. Welvie's implementation in Texas with Humana includes Medicare beneficiaries of all ages.

The Welvie intervention comprises outreach mailings, which include brief educational content, and an in-depth, six-step decision aid. Welvie considers beneficiaries who only receive outreach materials as the "low dose intervention group," and beneficiaries who also use the decision aid as the "high-dose intervention group." Outreach mailings provide information related to surgery decision-making, patient safety, and clinical guidelines (e.g., when to get a second opinion, colonoscopy guidelines). The outreach mailings also provide information on how to access Welvie's decision aid. Beneficiaries can then choose to use Welvie's decision aid, which can be completed online, on paper, or by phone. The decision aid is designed to educate patients about potential risks, benefits, treatment alternatives, and expectations related to surgery. Steps 1-3 of the decision aid focus on getting the right diagnosis, finding the right doctor, and making a treatment decision. Steps 4-6 of the decision aid focus on learning about hospitals, preparing for surgery, and recovering at home. The decision aid also engages "friends and family buddies," who are expected to play a key support role before, during, and after surgery. The decision aid provides buddies with tools, such as pre-surgery checklists and medication trackers.

Recently, Welvie and its partner Anthem collaborated to revise the cardiac care information in the decision aid focused on cardiac care to better align with the "Dr. Dean Ornish

Program for Reversing Heart Disease" offered by Anthem in partnership with the Cleveland Clinic. Steps 3 and 5 of the cardiac care Welvie decision aid were revised to include additional information about preventing cardiac illness and managing chronic illness through diet, exercise, and stress management. Welvie revised outreach materials to Anthem's cardiac patient population to focus on disease management, rather than surgery.

In June 2015, Welvie received a no-cost extension to continue ongoing outreach and data collection and to continue testing the feasibility of provider referrals to the online decision aid. Welvie is working closely with Humana-owned practices in Florida on the provider referral portion of the innovation project.

4.3 Evaluability

This section provides the latest information on the primary factors affecting the evaluability of Welvie. Table 4-1 describes the intervention and comparison group data availability and program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. As noted below, Acumen uses randomized control groups provided by Welvie for analyzing program effects on the Medicare Parts A and B Ohio cohort and the Anthem MA Ohio cohort. Beneficiaries in all randomized intervention groups received direct outreach materials from Welvie that include general health- and surgery-related information. MA claims data received from Welvie for the Humana MA Texas cohort were incomplete at the beneficiary level. Therefore, while enrollment and payer mix information are provided for the Texas MA population, quantitative analyses of program effects for this cohort are not included in this report. Results for the MA Humana Texas cohort will be included in future reports as more complete data become available.

Table 4-1: Welvie Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Intervention Group Data Availability	• Acumen used program data on intervention group beneficiaries randomly selected by the awardee and linked these beneficiaries to their Medicare records for program effectiveness analyses. o The Ohio Medicare FFS intervention group was drawn from the general Ohio FFS population, excluding those under age 65, nursing home residents and those without verifiable addresses. o The Ohio MA intervention group was drawn from Anthem BlueCross BlueShield MA beneficiaries in Ohio after applying the same exclusions as Ohio FFS above. o The Texas MA intervention group was drawn from Humana MA beneficiaries in Texas, excluding nursing home residents and those without verifiable addresses, but including beneficiaries under age 65. However, since claims data received for this population were incomplete, quantitative analyses of program effects for this cohort are not provided in this report.

Evaluability Factor	Status
Comparison Group Data Availability	• Acumen continues to use randomized control groups provided by Welvie. o Control groups were drawn from the same populations and after applying the same exclusions as described above for the corresponding Ohio FFS, Anthem Ohio MA, and Humana Texas MA intervention groups. Since claims data received for the Humana Texas MA population were incomplete, quantitative analyses of of program effects for this cohort are not provided in this report.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project.

Table 4-2 and Table 4-3 provide detailed information on the enrollment and payer mix figures for the 181,288 beneficiaries in Ohio enrolled in the program through February 20, 2015, and 53,793 beneficiaries in Texas enrolled through August 1, 2014. Program enrollment patterns shown below are consistent with the timeline of Welvie's outreach to new beneficiaries. Welvie started enrolling beneficiaries in the Anthem MA Ohio population earlier than in the FFS Ohio population. Moreover, there were several periods when Welvie did not conduct outreach to any new Ohio beneficiaries, including between October and December 2013; between April and June 2014; between October and December 2014; and in March 2015. Welvie started enrolling Texas beneficiaries in May 2014, and did not conduct outreach to any new Texas beneficiaries after August 1, 2014. Most Welvie participants were enrolled either in Medicare Parts A and B or MA. The program effectiveness analyses presented in Sections 4.4 and 4.5 were conducted separately on Medicare Parts A and B beneficiaries in Ohio, MA beneficiaries in Ohio, and MA beneficiaries in Texas.

Table 4-2: Payer Mix of Welvie Program Enrollment by Calendar Quarter, Ohio

Calendar Quarter	Medicare Parts A and B		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jul-Sep 2012	86	0%	78,805	99%	14	0%	500	1%	79,405
Oct-Dec 2012	32	*	1,379	*	*	*	70	*	*
Jan-Mar 2013	66,054	78%	10,720	13%	5,959	7%	1,465	2%	84,198
Apr-Jun 2013	18	*	1,102	*	*	*	166	*	*
Jul-Sep 2013	28	*	3,084	*	*	*	124	*	*
Oct-Dec 2013	0	0%	0	0%	0	0%	0	0%	0
Jan-Mar 2014	95	*	7,165	*	*	*	31	*	*
Apr-Jun 2014	0	0%	0	0%	0	0%	0	0%	0
Jul-Sep 2014	*	*	1,008	*	0	0%	25	*	*
Oct-Dec 2014	0	0%	0	0%	0	0%	0	0%	0
Jan-Feb 20 2015	18	*	3,301	*	0	0%	*	*	*
Total	66,338	37%	106,564	59%	5,995	3%	2,391	1%	181,288

Notes: Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.

"Medicare Parts A and B", "Medicare Advantage", and “Other Medicare Enrolled” may include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part D.
“Not Medicare-Enrolled/Unknown” includes beneficiaries who were not enrolled in Medicare on the day they entered the Welvie program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

Table 4-3: Payer Mix of Welvie Program Enrollment by Calendar Quarter, Texas

Calendar Quarter	Medicare Parts A and B		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Apr-Jun 2014	14	0%	53,657	100%	*	*	*	*	53,678
Jul-Aug 1 2014	0	0%	115	100%	0	0%	0	0%	115
Total	14	0%	53,772	100%	*	*	*	*	53,793

Notes: “Other Medicare Enrolled” includes beneficiaries enrolled in Part A only, Part B only, etc.
"Medicare Parts A and B", "Medicare Advantage", and “Other Medicare Enrolled” may include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part D.
“Not Medicare-Enrolled/Unknown” includes beneficiaries who were not enrolled in Medicare on the day they entered the Welvie program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

4.4 Program Effectiveness (Primary Analysis)

This section provides cumulative and updated quarterly findings from our intention-to-treat analysis on the impact of the Welvie SDM intervention on mortality, inpatient readmissions, health service utilization, and medical expenditures for Medicare beneficiaries. The intention-to-treat analysis included randomly selected beneficiaries who received Welvie outreach materials with brief health information content and an invitation to use the six-step decision aid, but it does not distinguish between beneficiaries who did or did not use the decision aid. As in previous reports, the cohort was restricted to Welvie beneficiaries with sufficient personal identifiers to be linked to their Medicare records and with continuous enrollment in both Medicare Parts A and B or MA for at least one year prior to their enrollment in the Welvie program through the quarter of interest after enrollment. This second annual report includes analyses on beneficiaries enrolled in the Welvie intervention through September 2014 using Medicare claims data through December 31, 2014. As mentioned in Section 4.3, Humana claims data provided by Welvie for the analysis of the MA cohort in Texas were incomplete at the beneficiary level and thus quantitative analyses for this cohort are not included in this report. Results for the MA Humana Texas cohort will be included in future reports as more complete data become available. After applying cohort restrictions, there were a total of 62,531 Medicare Parts A and B beneficiaries and 92,341 MA beneficiaries from Ohio available for analysis who were enrolled in the program for at least one quarter as of September 2014.

These analyses used the randomized comparison groups provided by Welvie. As shown in the tables in Appendix B.1, the intervention and control groups were well matched on

important predictive characteristics for the evaluation, consistent with randomization, for the Medicare Parts A and B and MA Ohio cohorts. Acumen continued to use in-house Medicare claims data for the Medicare Parts A and B beneficiaries ("Medicare FFS cohort") in Ohio and Anthem claims data provided by Welvie for the analysis of the MA cohort in Ohio.

The remainder of this section highlights key quantitative findings for Welvie. Sections 4.4.1, 4.4.2, and 4.4.3 describe notable results for mortality and inpatient readmissions, resource use, and medical expenditures, respectively. In each of these sections, Acumen presents cumulative findings for the entire study period on key outcomes in tables, followed by findings for each individual intervention quarter in graphs. The focus of the analysis is on examining differences between intervention and control groups, before and after the intervention. Thus the included figures display single difference or difference-in-difference (DiD) estimates. Statistically significant results for key outcomes are noted in the narrative. Complete results are provided in Appendix B, which also includes tables and figures tracking the meta-evaluation measures (total Medicare expenditures, inpatient admission rate, readmission rate, and ER visit rate) requested by CMS for both intervention and comparison groups beginning four quarters prior to the intervention and continuing through December 2014. A detailed description of our analytic method is provided in Section 1.2.2, while definitions of outcome measures are included in Appendix A.

4.4.1 Mortality and Inpatient Readmissions

Cumulatively across the seven quarters after program enrollment, the Welvie intervention was associated with a statistically significant decrease in mortality for the Medicare FFS Ohio cohort, as shown below in Table 4-4. Among the 62,531 Medicare FFS beneficiaries in Ohio who received the Welvie intervention for at least one quarter during the study period, there was a statistically significant decrease of about 808 deaths cumulatively over seven quarters, relative to the control population. The cumulative association between the Welvie intervention and mortality was not statistically significant across the seven quarters for the MA Ohio cohort.

Table 4-4: Welvie Cumulative Differences in Mortality from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS Ohio	7	62,531	-808.48*	(-1,042.5 | -574.5)	<0.001
MA Ohio	7	92,341	-57.06	(-277.8 | 163.7)	0.612

* Statistically significant at the five percent level

In the analysis of quarterly fixed effects, the Welvie intervention was similarly associated with statistically significant decreases in mortality after program enrollment for the Medicare FFS Ohio cohort, and non-significant changes for the MA Ohio cohort. As Figure 4-1 shows, mortality decreases were statistically significant for the Medicare FFS Ohio cohort in Q1, Q3, Q4, and Q5, and estimated at about 2 to 4 deaths per 1,000 beneficiaries per quarter. Mortality decreases were also observed in Q2, Q6, and Q7, but these were non-significant. For the MA Ohio cohort, non-significant mortality changes varied in direction by quarter and were much smaller in magnitude than those observed in the Medicare FFS cohort (see Figure 4-2). These results are detailed in Table Appendix B-4 in Appendix B.2.

Figure 4-1: Welvie Quarterly Difference in Mortality after Program Enrollment, Medicare FFS Ohio Cohort

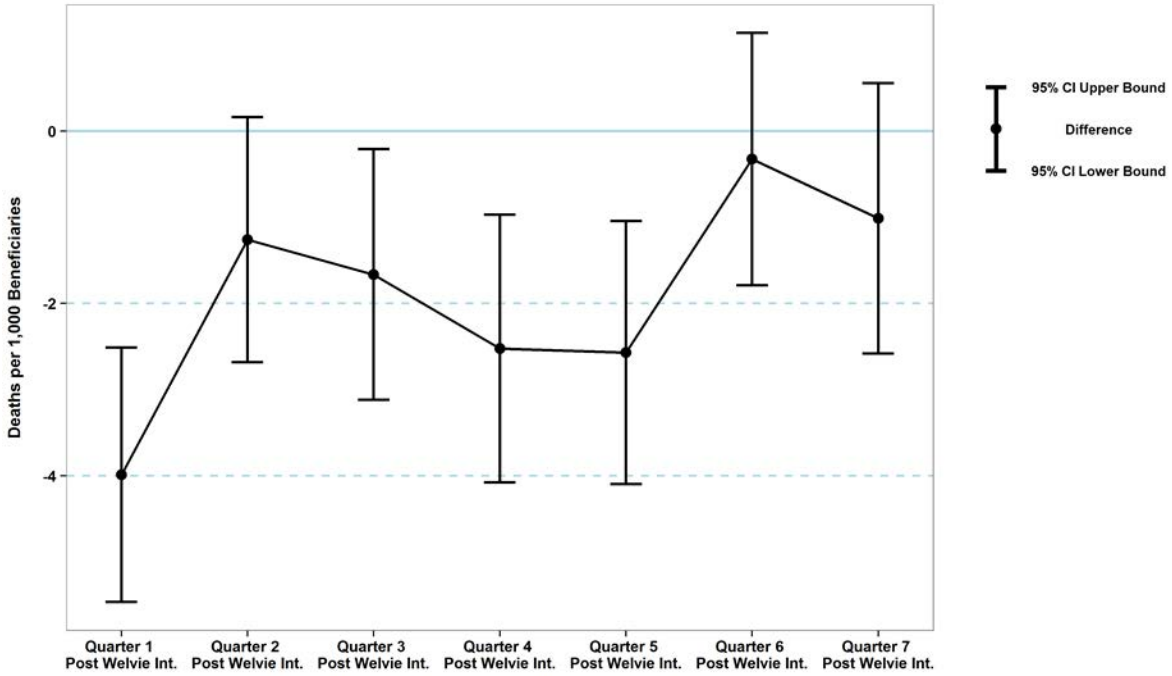
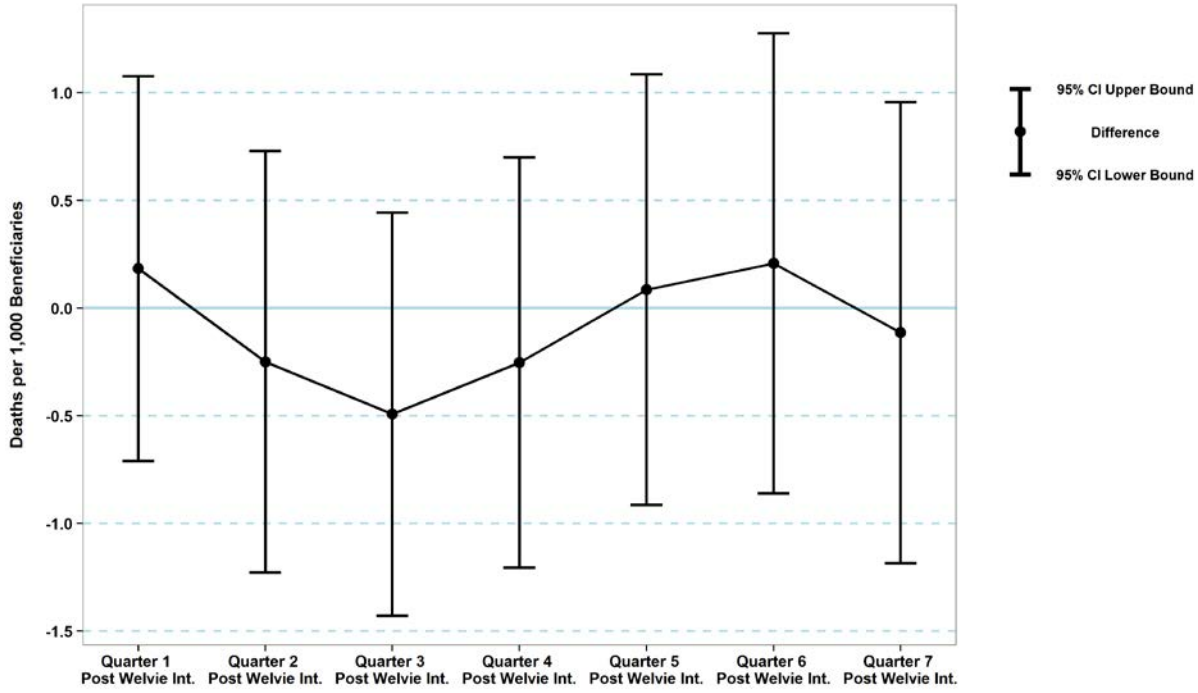


Figure 4-2: Welvie Quarterly Difference in Mortality after Program Enrollment, Medicare Advantage Ohio Cohort



The Welvie intervention was not associated with statistically significant changes in cumulative inpatient readmissions following all-cause hospitalizations across the seven quarters after program enrollment for any of the intervention cohorts; however, there were statistically significant cumulative decreases in readmissions following surgery-related hospitalizations for the Medicare FFS Ohio cohort. Table 4-5 below shows the cumulative results for all-cause inpatient readmissions while Appendix B.2 provides results for additional readmission measures. Cumulatively over the seven quarters after program enrollment, the intervention was associated with statistically significant decreases of around 118 readmissions following inpatient surgery admissions among the 7,861 FFS beneficiaries who had an inpatient surgery stay over the study period. Similarly, among the 1,999 FFS beneficiaries with a preference-sensitive orthopedic surgery stay over the study period, the intervention was associated with a cumulative reduction of 56 readmissions.

Table 4-5: Welvie Cumulative Differences in Inpatient Readmissions from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS Ohio	7	19,413	-121.18	(-326.1 | 83.7)	0.246
MA Ohio	7	20,732	-62.21	(-256.1 | 131.6)	0.529

* Statistically significant at the five percent level

In contrast to the non-significant cumulative findings on all-cause inpatient readmissions for the Medicare FFS Ohio cohort, the analysis of quarterly fixed effects found the Welvie intervention was associated with statistically significant changes in all-cause inpatient readmissions for two of the seven quarters for the Medicare FFS Ohio cohort. As

Figure 4-3 shows, a decrease of 24 inpatient readmissions per 1,000 beneficiaries in Q3 and an increase of 19 inpatient readmissions per 1,000 beneficiaries in Q5 were statistically significant for the Medicare FFS Ohio cohort.

However, the quarterly fixed effects on readmissions following inpatient surgery and inpatient preference-sensitive orthopedic surgery were consistent with the cumulative analysis for the FFS Ohio cohort. The Welvie intervention was associated with a statistically significant decrease of about 50 readmissions per 1,000 FFS beneficiaries following inpatient surgery stays in Q3 and a statistically significant decrease of about 66 readmissions per 1,000 FFS beneficiaries following inpatient preference-sensitive orthopedic surgery stays in Q7 relative to controls.

As in the cumulative analysis, changes in all-cause readmissions were also non-significant in the quarterly fixed analysis for the MA Ohio cohort. Figure 4-4 shows that changes in inpatient readmissions for the MA Ohio cohort varied in both magnitude and direction by quarter but were not statistically significant. These results are detailed in Table Appendix B-9 and Table Appendix B-10 in Appendix B.2.

Figure 4-3: Welvie Quarterly Difference in Readmission Rates after Program Enrollment, Medicare FFS Ohio Cohort

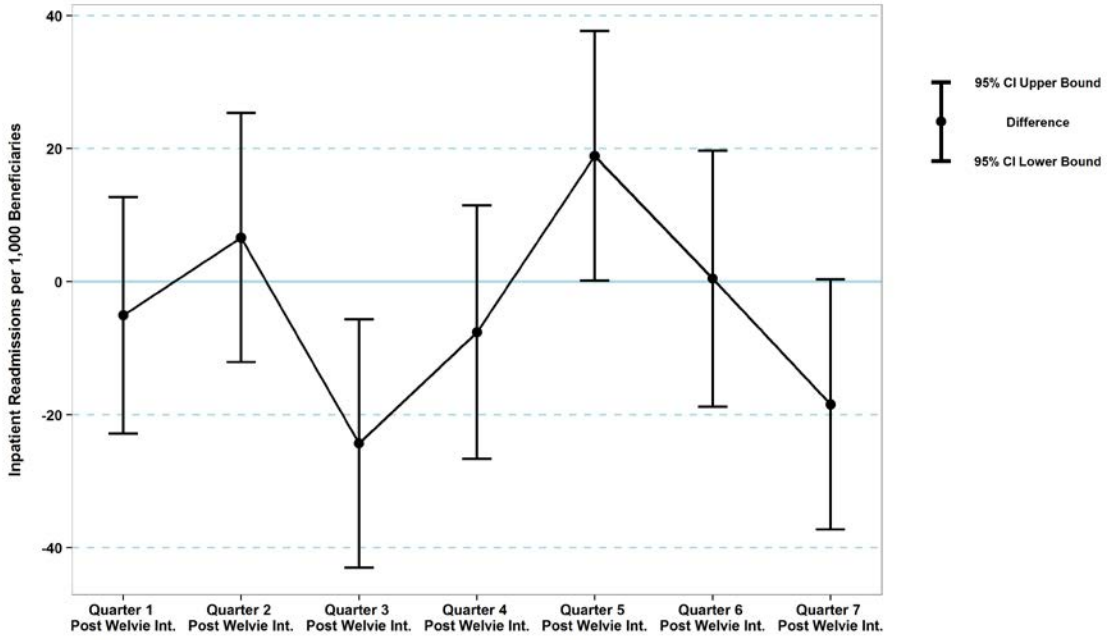
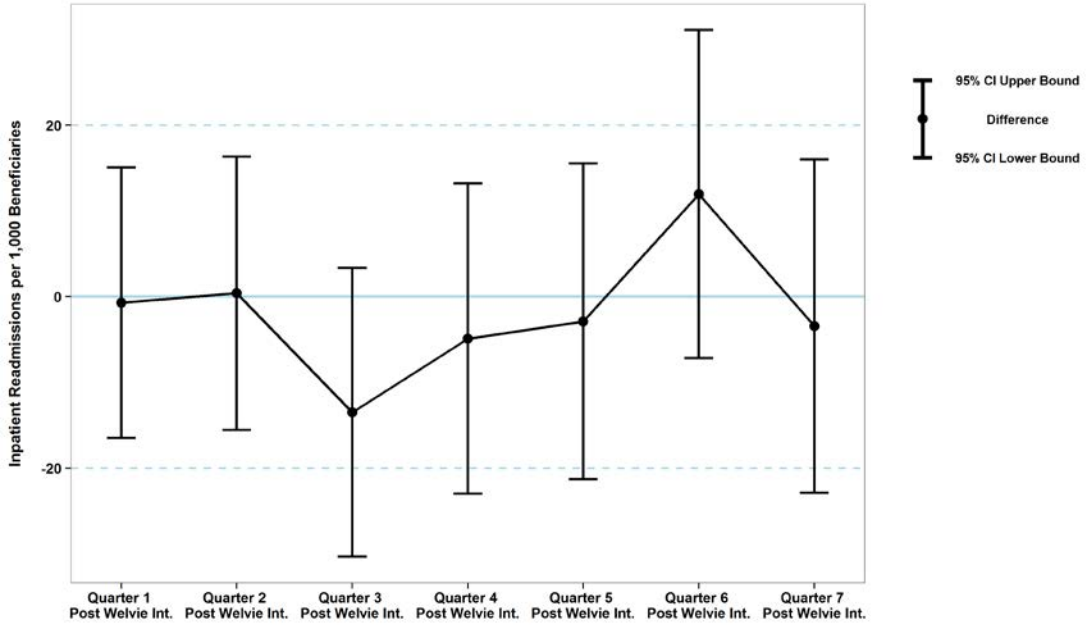


Figure 4-4: Welvie Quarterly Difference in Readmission Rates after Program Enrollment, Medicare Advantage Ohio Cohort



4.4.2 Health Service Resource Use

Cumulative effects on inpatient admissions across the seven quarters after program enrollment were not statistically significant for any of the Welvie intervention cohorts. Table 4-6 details these results for each of the cohorts.

Table 4-6: Cumulative Difference-in-Difference Estimate of Inpatient Admissions from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate	Confidence Interval	p-value
Medicare FFS Ohio	7	62,531	-235.61	(-1,363.9 | 892.7)	0.682
MA Ohio	7	92,341	-234.04	(-1,300.9 | 832.8)	0.667

* Statistically significant at the five percent level

In the quarterly fixed effects analysis, the Welvie intervention was also not associated with statistically significant changes in inpatient admissions in any of the observed intervention quarters for any of the cohorts. Figure 4-5 and Figure 4-6 detail these quarterly results for the Medicare FFS Ohio cohort and the MA Ohio cohort, respectively, in each of the seven quarters after program enrollment.

Figure 4-5: Welvie Quarterly Difference-in-Difference Estimate of Inpatient Admissions Rate, Medicare FFS Ohio Cohort

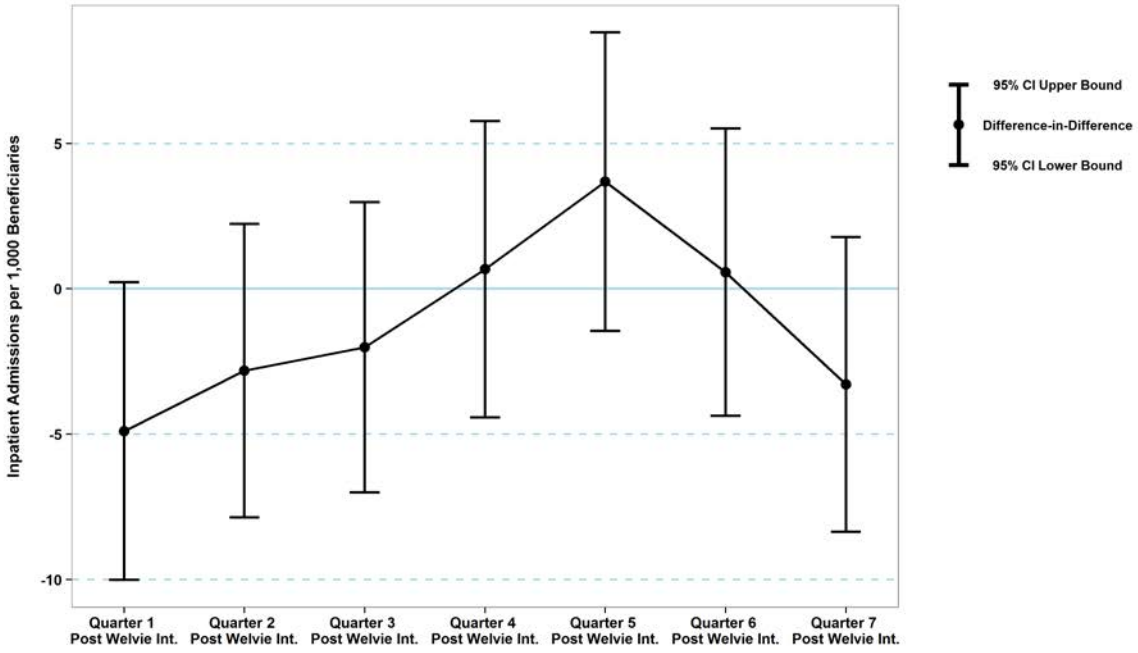
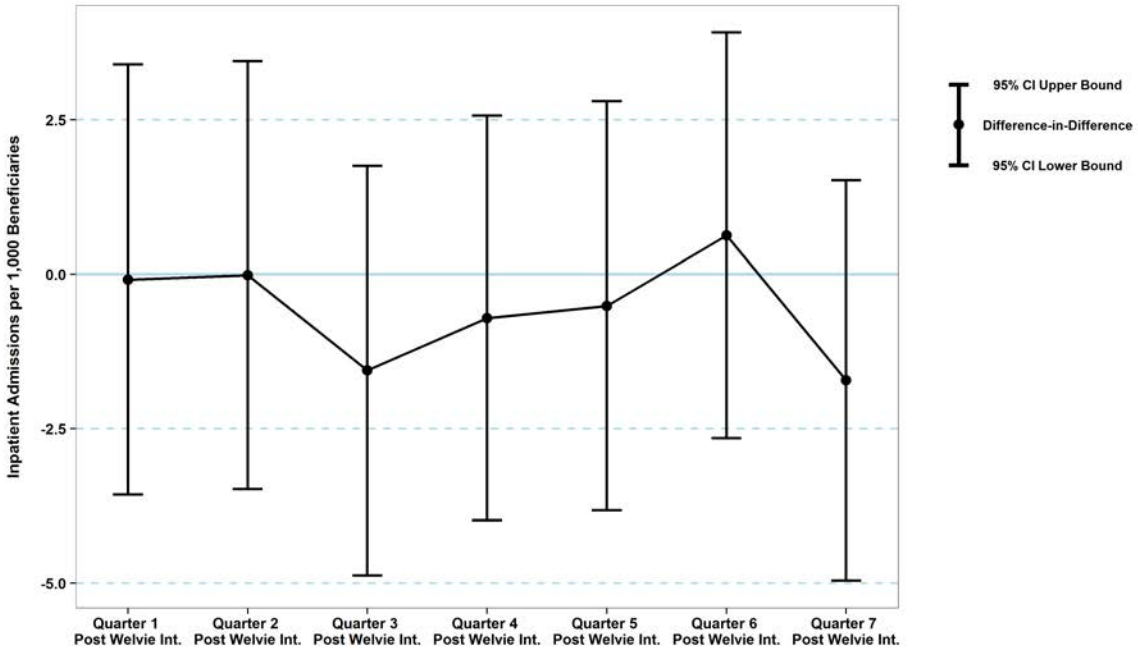


Figure 4-6: Welvie Quarterly Difference-in-Difference Estimate of Inpatient Admission Rate, Medicare Advantage Ohio Cohort



Cumulative effects on ER visits across the seven quarters after program enrollment were not statistically significant for any of the Welvie intervention cohorts, as shown in Table 4-7 below.

Table 4-7: Cumulative Difference-in-Difference Estimate of ER Visits from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate	Confidence Interval	p-value
Medicare FFS Ohio	7	62,531	-1,103.69	(-2,331.5 | 124.1)	0.078
MA Ohio	7	92,341	-13.55	(-1,172.8 | 1,145.7)	0.982

* Statistically significant at the five percent level

In the quarterly fixed effects analysis, the Welvie intervention was generally not associated with statistically significant decreases in ER visits, except for a decrease of 6 ER visits per 1,000 beneficiaries in Q3 for the Medicare FFS Ohio cohort. Figure 4-7 shows smaller non-significant decreases (4 or fewer ER visits per 1,000 beneficiaries) in most of the other quarters for the Medicare FFS Ohio cohort. There were no statistically significant effects of the Welvie intervention on ER visits in any of the seven individual quarters for the MA Ohio cohort (Figure 4-8).

Figure 4-7: Welvie Quarterly Difference-in-Difference Estimate of ER Visit Rate, Medicare FFS Ohio Cohort

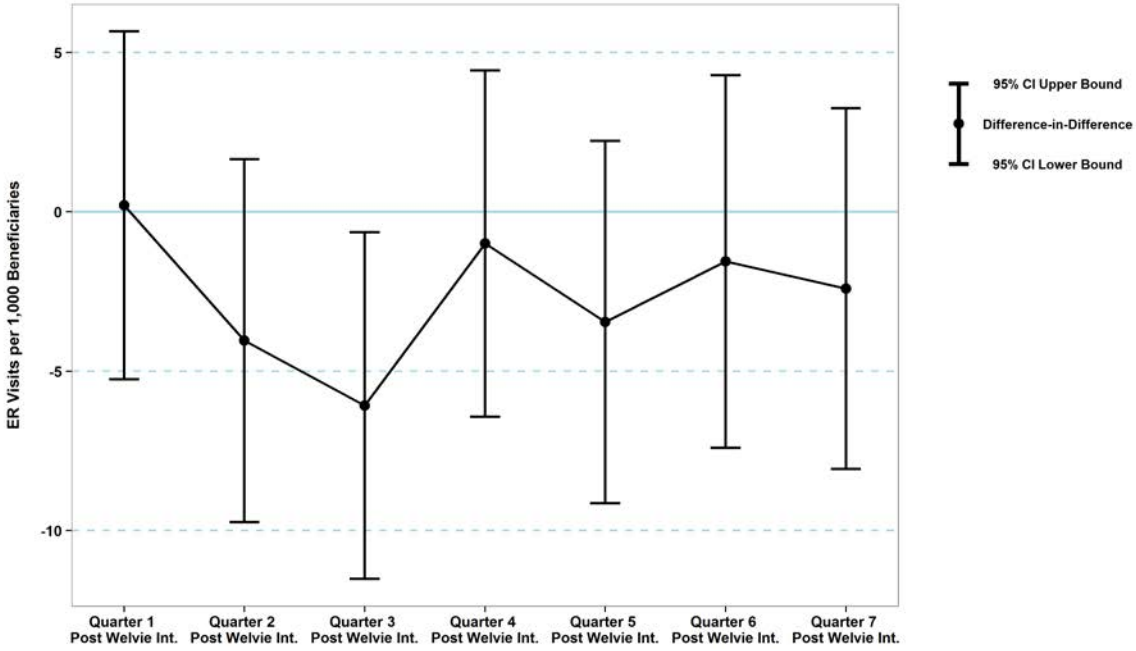
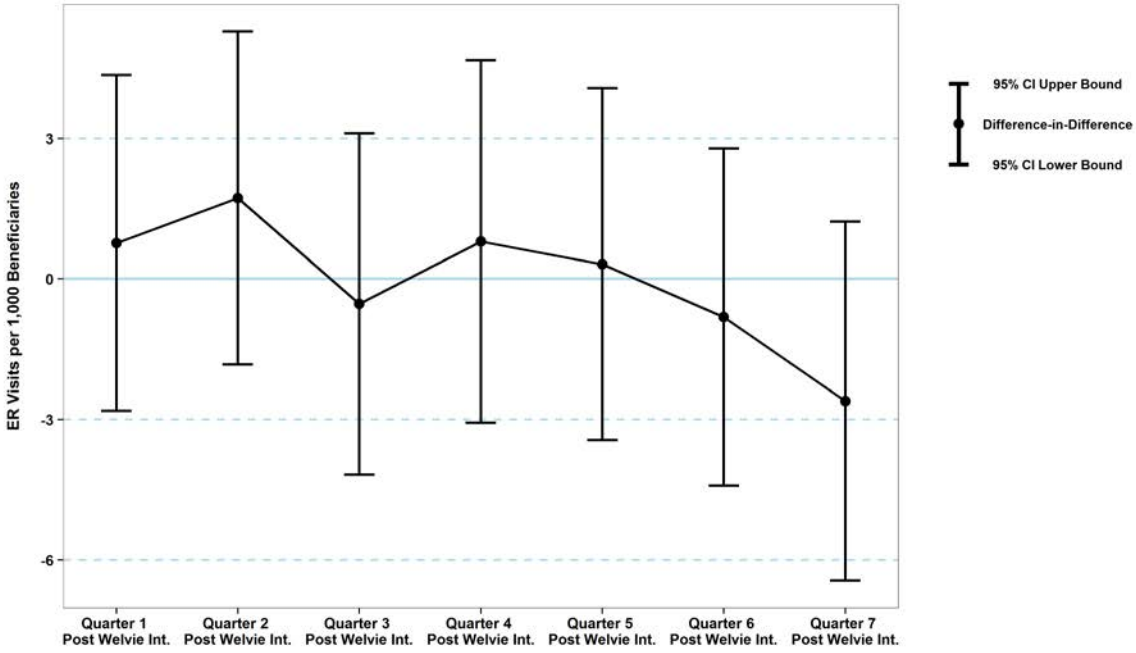


Figure 4-8: Welvie Quarterly Difference-in-Difference Estimate of ER Visit Rate, Medicare Advantage Ohio Cohort



Cumulative findings on additional health service use measures presented in Appendix B.3 were not statistically significant; however, in the quarterly fixed effect analysis, Acumen found statistically significant decreases in surgeries in one or two individual quarters after program

enrollment for the MA Ohio cohort. Appendix B.3 shows that there was a statistically significant decrease of 2 inpatient surgeries per 1,000 beneficiaries in the MA Ohio intervention group in Q3 relative to controls.

4.4.3 Medical Expenditures

Cumulative effects on total medical expenditures and inpatient expenditures across the seven quarters after program enrollment were not statistically significant for any of the Welvie intervention groups relative to controls. Table 4-8 and Table 4-9 below show results for total medical expenditures and inpatient expenditures, respectively.

For the MA Ohio cohort, however, there were cumulative statistically significant decreases in total surgery expenditures of $14,855,286 and outpatient surgery expenditures of $4,123,856 among 92,341 beneficiaries who were enrolled in the intervention for at least one quarter relative to controls. Cumulative results for additional expenditure categories are detailed in Appendix B.4.

Table 4-8: Cumulative Difference-in-Difference Estimate of Total Medical Expenditures from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate (US Dollars)	Confidence Interval (US Dollars)	p-value
Medicare FFS Ohio	7	62,531	-3,181,053	(-25,002,683 | 18,640,577)	0.775
MA Ohio	7	92,341	-18,072,213	(-41,209,839 | 5,065,413)	0.126

* Statistically significant at the five percent level

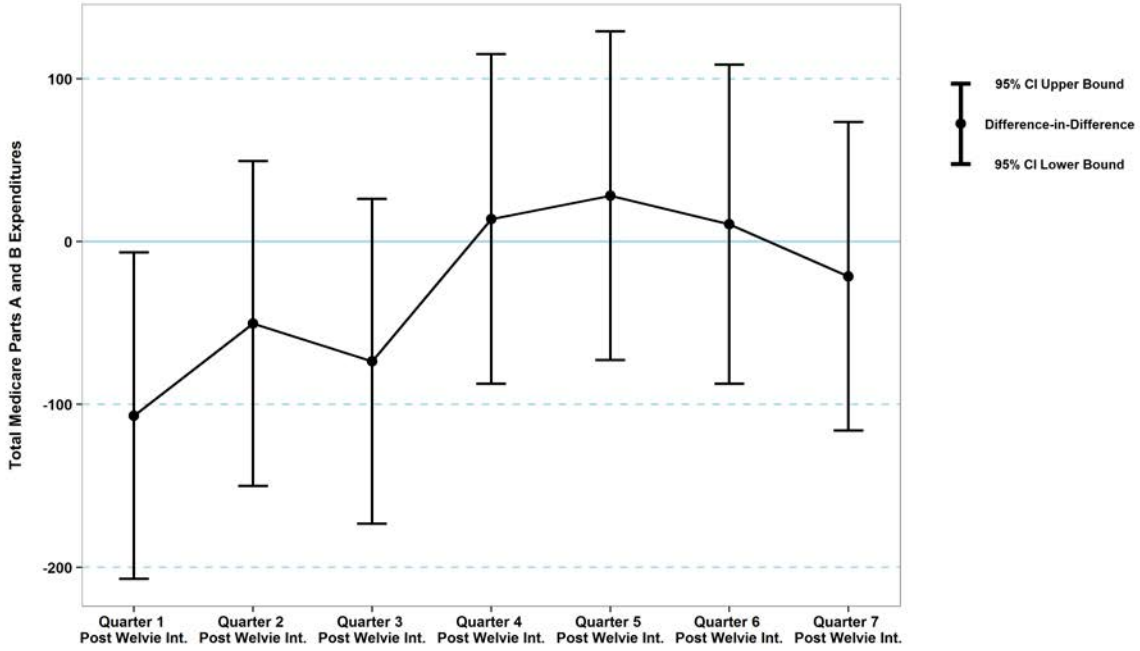
Table 4-9: Cumulative Difference-in-Difference Estimate of Inpatient Expenditures from Program Launch through 2014

Cohort	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate (US Dollars)	Confidence Interval (US Dollars)	p-value
Medicare FFS Ohio	7	62,531	-3,748,180	(-17,378,882 | 9,882,522)	0.59
MA Ohio	7	92,341	-8,961,099	(-25,108,579 | 7,186,380)	0.277

* Statistically significant at the five percent level

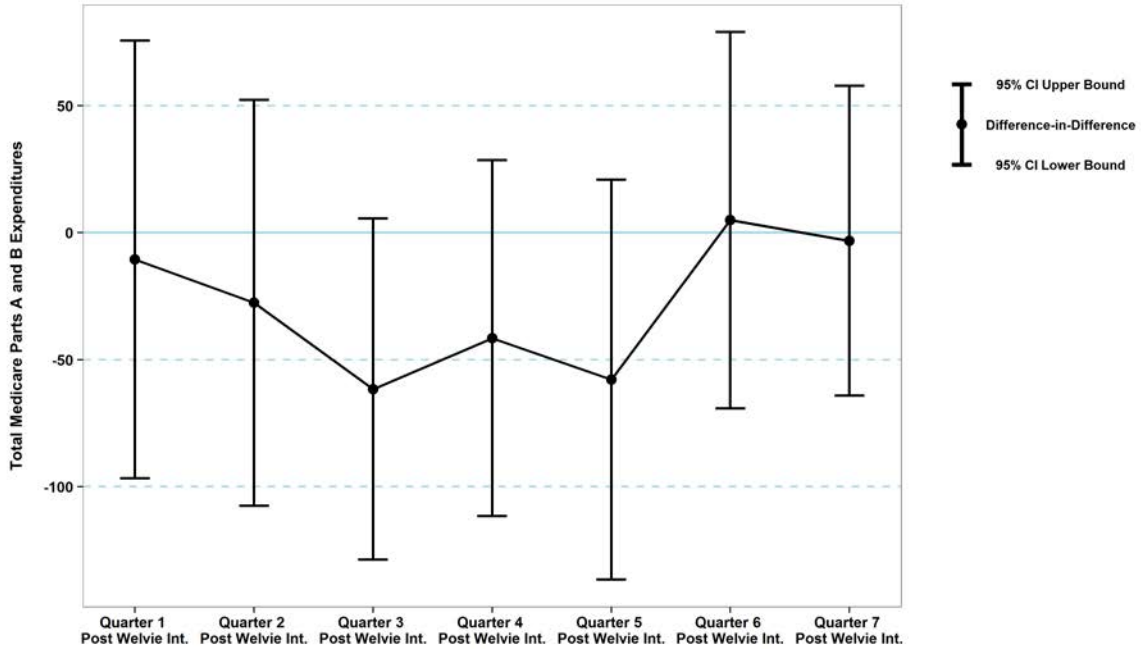
However, in the analysis of quarterly fixed effects for the Medicare FFS cohort, the Welvie intervention was associated with a statistically significant decrease in total medical expenditures, inpatient expenditures, and a few other categories of expenditures. As Figure 4-9 shows, there was a statistically significant decrease in total Medicare expenditures of $107 per beneficiary in the first quarter after enrollment in the Medicare FFS Ohio cohort. This was followed by non-significant reductions in Q2 to Q7. Appendix B.4, which includes results for additional expenditure categories for the Medicare FFS Ohio cohort, shows statistically significant reductions of $84 per beneficiary in inpatient expenditures and $57 per beneficiary in total surgery expenditures in Q1, also followed generally by non-significant reductions in Q2 to Q7. The similarity in these pattern of effects suggest that changes in total medical expenditures may be driven by inpatient and surgery-related outcomes for the Medicare FFS Ohio cohort.

Figure 4-9: Welvie Quarterly Difference-in-Difference Estimate of Total Medical Expenditures after Program Enrollment (US Dollars), Medicare FFS Ohio Cohort



For the MA Ohio cohort, the Welvie intervention was not associated with statistically significant changes in total medical expenditures in any individual quarters, consistent with the cumulative analysis. Figure 4-10 shows non-significant quarterly results on total medical expenditures for the MA Ohio cohort for the seven quarters after enrollment. Appendix B reports quarterly results for other expenditure categories.

Figure 4-10: Welvie Quarterly Difference-in-Difference Estimate of Total Medical Expenditures after Program Enrollment (US Dollars), Medicare Advantage Ohio Cohort



Consistent with the cumulative analysis for the MA Ohio cohort, statistically significant decreases in total surgery expenditures and outpatient surgery expenditures were also observed in individual quarters. There were statistically significant reductions in total surgery expenditures of $35 per beneficiary in the third quarter after enrollment, and statistically significant per-beneficiary reductions in outpatient surgery expenditures of $15 and $12, respectively, in the first and fourth quarters for the MA Ohio cohort. Additionally, the Welvie intervention was associated with statistically significant decreases of $47 per-beneficiary in inpatient expenditures in Q3 and a $13 per-beneficiary in skilled nursing expenditures in Q4. Appendix B provides additional details.

4.5 Program Effectiveness (High-dose Intervention)

This section describes the instrumental variable analysis that Acumen conducted to assess the effects of the Welvie high-dose intervention, defined as use of the decision aid component of the program. Section 4.5.1 describes our analytic approach for the instrumental variable analysis, while Section 4.5.2 presents findings from this analysis for Medicare beneficiaries who completed at least one of the six steps of the decision aid.

4.5.1 Analytic Approach

An instrumental variable analysis was conducted to assess the effects of the Welvie high-dose intervention on health, resource use and expenditures for Medicare beneficiaries. While Welvie's low-dose intervention group consists of randomly selected beneficiaries who received

outreach materials with brief health information content and an invitation to use the six-step decision aid, the high-dose intervention group consists of a subset of these beneficiaries who completed at least one of the six steps of the decision aid.

This instrumental variable analysis considers the six-step decision aid as the main treatment and focuses on assessing the average effect of this treatment. The primary analysis presented in Section 4.4 aimed to estimate the effect of offering the Welvie program to Medicare beneficiaries, or the effect of the intervention assignment on the outcomes of interest (the intention-to-treat effect, ITT), without considering receipt of the decision aid program itself. Since beneficiaries accessed the decision aid by choice, not everyone assigned to the low-dose intervention group received "treatment" (i.e., used the decision aid). The instrumental variable analysis estimates the local average treatment effect (LATE),[5] which is the average effect of the Welvie intervention on outcomes for people who actually received the treatment.

The instrumental variable analysis uses the randomized nature of assignment to the low-dose intervention group as a proxy for the environmentally modifiable entrance into the high-dose intervention program.[6,7,8] In the analysis of the Welvie high-dose intervention, assignment to the low-dose intervention group was used as the instrumental variable in a two-stage regression. The first stage was a logistic regression assessing the probability of being in the high-dose intervention program among the randomized low-dose intervention and control groups. The predicted probabilities were then used as an independent variable in the second stage, which assesses their association with health, resource use and expenditure outcomes in the DiD framework described in Section 1.2.2.

The instrumental variable analysis of the high-dose intervention is based on three assumptions. First, the assignment to the low-dose intervention group is associated with entrance into the high-dose intervention group. Second, the assignment to the low-dose intervention group is not affected by any confounding factors that may affect the association between entrance to the high-dose intervention and assessed health and cost outcomes. Third, the only way that assignment to the low-dose intervention affects health and cost outcomes is through entrance to the high-dose intervention group. The first two assumptions are consistent with program construction and randomization. The third assumption is based on the idea that receiving outreach materials with brief health information content and being invited to use the decision aid

[5] Joshua D. Angrist, Guido W. Imbens, and Donald B. Rubin, "Identification of Causal Effects Using Instrumental Variables," *Journal of the American Statistical Association* 91 (1996): 444-72.
[6] Ibid
[7] James J. Heckman, "Randomization as an Instrumental Variable," *The Review of Economics and Statistics* 78 (1996): 336-41.
[8] Sander Greenland, "An Introduction to Instrumental Variables for Epidemiologists," *International Journal of Epidemiology* 29 (2000): 722-29.

in itself are unlikely to have substantial uniform behavioral effects on individuals who do not choose to engage with the six-step decision aid.

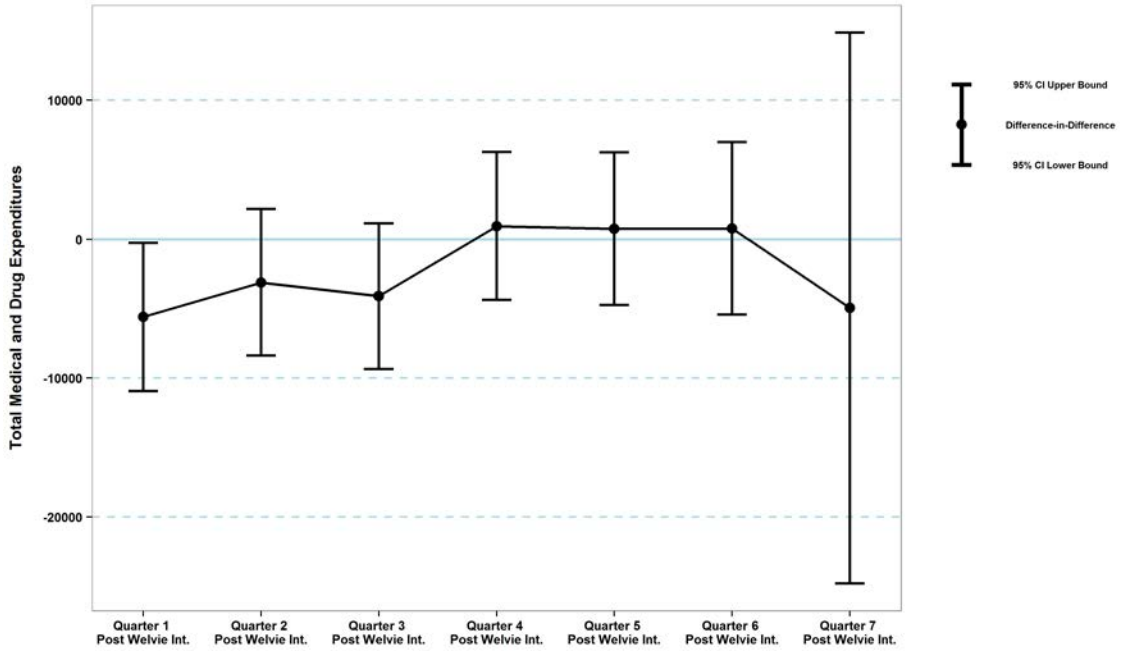
4.5.2 Effects of the Decision Aid on Resource Use and Expenditures

This section presents instrumental variable analysis results on the effects of the Welvie high-dose intervention on health service use and medical expenditures for Medicare beneficiaries. Quarterly findings on key resource use and expenditure outcomes are presented in graphs, and statistically significant effects are highlighted in the text. As in the primary analysis presented in Section 4.4, high-dose intervention effects are presented in terms of single difference or DiD estimates separately for the Medicare FFS Ohio cohort and the MA Ohio cohort, compared to their respective control groups. In the instrumental variable analysis, 1,204 Medicare FFS beneficiaries and 3,598 MA Ohio beneficiaries who completed at least one of the six steps of the decision aid were considered to have received the high-dose intervention.

The Welvie high-dose intervention was not associated with statistically significant effects on inpatient admissions for any of the cohorts, and statistically significant decreases found in other resource use categories such as ER visits and surgeries were limited to a single quarter after program enrollment. There was a statistically significant decrease of 318 ER visits per 1,000 beneficiaries in Q3 for the Medicare FFS Ohio intervention group relative to controls, and non-significant decreases for most of the other quarters after program enrollment.

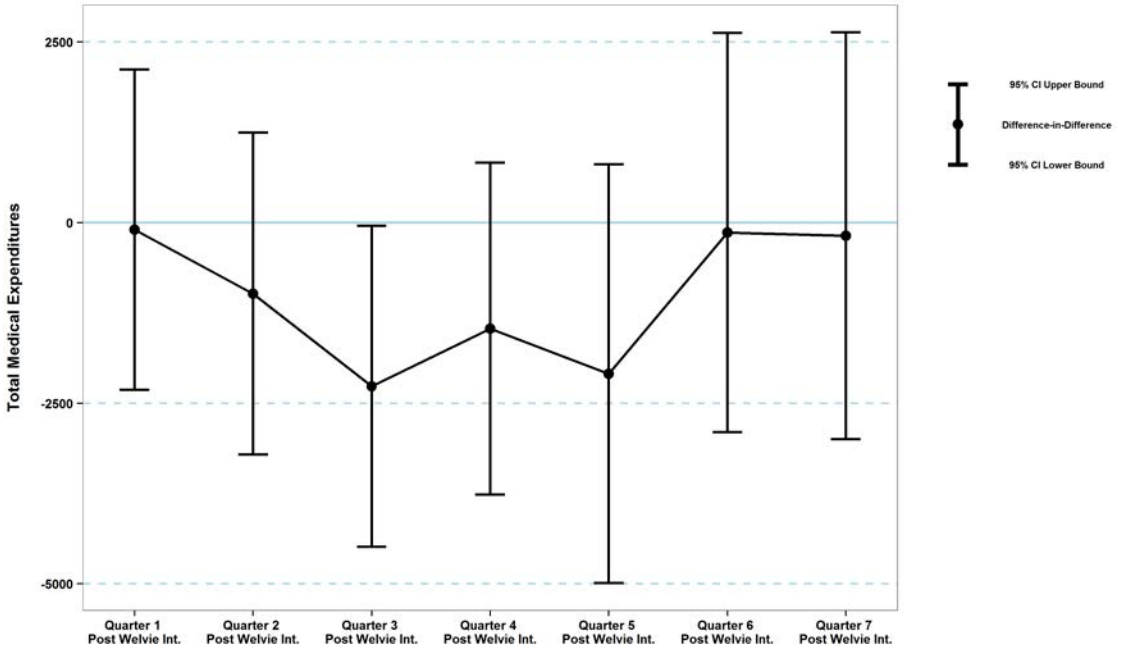
For the Medicare FFS Ohio cohort, the Welvie high-dose intervention was associated with statistically significant decreases in total Medicare Parts A, B, and D (total medical and drug) expenditures, inpatient expenditures, and surgery expenditures relative to controls in the first quarter after program enrollment. There was a statistically significant decrease of $5,602 per person in total medical and drug expenditures in Q1, and non-significant changes that were sometimes positive and sometimes negative in the remaining quarters (see Figure 4-11). Similar patterns of quarterly effects were observed for other categories of expenditures, with statistically significant decreases of $4,244 per person in inpatient expenditures, $2,738 per person in total surgery expenditures, and $1,108 per person in preference-sensitive cardiac surgery expenditures observed in Q1 (see Appendix B.4).

Figure 4-11: Welvie Quarterly Difference-in-Difference Estimates of Total Medical and Drug Expenditures (US Dollars), Medicare FFS Ohio High-dose Cohort



For the MA Ohio high-dose intervention group, there were statistically significant decreases in total medical expenditures, inpatient expenditures, skilled nursing facility expenditures, and surgery expenditures, relative to controls. Statistically significant decreases for all these expenditure categories were limited to Q3 or Q4 after program enrollment, and non-significant decreases were observed in the remaining quarters. Figure 4-12 shows there was a statistically significant decrease of $2,264 per person in total medical expenditures in Q3 among the high-dose intervention group beneficiaries relative to controls. The MA Ohio high-dose intervention was similarly associated with statistically significant decreases of $1,628 per person in inpatient expenditures in Q3 and $418 per person in skilled nursing facility expenditures in Q4. Statistically significant decreases of $1,272 per person in total surgery expenditures and $583 per person in preference-sensitive cardiac surgery expenditures were also observed, in Q3 and Q4 respectively, for the high-dose intervention group relative to controls. Instrumental variable regression results for additional expenditure categories are detailed in Appendix B.4.

Figure 4-12: Welvie Quarterly Difference-in-Difference Estimates of Total Medical Expenditures (US Dollars), Medicare Advantage Ohio High-dose Cohort



4.6 Implementation Effectiveness

This section summarizes updated findings on Welvie's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders, and awardee progress reports provided by the Lewin Group. Welvie tested new methods of outreach, such as webinars and in-person seminars, to engage more program participants and conduct a focus group on new product ideas. As part of its pilot test of provider referrals, Welvie reported challenges and lessons learned about gaining partners' buy-in and fitting in provider workflows. Table 4-10 summarizes findings from August 2014 to August 2015, unless otherwise noted.

Table 4-10: Welvie Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• 181,288 beneficiaries in Ohio as of February 20, 2015 and 53,793 beneficiaries in Texas as of August 1, 2014 received a minimally effective dose of the intervention, defined by Welvie as receipt of at least one outreach communication.[a] o Among online or phone version decision aid users, 75 percent of FFS beneficiaries in Ohio, 79 percent of MA beneficiaries in Ohio, and 75 percent of MA beneficiaries in Texas completed at least one of the six steps of the decision aid. Sections 4.4 and 4.5 provide detailed program effectiveness analyses for the Medicare FFS and MA Ohio cohorts. Program effectiveness analyses were not provided for the MA Texas cohort due to incomplete claims data. Completion rates of individual steps among beneficiaries who used the paper version are not tracked because monitoring tools that are used for the online and phone versions (e.g., clickstream analysis) could not be implemented for the paper version.[a] • The provider referral project, as described in Section 4.2, is in the early stages of implementation with only two beneficiaries having received referrals. However, these beneficiaries have not yet used the decision aid.

What were key successes in implementing the innovation as designed and factors associated with success?	• Welvie revised cardiac outreach materials to focus on disease management and prevention. New materials produced an increased response rate among Anthem participants, and as a result, Welvie incorporated the revisions into outreach materials for other partners.
	• Welvie reports that the following outreach strategies have been effective in engaging beneficiaries in the program and generating better response rates: 1) providing incentives; 2) mailing outreach materials followed by a telephone reminder; 3) mailing envelopes, as compared to postcards, with the CMS or Department of Health and Human Service logo; and 4) delivering outreach materials to beneficiaries on Monday, as compared to later in the week.
	• The new Midwest Medical Director at Anthem BCBS in Ohio is a strong supporter of SDM and is working closely with Welvie to support program outreach and co-branding.
	• As part of the no-cost extension activities, Welvie engaged Humana and practice leadership to obtain buy-in from practices and clinicians for Welvie's provider referral pilot project.
	• Welvie and Humana-owned practices simplified the patient eligibility criteria for the provider referral process.
	  o Providers can refer patients to the Welvie program for any condition, rather than a limited list of conditions as originally planned.
	  o Providers can refer beneficiaries to Welvie regardless of health insurance carrier, and Welvie will honor the referral.
	• Welvie conducted site visits to two Florida practices to inform site selection, workflows, and other plans for implementation of the provider referral pilot project.

Research Questions	Findings from August 2014 through August 2015
What were the challenges in implementing the innovation as designed?	• Providers have expressed initial concerns that participation in Welvie may increase appointment times and increase the number of patients seeking a second opinion. Welvie plans to address these concerns with feedback from the initial cohort of participating providers. • Welvie continues to work with primary care and specialty practices to refine workflows for provider referrals. • Welvie discovered significant variation in practices' ability to print Welvie marketing materials. Marketing materials were thus revised for black-and-white printing, and graphics were simplified. • Program enrollees who participated in an informational webinar (described below) experienced technical difficulties. Welvie plans to provide additional technical support for future webinars and is testing the feasibility of in-person, peer-to-peer learning events.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Welvie convened two informational webinars which, according to Welvie leaders and staff, (i) served as an additional method of outreach to Medicare beneficiaries, (ii) increased community knowledge about surgery and care options, and (iii) helped Welvie assess the feasibility of the peer-to-peer surgery buddies program in the future. o Welvie presented the decision aid information and collected feedback on incentives, patient engagement opportunities, and new decision support topics (e.g., diagnostic imaging support) during the seminar. o Welvie found strong support for peer-to-peer learning events, and more than 60 percent of attendees volunteered to host an event or serve as a surgery buddy. o Attendance at seminars was open to all; however, advertisements were only sent to beneficiaries who had previously received Welvie outreach materials. o Welvie reported that in-person events are cost-effective only if there are at least 25 attendees per seminar • Welvie is considering expanding its SDM program to address (i) end of life care, (ii) diagnostic radiology procedures, and (iii) prescription drug decisions.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Response rates to new outreach materials displaying the Humana brand were similar to response rates to non-branded materials in the Texas cohort. • Welvie used trend analyses of surgery utilization data to optimize the timing of its Year 2 communications in Ohio. • Welvie is conducting internal analyses of program impact on health care utilization to support sustainability discussions with existing partners.

[a]Source: Beneficiary-level program data sent by Welvie to Acumen.

4.7 Workforce

This section updates findings on workforce issues related to the Welvie intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group. Between August 2014 and July 2015, Welvie provided information on the decision aid and program policies to the Florida-based Humana practice staff participating in the provider referral pilot. Welvie made no major changes to workforce staffing or training for the ongoing implementations in Ohio and Texas.

4.8 Context

This section updates findings on context issues related to the Welvie intervention, based on qualitative information obtained from interviews with the awardee and other stakeholders and awardee progress reports provided by the Lewin Group. The awardee is actively engaging Humana-owned practices in Florida to implement provider referrals to the Welvie program. The awardee is also scaling up its innovation to reach an additional 600,000 Medicare beneficiaries outside of the HCIA project. Table 4-11 summarizes findings from March through May 2015, unless otherwise noted.

Table 4-11: Welvie Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Welvie tested co-branded outreach materials with MA plans because of a CMS rule change in January 2015 that allows MA plans to offer incentives for health improvement programs. • Practices that perceived minimal financial risk from implementing an SDM program, because of capitated payments or participation in financial risk arrangements, were more receptive to serving as Welvie provider referral sites.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• Welvie launched provider referrals in a few Humana-owned practices in Florida in June 2015.
How can successful innovation components be scaled and replicated in other settings?	• Since fall of 2014, Welvie has scaled its innovation to 600,000 additional Medicare beneficiaries (not included in the HCIA project), with little to no changes in workforce or innovation components.[a]

[a] Source: Lewin Quarterly Awardee Narrative Report, Pharm2Pharm (January-March 2015)

5 EVALUATION OF THE MEDEXPERT INTERNATIONAL HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the MedExpert International ("MedExpert") innovation, reflecting new analytic results through August 2015, unless noted otherwise. Section 5.1 provides an overview of the key findings—both qualitative and quantitative—for MedExpert. Section 5.2 highlights the awardee's innovation components, and Section 5.3 summarizes the most recent information available on the evaluability of the MedExpert program. Section 5.4 describes updated quantitative analysis findings on MedExpert's program effectiveness based on an intention-to-treat (ITT) framework for all beneficiaries who received MedExpert outreach (For more comprehensive quantitative results, see Appendix C). Finally, Sections 5.5, 5.6, and 5.7 highlight, respectively, updated findings on the evaluation categories of implementation effectiveness, workforce, and context.

5.1 Key Findings

The MedExpert intervention was associated with statistically significant decreases in mortality and readmissions relative to matched controls. Cumulatively over the six quarters after program enrollment, there was a statistically significant decrease of 235 deaths among the 48,778 Medicare FFS beneficiaries who received the intervention for at least one quarter relative to controls. These cumulative estimates are consistent with the estimates of quarterly fixed effects on mortality, which showed statistically significant reductions in two quarters and non-significant reductions in all but one remaining quarter. Similarly, over the six quarters after program enrollment, there was a statistically significant cumulative decrease of 156 hospital readmissions following all-cause inpatient readmissions for 14,352 MedExpert MA beneficiaries with an inpatient admission relative to controls. When examining quarterly fixed effects, however, MedExpert had no statistically significant effects on readmissions following all-cause inpatient admissions among MA beneficiaries in any of the six quarters after program enrollment.

Findings on the effects of the MedExpert program on resource use outcomes such as inpatient admissions and ER visits was inconclusive. There were no statistically significant cumulative results for any of the outcomes. The only statistically significant results in the quarterly fixed effects analysis were a decrease of 10 ER visits per 1,000 beneficiaries in the first quarter after enrollment and a decrease of 3 inpatient admissions per 1,000 beneficiaries in the third quarter after enrollment for the Medicare FFS intervention group relative to controls. (Data on ER use is unavailable for MA beneficiaries.)

The MedExpert intervention was not associated with statistically significant effects on total medical expenditures for FFS beneficiaries across the study period, but it was associated

with statistically significant decreases and increases in expenditures for certain types of services. Claims data on expenditures were unavailable for MA beneficiaries. There was a statistically significant decrease of $2,456,864 in home health expenditures cumulatively over the six quarters after program enrollment among 48,778 Medicare FFS beneficiaries who received the MedExpert intervention for at least one quarter. However, there was also a statistically significant increase of $3,022,104 in outpatient non-ER expenditures cumulatively over this same period in that population. At the quarterly level, the only statistically significant effect observed was a decrease in ER expenditures of around $8 per beneficiary for the FFS cohort, but this was only observed in the first quarter after program enrollment.

These analyses of program effects, however, are subject to limitations and should be interpreted cautiously. Because a randomized comparison group was unavailable for analysis, intervention beneficiaries were matched to comparison groups using Medicare data on observable demographic and health characteristics. However, unobserved differences and differential trends between the comparator groups may have influenced outcomes. Acumen will continue to refine the comparison group matching model for future reports.

With regards to innovation processes, the MedExpert HCIA implementation was fully mature, and services operated smoothly during August 2014 through the end of the HCIA-funded implementation period in June 2015. MedExpert conducted outreach to all eligible beneficiaries in the innovation population and focused on serving those beneficiaries who chose to engage in the program during the last few months of the innovation project. MedExpert reports that average call duration between MedExpert staff and program participants increased in this evaluation period, mostly owing to an increase in repeat callers who tend to have more serious conditions.

One area of focus for MedExpert over the past year has been finding ways to effectively communicate information from the MedExpert International Guidance Systems (MIGS), a robust information-gathering tool that facilitates the provision of SDM information on a large number of health topics to beneficiaries. MedExpert successfully managed limitations of the technology (e.g., poor readability of MIGS reports) by using staff to verbally interpret the SDM information for beneficiaries. The key benefits of the MIGS are that it (i) generates up-to-date reports on a wide range of health topics, (ii) provides beneficiaries with health information in a timely way, and (iii) is easy for beneficiaries to access by phone. However, the primary limitation is the readability of the MIGS reports, which typically exceed 100 pages in length and require a reading level well above a 12th grade level. This reflects the fact that the MIGS aggregates information directly from sources intended for audiences with health care expertise. As a result, staff are needed to interpret the MIGS reports, and reports are only shared with beneficiaries upon request. Medical Information Coordinators (MICs) and physicians are responsible for

listening to the beneficiary's reason for calling, critically thinking about the information that should be provided, and delivering the information in a user-friendly way.

MedExpert staff involved in delivering the phone-based intervention consider the program's approach, which includes following up with beneficiaries regularly after the initial call and allowing for longer "talk time" during calls, as important for both beneficiary engagement and staff satisfaction. The physician and RN-level MICs who participated in the site visit interviews noted that it takes time to build relationships with beneficiaries and that MedExpert's beneficiary engagement approach supports relationship building. For example, MedExpert's outreach schedule includes regular follow-up, such that beneficiaries can engage as their comfort with MedExpert increases and as the clinical need arises. In addition, MedExpert provides unlimited "talk time" during calls with beneficiaries, which allows the beneficiary to feel heard and allows staff to address issues that may not have been broached during a shorter call. Furthermore, staff noted that individuals who enjoy building relationships and listening to beneficiaries are more likely to be satisfied with and successful in their work at MedExpert.

During the period from July 2014 to March 2015, MedExpert reported staff retention rates between 80 to 85 percent, and staff participating in interviews suggested that the turnover may be due to relatively lower levels of job satisfaction among individuals who enjoy working in hospitals or traditional health care settings with specific tasks. The Acumen team will continue to monitor staffing issues through the upcoming workforce survey and in the context of workforce metrics available from CMS.

MedExpert is seeking additional contracts with health insurance carriers to sustain the program following the end of the HCIA cooperating agreement on June 30, 2015. The awardee is collaborating with its current partner, United HealthCare (UHC), on an impact analysis of MedExpert's services. The results of UHC's analysis will inform decisions to move forward with a post-HCIA contract with MedExpert.

5.2 Innovation Components

The MedExpert innovation is designed to improve quality of care and reduce expenditures by providing beneficiaries with up-to-date information on treatment options and clinical guidelines, which may help prevent unnecessary utilization of health services, including emergency room visits and outpatient care. MedExpert's staff of MICs and physicians use the MIGS, an information-harvesting and report-generating system that incorporates clinical guidelines, medical research, and other evidence-based health information, to provide evidence-based information on around 22,000 medical conditions to beneficiaries. MedExpert staff use MIGS reports as reference information during encounters with beneficiaries, sharing copies of

the reports with beneficiaries upon request. MedExpert consults with world experts on complex cases that require additional professional judgment.

The program does not target any particular medical condition, and it serves Medicare beneficiaries of all ages. MedExpert uses health insurance eligibility as its sole inclusion criteria, which allows it to reach a broad set of beneficiaries who may benefit from the intervention.

Beneficiaries can engage with MedExpert by phone, fax, text message, or email, with phone being the most frequently used method. For beneficiaries with more severe conditions, MedExpert staff may obtain the beneficiary's consent to work with a "communicator," who is a designated family member or friend who communicates directly with MedExpert and relays the information to the beneficiary. MedExpert reports that communicators are especially useful in cases when the beneficiary is overwhelmed with coping with his or her illness and with the volume of information provided by MedExpert.

The MIGS searches publicly available information including publications from the federal government (e.g., National Guidelines Clearinghouse [NGC], Physician Data Query [PDQ]) and other non-federal sources (e.g., non-profit organizations) and compiles the information into reports. MIGS reports are customizable based on a beneficiary's informational needs (e.g., seeking screening information, information on a recent diagnosis) and severity of condition (e.g., mild, moderate, severe). MIGS reports may include information on current clinical trials, such as a list of trials that are recruiting participants and the participant inclusion and exclusion criteria. MIGS reports may also include ratings of physicians who are identified by MedExpert as "experts" and recommended to beneficiaries. However, a drawback of the MIGS reports is their readability, since reports typically exceed 100 pages in length and require a reading level well above a 12th grade level.

MedExpert's intervention also includes patient advocacy and administrative services, include transferring medical records, scheduling appointments, coordinating health insurance benefits, and other services. MedExpert's patient advocacy services may improve quality of care by helping beneficiaries obtain necessary services and by improving care coordination.

MedExpert defines two levels of beneficiary engagements in its intervention. An "encounter" is defined as a single discussion or contact between a MedExpert staff and a beneficiary. An "episode" is considered a higher level of engagement often involving multiple discussions or encounters about the same health or care assistance topic.

5.3 Evaluability

This section provides the latest information on the primary factors affecting the evaluability of MedExpert. Table 5-1 describes the availability of intervention and comparison group data, as well as program maturity, which is defined by the program's stage of

implementation and the extent to which the innovation has changed since launch. The MedExpert intervention group consists of both randomly selected Medicare beneficiaries drawn from CMS data files, as well as non-randomly selected Medicare beneficiaries who MedExpert recruited through its partnerships with the Segal Consulting Group and UHC MA plans. Medicare beneficiaries who MedExpert recruited through its Segal Consulting Group partnership were exposed to the MedExpert intervention for several years prior to HCIA program launch, and these beneficiaries also received an additional suite of services not offered to other Medicare beneficiaries in MedExpert's intervention group for the HCIA project. These beneficiaries were thus not included in the analyses presented in Section 5.4. As Table 5-1 details, MedExpert did not identify comparison groups for any of the intervention subgroups, and Acumen's ability to match suitable comparison groups to non-randomly selected UHC beneficiaries may be particularly limited as these beneficiaries are likely to differ from the general Medicare Advantage population. Acumen continues to refine its comparison group matching criteria to minimize observable differences between intervention and comparison groups.

Table 5-1: MedExpert Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Intervention Group Data Availability	• Acumen used program data on MedExpert intervention group beneficiaries provided by the awardee and linked these data to Medicare data files for the analyses presented in Section 5.4.
Comparison Group Data Availability	• MedExpert reports randomly assigning Medicare beneficiaries in the Buccaneer data file it received from CMS into intervention and comparison groups. However, MedExpert had to purge data on the randomized comparison group beneficiaries due to changes in its data-sharing agreement with CMS. MedExpert was thus not able to provide data on this comparison group. • MedExpert does not identify a comparison group for intervention group beneficiaries enrolled through its partnership with United HealthCare. • Acumen continues to construct matched comparison groups drawn from FFS and MA beneficiaries in CMS administrative files for program effectiveness analyses. o Acumen's ability to match suitable comparison groups to non-randomly selected UHC plan beneficiaries may be particularly limited as these beneficiaries are likely to differ from the general Medicare Advantage population. Acumen continues to refine its comparison group matching criteria to minimize observable differences between comparator groups in our analysis.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project.

Table 5-2 provides detailed information on the program's enrollment and payer mix figures for the 325,121 MedExpert beneficiaries enrolled in the program on or before March 31, 2015. Among these beneficiaries, 86,975 were enrolled in Medicare Parts A and B on the day they enrolled in the program, while 213,685 were enrolled in MA. Table 5-2 shows that MedExpert enrolled Medicare beneficiaries on a rolling basis from early 2013 through early

2015. The smaller number of new beneficiaries enrolled in the program between October 2013 and March 2014 suggests that outreach efforts briefly slowed down during this period.

Table 5-2: Payer Mix of MedExpert Program Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A and B		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jan-Mar 2013	1,205	43%	1,465	52%	93	3%	53	2%	2,816
Apr-Jun 2013	7,972	42%	9,305	49%	949	5%	671	4%	18,897
Jul-Sep 2013	21,773	38%	24,489	43%	1,526	3%	9,678	17%	57,466
Oct-Dec 2013	14	42%	14	42%	*	*	*	*	33
Jan-Mar 2014	22	46%	17	35%	*	*	*	*	48
Apr-Jun 2014	20,071	25%	56,989	71%	1,025	1%	2,327	3%	80,412
Jul-Sep 2014	2,969	4%	76,761	95%	155	0%	1,167	1%	81,052
Oct-Dec 2014	20,720	43%	24,106	49%	1,202	2%	2,705	6%	48,733
Jan-Mar 2015	12,229	34%	20,539	58%	1,108	3%	1,788	5%	35,664
Total	86,975	27%	213,685	66%	6,066	2%	18,395	6%	325,121

Notes: This table includes all beneficiaries who enrolled in the MedExpert program through March 31, 2015 based on participant-level program data provided by MedExpert on April 22, 2015
Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.
"Medicare Parts A and B," "Medicare Advantage," and "Other Medicare Enrolled" may also include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part D.
"Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the MedExpert program including those with death dates occurring prior to program enrollment date, or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

5.4 Program Effectiveness

This section describes cumulative and quarterly findings from the intention-to-treat analyses on the impact of any exposure to the MedExpert SDM intervention on mortality, inpatient readmissions, health service utilization, and medical expenditures for Medicare beneficiaries. Acumen analyzed Medicare FFS and MA beneficiaries enrolled in the MedExpert program on or before September 30, 2014, using Medicare claims data through December 2014. Through conversations with MedExpert program leaders, Acumen has learned that Medicare beneficiaries that MedExpert recruited through its partnership with Segal Consulting Group were exposed to the MedExpert intervention for several years prior to HCIA program launch and that this sub-group also received an additional suite of services not offered to other Medicare beneficiaries in the MedExpert intervention group for the HCIA project. The analyses presented in this report thus do not include these beneficiaries. Acumen further restricted the analytic cohorts to individuals who had sufficient personal identifiers to be linked to their Medicare records and who were continuously enrolled in both Medicare Parts A and B for at least one year prior to their enrollment in the MedExpert program through the quarter of interest after

enrollment. There were a total of 48,778 Medicare Parts A and B ("Medicare FFS") beneficiaries and 165,017 MA beneficiaries available for analysis after applying these restrictions. Acumen matched comparison groups to these beneficiaries using a propensity score matching model described in Section 1.2.2. As shown in Appendix C.1, the intervention and comparison groups were generally well matched on observed demographic and baseline health characteristics for both the Medicare FFS and MA cohorts.

The remainder of this section highlights our key quantitative findings for MedExpert. Sections 5.4.1, 5.4.2, and 5.4.3 highlight notable results for mortality and inpatient readmissions, resource use, and medical expenditures, respectively. Each of these sections presents cumulative findings for the entire study period on key outcomes in tables, followed by findings for each individual intervention quarter in graphs. Our focus is on examining differences between intervention and comparison groups, before and after the intervention. Thus, the included figures display single difference or difference-in-difference (DiD) estimates. Statistically significant results for key outcomes are noted in the narrative for the intervention group relative to controls. Detailed results of our analyses are provided in Appendix C, which also includes tables and figures tracking the meta-evaluation measures recommended by CMS (total Medicare expenditures, inpatient admission rate, readmission rate, and ER visit rate) for both intervention and comparison groups beginning four quarters prior to the intervention and continuing through December 2014. A detailed description of our analytic method is provided in Section 1.2.2, and definitions of outcome measures are included in Appendix A.

5.4.1 Mortality and Inpatient Readmissions

Cumulatively across the six quarters after program enrollment, the MedExpert intervention was associated with a statistically significant decrease in mortality for the Medicare FFS cohort. As shown below in Table 5-3, among the 48,778 FFS beneficiaries who received the MedExpert intervention for at least one quarter during the study period, there was a statistically significant decrease of about 235 deaths cumulatively over six quarters, relative to the control population. For the MA cohort, the association between the MedExpert intervention and mortality was not statistically significant cumulatively across the six quarters after program enrollment.

Table 5-3: MedExpert Cumulative Differences in Mortality from Program Launch through 2014

Cohort	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS	48,778	-234.81*	(-377.5 | -92.1)	0.001
Medicare Advantage	165,017	-148.29	(-320.2 | 23.7)	0.091

* Statistically significant at the five percent level

In the analysis of quarterly fixed effects, the MedExpert intervention was also associated with statistically significant decreases in mortality in the second and third quarters after enrollment for the Medicare FFS cohort as well as a statistically significant decrease in mortality in the second quarter after enrollment for the MA cohort. For the Medicare FFS cohort, there were statistically significant decreases in mortality of about 2 deaths per 1,000 beneficiaries per quarter in both Q2 and Q3 in the intervention group relative to controls. The mortality decrease in Q2 for the Medicare MA cohort was estimated at about 1 death per 1,000 beneficiaries in the intervention group relative to controls. As Figure 5-1 and Figure 5-2 show, these statistically significant decreases are consistent with non-significant decreases in mortality in other quarters.

Figure 5-1: MedExpert Quarterly Differences in Mortality after Program Enrollment, Medicare FFS Cohort

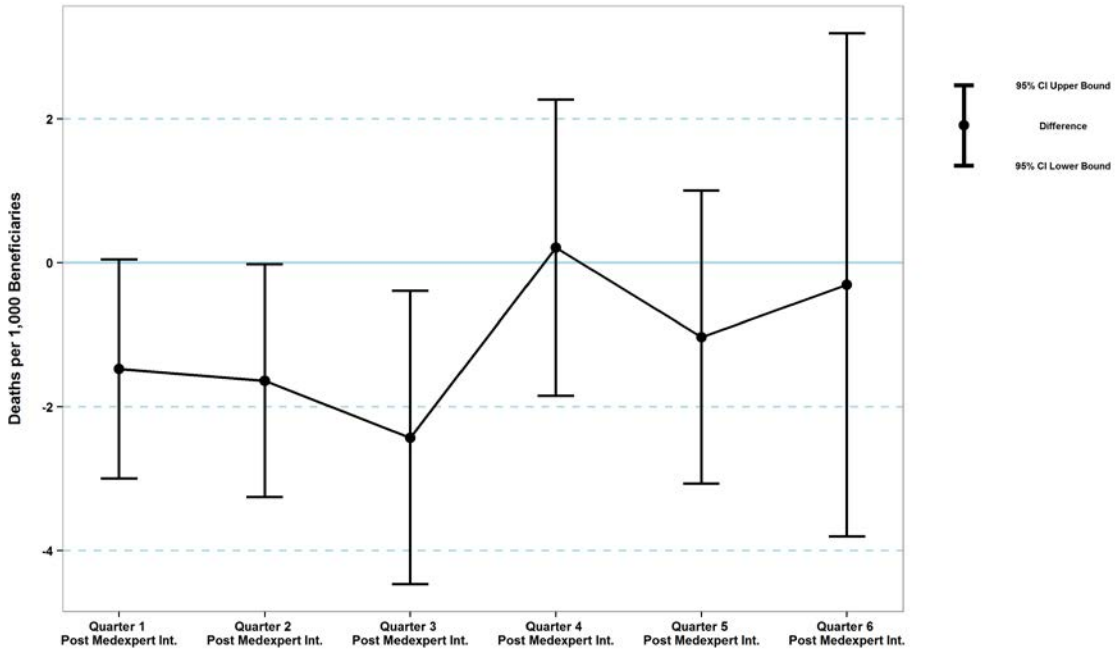
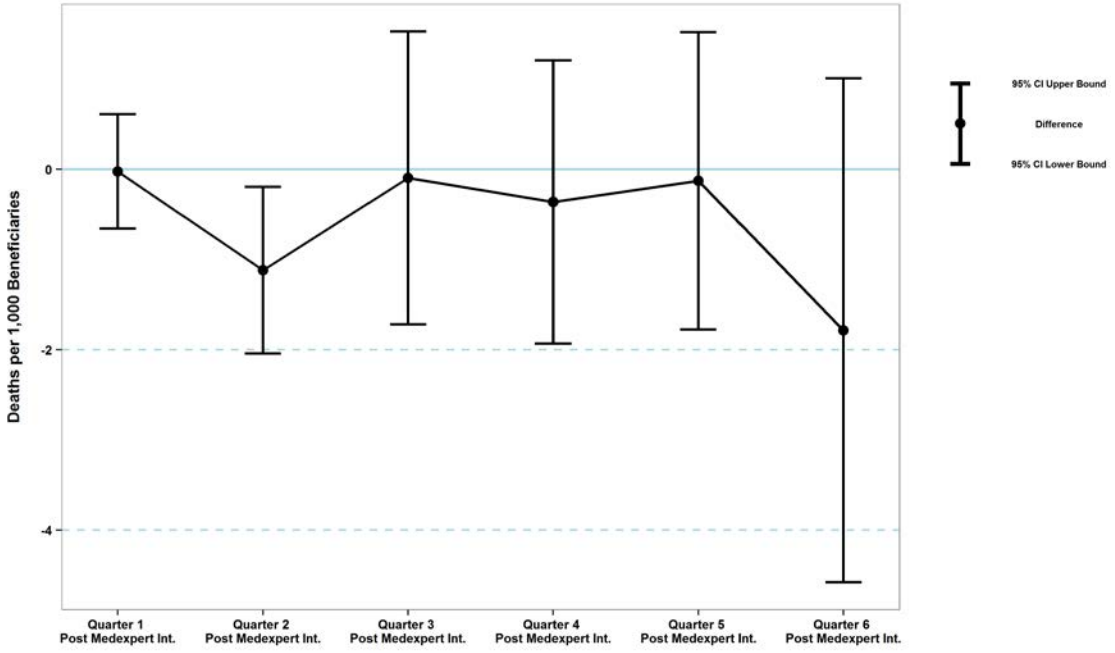


Figure 5-2: MedExpert Quarterly Differences in Mortality after Program Enrollment, Medicare Advantage Cohort



The MedExpert intervention was associated with a statistically significant decrease in hospital readmissions cumulatively across the six quarters after program enrollment for the MA cohort but not for the FFS cohort. As shown below in Table 5-4, there was a statistically significant decrease of 156 inpatient readmissions cumulatively over six quarters among the 14,352 MA beneficiaries with an inpatient admission who were enrolled in the MedExpert intervention for at least one quarter, relative to the control population. For the Medicare FFS cohort, the association between the MedExpert intervention and inpatient readmissions was not statistically significant cumulatively across the six quarters after program enrollment. In contrast to the statistically significant cumulative findings, the analysis of quarterly fixed effects found the MedExpert intervention was not associated with statistically significant changes in inpatient readmissions for the Medicare FFS or MA cohorts.

Table 5-4: MedExpert Cumulative Differences in Inpatient Readmissions from Program Launch through 2014

Cohort	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS	9,556	42.65	(-89.8 | 175.1)	0.528
Medicare Advantage	14,352	-155.86*	(-288.5 | -23.2)	0.021

* Statistically significant at the five percent level

5.4.2 Health Service Resource Use

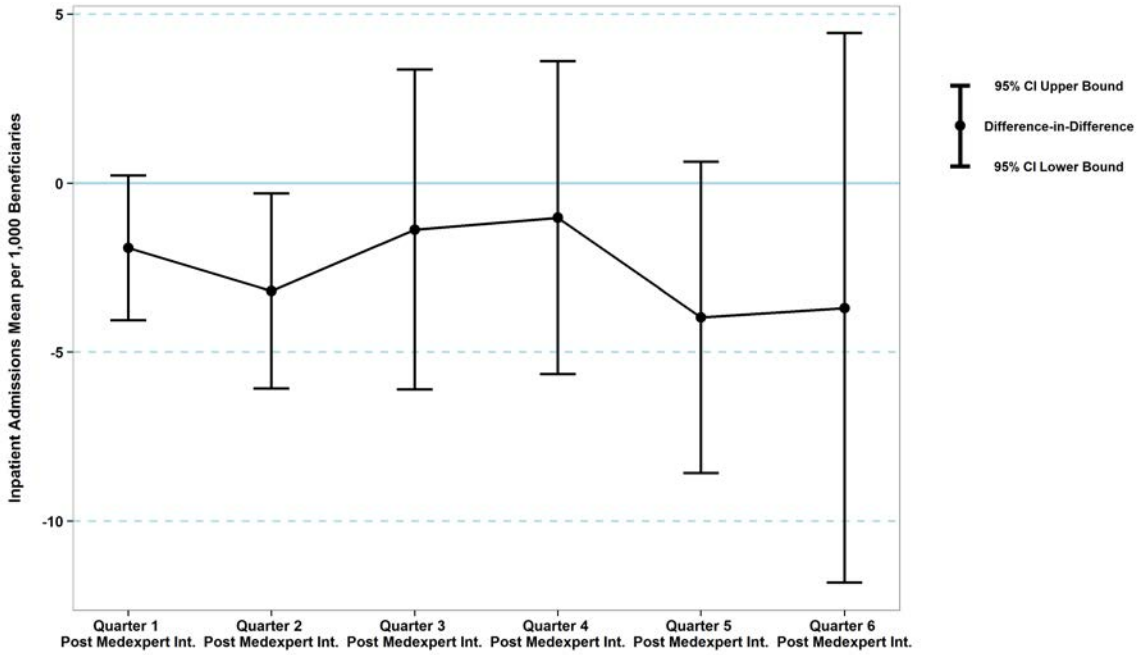
Cumulative effects on inpatient admissions across the six quarters after program enrolment were not statistically significant for any of the MedExpert intervention cohorts relative to controls (Table 5-5). Similarly, the MedExpert intervention was generally not associated with quarterly statistically significant effects on inpatient admissions among Medicare FFS or MA beneficiaries, except for a decrease of 3 inpatient admissions per 1,000 beneficiaries in Q2 for the MA cohort. Figure 5-3 shows the statistically significant decrease in inpatient admissions in Q2 is consistent with non-significant decreases in inpatient admissions in other quarters for the MA cohort relative to matched controls.

Table 5-5: MedExpert Cumulative Difference-in-Difference Estimate of Inpatient Admissions from Program Launch through 2014

Cohort	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS	48,778	33.67	(-564.8 | 632.2)	0.912
Medicare Advantage	165,017	-419.34	(-978.1 | 139.4)	0.141

* Statistically significant at the five percent level

Figure 5-3: MedExpert Quarterly Difference-in-Difference Estimates of Inpatient Admissions, Medicare Advantage Cohort



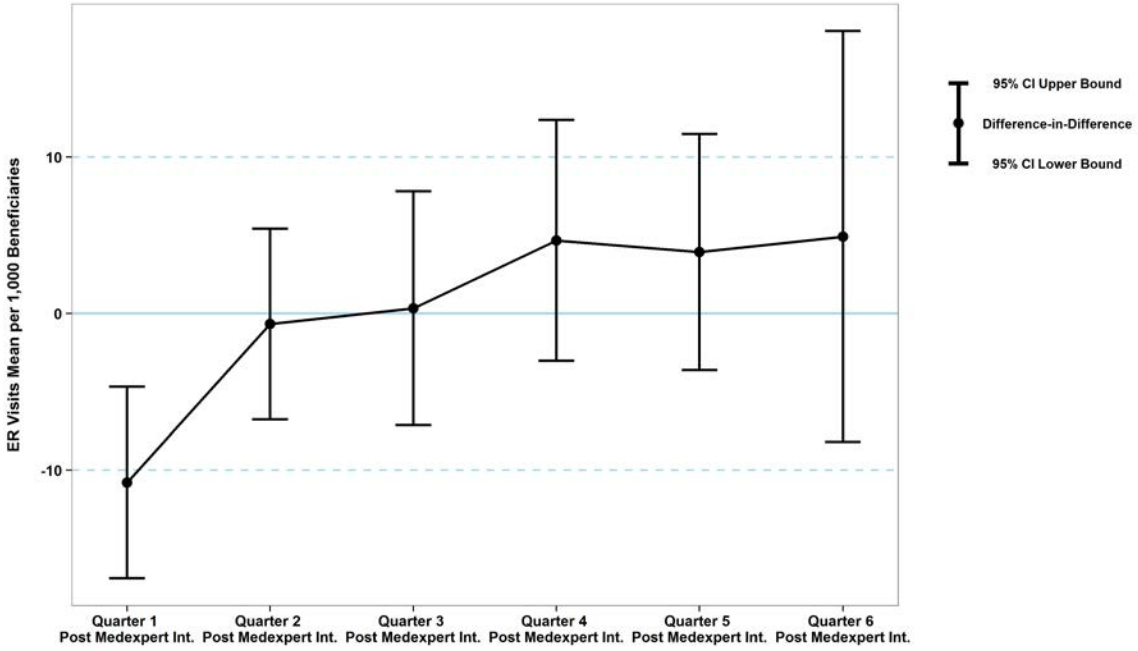
Cumulative and quarterly effects on ER visits across the six quarters after program enrollment were generally not statistically significant for the MedExpert Medicare FFS intervention group relative to controls. Cumulative results are shown in Table 5-6 below. As with the cumulative findings, the MedExpert intervention was generally not associated with quarterly statistically significant effects on ER visits among Medicare FFS beneficiaries, except for a decrease of 11 ER visits per 1,000 beneficiaries in the first quarter after program enrollment relative to controls for the FFS cohort (Figure 5-4). ER and other non-inpatient resource use data were not available for analysis for the MA cohort.

Table 5-6: MedExpert Cumulative Difference-in-Difference Estimate of ER Visits from Program Launch through 2014

Cohort	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Medicare FFS	48,778	60.73	(-577.3 | 698.7)	0.852

* Statistically significant at the five percent level

Figure 5-4: MedExpert Quarterly DiD Estimate of ER Visit Rate, Medicare FFS Cohort



5.4.3 Medical Expenditures

Over the six quarters after program enrollment, the MedExpert intervention was not associated with statistically significant cumulative effects on total medical expenditures or

inpatient expenditures for the Medicare FFS cohort. Table 5-7 provides cumulative results on total medical expenditures and inpatient expenditures, respectively, for the FFS cohort.

However, the MedExpert intervention was associated with a statistically significant decrease in home health expenditures and a statistically significant increase in non-ER outpatient expenditures cumulatively over the six quarters after program enrollment for the Medicare FFS cohort. Appendix C.4, which includes results for additional expenditure categories for the Medicare FFS cohort, shows a statistically significant increase of $3,022,104 in outpatient non-ER expenditures and a statistically significant decrease of $2,456,864 in home health expenditures cumulatively over the six quarters after program enrollment among 48,778 Medicare FFS beneficiaries who were in the MedExpert intervention group for at least one quarter, compared to the controls. Expenditure data for MA beneficiaries were not available for analysis.

Table 5-7: MedExpert Cumulative DiD Estimate of Total Medicare and Inpatient Expenditures from Program Launch through 2014, Medicare FFS Cohort

Outcomes	Number of Beneficiaries	Cumulative Difference Estimate (US Dollars)	Confidence Interval (US Dollars)	p-value
Total Medicare Parts A and B Expenditures	48,778	6,265,754	(-6,271,337 | 18,802,844)	0.327
Inpatient Expenditures	48,778	2,219,921	(-6,066,343 | 10,506,184)	0.600

* Statistically significant at the five percent level

Consistent with the cumulative analysis, the MedExpert intervention was not associated with statistically significant changes in total or inpatient medical expenditures for Medicare FFS beneficiaries in any of individual quarters after program enrollment. As Figure 5-5 shows, estimated effects on total Medicare FFS expenditures were not statistically significant in any of the six quarters. As shown in Figure 5-6, results for inpatient expenditures were similar, with non-significant findings in each quarter.

Unlike in the cumulative analysis, however, statistically significant effects on home health and non-ER outpatient expenditures were not observed in any of the individual quarters in the analysis of quarter fixed effects for the Medicare FFS intervention group relative to controls. Appendix C.4 presents results for additional expenditure categories; the effect of MedExpert on most of these categories was generally not statistically significant, except for a statistically

significant decrease of $7 per beneficiary in outpatient ER expenditures in the first quarter after program enrollment. Expenditure data for MA beneficiaries were not available for analysis.

Figure 5-5: MedExpert Quarterly DiD Estimate of Total Medicare Part A and B Expenditures per person after Program Enrollment, Medicare FFS Cohort

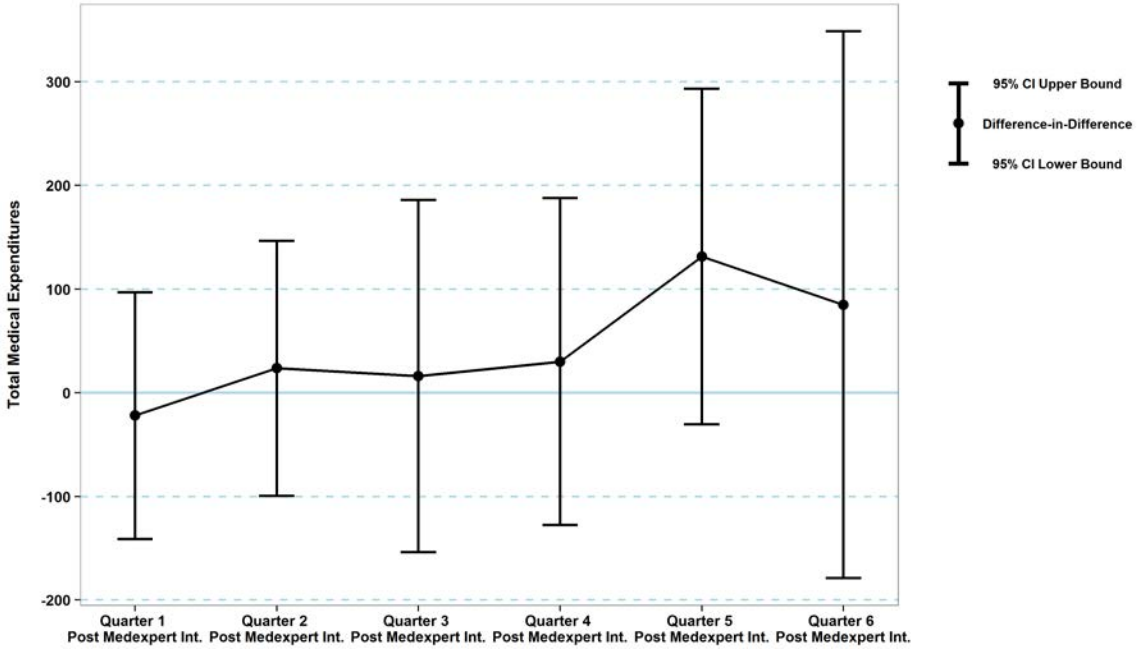
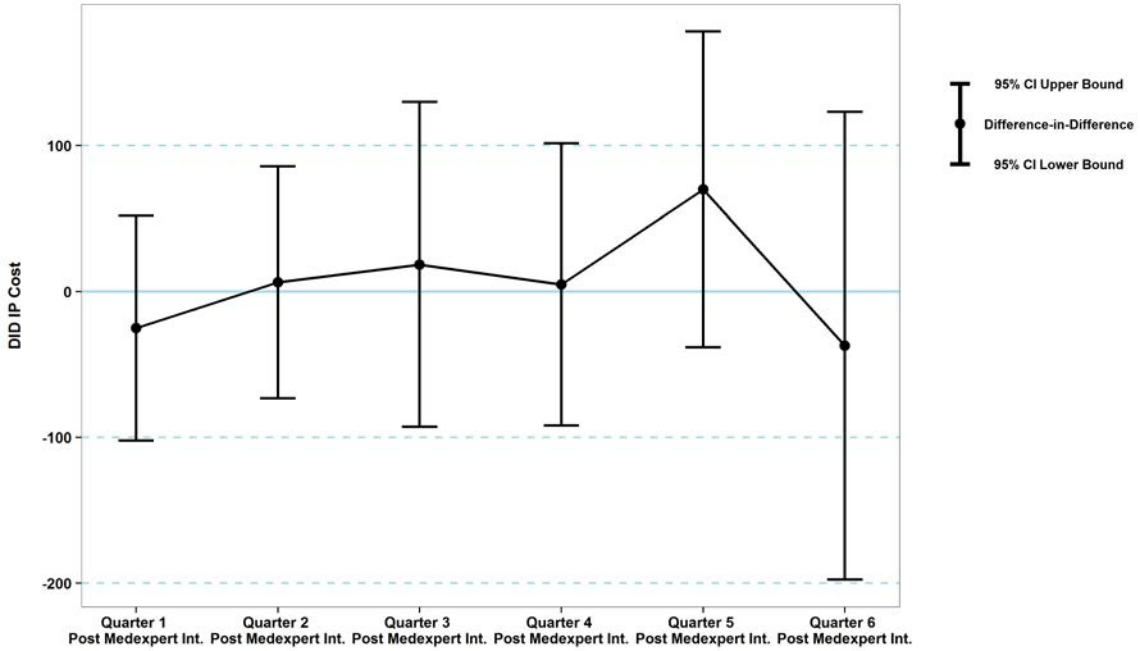


Figure 5-6: MedExpert Quarterly DiD Estimate of Inpatient Expenditures per person after Program Enrollment, Medicare FFS Cohort



5.5 Implementation Effectiveness

This section summarizes updated findings on MedExpert's implementation effectiveness based on qualitative information obtained from interviews with awardees and other stakeholders, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. MedExpert reported an increase in beneficiary encounters for a brief period following the completion of a new telephone outreach campaign in March 2015. Table 5-8 details findings from August 2014 through August 2015, unless otherwise noted.

Table 5-8: MedExpert Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• Cumulative program enrollment as of March 31, 2015 was 340,626.[a]
What were key successes in implementing the innovation as designed and factors associated with success?	• MedExpert reports that its direct outreach has been successful and it attributes this success to a natural-sounding, low-pressure approach during phone-based outreach and beneficiaries' ability to verify MedExpert as a legitimate Medicare service provider. • MedExpert included regular follow up phone calls in its outreach schedule to capture beneficiaries who are reluctant to engage until the second or third call • Medical Information Coordinators (MICs) and physicians are allowed unlimited "talk time" with beneficiaries, which allows them to build relationships and address issues that do not arise until 20 minutes or more into a call. • MICs can use the new partially-automated phone system to organize a "campaign," which serves as a work plan for the day and allows MICs to increase efficiency and prioritize their daily activities. • Average call duration increased to 4-5 minutes with Medical Information Coordinators (MIC) and 7-8 minutes with physicians in December 2014- February 2015 compared to an average of 3 minutes for both MICs and physicians in September- October 2014. o MedExpert attributes the increased call length to an increase in repeat callers who tend to have more serious conditions. • MedExpert is successfully referring beneficiaries to United HealthCare's (UHC) OptumHealth disease management programs for congestive heart failure and diabetes; however, referral rates are low, with approximately 30 beneficiaries referred to date. • MedExpert completed a telephone outreach campaign to new and existing beneficiaries in March 2015, and as a result, monthly frequency of encounters briefly increased.

Research Questions	Findings from August 2014 through August 2015
What were the challenges in implementing the innovation as designed?	• MedExpert's ability to provide information on community resources was negatively impacted when the National Library of Medicine's Directory of Health Organizations Online (DIRLINE), a robust source of information on health-related community resources, was discontinued in October 2014. • Although the implementation partnership between MedExpert and UHC, which includes legal agreements, data sharing, collaborative implementation and analysis plans, experienced challenges at start-up, the partnership has matured and implementation is proceeding relatively smoothly. • MedExpert stopped pursuing IRB approval, which would have allowed MedExpert to regain access to Medicare FFS data. o UHC declined to facilitate IRB approval because of concerns that the IRB would unnecessarily introduce burdensome consent requirements on its MA population. • MedExpert is developing policies to manage calls from beneficiaries who request MedExpert services but are no longer eligible because they switched insurance providers.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• MedExpert received encounter data, including procedures and diagnoses, from UHC for conducting its own analyses. MedExpert has not received approval to share UHC data with CMS HCIA evaluators.

[a]Source: Enrollee-level program data provided to Acumen by MedExpert on April 22, 2015

5.6 Workforce

This section updates findings on workforce issues related to the MedExpert intervention based on qualitative information obtained from interviews with awardees and other stakeholders, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. MedExpert staff often engage in ad hoc or peer-to-peer training to share knowledge among staff members. Table 5-9 summarizes updates from August 2014 through August 2015, unless otherwise noted.

Table 5-9: MedExpert Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What type and level of workforce training does the innovation provide?	• MedExpert physicians lead weekly meetings with MICs to discuss approaches to common call topics (e.g., back pain). o During site visit interviews, a convenience sample of MICs with nursing backgrounds reported that discussions with the physicians are highly valuable and help the nurses capture relevant information the physician may need when reviewing the case. • All MedExpert staff attend workplace culture and customer service training. • MICs also reported that the most useful training was shadowing and observing a more experienced MIC.

Research Questions	Findings from August 2014 through August 2015
What type of support structure is available for staff?	• In spring of 2014, MedExpert introduced a new automated phone system to increase call capacity and expected call volumes with minimal changes in other staff support. Under the new phone system, MICs are expected to field 150 calls per day, which is more than three times the daily call volume compared to the old phone system. • Managers are available at the call center and provide ad hoc support if a MIC is experiencing challenges with a call. • MICs report close working relationships with the physicians and are comfortable approaching physicians with ad hoc questions.
How does the innovation affect staff satisfaction?	• During the site visit interviews, a convenience sample of the MedExpert MICs with a nursing background and a physician reported that job satisfaction is dependent on the degree to which staff enjoy engaging with beneficiaries and building relationships. Individuals who enjoy working in hospitals or traditional health care settings with specific tasks may experience relatively lower job satisfaction. • Staff participating in site visit interviews reported increased job satisfaction due to improvements in queuing of incoming calls and a more even distribution of calls across MICs. • The physician reported improved job satisfaction with MedExpert's unlimited "talk time" policy as compared to the time constraints present in a traditional medical practice.

5.7 Context

This section updates findings on context issues related to the MedExpert intervention, based on qualitative information obtained from interviews with the awardee and other stakeholders, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. During the site visit, the Acumen team found that MedExpert aims to encourage a culture of collaboration and sharing of successful approaches among staff, and this type of workplace culture is supported by staff who enjoy building relationships and communicating with others.

6 EVALUATION OF THE TRUSTEES OF DARTMOUTH COLLEGE HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the Dartmouth College innovation, reflecting new analytic results from August 2014 to August 2015 unless otherwise noted. The findings are based on interviews with Dartmouth project staff and a review of progress reports developed by the Lewin Group as well as documentation provided by the awardee. Section 6.1 provides a high-level overview of the key qualitative findings. Section 6.2 summarizes innovation components of the awardee. Sections 6.3 provides the most recent information available on the evaluability of the program. The remaining sections provide additional detail on the key findings described in Section 6.1. Section 6.4 highlights findings related to the awardee's implementation effectiveness. Finally, Sections 6.5 and 6.6 highlight, respectively, updated findings on the evaluation categories of workforce and context. Findings on Dartmouth's program effectiveness are not included in this report. Although Acumen has received data on Dartmouth program participants, at the time this report was written Acumen and CMS had not finalized the scope and methodology to be used for a quantitative analysis of Dartmouth's program effectiveness.

6.1 Key Findings

As of June 30, 2015, implementation maturity varies across the organizations and sites involved in the Dartmouth SDM innovation. Differences can be partially attributed to variations in the project timeline: four organizations began program implementation in year one of the award, and ten did so in year two. Among the diverse organizations in the Dartmouth's High Value Healthcare Collaborative (HVHC), some did not have the necessary resources or chose not to devote the resources required by Dartmouth to implement aspects of the innovation. Dartmouth requires implementing organizations to enact major changes in the workflow and culture of care teams, make enhancements to the local informatics infrastructure, and agree to ongoing resource commitments. Consequently, only some organizations have the capacity to manage local health coach training and local project improvement activities, while others continue to require support from the Dartmouth Project Management Office (PMO) for survey administration tool (SAT) implementation, compliance with meeting data submission requirements, and health coach training.

One successful component of the intervention was the development of a robust data infrastructure used to provide data-driven feedback to SDM implementation sites on the impact of HVHC interventions on health care quality and costs. CMS claims data, member-submitted data from local electronic health records (EHRs) and administrative systems, and patient-reported health measures are analyzed to generate measures of health care quality and costs and

cross-member comparisons. The information is made available online through the HVHC Insight Tool. According to HVHC officials, CMS HCIA funding significantly accelerated the resource-intensive development of the data infrastructure. Dartmouth and the HVHC plan to sustain the data infrastructure after HCIA funding ends to provide data-driven feedback on future HVHC projects. Dartmouth continues to promote its data reporting tools among members, and reported an increase in requests for user accounts and training following the promotion of the Insight Tool at the HVHC Conference in April 2015. Dartmouth is also developing pre-recorded trainings for the tool that users can access on-demand. Although implementation sites have improved the quality of data submissions, HVHC members continue to experience challenges submitting lab results and vital statistics to the HVHC data infrastructure because of the complexity of creating standardized coding and the large volume of measures reported. Dartmouth and implementation sites plan to continue refining data submissions over time.

Dartmouth has worked to leverage EHRs to facilitate SDM implementation, though challenges have arisen with variations in EHRs across organizations. Virginia Mason Hospital and Medical Center (VMMC) and Dartmouth-Hitchcock Medical Center (DHMC) use EHR systems to identify eligible patients and then send them links to the SDM innovation through the online patient portal. VMMC also worked with its EHR vendor to begin incorporating longitudinal displays of patient-reported measures into sections of the EHR. Yet some sites are limited in their ability to leverage the systems for SDM project implementation because providers independently own their EHR systems or own different brands of EHRs, and as a result, EHR modifications are not easily scaled across all providers in the SDM project.

Program implementation was facilitated by a culture of quality improvement in some implementation sites. These sites were able to effectively identify process challenges or "defects," map workflows, and review skill-task alignment of staff. The presence of a well-established, organization-wide quality improvement process, such as the Virginia Mason Production System, facilitated implementation by fostering an organizational culture amenable to change and process improvement.

Dartmouth's implementation sites continue to address issues in health coaching sustainability, such as dosage and intensity of the intervention, staffing, and funding streams. Eligible patients have differing needs for health coaching, reflecting their clinical factors and the extent to which they need help making care decisions. Implementation sites are working to appropriately allocate health coaching resources based on the level of need. One site is developing draft plans for different levels of health coach services (i.e., high, medium, low), including eligibility criteria, intervention activities, and staffing plans. Although the short-term goal is to inform resource allocation after the HCIA award ends, it may also be useful in defining health coaching as a structured, reimbursable service in the future.

Dartmouth is exploring ways to sustain its SDM interventions after the end of HCIA-funded participant enrollment in June 2015. A no-cost extension (NCE) through June 2016 will support access to CMS data for evaluation purposes, but does not include funding for ongoing implementation. Dartmouth is reaching out to implementation sites to understand which components of the SDM interventions will be continued using HVHC funding after June 2015. Dartmouth is also seeking additional funding support from HVHC partners and pursuing publicly funded grants and partnerships with the private sector.

Dartmouth began disseminating qualitative findings among HVHC implementation sites and is developing plans for broader dissemination efforts. Dartmouth began publishing "Champions of Value" articles, which describe implementation sites' successes, challenges, and lessons learned regarding the Dartmouth interventions. These articles are sent to implementation sites in a weekly project newsletter distributed to HVHC sites. Popular "Champions of Value" article topics include health coaching and the spine care model. In addition, Dartmouth's condition-specific core teams are developing plans to collect more qualitative data and disseminate findings related to the condition-specific SDM interventions.

6.2 Innovation Components

The Dartmouth Institute and its HVHC partners are implementing SDM interventions across 8 of 14 HVHC member organizations to help patients make informed decisions about the use of preference-sensitive surgery and to help patients manage chronic illnesses. The Dartmouth innovation aims to: (i) improve preference-sensitive surgery decision making, which may reduce rates of inappropriate surgeries, and (ii) improve chronic disease management, which could reduce disease exacerbations/complications, thus lowering ER and hospital service use. As part of its SDM interventions, Dartmouth offers condition-specific decision aids to patients that provide them with evidence-based descriptions of their condition and treatment options. The decision aids generally consist of videos, although other formats (e.g., paper) are also used. Patients meet with a health coach to discuss the decision aid and treatment options. Some sites are working to develop different levels of health coaching intensity (i.e., high, medium, low) to help sustainably allocate health coach resources.

Dartmouth's SDM program is available to Medicare, Medicaid, dual-eligible, and private-payer patients at HVHC member organizations who are considering preference-sensitive hip, knee, spine, or implantable cardio-defibrillator (ICD) surgery as well as patients diagnosed with diabetes or congestive heart failure (CHF). For preference-sensitive surgery interventions, Dartmouth identifies patients with specific health conditions by using multiple eligibility criteria, including specific diagnoses related to hip or knee osteoarthritis, degenerative spinal conditions, or patients considering ICD insertion who are eligible through the 2013 ACCF/AHA Guideline for the Management of Heart Failure. These diagnoses are considered in conjunction with

procedure codes, age, and other specific factors. The diabetes intervention targets adult patients diagnosed with type-2 diabetes with health indicators including blood sugar, cholesterol, or blood pressure above a specified threshold. Some implementation sites leveraged the local EHR system to facilitate patient identification based on diagnosis codes or appointment types, but many sites rely on providers and administrative staff to refer patients to the intervention on an ongoing basis.

6.3 Evaluability

This section provides information on the primary factors affecting the evaluability of the Dartmouth intervention. Table 6-1 describes the availability of intervention and comparison group data, as well as program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. Although Acumen has received data on Dartmouth program participants, at the time this report was written, Acumen and CMS had not finalized the scope and methodology to be used for a quantitative analysis of Dartmouth's program effectiveness.

Table 6-2 provides detailed information on the program's enrollment and payer mix, based on participant-level program data provided by Dartmouth in June 2015. As Table 6-2 shows, Dartmouth had enrolled a total of 10,860 participants in its SDM interventions, with 5,601 of these participants enrolled in Medicare. Note that Dartmouth also provided data on more than 30,000 other Medicare beneficiaries who participated in patient engagement activities funded through the HCIA award but who did not participate in SDM activities. These participants are not included in the table below.

Table 6-1: Dartmouth Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Intervention Group Data Availability	• Dartmouth has provided data on 5,601 Medicare beneficiaries in its SDM interventions. Acumen and CMS, however, have not finalized the scope and methodology to be used for a quantitative analysis of Dartmouth's program effectiveness.
Comparison Group Data Availability	• Dartmouth has not provided data on a comparison group.
Program Maturity	• Program maturity varies across sites, with some core components of the awardee innovation more mature at some sites than others.

Table 6-2: Payer Mix of Dartmouth SDM Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A/B FFS		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jan-Mar 2013	221	*	*	*	17	*	274	*	*
Apr-Jun 2013	284	43%	38	6%	24	4%	321	48%	667
Jul-Sep 2013	861	44%	130	7%	84	4%	873	45%	1,948

Calendar Quarter	Medicare Parts A/B FFS		Medicare Advantage		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Oct-Dec 2013	566	41%	96	7%	62	4%	656	48%	1,380
Jan-Mar 2014	491	37%	75	6%	63	5%	716	53%	1,345
Apr-Jun 2014	518	39%	59	4%	68	5%	682	51%	1,327
Jul-Sep 2014	515	41%	63	5%	58	5%	606	49%	1,242
Oct-Dec 2014	624	45%	70	5%	68	5%	610	44%	1,372
Jan-Mar 2015	432	41%	65	6%	35	3%	510	49%	1,042
Apr-Jun 2015	*	*	*	*	*	*	11	50%	22
Total	4,519	42%	601	6%	481	4%	5,259	48%	10,860

Source: Participant-level data provided by Dartmouth in June 2015.
"Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the Dartmouth program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims. Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.
*All cell counts less than eleven have been suppressed to protect participant confidentiality.

6.4 Implementation Effectiveness

This section summarizes updated findings on Dartmouth's implementation effectiveness, based on qualitative information obtained from interviews with awardees, site visits to VMMC and DHMC, and awardee progress reports provided by the Lewin Group. Table 6-3 summarizes findings from August 2014 to August 2015, unless otherwise noted.

Table 6-3: Dartmouth Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• One or more SDM interventions are being implemented at 8 of 14 HVHC organizations.

Research Questions	Findings from August 2014 through August 2015

What were key successes in implementing the innovation as designed and factors associated with success?	• Clinical staff reported that the presence of a full-time, on-site project coordinator significantly facilitated project implementation.
	  o Project coordinator responsibilities include operationalizing the Dartmouth-provided implementation guides for the specific implementation site, managing cross-cutting issues (e.g., use of the EHR), and timely troubleshooting and coordination with the Dartmouth PMO.
	• The presence of a well-established, organization-wide quality improvement process, such as the Virginia Mason Production System, facilitated implementation by fostering an organizational culture amenable to change and process improvement.
	• Use of online patient portals has supported outreach and facilitated enrollment in the intervention.
	  o At some sites, administrative staff identify eligible patients based on diagnoses in the EHR or appointment types, and they send an invitation to participate through the online patient portal.
	  o Patients can view the decision aid and complete the patient survey prior to an appointment.
	• Sites moved patient identification as early as possible (e.g., primary care, physical therapy) to engage patients before they have made a decision about treatment.
	• Dartmouth PMO reports that one-on-one calls with each site were necessary to collect clean, reliable data from all HVHC members.
	• Sites anecdotally report devoting one full-time equivalent (FTE) senior data manager to fulfill the HVHC data specifications during year one, with reduced effort during subsequent years.
	• Dartmouth began to disseminate "Champions of Value" articles, which describe implementation sites' successes, challenges, and lessons learned regarding the Dartmouth innovation.
	• Dartmouth promoted the HVHC Insight Tool at the HVHC Conference in April 2015 and received increased requests for user accounts and trainings. HVHC members use the web-based tool to access comparative, longitudinal reports on quality and cost outcomes associated with HVHC interventions, including the HCIA-funded SDM interventions.

Research Questions	Findings from August 2014 through August 2015
What were the challenges in implementing the innovation as designed?	• Dartmouth reports challenges obtaining clean, reliable data from member sites for HVHC's internal data analyses. To troubleshoot issues, Dartmouth meets with individual sites' data teams, as needed. • Some sites require individual support from the Dartmouth PMO for SAT implementation, help meeting data submission requirements, and support for health coaching training. • Dartmouth continues to work with implementation sites to accurately identify patients who received the interventions and provide enrollment data to the CMS evaluation team. • At some sites, the hospital and outpatient clinics have different EHR systems; therefore, it is more challenging to leverage the EHR systems for patient recruitment. • Local EHR implementations were reported to have diverted time and resources away from the HCIA project and caused implementation delays at many sites. • Dartmouth PMO is refining its communication plans to provide more advance notice of SAT software updates. • Dartmouth officials report that the creation of physician-hospital networks (PHNs) was challenging and more time-consuming than initially planned. The PHNs are used to attribute beneficiaries to a health care provider in Dartmouth's analyses of the quality and costs associated with its interventions, including SDM. • Dartmouth reported challenges in finding ways to sustain funding for health coaches who do not have clinical or otherwise billable roles after the HCIA project concludes. • Implementers of the SDM intervention for CHF patients considering receiving ICD insertions are determining the most appropriate placement of the intervention in the clinical workflow. • Implementation sites reported challenges in submitting lab results and vital statistics because of the complexity of creating standardized coding and the large volume of measures. Dartmouth plans to use these measures to assess the clinical effectiveness of the SDM interventions (e.g., diabetes, CHF) and report the findings to sites. • Sites have experienced challenges related to clinician buy-in due to perceived burden on patients, a belief that the physician should be the source of information about treatment options, and competing demands for clinicians' time. In response, Dartmouth PMO provided recommendations and talking points to the sites to improve clinician buy-in (e.g., consultations can be more focused and efficient after SDM, SDM helps mitigate risk of litigation) and increase enrollment.
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• Some sites are working to develop different levels of health coaching intensity (i.e., high, medium, low) to help sustainably allocate health coach resources.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Dartmouth launched the "HVHC Insight Tool," a web-based portal that HVHC members can use to view comparative, longitudinal reports on quality and cost outcomes associated with HVHC interventions, including the HCIA SDM. • The Diabetes Core Team is conducting a qualitative analysis to better understand factors that facilitate or impede HCIA project implementation. • The Diabetes Core Team is also conducting an analysis of patient utilization of primary and specialty care to inform future refinements to the diabetes innovation.

6.5 Workforce

This section updates findings on workforce issues related to the Dartmouth intervention, based on qualitative information obtained from interviews with awardees, awardee progress reports provided by the Lewin Group, and site visits to two implementation sites. Table 6-4 summarizes updates from August 2014 to August 2015, unless otherwise noted. As the table shows, Dartmouth has recently developed training for its HVHC Insight Tool.

Table 6-4: Dartmouth Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What type and level of workforce training does the innovation provide?	• Sites with capacity to conduct their own health coach training (e.g., Intermountain, Baylor, MaineHealth) have initiated local training programs or integrated health coach training into existing nurse training curricula. • Dartmouth launched online health coach training in December 2014. A staff member at sites using the online training will serve as a mentor and review training assignments. • Dartmouth launched an online course titled, "Shared Decision Making for Providers," which is designed to foster behavior change in providers and address known barriers (e.g., concerns about added workload due to SDM) to SDM project implementation. • Dartmouth is developing pre-recorded training for the HVHC Insight Tool, which HVHC members can use to view comparative, longitudinal reports on quality and cost outcomes associated with HVHC interventions, including the HCIA SDM.
What type of support structure is available for staff?	• Dartmouth created additional health coach workgroups that will focus on marketing the intervention and managing the paper versions of the patient surveys. • Additional health coach training supports, such as site-specific training manuals or local trainers/mentors, are now available at implementation sites.
What type of support structure is effective for staff deployment?	• Some health coaches reported that the Dartmouth health coach training was redundant with other local trainings and could be better harmonized with these efforts. • Dartmouth provides ongoing implementation support through the HVHC learning collaborative webinars, in-person conferences, and small workgroups.
How does the innovation affect staff satisfaction?	• Among nurses whose practice typically did not involve health coaching, the new role as a health coach significantly increased satisfaction. Other nurses whose practice typically involved health coaching tasks (e.g., discussions of treatment options or personal health goals) reported no change.

6.6 Context

This section updates findings on context issues related to the Dartmouth intervention, based on qualitative information obtained from interviews with the awardee and other stakeholders, awardee progress reports provided by the Lewin Group, and site visits to two implementation sites. Table 6-5 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 6-5: Dartmouth Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Starting in January 2015, implementation sites that use qualifying clinical staff as health coaches are able to bill for diabetes and CHF health coaching under the new CMS chronic care management fee schedule. • Some sites had existing SDM or disease management programs, which reduced the level of effort needed for the HCIA implementation because portions of the SDM processes were already in place.
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• The HVHC CEO communicates major implementation changes, such as those related to data reporting, to HVHC partner CEOs, and partner CEOs are responsible for communicating within their organizations.

7 EVALUATION OF THE IHARP HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the Carilion New River Valley Medical Center's Improving Health for At-risk Rural Patients (or IHARP) innovation, reflecting new analytic results from August 2014 through August 2015 unless noted otherwise. Section 7.1 provides a high-level overview of the key qualitative and quantitative findings. Section 7.2 summarizes innovation components of the awardee. Section 7.3 provides the most recent information available on the evaluability of the program. The remaining sections provide additional detail on the key findings described in Section 7.1. Section 7.4 summarizes findings related to program effectiveness (for more comprehensive quantitative results, see Appendix D). Section 7.5 highlights findings related to the awardee's implementation effectiveness. Finally, Sections 7.6 and 7.7 highlight, respectively, updated findings on the evaluation categories of workforce and context.

7.1 Key Findings

Across the five post-implementation quarters, IHARP has been associated with a cumulative, statistically significant decrease in mortality rate, but increases for a range of resource use and expenditure outcome measures compared to controls: inpatient admissions, number of hospital days, and total medical and drug expenditures among other expenditure categories. Examining outcomes at the quarterly level shows that the significant cumulative results can be attributed primarily to Q1 of the intervention period: Acumen identified significant findings in Q1 for a number of resource use and expenditure outcomes but few significant findings in subsequent quarters. However, given the non-randomized design of the intervention and limitations of using Medicare data to construct comparison groups, Acumen cannot rule out the influence of unobserved baseline differences and differential trends in unobserved characteristics between the two groups. These unobserved factors may include patient treatment preferences and medication dosages, which cannot be observed in Medicare claims data.

Although IHARP ended enrollment under the HCIA grant in December 2014, according to data provided by the awardee, IHARP steadily increased enrollment during 2014; total program enrollment exceeded the 2,500 projected target by nearly 180 enrollees. Program leaders and IHARP team members reported that referrals from primary care practices have contributed significantly to increasing enrollment levels, even though they were not an initial component of IHARP's innovation. In particular, primary care-based care coordinators have been strong advocates of the program and a large source of referrals. IHARP deployed a variety of strategies to promote physician and office staff referrals, including increasing pharmacist visibility in primary care practices, having pharmacists speak one-on-one with physicians,

highlighting potential time savings and improvements in quality measure performance, and having physician champions endorse the program to their peers.

IHARP has identified key strategies for improving the effectiveness of program implementation. Program leaders and primary care clinical pharmacists alike emphasized that in-person visits, especially for the initial visit, improve the effectiveness of medication management services. Though it can be challenging to convince patients that in-person visits are necessary, scheduling these visits to coincide with physician visits or other services, such as lab testing, has been a useful strategy for increasing face-to-face encounters. IHARP also found that shifting the role of the community pharmacist coordinator to focus on medication assistance program-related paperwork has helped address medication affordability issues; prior to engaging with the intervention, roughly 40 percent of program participants were not taking prescribed medications due to cost concerns.

Among the key challenges IHARP has faced is ensuring that pharmacies and clinic staff account for changes made to participants' prescriptions. Clinic office staff sometimes authorize refills without reviewing medication or dosage changes made by the pharmacist, and pharmacies occasionally automatically generate refill requests of old medications or dosages previously changed by primary care clinical pharmacists. Program leaders indicated that this challenge is common in the health care system and not unique to Carilion. Another contributing factor is the lack of reliable communication methods to convey medication changes to community and mail-order pharmacies.

Staff turnover has not been a challenge during the project and program staff are satisfied with their roles. Site visit interviews and interviews conducted by program leaders both found that clinical pharmacists had a high level of satisfaction. These interviews also revealed that physician satisfaction with IHARP increased over the course of program implementation, which program leaders attributed to growing physician comfort with the program and physician perceptions that IHARP is improving the quality of patient care.

After the end of HCIA grant funding, Carilion Clinic has committed to continue the IHARP program by financially supporting IHARP staff. Carilion leadership believes the innovation aligns well with efforts to implement patient-centered medical homes, and contributes to Affordable Care Act priorities, such as limiting readmissions and promoting value-based purchasing. IHARP's nine-month no-cost extension will focus entirely on completing evaluation of patients enrolled prior to 2015. This year IHARP began enrolling new patients outside the HCIA grant. Between January and March 2015, the program enrolled 150 additional participants. Though inpatient enrollment ended in winter 2015, program leaders have encouraged hospital-based pharmacists to refer patients who could benefit from IHARP to primary care clinical pharmacists.

Transitioning into this Carilion-funded model, IHARP continues to explore ways to improve its implementation efforts and intervention delivery. Primary care clinical pharmacists reported challenges in completing quarterly follow-up calls, and suggested having flexibility to use their clinical judgment to determine the need for and frequency of follow-up services. As a result, program leaders decided that for patients enrolled after the start of 2015, primary care clinical pharmacists would have the flexibility to determine how often to follow up with patients and for how long this follow up should occur. To assist with pharmacist workflow and completion of follow-up communication and documentation, program leaders reported a desire to develop an expanded clinical pharmacy technician role for IHARP, which they believe will increase primary care clinical pharmacist capacity to provide services. They reported currently working on a job description and seeking Carilion budgetary approval for these positions. Of note, they highlighted that they have been collaborating with Dr. Steven Chen, a program leader for the USC MM HCIA innovation, to model this role off the expanded pharmacist technician role used in USC's innovation. Also, the initial IHARP telepharmacy pilot generated very few pharmacist referrals. As of May 2015, program leaders were actively pursuing a partnership with Appalachia College of Pharmacy that would allow pharmacists access to targeted Medicare Part D MTM opportunities through remote consultations. These activities will supplement the current work of the primary care clinical pharmacists and allow IHARP to provide services to a larger geographic area. Additionally, IHARP continues to look for opportunities to implement collaborative practice agreements with Carilion physicians, an effort that primary care clinical pharmacists overwhelmingly support.

Though Carilion has committed to financially supporting the program, Carilion leaders noted that having IHARP generate revenue through reimbursement in addition to achieving cost savings is an ideal goal for the ongoing sustainability and scalability of the program. As a result, IHARP has pursued options for allowing pharmacists to bill for services rendered incident to physician care. Program leaders are working to create mechanisms in Carilion's Epic electronic health record but have encountered delays, as Carilion's billing department is currently focused on handling other changes related to bundled and value-based payment structures. The billing department plans to work through some of these issues before focusing on implementing the IHARP billing mechanism; however, project leaders are hopeful that the billing feature will be operational in the first quarter of Carilion's next fiscal year, starting October 2015. Though this represents a significant step toward revenue generation, there was broad agreement among IHARP program leaders and pharmacists that the lack of pharmacist recognition as providers in federal policies will impede reimbursement for services and could negatively affect the long-term ability to scale the program. Though program leaders included revenue generation through billing and copayment collection in the program's sustainability plan, IHARP pharmacists and Carilion office staff stated that requiring patients to pay for IHARP services was questionable as

a model for sustaining or scaling the program despite high patient satisfaction with the program, since IHARP's patient population struggles with office visit co-payments. They indicated that introducing additional fees may deter patients from seeking care and that even patients who could afford these payments would likely be hesitant to invest in pharmacy services.

7.2 Innovation Components

IHARP is a patient-centered care model that provides medication and chronic disease state management services to targeted patients through hospital, primary care, and community-based pharmacists. Program participants receive longitudinal care from their pharmacist that includes comprehensive medication reviews, medication reconciliation, assistance with adherence, medication and disease state education, as-needed referrals to medication assistance programs, and preventive care services. In participating hospitals, program participants receive medication reviews by hospital-based pharmacists. In Carilion primary care clinics, patients have office visits with primary care clinical pharmacists every three months. During these visits, primary care clinical pharmacists conduct medication management assessments, medication reconciliation, assessments of progress towards therapeutic goals, and recommendations for ongoing care plans. The initial visit typically lasts between 45-60 minutes, depending on patient complexity, and subsequent visits average between 15 and 30 minutes. Community pharmacists may deliver medication history reviews, medication reconciliation, assistance with adherence, and preventive care services. The focus of IHARP is on patients residing in rural southwest Virginia and the Roanoke area.

Eligible patients were initially identified during hospital admission and from participating Carilion primary care clinics. For inpatient enrollment, hospital pharmacists used a daily list of patients produced by a targeting algorithm in the Epic electronic health record system to identify and recruit eligible patients. The algorithm targeted patients who suffered from two or more chronic conditions, and were prescribed four or more medications in order to manage their chronic illness. Formal inpatient enrollment ended in early 2015. Now, eligible patients are identified and enrolled primarily at participating clinic sites by clinic office staff and primary care clinical pharmacists. Hospital pharmacists are still able to make referrals to the program even though formal inpatient enrollment has ended.

Patients enrolled after December 31, 2014 were not included in the HCIA evaluation sample. Starting in 2015, IHARP modified its approach to pharmacist follow ups for new enrollees. Instead of quarterly follow ups for all patients, program leaders began allowing pharmacists to determine how often to follow up with IHARP patients and for how long this follow up should occur. Patients enrolled prior to 2015–who are included in the HCIA evaluation sample–receive standard quarterly follow-up visits or calls for the duration of their participation, which is patient specific and ranges from six months to two years. Leadership

considered relaxing the inclusion criteria for those enrolled in 2015 and beyond; however, they have found that the vast majority of those enrolled have met the inclusion criteria used for the HCIA grant.

7.3 Evaluability

This section provides updated information on the primary factors affecting the evaluability of IHARP. Table 7-1 provides detailed information on the program's enrollment and payer mix, based on participant-level program data provided by the awardee. In January 2015, IHARP provided Acumen with data on 2,367 enrollees. IHARP also enrolled over 200 additional patients who had been excluded from the data shipment provided by the awardee. Although they were not included in this evaluation, IHARP has subsequently provided this additional data to Acumen, and these individuals will be included in future estimates of program effectiveness. Consequently, the payer mix numbers presented below do not reflect the entire intervention cohort.

Table 7-1: Payer Mix of IHARP Program Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A/B/D FFS		Medicare Advantage And Part D		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jan-Mar 2013	43	43%	20	20%	16	16%	21	21%	100
Apr-Jun 2013	43	38%	20	18%	18	16%	31	28%	112
Jul-Sep 2013	145	38%	64	17%	50	13%	118	31%	377
Oct-Dec 2013	132	35%	79	21%	53	14%	117	31%	381
Jan-Mar 2014	157	38%	75	18%	46	11%	136	33%	414
Apr-Jun 2014	166	37%	83	19%	57	13%	140	31%	446
Jul-Sep 2014	121	36%	68	20%	41	12%	107	32%	337
Oct-Dec 2014	62	31%	48	24%	22	11%	68	34%	200
Total	869	37%	457	19%	303	13%	738	31%	2,367

Source: Partial participant-level data provided by IHARP in January 2015.
Notes: Only beneficiaries in the "Medicare Parts A/B/D FFS" category are included in the quantitative analysis in Section 7.4. "Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the IHARP program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.

Table 7-2 highlights the comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. A total of 592 Medicare FFS enrollees were available for quantitative analysis of program effectiveness. These enrollees' outcomes are assessed in the empirical results in Section 7.4. However, results from this empirical analysis may not be reflective of IHARP's impact on the program's entire Medicare population, as data for over 200 program participants were unavailable to Acumen for this report.

Table 7-2: IHARP Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Comparison Group	• IHARP has not provided comparison group data. Thus, Acumen constructed a comparison group by selecting Medicare beneficiaries from the general population who matched the IHARP intervention group on important demographic and health characteristics observed in Medicare data. Our evaluation is therefore subject to limitations of a non-randomized study design, as well as the limitations of Medicare data to capture predictive variables to create well-matched comparison groups. • IHARP has created a comparison group for its own analysis of the intervention. Acumen will assess IHARP's algorithm to see if any insights can be adapted to improve Acumen's matching methodology.
Data Availability	• Acumen has used program data on intervention group beneficiaries provided by the awardee and linked these data to Medicare data files. A total of 592 Medicare FFS enrollees with enrollment dates prior to October 2014 are included in the empirical results in Section 7.4.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project, with changes being made to the target population and enrollment approaches in May 2013.

7.4 Program Effectiveness

This section presents findings on the impact of the IHARP MM intervention on mortality, inpatient readmissions, health service utilization, medical expenditures, and medication adherence. Acumen estimated IHARP's program effects for FFS beneficiaries using Medicare claims data through December 31, 2014. However, as noted above in Section 7.3, at the time Acumen began its assessment of program effectiveness, the awardee had made data available for only a portion of FFS participants. Consequently, the findings in this chapter reflect only those beneficiaries with available data. To be included in the analysis, Medicare FFS beneficiaries were required to have sufficient personally identifiable information to be linked to Medicare claims data. Acumen then restricted this population to beneficiaries who enrolled in the program prior to October 2014, to ensure that all enrollees in the analysis had sufficient program participation with adequate claims data runout. Also, to construct a robust matching algorithm, the population was restricted to individuals who had continuous Medicare Parts A, B, and D enrollment for one year prior to the intervention through the intervention quarter of interest and who were prescribed drugs to treat at least one of seven conditions targeted by the intervention: hypertension, diabetes, chronic obstructive pulmonary disease, asthma, heart failure, hyperlipidemia, or depression. These restrictions decreased the sample size available for analysis from 869 to 592 Medicare FFS beneficiaries. The analysis compared the IHARP program participants to a control group that Acumen constructed using the propensity score matching model described in Section 1.2.2. To increase comparability, the controls were selected from the state of Virginia (the location of the intervention) as well as the surrounding states of Kentucky, North Carolina, Tennessee, and West Virginia. Beneficiaries were pulled

only from counties with levels of population density comparable to those found in the counties of the intervention cohort. In addition, Acumen matched intervention and control beneficiaries using the area socioeconomic deprivation index.[9]. Acumen did not conduct analysis of the innovation's participants who were enrolled in MA and Part D, which totaled 457 beneficiaries; the small sample size would have resulted in limited statistical power for DiD analysis. Acumen will include findings on the MA population once Acumen has the opportunity to analyze data on more program participants.

Cumulative results on the impact of the intervention on all participating beneficiaries show a statistically significant decrease in mortality rates but increases for a range of resource use and expenditure outcome measures compared to controls: inpatient admissions, number of hospital days, and total medical and drug expenditures among other expenditure categories. Quarterly fixed effects show that the significant cumulative results can be attributed primarily to Q1 of the intervention period: Acumen found significant findings in Q1 for a number of resource use and expenditure outcomes but few significant findings in subsequent quarters. Acumen's ability to detect significant effects, however, is limited by the small sample size of the Medicare FFS population. Moreover, there are limitations associated with the use of non-randomized comparison groups. The intervention and comparison groups in the analysis are well matched on demographic and health characteristics, as well as pre-enrollment resource use, expenditures, and Part D prescription drug event variables. (See tables in Appendix D.) However, given the non-randomized design of the intervention and limitations of using Medicare data to construct comparison groups, Acumen cannot rule out the influence of unobserved baseline differences and differential trends in unobserved characteristics between the two groups. These unobserved factors may include patient treatment preferences and medication dosages, which cannot be observed in Medicare claims data. For future reports, Acumen will continue to refine comparison-group matching criteria, including adding additional program-specific covariates to the matching model to reduce the effect of unobservable baseline differences between the intervention and comparison cohorts.

The remainder of this section highlights key quantitative findings for the IHARP innovation. Sections 7.4.1, 7.4.2, 7.4.3, and 7.4.4 highlight key results for mortality and inpatient readmissions, resource use, medical expenditures, and medication adherence, respectively. In each of these sections Acumen presents key outcomes in graphs and characterizes in narrative the outcomes for which there are statistically significant results. Our focus in the narrative is on differences between the intervention and control groups, before and

[9] Index is available at http://www.hipxchange.org/ADI.

after the intervention. Thus the included figures display single difference and difference-in-difference (DiD) estimates. Acumen provides complete results in Appendix D.

7.4.1 Mortality and Inpatient Readmissions

As shown below in Table 7-3, IHARP was associated with a statistically significant effect on mortality but not on all-cause readmissions. Cumulatively across the five quarters after program enrollment, the IHARP intervention was associated with a statistically significant decrease in mortality: among the 592 Medicare FFS beneficiaries included in the intervention cohort who were enrolled in the IHARP intervention for at least one quarter, there were 48 fewer deaths relative to controls. However, cumulative findings show that the intervention cohort did not experience a significant decrease in all-cause inpatient readmissions.

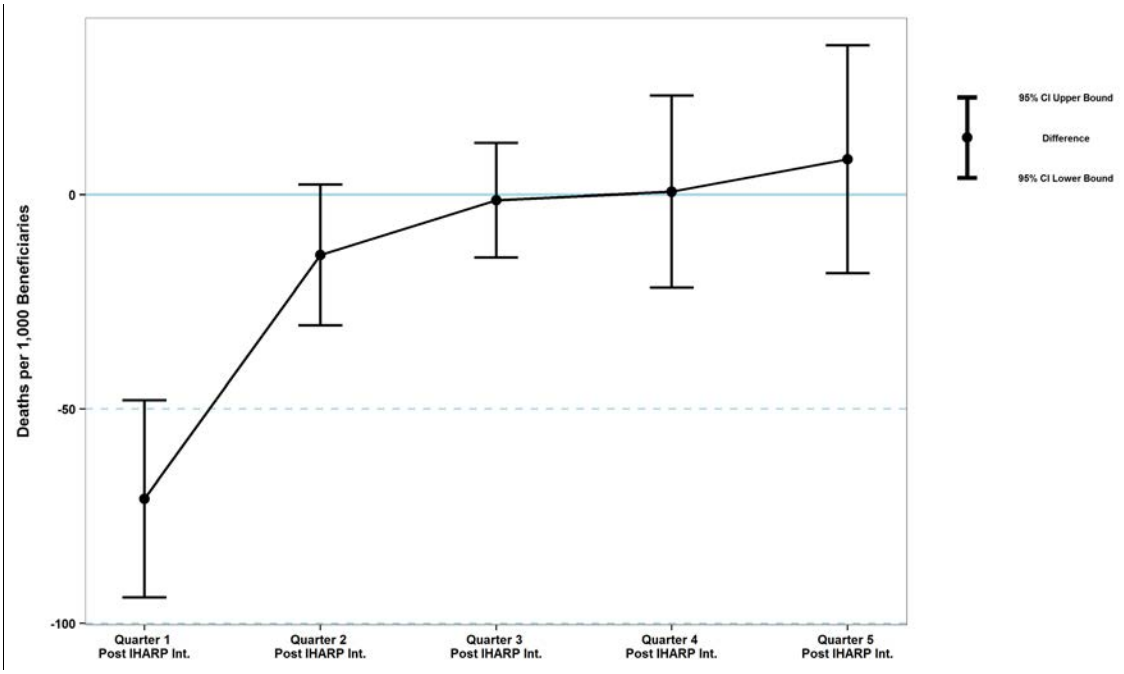
Table 7-3: IHARP Cumulative Differences in Mortality and Readmissions from Program Launch through 2014, Medicare FFS Cohort

Measure Outcome	Number of Intervention Quarters	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	P-Value
Mortality	5	592	-47.90*	(-66.6, -29.2)	<0.001
Readmissions	5	252	1.48	(-25.6, 28.6)	0.914

* Statistically significant at the five percent level

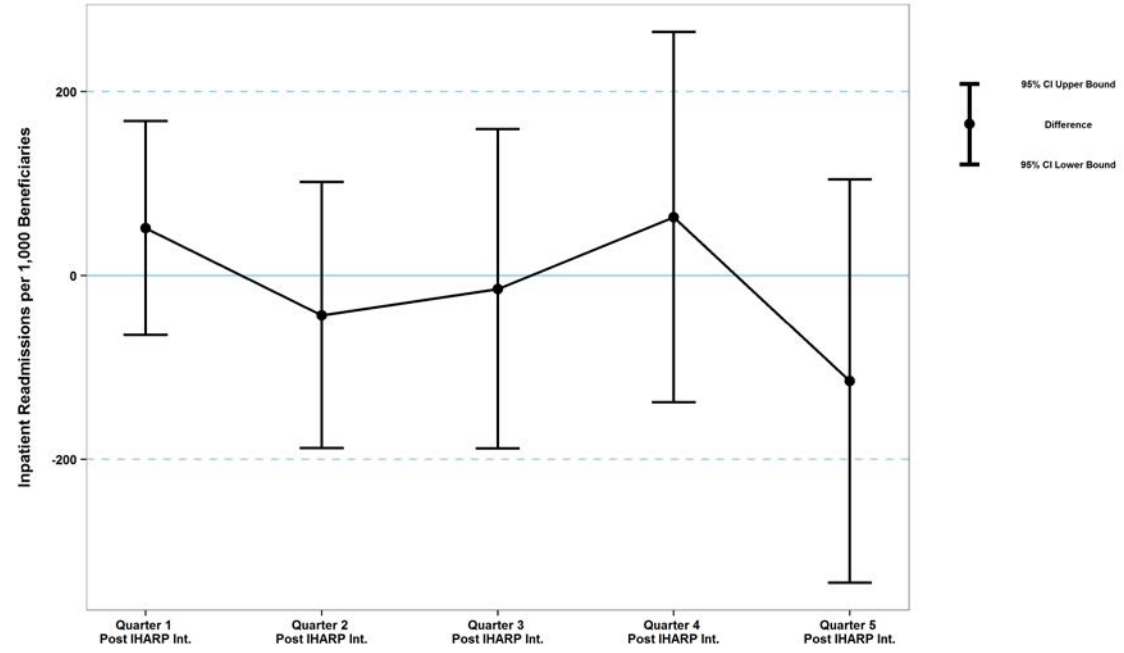
In the analysis of quarterly fixed effects, the IHARP intervention was not associated with consistent statistically significant decreases in mortality, with a significant effect only in Q1 of 71 fewer deaths per 1,000 beneficiaries compared to controls, as shown below in Figure 7-1. The Q1 effect is likely the cause of the large cumulative impact on mortality described above. IHARP restricts program enrollment to beneficiaries with six months or greater life expectancy, a key variable that is not observable in Medicare claims data and that would likely impact mortality rates in the intervention period. Consequently, intervention group beneficiaries may be healthier than comparison group beneficiaries, despite the similarity of the groups based on characteristics observable through Medicare claims. Acumen is continuing to refine its matching model to add program-specific covariates to address unobserved baseline differences, including those that may impact mortality rates.

Figure 7-1: IHARP Quarterly Differences in Mortality per 1,000 Beneficiaries after Program Enrollment, Medicare FFS Cohort



Consistent with the cumulative findings on readmissions, the analysis of quarterly fixed effects did not find the IHARP intervention associated with decreases in readmissions for any quarter of the intervention period, as shown below in Figure 7-2.

Figure 7-2: IHARP Quarterly Differences in Readmissions per 1,000 Beneficiaries after Program Enrollment, Medicare FFS Cohort



7.4.2 Health Service Resource Use

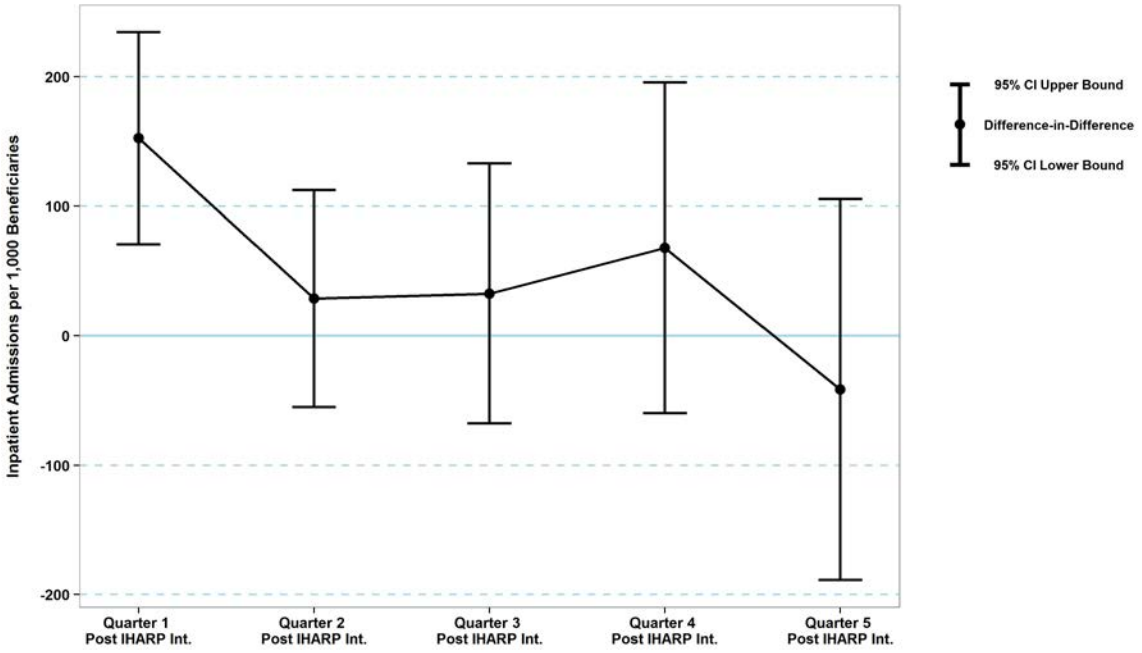
Cumulatively across the five quarters after program enrollment, the IHARP intervention was associated with statistically significant increases in inpatient admissions and number of hospital days, as shown below in Table 7-4. Results show statistically significant increases of 169 inpatient admissions and 679 hospital days, relative to controls. However, cumulative effects on ER visits across the five quarters after program enrollment were not statistically significant for the Medicare FFS cohort.

Table 7-4: Cumulative Difference-in-Difference Estimates for Resource Use Measures from Program Launch through 2014, Medicare FFS Cohort

Outcome Measure	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate	Confidence Interval	P-Value
Inpatient Admissions	5	592	168.86*	(69.0, 268.7)	<0.001
Hospital Days	5	592	679.00*	(38.7, 1,319.3)	0.038
ER Visits	5	592	110.64	(-35.5, 256.8)	0.138

Quarterly fixed effects showed that the IHARP intervention was associated with a statistically significant increase of 153 inpatient admissions per 1,000 beneficiaries in Q1, but no significant effects on inpatients were observed in other quarters, as shown below in Figure 7-3. The difference in admissions in Q1 undoubtedly accounts for much of the increase in admissions seen in the cumulative effect described above. However, there is no clear mechanism through which one would expect the program to increase inpatient admissions. The significant result may be due to differences in unobservable characteristics between treatment and control beneficiaries. The treatment and comparison populations are well-matched on observable characteristics, and Acumen will continue to refine matching models as additional data become available in future iterations of the analysis.

Figure 7-3: IHARP Quarterly DiD Estimates of Inpatient Admission Rate, Medicare FFS Cohort



Moreover, quarterly fixed effects also found a significant increase in Q1 for the number of hospital days, as shown below in Figure 7-4. Among Medicare FFS beneficiaries, the IHARP intervention was associated with an increase of 696 hospital days per 1,000 beneficiaries compared to among controls in the first quarter after program enrollment. There were no statistically significant quarterly effects of IHARP on ER visits, however, for any of the intervention quarters, as shown below in Figure 7-5.

Figure 7-4: IHARP Quarterly DiD Estimates of Number of Hospital Days, Medicare FFS Cohort

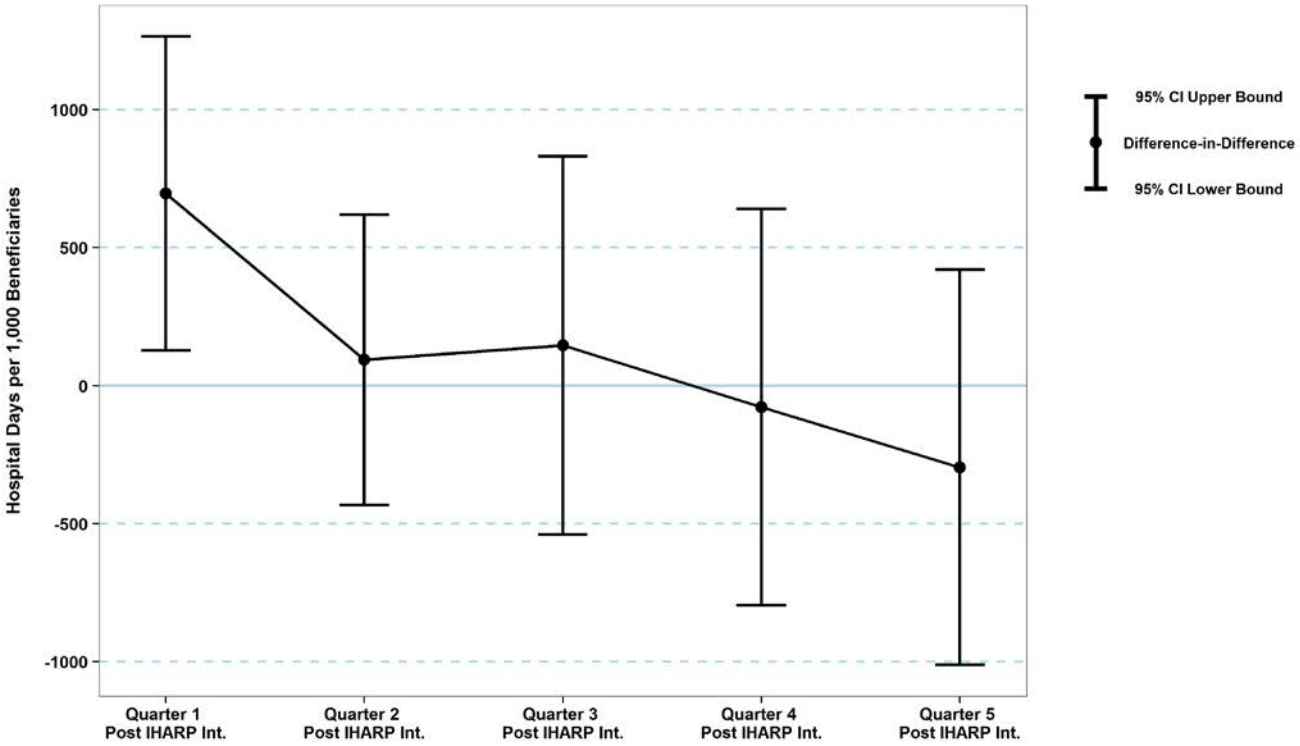
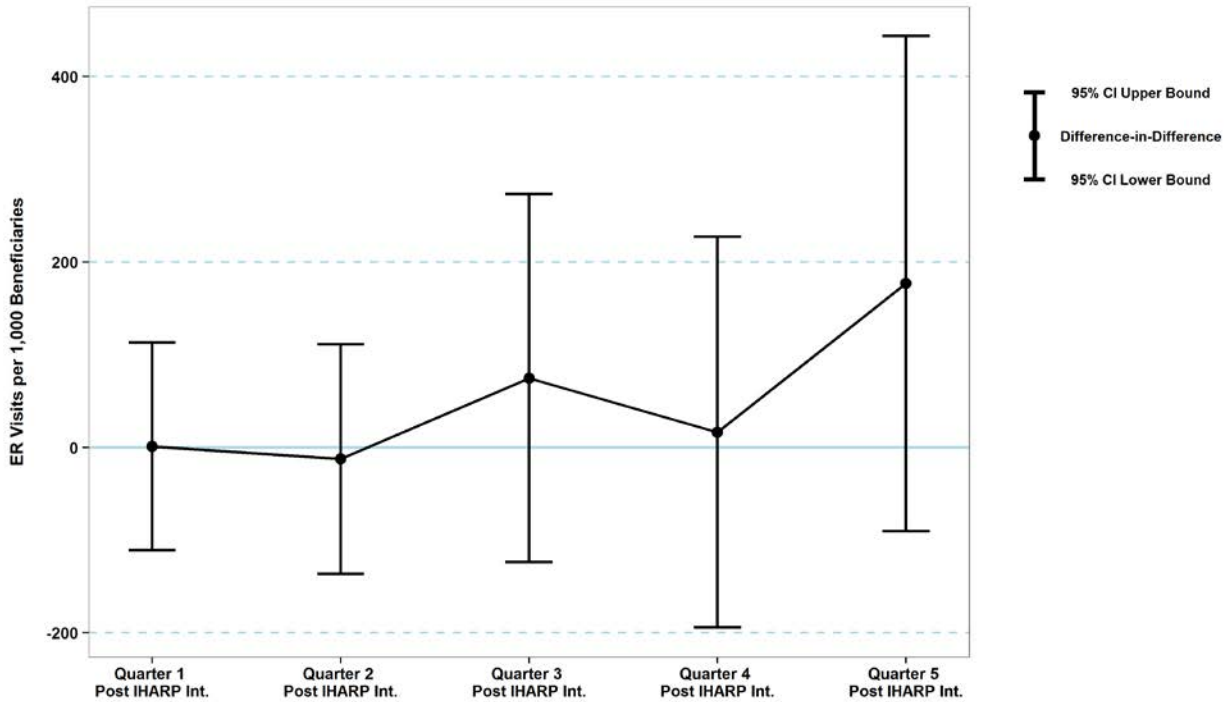


Figure 7-5: IHARP Quarterly DiD Estimates of ER Visit Rate, Medicare FFS Cohort



7.4.3 Medical Expenditures

Among the Medicare FFS cohort across the five quarters after program enrollment, the IHARP intervention was associated with cumulative, statistically significant increases in total medical and drug expenditures as well as increases in a number of other expenditure categories, including inpatient, outpatient non-ER, and physician/carrier costs. More specifically, the intervention was associated with an increase of total Medicare Parts A, B, and D payments of $2,151,961 and an increase in inpatient expenditures of $1,126,631, as shown below in Table 7-5. Complete results can be found in Appendix D.

Table 7-5: IHARP Cumulative Difference-in-Difference Estimates of Medicare Expenditures from Program Launch through 2014, Medicare FFS Cohort

Outcome Measure	Number of Intervention Quarters	Number of Beneficiaries	Cumulative DiD Estimate	Confidence Interval	P-Value
Medicare Parts A, B, D Expenditures	5	592	$2,151,961*	(604,444, 3,699,478)	0.006
Inpatient Expenditures	5	592	$1,126,631*	(197,338, 2,055,924)	0.017

* Statistically significant at the five percent level

At the quarterly level, the intervention had significant impacts on total medical and drug expenditures as well as on total inpatient costs only in Q1 of the intervention period. Specifically, the intervention was associated with increases of $1,851 per beneficiary for total medical and drug costs and $1,025 per beneficiary for inpatient expenditures in that first quarter, as shown below in Figure 7-6 and Figure 7-7. As with the service utilization outcomes described above in Section 7.4.2, there is no clear mechanism through which the IHARP intervention would be expected to increase expenditures, particularly in categories such as inpatient spending. The treatment and comparison populations are well-matched on observable characteristics, and Acumen plans to continue to refine matching models in future iterations of the analysis to limit the chance that results are due to differences in observables across the two populations. However, Acumen cannot eliminate the possibility that the significant result may be due to differences in unobservable characteristics between treatment and control beneficiaries.

Figure 7-6: IHARP Quarterly DiD Estimates of Total Medical and Drug Expenditures after Program Enrollment, Medicare FFS Cohort

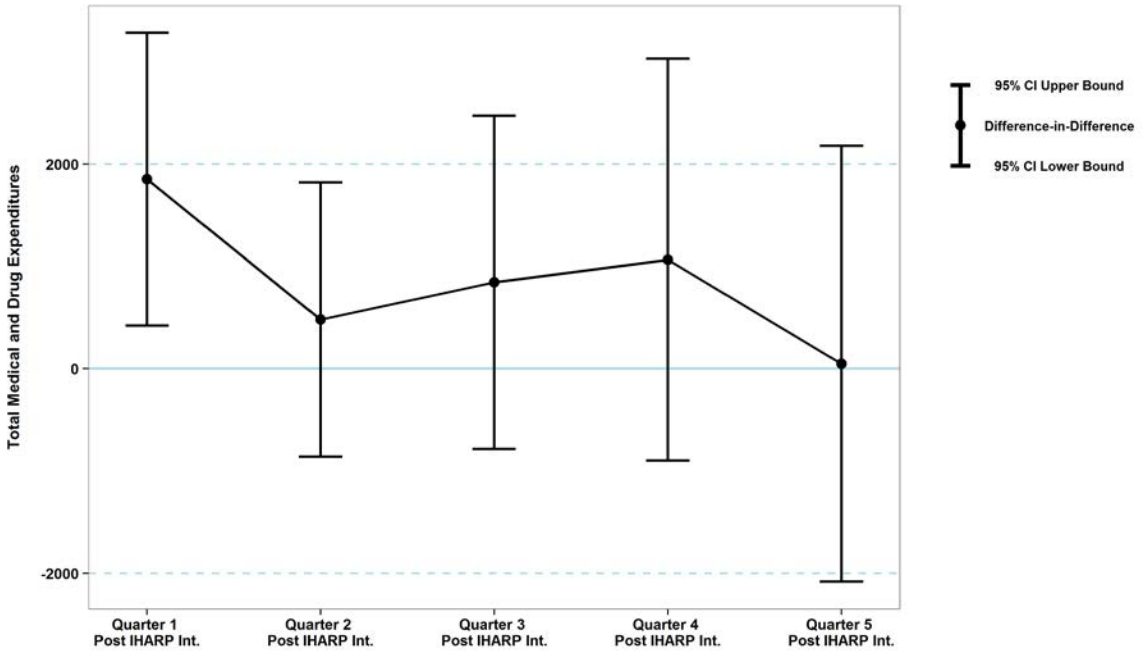
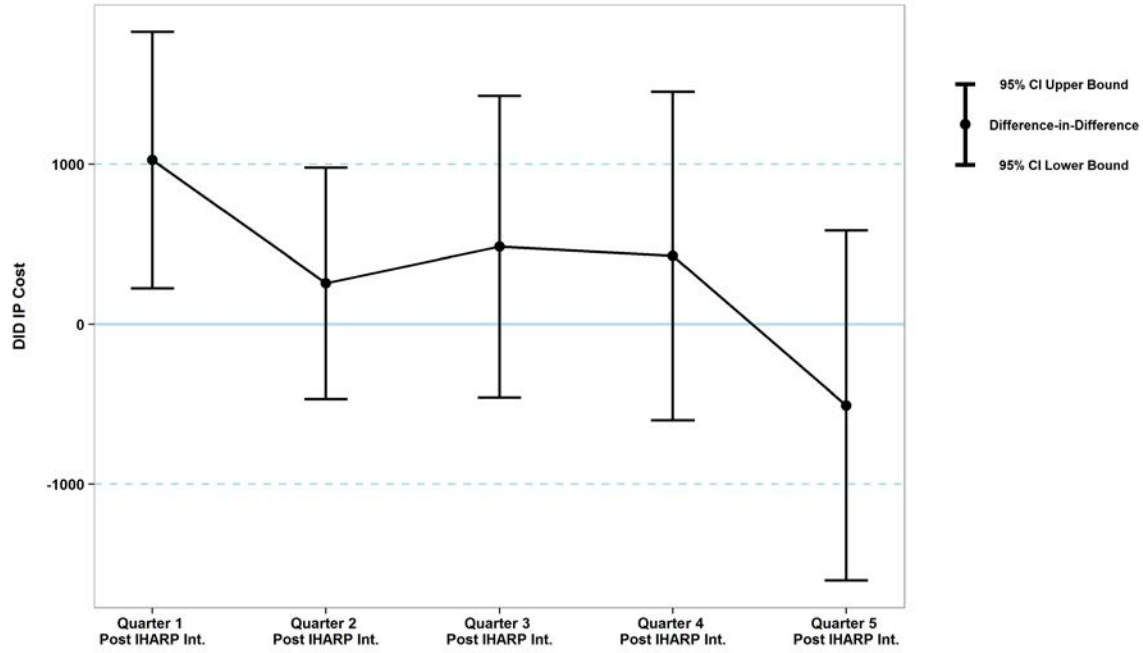


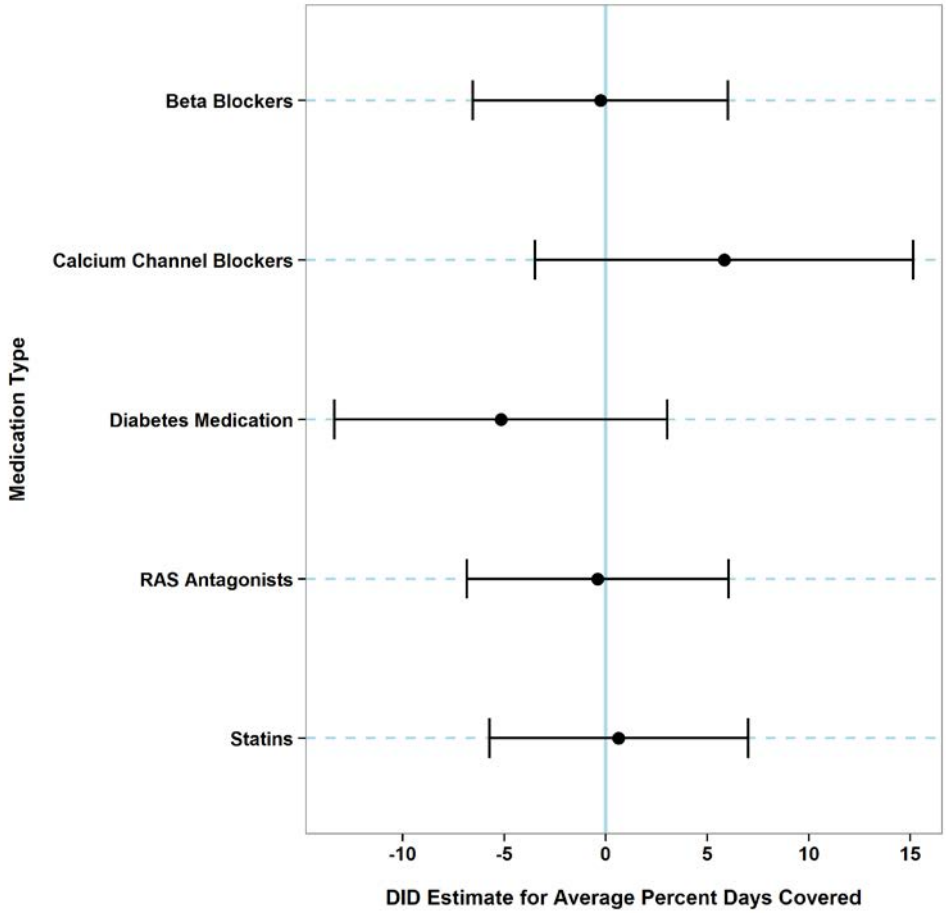
Figure 7-7: IHARP Quarterly Difference-in-Difference Estimates of Total Inpatient Expenditures after Program Enrollment, Medicare FFS Cohort



7.4.4 Medication Adherence

Acumen found no statistically significant effect of the IHARP intervention on medication adherence, although results varied in direction for the five therapeutic drug classes of interest, as shown below in Figure 7-8. Acumen determined adherence using the Pharmacy Quality Alliance's measures on proportion of days covered (PDC). PDC accounts for medications covered by Medicare Part D and does not include over-the-counter medications or drugs whose cost is fully covered by medication assistance programs. PDC was calculated through prescription claims for drugs within the therapeutic class for the first four quarters of the intervention period. The population was restricted to beneficiaries who had two prescriptions for drugs within the therapeutic class during the one-year baseline period and another two prescriptions during the first four quarters of the intervention period.

Figure 7-8: IHARP DiD Estimates of Average Percent Days Covered by Therapeutic Drug Class, Medicare FFS Cohort



7.5 Implementation Effectiveness

This section summarizes updated findings on IHARP's implementation effectiveness, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. IHARP ended enrollment under the HCIA grant in December 2014, totaling 2,367 cumulative participants, and continued to enroll new patients starting in 2015 with the financial support of Carilion Health System. IHARP has encountered ongoing challenges with implementing the program in the community pharmacy setting but continues to provide services to patients in the primary care and hospital settings, although it formally ceased inpatient enrollment in 2015. IHARP continues to look for ways to make improvements to its innovation and is exploring partnerships that will expand its telepharmacy and service capabilities. Table 7-6 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 7-6: IHARP Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• Total program enrollment exceeded the 2,500 projected target by nearly 180 enrollees at the end of December 2014. • Though 2015 enrollees are outside the HCIA grant, IHARP did enroll 150 additional participants between January and March 2015.[b] • IHARP is continuing to enroll patients and deliver services through the financial support of Carilion Health System.

Research Questions	Findings from August 2014 through August 2015
What were key successes in implementing the innovation as designed and factors associated with success?	• Program leaders and primary care clinical pharmacists interviewed during the site visit reported that the following strategies helped increase physician participation in, and referrals to, IHARP: o attending office staff meetings and having one-on-one meetings with physicians o being attuned to a physician's preferred method(s) for communication o highlighting that IHARP has the potential to save physicians time and help them with quality measures, polypharmacy issues, and compliance requirements o increasing the visibility of primary care consulting pharmacists within Carilion clinics o having physicians endorse IHARP to their peers • Inpatient pharmacists reported that the following strategies were useful for getting patients to accept IHARP services: o emphasizing that IHARP is a free service o being respectful of a patient's condition (i.e., not approaching a patient who is acutely ill) o using the medication review and reconciliation process to detect issues and demonstrate the value of a pharmacist's services o giving packets with informational materials about IHARP to patients, including the name and picture of the primary care clinical pharmacist who will be following the patient after discharge • Program leaders and primary care clinical pharmacists reported that scheduling primary care clinical pharmacist visits with physician visits has been a useful strategy for getting patients to have face-to-face encounters with pharmacists. Program leaders and primary care clinical pharmacists emphasized the importance of having an in-person initial visit since it forms the foundation of the patient-pharmacist relationship. • Physician trust of IHARP primary care clinical pharmacists has increased, and the primary care clinical pharmacists reported that physicians now accept most of their care and medication recommendations. • Having the community pharmacy coordinator work with IHARP patients who need medication assistance has positively impacted IHARP's ability to serve these patients. o In winter 2015, IHARP shifted the responsibilities of the community pharmacy coordinator from focusing on community pharmacy relationships to working with Carilion's medication assistance program (MAP), which helps individuals who meet the program's income requirements get their medications at little or no cost. The coordinator now works with MAP to ensure that IHARP patients complete their medication assistance-related paperwork. o According to program leaders, this process has led to more patients receiving needed medication assistance.

Research Questions	Findings from August 2014 through August 2015

What were the challenges in implementing the innovation as designed?	• Coordinating and communicating with community pharmacies has been an ongoing challenge.
	  o Community pharmacists have had difficulty incorporating in-depth patient medication management services into their workflow.
	• Primary care clinical pharmacists work in multiple clinics, sometimes in as many as four. Dividing time across multiple locations has made full integration into the practice setting difficult in some cases.
	• Scheduling patient visits with primary care clinical pharmacists has become more difficult as patient volume has increased and pharmacist case load is reaching higher levels.
	• Some primary care clinical pharmacists reported struggling to find time to complete quarterly follow-up phone calls with patients and questioned whether this requirement was necessary for all patients.
	  o The pharmacists expressed a desire to have flexibility to use their clinical judgment to determine the need for and frequency of follow-up services. This feedback contributed to program leaders' decision to allow pharmacists to use their clinical judgement to decide when follow ups are appropriate for each patient enrolled in 2015.
	• Primary care pharmacists have learned that IHARP clinic staff and community pharmacies are making incorrect medication refill authorizations and requests that have created drug therapy problems among some program participants.
	• Clinic office staff sometimes authorize a refill without reviewing medication or dosage changes that the pharmacist has made.
	• Pharmacies automatically send refill requests with an old medication or dosage.
	• Program leaders reported that the inability to engage community pharmacies may be one factor contributing to this trend, though this challenge, they say, exists across the country and is not unique to Carilion. Lack of reliable communication methods to convey medication changes to community and mail-order pharmacies is another factor.

Research Questions	Findings from August 2014 through August 2015
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• In fall 2014, IHARP stopped enrolling patients from Carilion New River Valley Hospital because primary care clinical pharmacists in the area had full caseloads. In winter 2015, it slowed enrollment from Roanoke Memorial Hospital, and by spring 2015, IHARP stopped inpatient enrollment altogether. IHARP continues to accept patient referrals from primary care practices. o IHARP does not plan to formally enroll patients from the hospital in the future; however, program leaders have encouraged hospital-based pharmacists to refer patients who could benefit from IHARP to primary care clinical pharmacists. • IHARP implemented a remote version of the program that uses simple technology via Web cam to allow telepharmacy consultations with Carilion's Galax practice, which serves few patients and is a significant commute for the primary care clinical pharmacists. o The telepharmacy program at the Galax practice has not been highly utilized largely because Galax physicians and office staff have not made many patient referrals. o Program leaders are actively pursuing a partnership with Appalachia College of Pharmacy that will enable broader telepharmacy capabilities. o Program leaders believe that Appalachia College of Pharmacy's ability to identify eligible patients from Carilion's patient pool using MTM software would circumvent the challenges encountered at the Galax practice and boost use of telepharmacy. • The partnership with Appalachia College of Pharmacy will also provide IHARP access to a pharmacy call center. The call center will supplement the current work of the primary care clinical pharmacists, provide additional support with implementation of the program, and allow IHARP to serve a larger volume of patients. • As of May 2015, program leaders were exploring the possibility of developing a clinical pharmacy technician role for the IHARP program and believe this role will increase primary care clinical pharmacist capacity to provide services. o They were working on a job description and seeking Carilion budgetary approval for the position. • Program leaders are working with Community Care North Carolina, another HCIA grantee that is developing an accountable care collaborative, to understand how it is engaging and compensating community pharmacies as part of its accountable care model. Program leaders believe this partnership may provide insight into strategies that will help IHARP better engage community pharmacies.

Research Questions	Findings from August 2014 through August 2015
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• IHARP conducted an external fidelity review of the documentation associated with intervention and medication recommendations made by the program's primary care clinical pharmacists. The lead primary care clinical pharmacist met individually with each primary care clinical pharmacist to discuss results from this review and provided guidance on any inconsistencies in documentation practices or the care model. • In winter 2015, IHARP completed chart reviews of medications and related issues for all the patients enrolled in the program between January 2013 and April 2014. The reviews revealed that especially during the early months of the project, the number and type of medication-related problems were underreported due to lack of understanding, time constraints, and constrained fields in the document flow sheet, which only allowed pharmacists to enter up to 15 medication-related problems. As a result, IHARP revised its reported data on these two key measures and provided additional training to pharmacists on how to use the documentation tool. • This past year, IHARP continued to use aggregated data from the Wellby system (which allows patients to provide near-real-time feedback via text messages or web interface to providers about their services) at three Wellby kiosks to identify gaps in care and opportunities for quality improvement.

[a] Source: Program data provided by IHARP in January 2015. The analysis omits more than 200 program participants who were excluded from the original data provided by the awardee.
[b] Source: Lewin Quarterly Awardee Progress Reports, IHARP, (Jan-March 2015).

7.6 Workforce

This section updates findings on workforce issues related to the IHARP intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. IHARP experienced no staff turnover over the entire duration of its HCIA grant, which program leaders attribute to its hiring approaches and ongoing efforts to engage staff in program decision making. Interviews conducted with IHARP and the site visit revealed that overall workforce impressions of IHARP are positive, and pharmacists have a high level of satisfaction with their roles. All IHARP primary care clinical pharmacists hired for the grant are continuing with the program into the no-cost extension period. Table 7-7 summarizes updates from August 2014 through August 2015, unless otherwise noted.

Table 7-7: IHARP Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What type and level of workforce training does the innovation provide?	• Primary care clinical pharmacists reported that the ADAPT training they received was useful but somewhat excessive or redundant for experienced pharmacists. o The ADAPT training is a 19-week online continuing education course provided by IHARP's partner, the Canadian Pharmacist Association, that is focused on primary care clinical pharmacy services. o They suggested having a modified version of the training for experienced pharmacists. o In response to this feedback, program leaders decided to explore the possibility of using various modules to customize the ADAPT training based on each pharmacist's personal background and experience. • IHARP reported plans to develop training programs for clinical pharmacy technicians and medical assistants who are interested in working with the primary care clinical pharmacists.
What type of support structure is effective for staff deployment?	• All primary care clinical pharmacists interviewed during the site visit reported that bi-weekly calls with other pharmacists were a very effective support structure. • The opportunity to shadow experienced primary care clinical pharmacists was cited as another one of the more helpful support structures. • Clinical guidelines were useful to primary care clinical pharmacists early in the project but are not as widely utilized now since pharmacists are familiar with them.
How does the innovation affect staff satisfaction?	• During interviews conducted as part of the site visit, primary care clinical pharmacists indicated they are satisfied with their roles. • Program leaders reported that interviews with the primary care clinical pharmacists conducted in April 2015 indicated that overall impressions of IHARP are positive, and pharmacists have a high level of satisfaction with their roles. • Physician satisfaction with the program, though high in the program's first year, increased in the second year of the project. Program leaders believe higher satisfaction is the result of growing physician comfort with the program and physician perceptions that IHARP is improving the quality of patient care.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• The IHARP program has experienced no staff turnover throughout the entire duration of the project. o According to program leaders, welcoming staff input on the structure and direction of the program has contributed to the high level of staff retention. o Additionally, program leaders stated that they focused on hiring staff with high tolerance for change, flexibility, and commitment to the program. They believe this has contributed to staff retention. • In May 2015, program leaders reported that Carilion will retain all primary care clinical pharmacists hired for the grant and will consider in September 2015 whether to hire more staff for the IHARP program.

7.7 Context

This section updates findings on context issues related to the IHARP intervention, based on qualitative information obtained from interviews with awardee program leaders and staff

members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. IHARP is providing unique services to patients, and according to interviews of primary care clinical pharmacists conducted by the program in April 2015, pharmacists feel that their relationships with clinic staff continue to improve and that the trust between them and the staff has strengthened over time. One important factor that has helped foster this relationship is the underlying patient-centered medical home structure of the participating Carilion practices, which emphasizes team-based care. As mentioned, IHARP was successful in sustaining its program beyond its HCIA grant through full financial support of Carilion Health System and is exploring mechanisms for reimbursement of clinical pharmacy services through existing CPT codes and incident to physician billing. Table 7-8 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 7-8: IHARP Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• A significant number of Carilion's primary care practices have reached the highest level of patient-centered medical home recognition from the National Committee for Quality Assurance (NCQA), which is the most widely used way to transform primary care practices into medical homes. The patient-centered medical home model, which emphasizes team-based care, has been an important foundation for the acceptance of IHARP's model and the promotion of teamwork between primary care clinical pharmacists and clinic physicians and staff members. o All primary care clinical pharmacists interviewed during the site visit underscored the importance of the NCQA recognition in helping build teamwork in the implementation of IHARP. • Program leaders reported that, given IHARP's patient population, medication non-adherence is largely due to cost. Leaders estimate that this is the primary issue for about 40 percent of IHARP's patients. • IHARP has been unable to develop a mechanism in Epic (Carilion's EHR) for primary care pharmacists to begin billing for their services incident to physician billing. o Carilion's billing department is getting up to speed on bundled and value-based payment structures, and plans to work through some of these issues before focusing on implementing the IHARP billing mechanism o Project leaders are hopeful that the billing feature will be operational in the first quarter of Carilion's next Fiscal Year, which starts in October 2015. • IHARP continues to consider approaches for instituting collaborative practice agreements with Carilion physicians. The agreements will enable primary care clinical pharmacists to initiate or change drug therapies and refer patients for care instead of just providing recommendations to primary care providers. o During site visit interviews, primary care clinical pharmacists overwhelmingly advocated for these agreements. These agreements will increase efficiency by reducing the time spent getting physician approval of medication changes. o Feedback from program leaders and clinical pharmacists revealed that trust between providers and pharmacists is a necessary precursor to collaborative practice agreements and that this trust takes time to build. Primary care clinical pharmacists indicated that newer physicians are more receptive to collaborating with them. The pharmacists attributed this to the team-based training the physicians have received and to the fact that because the physicians are establishing their practices, they are more open to change and collaboration.
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• During the site visit, primary care clinical pharmacists reported that IHARP leadership has been supportive, collaborative, and effective.

Research Questions	Findings from August 2014 through August 2015
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• Interviews of physicians and office staff conducted by IHARP program leaders revealed that these individuals have had very positive experiences with the program and see the pharmacists as an integral part of the care team. • Program leaders reported that preliminary information from interviews with the primary care clinical pharmacists conducted in April 2015 also indicates that pharmacists feel they have increasingly become more integrated into the clinics and are valued members of the health care team. Pharmacists revealed that their relationships with clinic staff continue to improve and that the trust between them and the staff has strengthened over time.
To what extent does the innovation duplicate practices or programs that are already existent?	• Though timing patient interactions can be an issue, primary care clinical pharmacists and care coordinators reported during the site visit that their services do not overlap. While both make patient follow-up calls immediately after hospital discharge, the topics covered during these calls are different. They also attempt to stagger the timing of the calls and use information collected by each other to inform their interactions with patients.
How can successful innovation components be scaled and replicated in other settings?	• IHARP was successful in sustaining its program beyond its HCIA grant, and Carilion senior leaders reported supporting the ongoing operations and expansion of the program. o IHARP program leaders are working with Carilion leaders to consider strategic expansion of IHARP to clinics that are struggling with certain quality measures, such as CMS' 'Star Ratings.' For example, IHARP's internal data show the program has been successful in improving diabetes measures, so they are exploring the possibility of allocating IHARP pharmacists to clinics not performing well in diabetes metrics to boost quality scores. • IHARP program leaders are exploring mechanisms for reimbursement of clinical pharmacy services, since Carilion leaders have noted that having IHARP generate revenue through reimbursement in addition to achieving cost savings is an ideal goal for the ongoing sustainability and scalability of the program. o IHARP program leaders continue to work with Carilion to create mechanisms in Epic that will allow pharmacists to use available CPT codes and bill incident to physician billing for their services. o However, there was broad agreement among IHARP pharmacists that the lack of pharmacist recognition in federal policies will impede reimbursement for services and could negatively affect the long-term ability to scale the program • IHARP pharmacists, and Carilion office staff all stated that requiring patients to pay for IHARP services was a questionable model for sustaining or scaling the program despite high patient satisfaction with the program. o IHARP's patient population struggles with office visit co-payments and introducing additional fees may deter patients from seeking care. o Even patients who could afford these payments would likely be hesitant to invest in pharmacy services. • IHARP undertook numerous dissemination activities this past year, including presenting to Carilion Clinic, public, and professional communities, to raise broader awareness of IHARP and generate interest in implementing it.

8 EVALUATION OF THE UNIVERSITY OF SOUTHERN CALIFORNIA HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the University of Southern California (USC) innovation, reflecting new analytic results from August 2014 through August 2015 unless noted otherwise. Section 8.1 provides a high-level overview of the key qualitative and quantitative findings. Section 8.2 summarizes innovation components of the awardee. Section 8.3 provides the most recent information available on the evaluability of the program. The remaining sections provide additional detail on the key findings described in Section 8.1. Section 8.4 summarizes findings relating to program effectiveness (for more comprehensive quantitative results, see Appendix E). Section 8.5 highlights findings related to the awardee's implementation effectiveness. Finally, Sections 8.6 and 8.7 highlight, respectively, updated findings on the evaluation categories of workforce and context.

8.1 Key Findings

Acumen did not find any statistically significant impacts of the USC MM intervention on measures of mortality, inpatient readmissions, utilization, or medication adherence, except for a statistically significant increase in hospital readmissions compared to controls during the sixth quarter of the intervention. However, the non-significant findings may be driven by the small sample size of the Medicare beneficiary population, which limits statistical power.

According to program leaders, strategies to increase enrollment in the USC intervention led to a steady rise in enrollment levels, reaching a rate of approximately 200 new patients per month. As enrollment increased, program leaders implemented a number of strategies to support pharmacy teams in managing their caseloads, including creating a float pharmacy team to provide support to busy locations and opening an additional clinic. Additionally, the USC innovation benefited from collaborative practice agreements and an underlying team-based care model that was promoted across the AltaMed system by organizational leadership. In September 2014, USC further enhanced its clinical pharmacy services by adding a video telehealth component at one location and expanding the telehealth services to two additional sites in the fall and winter of 2014.

In May 2015, USC reported that it would be unable to sustain the pharmacy team model in its current form, and would stop actively enrolling patients and providing in-person services, focusing only on video telehealth for patients beginning on July 1, 2015. This decision was the result of the AltaMed board of directors' decision on April 2015 not to allocate budgetary funds to support the continued integration of the pharmacy teams into AltaMed clinics. The Board of Directors instead approved a significantly modified version of the care model consisting of three pharmacists and three pharmacy technicians, along with eight mid-level providers. This decision

was largely driven by the fact that mid-level providers, unlike pharmacists, are recognized as health care providers for the purposes of payment policies and are able to autonomously bill for services. As of May 2015, program leaders did not have a clear sense of the role of the mid-level provider and pharmacist in this new model but emphasized that the model represented a completely different care delivery approach from the one implemented and tested under the HCIA grant.

The USC intervention experienced high rates of workforce turnover, but during site visits staff members expressed satisfaction with their roles and said they felt positive about the HCIA innovation. Since its implementation, the USC innovation has faced high turnover of physicians, care coordinators, and medical assistants and has experienced ongoing intermittent direct staff turnover, particularly among pharmacy technicians. However, during site visits, pharmacy team members reported feeling satisfied with their roles, their training, and the overall pharmacy team model, and they indicated that they appreciated having the opportunity to establish more in-depth relationships with patients. Therefore, it appears that the high turnover rate was largely attributable to uncertainty following AltaMed's budgetary decision. Overall, pharmacy team members expressed satisfaction with the team model and reported that they were efficient and could see up to twice as many patients when they had support from the full pharmacy team. This past year USC also undertook several efforts to create a sustainable workforce to support the clinical pharmacy team model, including partnering with three pharmacy technician schools to implement "co-trainings" to prepare graduates for work in the clinical pharmacy team model, and developing an online training module to similarly prepare pharmacists for providing clinical pharmacy services.

Overall, feedback collected during the site visit indicated that primary care providers and office staff felt positively toward the program. Administrators, medical directors, and primary care providers reported that pharmacy teams increased provider productivity and allowed providers to support a larger caseload. USC deployed a variety of strategies to promote physician collaboration with the pharmacy teams: highlighting potential time savings and improvements on quality measures, seeking physician input on disease-specific protocols, listening to physician recommendations, encouraging pharmacists to speak one-on-one with physicians, encouraging patients to promote the program to their physicians, and making sure physician champions endorse the program to their peers.

Program leaders are continuing to pursue avenues to scale clinical pharmacy services to other settings by collaborating with outside organizations including health systems, pharmacy associations, foundations, health plans, federally qualified health centers, and California's Department of Public Health. Though program leaders are optimistic that these collaborations may lead to uptake of the model, they underscored that a fundamental barrier to sustaining and

scaling pharmacist-based programs is that federal policies do not recognize pharmacists as Medicare Part B health care providers, which severely limits when pharmacists can receive reimbursement for services.

As of July 1, 2015, USC transitioned into a one-year, no-cost extension that will focus on sustaining and expanding only the telepharmacy component of the innovation. Program leaders planned to have three clinical pharmacists and three pharmacy technician teams support this effort. Program leaders are optimistic about the value and effectiveness of the telepharmacy program, even though they have experienced some technology-related challenges with telepharmacy platforms.

8.2 Innovation Components

The USC innovation leverages novel clinical protocols to provide medication and disease management services at AltaMed safety net clinics; these services include comprehensive medication management, medication reconciliation, medication access assistance, patient counseling, drug education, provider education services, and preventive care. Program services are provided by teams of pharmacists, pharmacy residents, and pharmacy technicians who are integrated into each clinic. The clinical pharmacy teams use USC-developed clinical protocols that include clinical checklists, suggested interventions, patient counseling and education topics, preventive care screenings, dosage guidelines for targeted disease states (asthma, congestive heart failure, diabetes, hypertension, dyslipidemia, anticoagulation therapy), and medication management services (prescription refills and medication reconciliation). Primary care providers recruit patients during in-person office visits at AltaMed clinics. Pharmacy technicians recruit patients by phone whom they have identified through lists generated by the AltaMed electronic health record and daily discharge reports on managed care patients. Pharmacy technicians conduct telephone follow-up for patients to assess their health and medication status, and they also conduct telephone follow-up after a patient's discharge from the program to determine if a patient is no longer meeting clinical goals and needs to re-enroll in the program.

The program targets patients at high risk for poor medical outcomes who are identified through hospitalization reports, through a systematic electronic review of medical records utilizing novel algorithms, or during primary care visits. There are several factors in determining whether a patient is "high risk," and the intervention primarily targets patients who have been diagnosed with four or more chronic conditions, are taking eight or more medications, or have at least one poorly controlled chronic condition. Other factors considered are whether patients have poor adherence with drug therapy for a chronic disease, or whether they are taking warfarin, an anticoagulant medication used to prevent heart attacks, strokes, and blood clots in at-risk patients. Most commonly, physicians refer patients with diabetes, followed by patients with hypertension and patients on anti-coagulation therapy. Participating AltaMed clinics are located

primarily in lower socioeconomic status, Latino communities; the majority of patients served are Latino.

In fall 2014, USC began providing innovation services through telehealth technology that enables pharmacy team members to interact with patients in remote locations. As of May 2015, USC has three clinics with telehealth capabilities. The telehealth model includes an in-person medical assistant at the AltaMed clinic who acts as the pharmacist's "hands," while the clinical pharmacist, resident, and pharmacy technician interact with patients remotely through a telehealth video monitor on USC's campus. Clinical pharmacy teams use laminated patient handouts and educational materials, allowing the clinical pharmacy team to write on materials during visits, and a USC-developed YouTube video tutorial for patients to learn how to use a glucometer. To recruit patients, pharmacy technicians mail appointment postcards to eligible patients and make cold calls asking patients to schedule clinical pharmacy appointments.

8.3 Evaluability

This section provides information on the primary factors affecting the evaluability of the USC MM innovation. Table 8-1 provides detailed information on the program's enrollment and payer mix, based on participant-level program data provided by USC. Between October and December 2014, USC substantially increased the number of cumulative participants, from 5,000 to 5,500 patients. The vast majority of these beneficiaries (84%) were not enrolled in Medicare or did have not sufficient identifiable information to link to Medicare claims data.

Table 8-1: Payer Mix of USC Program Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A/B/D FFS		Medicare Advantage and Part D		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Oct-Dec 2012	55	*	69	*	*	*	529	*	*
Jan-Mar 2013	29	4%	53	7%	12	2%	632	87%	726
Apr-Jun 2013	23	*	13	*	*	*	446	*	*
Jul-Sep 2013	24	*	72	*	*	*	466	*	*
Oct-Dec 2013	26	*	187	*	*	*	540	*	*
Jan-Mar 2014	43	*	157	*	*	*	507	*	*
Apr-Jun 2014	21	*	116	*	*	*	437	*	*
Jul-Sep 2014	15	*	81	*	*	*	425	*	*
Oct-Dec 2014	12	*	63	*	*	*	422	*	*
Total	248	5%	811	15%	37	1%	4,404	80%	5,500

Source: Participant-level data provided by USC in April 2015.
Notes: Beneficiaries in the "Medicare Parts A/B/D FFS" and the "Medicare Advantage and Part D" categories are included in the quantitative analysis in Section 8.4. "Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the USC program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims. Most beneficiaries classified as "Other Medicare Enrolled" have Medicare Part A only, although other insurance statuses (e.g., Parts A and D) are rarely observed.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

Table 8-2 highlights updates to the comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. As pointed out in the table, for the quantitative analysis of USC's program effectiveness, 702 Medicare FFS and MA beneficiaries were successfully matched to control beneficiaries.

Table 8-2: USC Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Comparison Group	• USC provided Acumen with data on Medicare beneficiaries who received services at AltaMed clinics but were not enrolled in the innovation. Acumen constructed a comparison group from among these beneficiaries using a propensity score matching algorithm.
Data Availability	• Acumen has used program data on intervention group beneficiaries provided by the awardee and linked these data to Medicare data files. A total of 702 Medicare enrollees with enrollment dates prior to October 2014 who could be matched to a control beneficiary are included in the empirical results in Section 8.4.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project.

8.4 Program Effectiveness

This section presents cumulative and quarterly findings on the impact of the USC intervention on mortality, inpatient readmission, utilization, and medication adherence for the combined Medicare FFS and Medicare Advantage intervention populations. Acumen estimated USC's program effects using Medicare claims data provided by the awardee through December 31, 2014.

To construct a statistically robust analysis, a number of restrictions were placed on the intervention population included in the evaluation. Patients identified as Medicare beneficiaries were required to have sufficient personally identifiable information to be linked to Medicare claims data and to have been enrolled in the USC program prior to October 1, 2014. The population was then restricted to individuals who had continuous Medicare Part D enrollment for one year prior to the intervention to facilitate construction of a matching algorithm that included Part D prescription drug event variables. These restrictions decreased the sample size available for analysis from 1,096 to 702 Medicare beneficiaries. These selected program participants were compared to a control group constructed by Acumen using the propensity score matching model described in Section 1.2.2. EHR provided by the awardee and Medicare data were used to match intervention and control beneficiaries based on predictive sociodemographic, utilization, and expenditure data variables and to assess beneficiaries' outcomes in the intervention period. Outcomes focus on mortality, inpatient readmission, utilization, and medication adherence.

Measures of medical expenditures are not in available MA claims data, and therefore, not presented in our findings.

Our quantitative analysis did not find that the USC MM intervention had any statistically significant impacts on measures of mortality, inpatient readmission, utilization, or medication adherence, except for a statistically significant increase in hospital readmissions compared to controls during the sixth quarter of the intervention. However, lack of significant findings may be driven by limited statistical power, and in particular by the small sample size of the Medicare beneficiary population. As data on more beneficiaries become available, Acumen will include additional program participants in the USC analysis, increasing the statistical power in future results. The intervention and comparison groups in the analysis are well matched on demographic and health characteristics, as well as pre-enrollment resource use, expenditures, and Part D prescription drug event variables (See Appendix E.1). However, given the non-randomized design of the intervention, Acumen cannot rule out the influence of unobserved baseline differences and differential trends in unobserved characteristics between the two groups in our results. For future reports, Acumen plans on continuing to refine its comparison group matching criteria, including adding additional program-specific covariates to our matching model to eliminate remaining baseline differences between the intervention and control cohorts.

The remainder of this section discusses key quantitative results for the USC innovation. Sections 8.4.1, 8.4.2, and 8.4.3 highlight key results for mortality and patient readmissions, resource use, and medication adherence, respectively. Acumen presents key outcomes in graphs and characterizes them in narrative. Our focus in the narrative is on differences between the intervention and control groups, before and after the intervention. Thus the included figures display single difference and difference-in-difference (DiD) estimates. Definitions of outcome measures are included in Appendix A and complete results for measures of program effectiveness are presented in Appendix E.

8.4.1 Mortality and Inpatient Readmissions

Cumulatively across the six quarters after program enrollment, the USC intervention was not associated with statistically significant decreases in mortality or readmission rates compared to controls, as shown below in Table 8-3. However, the lack of significant findings may be attributable to the limited sample size and does not necessarily suggest that the intervention had a limited impact on these outcomes.

Table 8-3: USC Cumulative Differences in Mortality and Readmissions from Program Launch through 2014, Medicare Cohort

Outcome Measure	Number of Intervention Quarters	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	P-Value
Mortality Rate	6	702	-0.15	(-12.2, 11.9)	0.981
Readmissions Rate	6	124	-4.11	(-18.6, 10.4)	0.579

* Statistically significant at the five percent level

Consistent with the cumulative findings, quarterly fixed effects show that the mortality rate for the USC intervention cohort was not significantly different from the rate for controls (For complete results, see Appendix E.). However, quarterly fixed effects for readmissions did find a statistically significant difference in Q6, with the intervention associated with 231 more readmissions per 1,000 beneficiaries than controls.

Figure 8-1: USC Quarterly Differences in Mortality per 1,000 Beneficiaries after Program Enrollment, Medicare Cohort

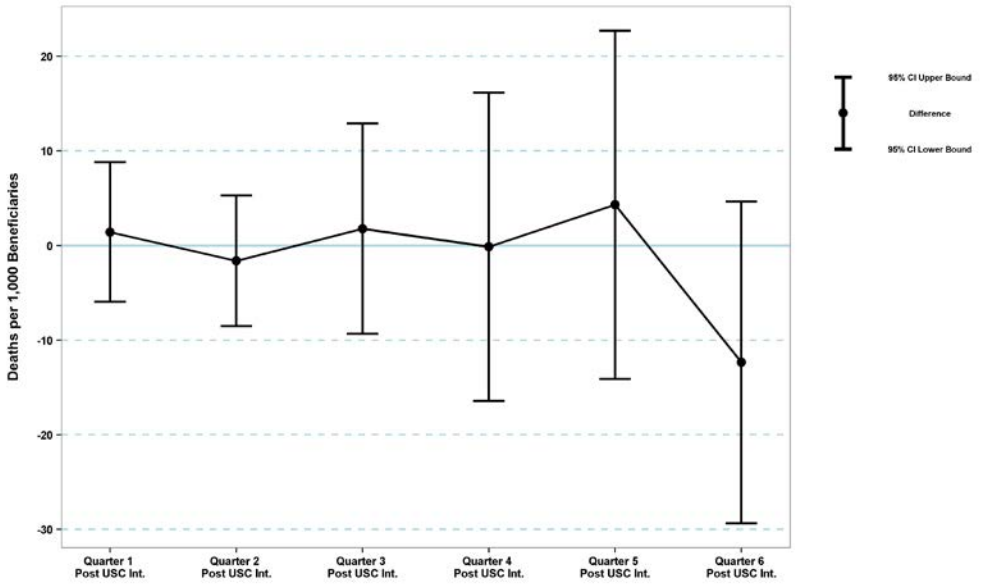
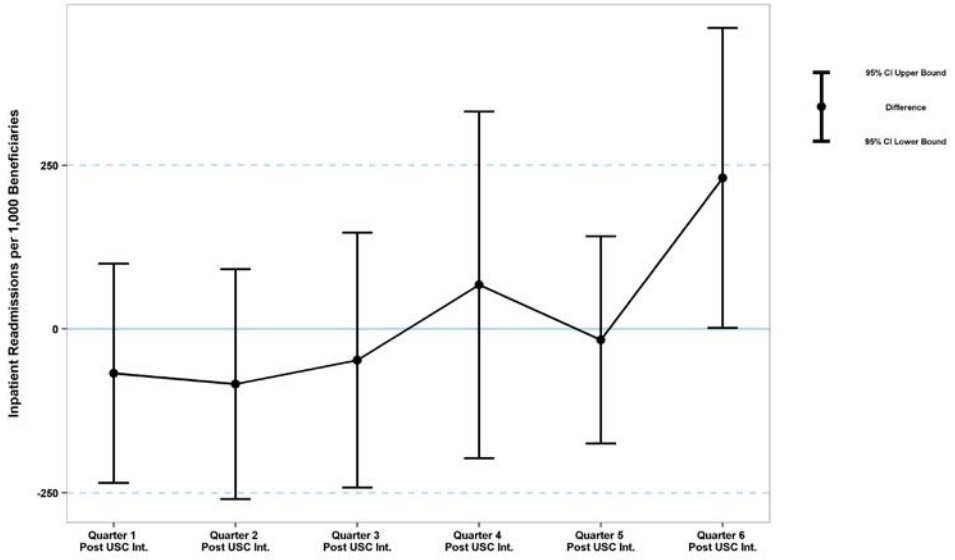


Figure 8-2: USC Quarterly Differences in Readmissions per 1,000 Beneficiaries after Program Enrollment, Medicare Cohort



8.4.2 Health Service Resource Use

Cumulative effects on inpatient admissions and number of hospital days across the six intervention quarters were not statistically significant for the USC Medicare cohort, as shown below in Table 8-4. Quarterly DiD results for these measures also fail to show statistically significant results. However, given limited statistical power, Acumen cannot conclude that the innovation did not have an impact on these outcomes. These results may be due to the limited ability to detect an effect.

Table 8-4: USC Cumulative Differences in Resource Use Measures from Program Launch through 2014, Medicare Cohort

Outcome Measure	Number of Intervention Quarters	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	P-Value
Inpatient Admissions	6	702	15.93	(-50.2, 82.1)	0.637
Number of Hospital Days	6	702	-345.54	(-1,164.6, 473.5)	0.408

* Statistically significant at the five percent level

Figure 8-3: USC Quarterly DiD Estimates of Inpatient Admission Rate, Medicare Cohort

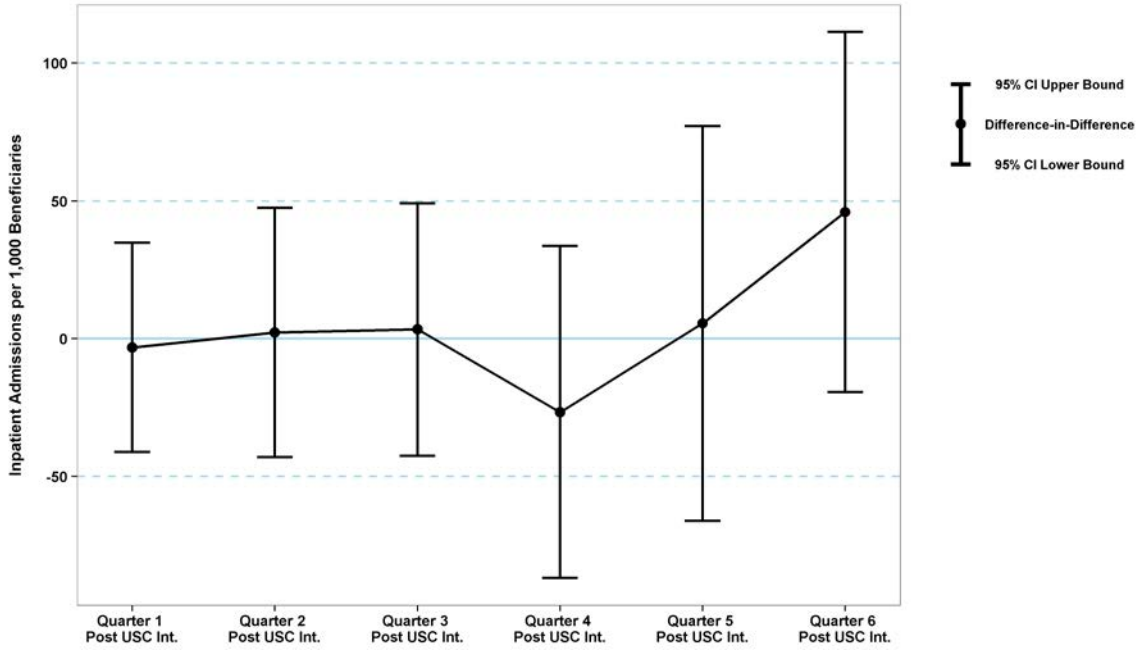
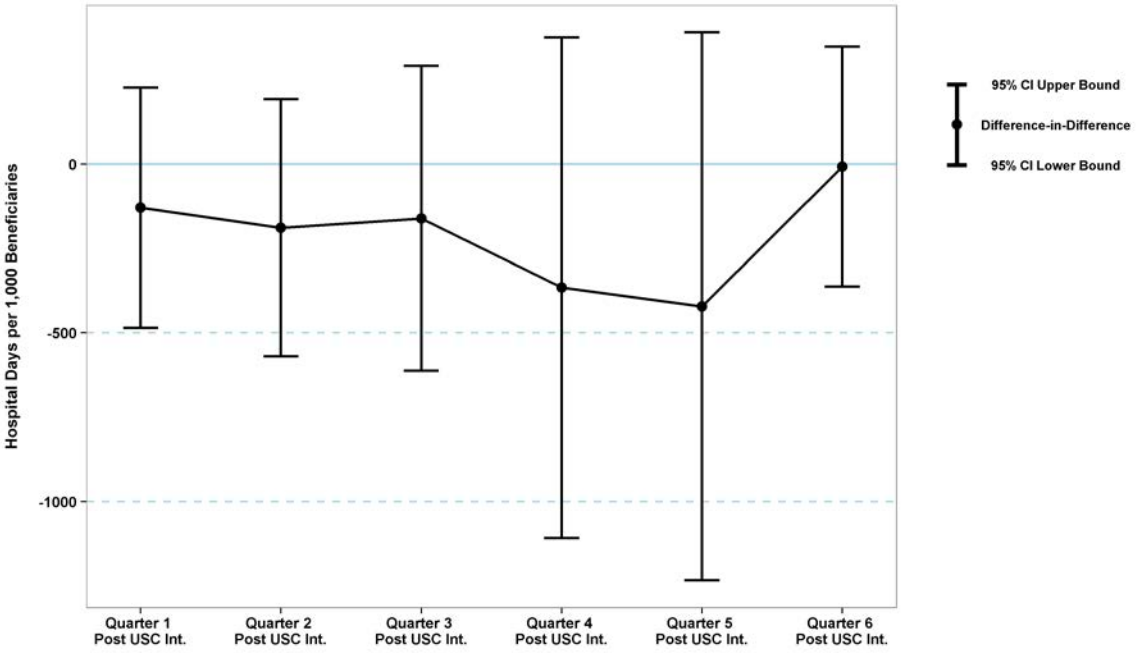


Figure 8-4: USC Quarterly DiD Estimates of Number of Hospital Days, Medicare Cohort

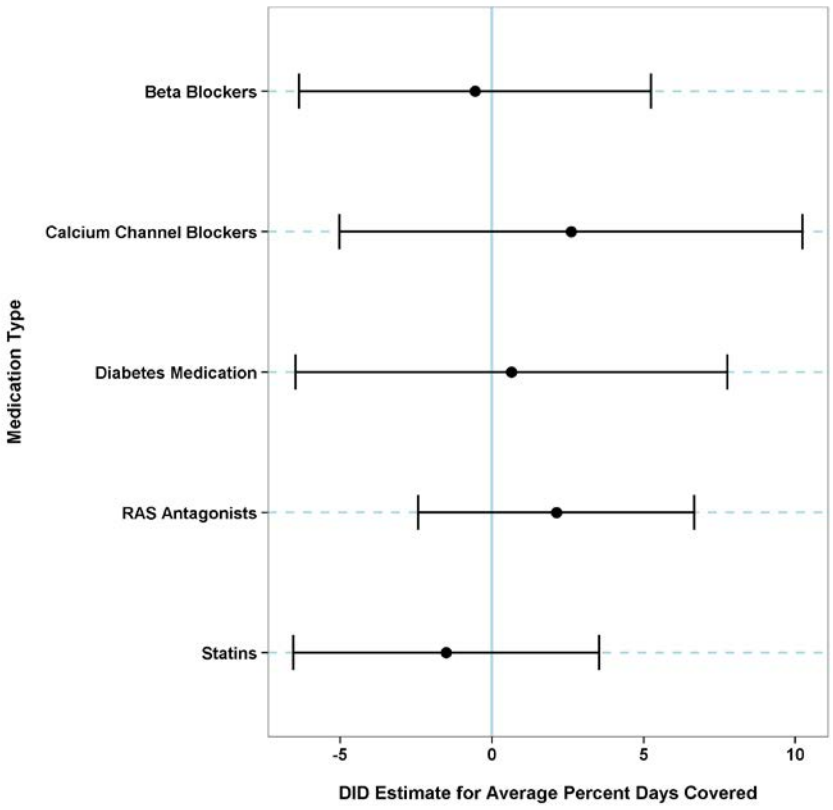


8.4.3 Medication Adherence

Our DiD results did not show a statistically significant effect of the intervention on adherence rates for any of the five therapeutic drug classes included in the analysis, as shown below in Figure 8-5**.** However, given limited statistical power, Acumen cannot conclude that the intervention had no effect on adherence. Acumen determined adherence using the Pharmacy Quality Alliance's measures on proportion of days covered (PDC). PDC was calculated through

prescription claims for drugs within the therapeutic class for the first four quarters of the intervention period. The population was restricted to beneficiaries who had two prescriptions for drugs within the therapeutic class during the one-year baseline period and another two prescriptions during the first year of the intervention.

Figure 8-5: USC DiD Estimates of Average Percent Days Covered by Therapeutic Drug Class, Medicare Cohort



8.5 Implementation Effectiveness

This section summarizes updated findings on USC's implementation effectiveness, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. USC has steadily increased enrollment over the past year, cumulatively serving 5,500 patients and reaching levels close to projected targets. As enrollment levels increased, program leaders implemented a number of strategies to support pharmacy teams in managing their caseloads, including implementing a float pharmacy team and opening an additional clinic. In September 2014, USC began to provide telehealth services at one clinic and expanded to two additional clinics in the fall and winter of 2015. As the focus of the no-cost extension year, program leaders reported that the program will deliver only telepharmacy services after July 1,

2015 and end in-person services. Table 8-5 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 8-5: USC Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to data received from the awardee, USC has enrolled 5,500 patients through the end of 2014.[a] • Program leaders reported that the pharmacy teams stopped enrolling new patients in early May 2015 to focus on wrapping up services with existing patients. Program leaders indicated that pharmacy teams would evaluate non-enrolled patients who required urgent pharmacy services on an as-needed basis. o As of May 2015, program leaders reported that the pharmacy teams would stop providing in-person services to patients after June 30, 2015 and that a subset of pharmacy team members would continue to provide telepharmacy services as part of USC's no-cost extension.

What were key successes in implementing the innovation as designed and factors associated with success?	• Clinical pharmacy team members, program leadership, and referring primary care providers reported that the following strategies contributed to provider and clinic acceptance of the innovation:
	  o Preparing for the clinical pharmacy team well in advance of the launch by educating primary care providers about clinical pharmacy services, gaining provider buy-in on the disease-specific protocols, and listening to provider recommendations.
	  o Having pharmacists communicate with primary care physicians in person early on about clinical decisions to demonstrate competence and establish trust.
	  o Using positive feedback from participating providers and patients to obtain buy-in from additional providers.
	  o Highlighting the potential of the innovation to contribute to improvements on quality indicators, such as Healthcare Effectiveness Data and Information Set (HEDIS) measures.
	  o Emphasizing that the innovation increases primary care provider productivity, allowing providers to have larger patient caseloads.
	• During the site visit, pharmacy team members reiterated the importance of having pharmacy technicians speak both English and Spanish and using warm handoffs from physicians to promote patient engagement, which was previously emphasized by program leaders. Pharmacy team members also reported that patient referrals have been an effective engagement strategy, as some patients have referred other family members or peers.
	• Clinical pharmacy team staff reported several key successes in improving workflow, productivity, and patient care:
	  o Pharmacy technicians indicated that using disease-specific follow-up forms to conduct two-month follow ups with discharged patients have helped them identify patients who need further assistance from the pharmacist.
	  o Pharmacists reported that they are able to see up to twice as many patients when they have support from the full pharmacy team (a pharmacy technician, a pharmacy resident, and a medical assistant) as opposed to when they work independently.
	• Program leaders indicated that they use floating pharmacy teams to help pharmacy teams manage their caseload as needed.

Research Questions	Findings from August 2014 through August 2015

What were the challenges in implementing the innovation as designed?	• Program staff reported that space constraints have been challenging in some clinics. In these locations, pharmacists often have to borrow exam rooms when they are not occupied by other clinicians or use the clinical pharmacy team office for patient visits.
	• In some cases, high demand for clinical pharmacy services has made it challenging for pharmacists to manage their caseload and workflow.
	  o During site visit interviews, pharmacists said they face difficulties managing their patient caseloads. At one clinic, this resulted in pharmacists seeing patients every three to four weeks instead of every two weeks as designed.
	  o Clinical phone calls and consultations from clinic staff can be disruptive to pharmacist workflow, reducing the number of patients a pharmacist can see in a day.
	  o Pharmacists reported that the Program of All-Inclusive Care for the Elderly (PACE) patients take more time to educate and treat. Pharmacists explained that family members may attend visits, which prolongs the meetings, and pharmacists and pharmacy technicians follow up with patients in-person since the patients are on site.
	• The teaching environment lowers pharmacist productivity since it takes additional time for pharmacists to supervise and educate pharmacy students.
	• Program staff reported that high turnover of physicians, care coordinators, and medical assistants at some AltaMed clinics has negatively impacted implementation of the pharmacy team model because staff need time to become familiar with the pharmacy team.
	• IT problems delayed and disrupted the expansion of the telehealth program to additional clinic locations. The Cisco telehealth units experienced issues with configuration and overheating.
	  o Program leaders tried to transition to a different telehealth technology (Blue Jeans), which is HIPAA compliant and already used extensively at USC; however, AltaMed had connectivity issues with Blue Jeans, so pharmacy teams had to continue using Cisco units.

What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• In September 2014, USC began to provide telehealth services at one clinic and expanded to two additional clinics in fall/winter 2015. This enabled USC to provide clinical pharmacy services to its target populations in smaller or more remote clinics which were not busy enough to warrant an onsite clinical pharmacy team. o At the busiest telehealth clinic, where the pharmacy team saw patients two days per week, program leaders expanded services from 8 to 10 hours to meet increased patient demand. • The opening of AltaMed Pico Passons clinic in fall 2014 reduced the caseload of other clinics and reduced overbooking of clinical pharmacy follow-up appointments. • In fall 2014, program leaders also arranged for a second clinical pharmacy team to visit the PACE clinic twice a week. After this change, program staff at the PACE site reported they were able to see almost 50 percent more patients. • To increase awareness of the program among participating AltaMed clinics (and generate referrals), program leaders began publishing a newsletter in November 2014 to share results, treatment evidence, and regional or specialty-specific updates.

Research Questions	Findings from August 2014 through August 2015
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Pharmacists use quarterly evaluations of pharmacy technicians to identify opportunities for additional education and improvement. • Although USC does not survey patients on their experiences with the HCIA intervention, AltaMed periodically conducts a broader survey of patients at its clinics. According to AltaMed officials, this system-wide survey showed that patients have positive reactions to the pharmacy team. • Satisfaction surveys conducted as part of a pharmacy resident project indicated that providers and patients are highly satisfied with the clinical pharmacy team. • USC uses findings from pharmacy resident projects to inform program operations and implementation.

[a] Source: Participant-level data provided by USC in April 2015.

8.6 Workforce

This section updates findings on workforce issues related to the USC intervention, based on qualitative information obtained from interviews with awardees and other stakeholders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. The USC innovation has experienced ongoing intermittent staff turnover, particularly among pharmacy technicians. After the announcement that AltaMed would not financially support the clinical pharmacy teams in their current form and would instead approve a significantly modified version of the care model with a different health care workforce (three pharmacists and three pharmacy technicians, along with eight mid-level providers), program leaders reported that all clinical pharmacy team members began to actively seek alternate employment. Pharmacy team members interviewed during the site visit reported satisfaction with their roles and that they appreciated having the opportunity to establish more in-depth relationships with patients. Table 8-6 summarizes updates from August 2014 through August 2015, unless otherwise noted.

Table 8-6: USC Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What type and level of workforce training does the innovation provide?	• Graduating pharmacy residents stay on the pharmacy teams an extra month after graduating to train their replacements (incoming residents). ○ Program leaders believe this crossover training has been critical for maintaining program effectiveness and efficiency. • Clinical pharmacists indicated that residency training was instrumental in preparing them for the clinical pharmacist role and exposing them to different clinical settings. • Pharmacy technicians indicated that the three-day training they received on the innovation was sufficient. • Pharmacy technicians also indicated that shadowing other pharmacy technicians and receiving hands on training was helpful.

Research Questions	Findings from August 2014 through August 2015
What type of support structure is effective for staff deployment?	• Interdisciplinary team meetings have helped integrate clinical pharmacy teams and other clinicians into the clinics and provided valuable opportunities to discuss strategies for complex patients. • Residents spend five to six months at each site (as opposed to two months). This extended time allows residents to build relationships and develop rapport with primary care providers and other clinicians. Residents are also able to see patients improve over time. In interviews, program staff reported that the extended training was very helpful. • USC has initiated "co-training" with three pharmacy technician schools, which is designed to prepare graduates for work in the clinical pharmacy team model and create a sustainable workforce for the model. o USC pharmacy residents teach topic areas that extend beyond the schools' current curricula capabilities. o Two of the three pharmacy technician schools are led by former USC School of Pharmacy graduates.
How does the innovation affect staff satisfaction?	• During interviews conducted as part of the site visit, clinical pharmacy team members reported that they were satisfied with their roles. o In particular, pharmacists and pharmacy technicians were satisfied with having the opportunity to establish more in-depth relationships with patients. • Pharmacy technicians reported that they enjoyed teaching patients and problem solving as a departure from a traditional dispensing role.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Program leaders and staff reported that AltaMed clinics have experienced ongoing medical assistant, physician, and care coordinator turnover. • Over the course of the innovation, turnover of pharmacy technicians has been particularly high. o Program leaders attributed some of the pharmacy technician turnover to commute times. As a result, USC placed staff in clinics closer to their homes to shorten staff commutes whenever feasible, which, according to program leaders, improved retention rates. • After the announcement that the AltaMed Board of Directors did not approve a budget for funding teams consisting of a pharmacist and pharmacy technician, four medical assistants and one pharmacy technician left the program. o As of May 2015, program leaders reported that this announcement served as a catalyst for all clinical pharmacy team members to actively search for new jobs.

8.7 Context

This section updates findings on context issues related to the USC intervention, based on qualitative information obtained from interviews with the awardee and other stakeholders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. The USC innovation has benefited from collaborative practice agreements and an underlying team-based care model promoted across the AltaMed system by organizational leadership. Program leaders are continuing to pursue avenues to scale clinical pharmacy services to other settings by collaborating with outside organizations. However, according to information from program leaders collected in May 2015, the clinical pharmacy team model as tested under the HCIA grant will no longer be in operation after June 30, 2015 following AltaMed leadership's decision to approve a budget largely centered on mid-level providers instead of

pharmacists and pharmacy technicians. Table 8-7 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 8-7: USC Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015

What endogenous (e.g., organizational) and exogenous (policy and environmental) factors affect implementation?	• According to program staff and primary care providers, the collaborative practice agreements in place between pharmacists and primary care providers are appropriate in scope, increase workforce productivity, and are critical to delivering program services efficiently.
	• In the safety net clinic setting, medical directors and senior leadership may be more amenable to the program than private practice because there are more needs in the safety net clinic setting and medical community.
	• AltaMed leadership emphasizes a patient-centric team-based care model across the organization that has fostered acceptance of the pharmacy team by other providers.
	  o Even with this foundational team-based model, trust between providers and the pharmacy team has taken time to build.
	• Program leadership attributes some program success to the rigor of the USC pharmacy program, where pharmacists and pharmacy residents receive their training.
	• AltaMed's NextGen EHR system has been a critical communication tool for the pharmacy teams. The pharmacy teams rely on the system to communicate internally and with primary care providers and other staff in AltaMed clinics.
	• Program staff indicated that physicians who are relatively new to the profession have been generally more receptive to pharmacist collaboration. AltaMed leaders indicated that training in team-based care models and the influence of physician peers may account for some of this buy-in.
	• Program leaders reported that the AltaMed Board of Directors did not approve a budget for funding pharmacy teams consisting of only a pharmacist and technician following the conclusion of the HCIA grant. Instead, the Board approved a budget for a substantially modified model that will use only 3 pharmacists and 3 pharmacy technicians, along with 8 mid-level providers (who will likely be physician assistants), who will provide services to patients across all participating AltaMed clinics. This approach is based loosely on a model developed by Kaiser Permanente.
	  o AltaMed opted to use more mid-level providers, who have the ability to autonomously bill, over pharmacists, who are not recognized as autonomous providers and cannot bill. This decision was largely driven by financial considerations associated with the current fee-for-service environment. Program leaders speculated that budget approval would have been more likely in a capitated and/or value-based payment arrangement.
	  o As of May 2015, program leaders reported that they did not have a clear sense of the role of the mid-level provider and pharmacist in this new model, though they believed it may involve mining trigger lists designed to improve HEDIS measures.
	  o Program leaders emphasized that this care delivery model represents a significant departure from the model tested under the HCIA grant.

How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• Clinical pharmacy teams reported that USC leadership has been supportive and responsive to feedback.

Research Questions	Findings from August 2014 through August 2015
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• Interviews with primary care providers, site medical directors, other clinical staff, and site administrators revealed that the clinical pharmacist and pharmacy team is viewed as an integral part of the care team. o Administrators, medical directors, and primary care providers reported that the pharmacy teams have increased provider productivity, allowing providers to see more patients and see patients less frequently, since pharmacists are conducting patient visits in between primary care provider visits. o Primary care providers indicated that clinical pharmacists have caught medication errors and potential adverse drug interactions. o Additionally, physicians and office staff have used pharmacists as a resource on up-to-date medications and clinical research.
To what extent does the innovation duplicate practices or programs that are already existent?	• AltaMed clinical and administrative staff reported that the clinical pharmacy team does not duplicate efforts with other providers. • Site medical directors and administrators indicated that if pharmacy teams were not in the clinics, physicians would have to spend more time on medication issues or nurses without specialized pharmacy training would have to fill this role.
How can successful innovation components be scaled and replicated in other settings?	• Program leaders and staff reported that an important broader policy factor for scalability is the implementation of policies that recognize pharmacists as health care providers. • Program leaders indicated that the program is customizable to many disease states and patient populations. They have met frequently with various organizations that are interested in adapting a clinical pharmacy program but many of the organizations require a strong business case to justify the significant financial outlay of launching a program. • According to program leaders, the focus of the no-cost extension will be only on expanding and improving the telepharmacy component of the innovation. o Three clinical pharmacists and three pharmacy technician teams will continue to support the telepharmacy service. o This may be a promising approach for providing clinical pharmacy services in smaller clinics. • Collaborative efforts with USC's Center for Scholarly Technology resulted in an online training module that is designed to prepare pharmacists for providing clinical pharmacy services. In May 2015, program leaders reported that the Indian Pharmacists Association planned to pilot the training module among retail pharmacies and anticipated that this training will allow these pharmacies to begin offering clinical pharmacy services. o As of May 2015, USC had completed the content for the online training module and was making enhancements to better engage the learner through use of synchronous and asynchronous learning methods. o Program leaders reported that they expected the pilot, which will last 6 months and involve 5 to 10 pharmacies and a variety of different stakeholders, to launch by the end of grant funding. They indicated that the pilot is part of a broader effort to enable community pharmacies to receive reimbursement for clinical pharmacy services and gain access to electronic health record information. • As of May 2015, program leaders indicated they were continuing to pursue efforts to scale clinical pharmacy services to other settings by collaborating with outside organizations such as health systems, foundations, federally-qualified health centers, and California's Department of Public Health. • USC pharmacy leadership and USC's Institute for Creative Technologies reported they were seeking funding from private sources to develop clinical pharmacist "avatars" to provide medication management services. In this development, virtual pharmacists could check in with patients to provide basic diagnostic services and medication education as a supplement to real life pharmacists.

9 EVALUATION OF THE HEARTSTRONG HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the Trustees of the University of Pennsylvania's (UPenn) HeartStrong innovation, reflecting results from August 2014 through August 2015 unless noted otherwise. Section 9.1 provides a high-level overview of the key findings. Section 9.2 summarizes innovation components of the awardee, and Section 9.3 provides the most recent information available on the evaluability of the program. The remaining sections provide additional detail on the key findings described in Section 9.1. Section 9.4 highlights findings related to the awardee's implementation effectiveness, and Sections 9.5 and 9.6 highlight, respectively, updated findings on the evaluation categories of workforce and context. Acumen does not report on HeartStrong's program effectiveness in this second annual report; at the time this report was written some of HeartStrong's insurer partners had not made data on the innovation's participants available for analysis, and as a result, Acumen did not have data on a sufficient number of participants for a credible quantitative analysis.

9.1 Key Findings

Despite initial difficulty reaching enrollment targets, HeartStrong employed a range of recruitment strategies and successfully met its enrollment goal of 1,500 patients in December 2014. Recruitment strategies included establishing weekly enrollment targets, having program advisors adjust their schedules to make patient recruitment calls during different times of the day including evenings and weekends, and designating one program advisor to monitor the patient recruitment call queue and assign calls to program advisors. HeartStrong also added promotional materials–brochures, magnet pads, pens, and bracelets–to encourage eligible patients to open the recruitment mailing and implemented a process to conduct more intensive follow up through additional phone calls and letters for patients who either stopped using their GlowCaps or initially agreed to enroll in the program but did not set up their GlowCaps devices.

HeartStrong worked to improve patient engagement in the program through program web portal enhancements, which have resulted in increased web traffic. The redesigned portal launched in October 2014, and it serves as an ongoing source of support and information for program participants. The portal includes more graphics and user-friendly designs, pictures and contact information for program advisors, and an enhanced list of resources developed by the social workers, including instructions for troubleshooting GlowCaps. The effort to increase patient engagement is critical since the HeartStrong innovation provides services entirely through telephone and web-based communication.

One ongoing implementation challenge for HeartStrong was connectivity issues among patients without a cell phone signal, since GlowCaps use cell phone signals to transmit alerts and adherence data. To address this issue, HeartStrong launched a pilot test of an "alternative device" (MedSignal) that uses a landline, instead of cell phone service, to transmit alerts and adherence data. As of May 2015, a handful of patients were using MedSignal, and according to program leaders, feedback from these patients has been positive, indicating that this device may be a reasonable option for participants who have been unable to use GlowCaps because their homes are located in an area that does not have good cellular reception.

HeartStrong pilot experiments have identified effective patient and family engagement strategies. Preliminary data indicate that an "opt-out" enrollment experiment, which sent patients GlowCap bottles upfront by mail along with a full package of information on using the bottles, substantially increased acceptance rates: 40% overall compared to 7% for the main intervention study. Also, findings from a social influence experiment found that telephone outreach is more effective for recruiting adherence partners than email and that adherence partners had a greater impact on patients who described themselves as more forgetful or who did worse in a screening test for forgetfulness.

Over the past year, HeartStrong experienced minimal staff turnover, and program advisors and social workers reported being largely satisfied with their roles. The only staff change during the past year was the departure of a project manager. During interviews conducted during the site visit, HeartStrong's program advisors reported that they were satisfied with their role in the innovation. Social workers reported that their skills were initially underutilized due to lack of clarity about their role. However, this clarity improved over time as they worked with program leaders to better define their function within the program, and, when interviewed in October 2015, they reported feeling there was a relatively good fit between their roles and skills, as they were more frequently intervening with patients to address their social needs. The social workers did note, however, that during HeartStrong's enrollment period, they had to invest a larger proportion of their time in patient enrollment activities, which limited their ability to fully provide social services for patients.

As of July 1, 2015, HeartStrong transitioned into a one-year, no-cost extension. During the no-cost extension year, HeartStrong will continue to follow and provide services to patients enrolled in its primary intervention study and focus on obtaining complete claims data for its analysis and ensuring that the project databases contain accurate and consistent documentation of patient services. Program leaders reported plans to significantly decrease staffing levels for the program as of July 1, indicating they would reduce staff from 11 full-time personnel to only four: the project director, a program advisor, and two social workers (one of whom would return from leave in August 2015). HeartStrong plans to keep this staffing model through October 2015 and

eventually retain only the project director and program advisor by December 2015. Project leaders believe this staffing model streamlines staff while still providing adequate resources to provide services to patients.

9.2 Innovation Components

The HeartStrong innovation provides patients who were recently hospitalized for acute myocardial infarction (AMI) with automated and person-based medication reminder systems, as well as financial incentives to encourage medication adherence. Eligible participants are identified by insurance partner claims data indicating patients that have been diagnosed with AMI and discharged from the hospital with a length of stay between one and 180 days. Patients who are targeted are individuals who have been prescribed two or more of the following types of targeted medications: aspirin, beta blocker, platelet blocker, or statin. Insurers scan discharge diagnosis codes and submit the data to HeartStrong. HeartStrong staff members then review and clean the claims data and send recruitment letters to eligible patients. Participants receive Vitality GlowCap pill bottles for each of four targeted medications/medication classes. Alternatively, patients are able to receive pill bottles organized by time of day (i.e., AM and PM) instead of receiving separate pill bottles for each of the four targeted medication classes. The bottles are programmed to provide an audio and visual alert to remind patients when to take their medications and send a signal back to HeartStrong's electronic portal whenever the patient opens them.

Patients who adhere to their medications by opening their GlowCap pill bottles are entered into a lottery to receive incentive payments. Patients have a 1-in-10 chance of winning $5 or a 1-in-100 chance of winning $50 for each day they are adherent. Patients who do not adhere to their medications receive follow-up interventions that escalate as the number of non-adherent days increase. Interventions begin with automated text, email or interactive voice response (IVR) alerts to patients and escalate to alerts to an identified friend/family member and then to phone calls, mailed letters, and contact with the patient's physician if non-adherence persists. Additionally, program advisors (research coordinators and social workers) follow up with patients who have not taken their medications within four days to help address adherence issues. Patients are referred for additional social work follow-up as needed. Patients who either stop using their GlowCaps or initially agree to enroll in the program but do not set up their GlowCaps receive additional follow up interventions, depending on their length of involvement in the study. This follow up consists of a combination of phone calls and letters.

9.3 Evaluability

This section provides information on the primary factors affecting the evaluability of HeartStrong. Table 9-1 highlights updates to the comparison group, data availability, and

program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. Acumen still has not received data on all HeartStrong Medicare participants and does not have an adequate sample size for quantitative analysis of program effectiveness.

Table 9-1: HeartStrong Comparison Group and Program Data Availability

Evaluability Factor	Status
Comparison Group	• HeartStrong randomly assigned individuals to a control group. Acumen is assessing the control group's comparability with participants.
Data Availability	• Some of HeartStrong's insurer partners had not yet made data on the innovation's participants available for analysis; Acumen currently has data on only 272 Medicare participants. Consequently, Acumen does not have data on a sufficient number of participants for a credible quantitative analysis of program effectiveness.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project.

Table 9-2 provides detailed information on the program's sample size—enrollment and payer mix data provided by the awardee. HeartStrong ended enrollment in December 2014, meeting its enrollment target of 1,500 participants.

Table 9-2: Payer Mix of HeartStrong Program Enrollment by Calendar Quarter

Calendar Quarter	Program Enrollees								Total
	Medicare Parts A and B FFS		Medicare Advantage		Medicaid		Commercial		
Jan-Mar 2013	*	*	0	0%	0	0%	0	0%	*
Apr-Jun 2013	*	*	*	*	0	0%	20	56%	36
Jul-Sep 2013	*	*	40	*	0	0%	89	*	*
Oct-Dec 2013	*	*	37	*	0	0%	151	*	*
Jan-Mar 2014	*	*	68	29%	*	*	157	68%	231
Apr-Jun 2014	*	*	119	46%	*	*	134	51%	261
Jul-Sep 2014	*	*	146	48%	*	*	144	47%	304
Oct-Dec 2014	*	*	169	49%	*	*	163	47%	346
Cumulative Total	37	2%	586	39%	20	1%	858	57%	1,501

Source: Participant-level data provided by HeartStrong in April 2015.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

9.4 Implementation Effectiveness

This section summarizes updated findings on HeartStrong's implementation effectiveness, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in October 2014. HeartStrong met its cumulative participation goal of 1,500 participants in December 2014, deploying a variety of engagement strategies to reach this target. HeartStrong launched a revamped, more user-friendly version of its patient portal with additional graphics, pictures, contact information for program advisors, and available patient resources, which was successful in increasing web traffic. Program advisors also implemented additional follow up processes for those who either stop using their GlowCaps or initially agree to enroll in the program but do not set up their GlowCap devices, resulting in the reengagement of six patients. Additionally, HeartStrong has determined that enrollment rates for its "opt-out" experiment, in which patients received GlowCap bottles upfront by mail along with a full package of information, were much higher than they were for the main intervention study. Table 9-3 summarizes findings from findings from August 2014 through August 2015, unless otherwise noted.

Table 9-3: HeartStrong Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• Despite initial challenges with low program enrollment, HeartStrong reached its cumulative participation goal in December 2014, enrolling more than 1,500 patients in the program. • HeartStrong recruited its last patient for its primary intervention study on January 6, 2015 and is following all enrolled patients for a full year.

Research Questions	Findings from August 2014 through August 2015

What were key successes in implementing the innovation as designed and factors associated with success?	• HeartStrong reports that the following strategies helped the program reach its enrollment target:
	  ○ using a tracking mechanism on the recruitment mailings which helps program advisors gauge when to time the outreach call, improving staff efficiency and ability to recruit patients
	  ○ co-branding recruitment letters with insurer partners
	  ○ offering a $25 incentive first for enrollment and again upon setting up the GlowCap devices
	  ○ translating the overall recruitment goal into weekly enrollment goals, which has provided concrete and frequent targets for program advisors
	  ○ having program advisors adjust their schedules to make patient recruitment calls during different times of the day, including evenings and weekends
	  ○ designating one program advisor to monitor the patient recruitment call queue and assign calls to program advisors
	• HeartStrong revamped its patient portal website, resulting in an increase in website traffic. Program leaders attribute the increase specifically to a number of improvements, such as more graphics and user-friendly designs, pictures and contact information for program advisors, and an enhanced list of resources developed by the social workers, including instructions for troubleshooting the GlowCaps. Additionally, program advisors encourage patients to visit the portal whenever they talk with patients, and HeartStrong sends automated messages through the portal to remind patients to visit the site.
	• Since HeartStrong relies heavily on technology, program leaders reported that an important success factor has been having a dedicated, internal web developer who understands the programming code and structure of the databases and websites used to manage HeartStrong execute information technology system improvements.
	• Program leaders reported that using a program called Slack, an online platform for team communication that facilitates group chats, has helped with team communication and function.
	  ○ Slack enables online team discussions and also helps staff members and project leaders respond quickly to issues that arise.

What were the challenges in implementing the innovation as designed?	• HeartStrong has continued to encounter connectivity issues among patients without a cell phone signal, since GlowCaps use cell phone signals to transmit alerts and adherence data. • HeartStrong has encountered issues with claims data that impacted its recruitment and evaluation efforts. HeartStrong experienced delays in getting Medicare patient data which limited its ability to recruit Medicare beneficiaries, and though HeartStrong has received comprehensive medical claims data from its insurer partners, it only has partial pharmacy data because some of its insurer partners have agreements with outside pharmacy benefit managers to administer pharmacy coverage. • Program leaders noted that integrating the GlowCaps devices with HeartStrong's Way to Health platform (the system used to monitor adherence and run the patient lotteries) has been an ongoing process and has required substantial time and resources. • During the final phases of HeartStrong's enrollment period, social workers reported they had to invest a larger proportion of their time to patient enrollment activities, which limited their ability to fully provide social services for patients.

Research Questions	Findings from August 2014 through August 2015
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• HeartStrong added promotional materials (brochures, magnet pads, bracelets, and pens) to encourage eligible patients to open the mailed recruitment materials. • HeartStrong increased the amount of follow up program advisors conduct with patients who either stop using their GlowCaps or initially agree to enroll in the program but do not set up their GlowCap devices. (These patients represent roughly 10 percent of intervention patients.) o As of May 14, 2015, HeartStrong had reengaged six patients through this new follow-up process. All of these patients had initially agreed to participate in the program but had failed to set up their GlowCaps. • In December 2014, the HeartStrong team implemented a screening tool for eligible patients over 75 to ensure that they can consent to program participation; however it was not widely used since recruitment ended in mid-December. o According to program leaders, the tool was effective, and the program would have benefited from using the tool in the beginning of the program. Program leaders strongly recommended using this type of tool for future iterations of the program, especially since all the interactions with patients are by phone, limiting ability to assess cognitive deficits through in-person observation.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• In mid-October, HeartStrong launched a pilot test of an alternative device (MedSignal) that uses a landline, instead of cell phone service, to transmit alerts and adherence data. o As of May 2015, about six patients were using MedSignal, and according to program leaders, feedback from these patients has been positive. HeartStrong program leaders reported that this device seems to be a reasonable option for participants who have been unable to use GlowCaps because their homes are located in an area that does not have good cellular reception. • HeartStrong completed enrollment for its "opt out" experiment, in which patients received GlowCap bottles upfront by mail along with a full package of information. o As of May 2015, HeartStrong was continuing to follow the enrolled patients, but preliminary data indicated that the overall acceptance rate was around 40% of the 50 who received devices (vs. about 7% for the main intervention study). Though the analysis is still in progress, program leaders believe this is a promising approach for enrolling patients. • HeartStrong conducted a "social influence" study to learn whether involving adherence partners (i.e., friends and family members) in the program is an effective way to improve adherence. Two key findings from this study were that 1) recruiting friends and family via automated methods (i.e., email) is not as effective as telephone outreach, and 2) adherence partners were more likely to improve adherence among those who described themselves as more forgetful or who did worse in a screening test for forgetfulness. Program leaders plan to use these findings to inform future studies.

9.5 Workforce

This section updates findings on workforce issues related to the HeartStrong intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted

in October 2014. HeartStrong experienced minimal staff turnover this past year, with only one project manager leaving the project. Though HeartStrong does not formally measure staff satisfaction, program advisors reported being satisfied with their roles during interviews conducted as part of the site visit, with the role of social worker improving over time. HeartStrong reported plans to significantly decrease staffing levels after transitioning into its no-cost extension period, with HeartStrong staff consisting only of the project director, one program advisor, and one social worker. Table 9-4 summarizes updates from findings from August 2014 through August 2015, unless otherwise noted.

Table 9-4: HeartStrong Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What type of support structure is available for staff?	• Program advisors use the patient portal to electronically receive information from and communicate with patients.
What type of support structure is effective for staff deployment?	• Program advisors reported that weekly operational staff meetings, team/leadership meetings, social worker rounds, meetings with Vitality (manufacturer of GlowCaps), and weekly program advisor rounds (during which all the program advisors discuss issues specific to their roles) are particularly helpful support structures. • Program advisors indicated they have used OneNote to document protocols and informal standard operating procedures and that this has been a useful process. Standardized protocols and scripts have helped program advisors perform their tasks, especially early in the project when they were still mastering their roles.
How does the innovation affect staff satisfaction?	• HeartStrong does not formally measure staff satisfaction, but during interviews conducted as part of the site visit, program advisors indicated they are satisfied with their roles. o All program advisors expressed strong commitment to their work and believe the program is making a difference in patients' health. o The program advisors who are research assistants reported that project leadership has been effective with matching their skills to tasks and maximizing their strengths within the program advisor role. o The program advisors who are social workers expressed some initial lack of clarity about their roles, which they believe stemmed from a general lack of understanding about the skills and expertise of social workers; they indicated this has improved over time to a point where they are providing social services and intervening with patients to address social needs.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• HeartStrong had minimal staff turnover this past year, with only one staff member (the project manager) leaving the project. • HeartStrong reported plans to significantly decrease staffing levels after transitioning into the no-cost extension period. o As of July 1, 2015, full-time HeartStrong staff will consist only of the project director, one program advisor, and one social worker. A second social worker (who is currently on leave) will also return full-time in August. One of the social workers will then leave at the end of October 2015, and the other will leave in December 2015.
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• The program advisor role was created specifically for HeartStrong, so this position represents a workforce change. HeartStrong also developed a device manager role. The device manager is responsible for setting up, mailing, and managing the GlowCaps devices.

9.6 Context

This section updates findings on context issues related to the HeartStrong intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in October 2014. During interviews conducted as part of the site visit, HeartStrong staff reported that project leadership has been collaborative and effective in communicating key decisions and that efforts to promote teamwork have been valuable and contributed to the effective implementation of the program. HeartStrong has not undertaken specific activities to scale the program and believes publishing results from its randomized controlled trial will bring broad awareness of the innovation and contribute to its replication in other settings. Table 9-5 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 9-5: HeartStrong Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What endogenous (e.g., organizational) and exogenous (policy and environmental) factors affect implementation?	• Given the large geographical service area for HeartStrong, social workers reported that they have had to rely more on national resources for patient support services since they are not familiar with the local resources available throughout the country. • Program leaders and program advisors feel teamwork is essential to the implementation of HeartStrong and has improved as the project has progressed. o Initially, teamwork was hindered as roles and responsibilities were not clearly defined. Program advisors feel this has now been fixed and the team is functioning together well. o An organizational chart for the project was helpful in clarifying roles and team structure. o Frequent staff meetings have improved teamwork. o Recent team-building activities conducted by an outside consultant and UPenn's Department of Organizational Effectiveness helped to solidify respect and relationships among team members. o Having team members with areas of expertise within the project has contributed to the team's success and ongoing operations.
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• Program advisors reported that project leadership is supportive and effective in communicating key decisions. • Social workers reported that having one-on-one time with the principal investigator has made them feel as though their opinions are valued and led to meaningful changes in workflow and process improvements.
How can successful innovation components be scaled and replicated in other settings?	• UPenn's priority is to publish results from the innovation and believes this approach will bring broad awareness of the innovation and contribute to its replication in other settings.

10 EVALUATION OF THE PHARMACY SOCIETY OF WISCONSIN HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the Pharmacy Society of Wisconsin (PSW) innovation, reflecting new analytic results through August 2015, unless noted otherwise. Section 10.1 provides an overview of the key findings for PSW. Section 10.2 summarizes the innovation components of the awardee. Section 10.3 provides the most recent information available on the evaluability of the PSW program. The remaining sections provide additional detail on the key findings described in Section 10.1. Section 10.4 highlights findings related to the awardee's implementation effectiveness. Finally, Sections 10.5 and 10.6 highlight, respectively, updated findings on the evaluation categories of workforce and context. This second annual report does not include program effectiveness analyses of the PSW intervention. Acumen is currently examining medical and drug claims in data provided by WI DHS, and identifying a suitable comparison group of individuals who did not receive the intervention. Results from the quantitative analysis of program effects on mortality, inpatient readmissions, health service utilization, and medication adherence will be included in future reports.

10.1 Key Findings

PSW consistently exceeded its projected goals for pharmacy accreditation and pharmacist certification over the past year. Overall, it was successful in spreading the Wisconsin Pharmacy Quality Collaborative (WPQC) model across the state of Wisconsin, and continued to add payer partners to expand its pool of patients eligible for the program. Payer partners were added in an effort to allow pharmacies to provide medication therapy MTM services to additional patients covered by various insurers, and thus also help pharmacies justify making more permanent staffing and workflow changes to deliver the MTM intervention. Interviews with program staff indicate that outreach efforts may have reached a tipping point over the past year, as requests from pharmacies and pharmacists to participate in the WPQC innovation after hearing about it from peers have increased significantly.

The number of comprehensive medication review/assessments or Level 2 (L2) services that were delivered was below projections during the evaluation period; however, PSW made continued efforts to improve L2 service delivery, and the number of L2 services delivered has generally increased over time. In addition to providing Level 1 (L1) services, or brief medication reviews to beneficiaries during medication dispensing at participating pharmacies, PSW also offers L2 services consisting of scheduled comprehensive medication reviews. PSW has not faced any major challenges in providing L1 services, and continues to make efforts to increase and improve the provision of L2 services. PSW launched a second and third round of workgroups in December 2014 and March 2015, respectively, to help support pharmacists and

pharmacy technicians in providing L2 services. It also held its annual WPQC pre-conference and conference in April 2015, which was designed to offer additional training focused on the delivery of L2 follow-up services, in addition to ways to incorporate the WPQC program into pharmacy workflow and to develop partnerships with physicians. Pharmacies reported making steady improvements to enable the provision of L2 services by implementing staffing models that provide dedicated time for pharmacists to deliver L2 services; dovetailing L2 services with medication pickups, a clinic visit, or lab work; and making more efficient use of pharmacy technicians and other pharmacy support staff to assist with the L2 workflow. PSW also began offering small incentives for pharmacies to provide a targeted number of L1 and L2 services.

Another significant development which helped increase the volume of WPQC MTM services was the initiation of electronic alerts (or "pushes") through the comprehensive Aprexis medication management system to pharmacies to identify Wisconsin Department of Health Services (WI DHS) health plan beneficiaries who are eligible to receive L1 and L2 services. The automatic identification of eligible WI DHS health plan beneficiaries through the Aprexis system began in November 2014. PSW undertook numerous activities to adequately prepare pharmacists for these pushes, including offering specialized training and conducting follow-up calls and site visits with pharmacies. In May 2015, PSW reported an increase in delivered L2 services over the previous quarter and reported that the number of L2 services that were categorized as "in progress," which includes scenarios where pharmacists are reaching out to individuals who are eligible for services, working to schedule an appointment, or awaiting a decision by a prescriber about recommendations from an L2 service that was delivered, nearly tripled. Program leaders indicated they expected to see the number of delivered L2 services increase as these "in progress" L2 services were completed over the last months of the HCIA grant.

PSW did not receive a no-cost extension from CMS, and as a result, program leaders reported in May 2015 that they were considering ways to streamline and sustain the WPQC program following the conclusion of HCIA grant funding on June 30, 2015. As of May, PSW's payers, who reimburse pharmacies for providing MTM services to their respective beneficiary groups, remained committed to the program, and PSW planned to continue to accredit pharmacies and certify pharmacists, technicians, and pharmacy students, to continue providing WPQC MTM services to beneficiaries of private payer partners and WI DHS. In conjunction with the WPQC Steering Committee, program leaders were considering ways to simplify and centralize the support services that PSW provides to accredited pharmacies following June 30. Program leaders reported that the Regional Implementation Specialists (RISs) would no longer provide intense support through site visits, and PSW was looking to centralize its performance reports and revamp its semi-annual quality assurance evaluation process. PSW's Board of Directors decided to keep the core staff of the WPQC program in tact at least through the end of September 2015, and program leaders indicated they would continue to pursue additional

sustainability strategies, including leveraging a State Innovation Models (SIM) grant and considering implementing pharmacy and staff member dues for participation in the WPQC program.

At the time of the May qualitative interview, program leaders were uncertain about the financial viability of the Aprexis system for facilitating the provision of MTM services to WI DHS beneficiaries after the conclusion of the HCIA grant. Program leaders submitted a proposed budget amendment to the Wisconsin Joint Finance Committee to request state funding to cover the Aprexis system for WI DHS beneficiaries after the HCIA grant funding ends. Program leaders reported that Aprexis was developing its proposed fee structures, which would determine the future cost of the utilization of the Aprexis system for the WPQC program. Though PSW's private insurer partners pay for the Aprexis system, the HCIA grant paid for the use of the Aprexis system for WI DHS beneficiaries. If funds are not available, participating pharmacies may need to either absorb the cost of the Aprexis system or stop using it in the delivery of services to WI DHS beneficiaries. If the Aprexis system becomes unavailable for WI DHS beneficiaries, program leaders believe ongoing pharmacy participation in the WPQC program may be significantly impacted, as the Aprexis system creates numerous efficiencies, including mechanisms for patient identification, documentation, billing, and performance reporting. If pharmacies have to revert back to a manual process for identifying eligible WI DHS beneficiaries and use separate systems for data tracking and billing, this might reduce efficiency, increase pharmacy workload and create a disincentive for pharmacies to continue participating in the WPQC program.

10.2 Innovation Components

The PSW project was designed to implement a standardized MTM model across the state of Wisconsin in which existing community pharmacists and pharmacy technicians provide an expanded set of services to help beneficiaries effectively manage their medications. The project has developed the WPQC, a network of pharmacies and contracted health plans, to help expand and standardize the MTM model. Under the innovation, participating pharmacies become members of WPQC through a registration and accreditation process. This process involves meeting rigorous standards, including training and certification of at least one of the pharmacy's pharmacists to deliver MTM services. Once pharmacists are certified, they deliver two levels of WPQC MTM services: Level 1 (L1) and Level 2 (L2).

Participating pharmacists provide L1 services during medication dispensing (point-of-sale) to eligible patients. These services many include: (i) review of cost effectiveness of medications and identification of opportunities to change the dose, dosage form, or duration of therapy; (ii) consultation and education to improve patient adherence; (iii) consultation on any device associated with a medication; and (iv) review of opportunities to add or delete

medications based on clinical guidelines, indication, or other reason as determined by the pharmacist.

Patients with targeted conditions receive L2 services, which consist of a more in-depth comprehensive medication review and assessment provided on an appointment basis (typically lasting about 60 minutes) followed by up to three 3 to 45-minute pharmacist visits annually. L2 services include: (i) identification, resolution, and prevention of medication-related problems; (ii) assessment of patient's health status; (iii) formulation of a medication treatment plan; (iv) in-depth education and training on adherence and appropriate medication use; (v) provision of a personal medical record and medication action plan following each encounter; and (vi) follow up medication reviews to monitor and evaluate patient response to therapy.

The WPQC program targets WI DHS and partnering commercial insurance plan beneficiaries who have at least one of the following conditions: diabetes, heart failure, asthma, and geriatric syndromes. A representative from an accredited pharmacy (pharmacist, pharmacy technician, pharmacy student) contacts eligible patients to enroll them in the program. Patients may be eligible for multiple L1services, L2 services, or both, since the program uses separate sets of criteria to identify which patients are eligible for L1 and L2 services for each targeted condition.

10.3 Evaluability

This section provides the most recent information on the primary factors affecting the evaluability of PSW's WPQC program. Table 10-1 provides updated information on the availability of intervention and comparison group data as well as program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. As discussed below, Acumen used WI DHS health plan beneficiary claims and MTM data submitted by providers to the WI DHS portal to identify beneficiaries receiving WPQC MTM interventions. Although PSW's WPQC program also serves private health plan beneficiaries, WI DHS beneficiaries account for the majority of WPQC's participant population. Acumen plans to include results for non-Medicare WI DHS beneficiaries in future reports.

Table 10-1: PSW Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Intervention Group Data Availability	• Acumen used WI DHS health plan claims data and MTM data submitted by participating pharmacies to the WI Provider Portal to identify WI DHS beneficiaries who received the PSW intervention. o Beneficiaries in the WI DHS claims data were classified as PSW program participants if their claims contained procedure codes for MTM services rendered by a WPQC certified pharmacy or if the WI Provider Portal MTM data identified them as such.
Comparison Group Data Availability	• PSW does not identify a comparison group. Acumen will match a comparison group drawn from the pool of WI DHS beneficiaries who did not participate in the PSW program but who were enrolled in Medicare Parts A, B and D, or MA and Part D.
Program Maturity	• The PSW program has been in existence for the past eight years and has undergone minimal changes since the launch of the HCIA project.

Table 10-2 provides the program's enrollment and payer mix figures for beneficiaries of WI DHS health plans who received PSW MTM services between October 2012 (HCIA program launch) and March 27, 2015, based on the latest data provided by WI DHS. As Table 10-2 shows, there were 1,417 individuals enrolled in WI DHS health plans as well as Medicare Parts A, B and D, and 1,097 individuals enrolled in WI DHS health plans as well as MA and Medicare Part D.

Table 10-2: Payer Mix of PSW Program Enrollment by Calendar Quarter

Calendar Quarter	Enrolled in WI DHS Health Plans, and Medicare Parts A, B, and D		Enrolled in WI DHS Health Plans, and Medicare Advantage and Part D		Enrolled in WI DHS Health Plans and Other Medicare		Enrolled in WI DHS Health Benefit Plans Only		Total
Oct-Dec 2012	33	*	*	*	105	*	308	*	*
Jan-Mar 2013	107	5%	49	2%	324	15%	1,639	77%	2,119
Apr-Jun 2013	107	4%	92	3%	394	14%	2,153	78%	2,746
Jul-Sep 2013	126	5%	92	4%	531	20%	1,843	71%	2,592
Oct-Dec 2013	113	4%	88	3%	552	21%	1,836	71%	2,589
Jan-Mar 2014	222	7%	144	4%	669	20%	2,315	69%	3,350
Apr-Jun 2014	190	4%	146	3%	800	18%	3,258	74%	4,394
Jul-Sep 2014	194	5%	150	4%	647	16%	3,115	76%	4,106
Oct-Dec 2014	179	6%	223	7%	349	11%	2,306	75%	3,057
Jan-Mar 27 2015	146	5%	108	4%	288	11%	2,156	80%	2,698
Total	1,417	5%	1,097	4%	4,659	17%	20,929	74%	28,102

Notes: "Enrolled in WI DHS Health Plans and Other Medicare" includes beneficiaries enrolled in Part A only, Part B only, and/or Part D only in addition to WI DHS Health Plans.
"Enrolled in WI DHS Health Benefit Plans Only" includes WI DHS health plan beneficiaries who were not enrolled in Medicare on the day they entered the PSW program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.

The enrollment count includes WI DHS health plan beneficiaries who received PSW MTM services between October 2012 (HCIA launch) and March 27, 2015. We used beneficiary-level WI DHS data received by Acumen on April 20, 2015 and linked these data to Acumen's in-house Medicare data to assess Medicare enrollment status.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

10.4 Implementation Effectiveness

This section summarizes updated findings on PSW's implementation effectiveness, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. PSW reported that it exceeded its projected cumulative goals for program participation, pharmacy accreditation, and pharmacist certification. This past year, the volume of L2 services delivered generally improved over time but remained below projections. Participating pharmacies indicated they deployed a number of strategies to boost L2 levels, including dovetailing L2 appointments with other health care activities, deploying a staffing model that provides dedicated time for pharmacists to deliver L2 services, and leveraging pharmacy technicians and other support staff, when feasible. PSW also began offering small incentives for pharmacies to provide a targeted number of L1 and L2 services. In November 2014, PSW initiated electronic alerts through the Aprexis system (known as pushes) to pharmacies to identify WI DHS beneficiaries who are eligible to receive L1 and L2 services. Table 10-3 summarizes findings from August 2014 through July 2015, unless otherwise noted.

Table 10-3: PSW Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through July 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• According to PSW, program participation (i.e., the number of individuals who receive the MTM intervention from a certified pharmacist) was 20.6 percent above initial projections from January to March 2015.[a] • As of May 2015, PSW reported that the innovation cumulatively certified 1,336 pharmacists and accredited 364 pharmacies, well exceeding Year 3 expectations for both measures.[b] o Program leaders reported, however, that the number of certified pharmacists dropped to approximately 800 after March 31, which was the annual deadline for certification renewal. This figure still exceeds program goals, and the reasons for this decrease are discussed in Section 10.6.

Research Questions	Findings from August 2014 through July 2015
What were key successes in implementing the innovation as designed and factors associated with success?	• All Regional Implementation Specialists (RISs) are pharmacists and have previous practical pharmacy experience. This increased their credibility among participating pharmacists and helped them troubleshoot implementation challenges. • PSW reports that peer-to-peer communication and promotion of the program by pharmacists has been successful. This past year, PSW noted pharmacists began proactively requesting to participate after hearing about the program from peers. • Dovetailing L2 appointments with other health care activities is one strategy for improving patient likelihood to accept the service. o Community pharmacists reported that they try to dovetail L2 services with medication pickups, and health system pharmacists indicated they attempt to schedule L2 visits immediately before or after a clinic visit or lab work. • Pharmacists and program leaders also reported that personalizing invitations to demonstrate care and understanding of the patient's health opportunities has been another way to improve patient acceptance rates for L2 services. • One pharmacy organization that serves a large WI DHS population in the Milwaukee area implemented home visits for L2 services. This strategy, though unique to this organization, led to high levels of L2 service uptake and extremely low rates of no-shows. • Focus groups conducted by program leaders and WI DHS revealed that WI DHS beneficiaries who had strong relationships with pharmacists were more likely to accept L2 services. • Developing strong relationships with providers has helped to build trust and increased the likelihood of acceptance of pharmacist recommendations. Pharmacists have established these relationships through one-on-one meetings with providers, academic detailing with practices, and participation in community health events with providers. • Some pharmacies have implemented staffing models that provide dedicated time for pharmacists to deliver L2 services. When feasible, pharmacies have also taken steps to more effectively use pharmacy technicians and other staff members to assist with enrolling patients and providing L1 and L2 services. Pharmacists and program leaders reported that these activities were associated with successful implementation of the program. • In November 2014, the Aprexis system began pushing or electronically sending information about eligible WI DHS patients to pharmacists following the approval of Aprexis as a health technology vendor by WI DHS. This push process was designed to increase provision of L2 services. o As of May 2015, the cumulative number of L2 services delivered was still below PSW's projection; however, there was an increase in delivered L2 services and nearly a tripling in the number of L2 services that were "in progress" in the preceding quarter. (The "in progress" category includes scenarios where the pharmacists are reaching out to individuals who are eligible for services, working to schedule an appointment, or awaiting a decision by a prescriber about recommendations from an L2 service that was delivered.) o Program leaders emphasized that the time needed to schedule L2 services may partially explain why increases in L2 services were not as high as expected immediately following the WI DHS pushes. • Program leaders reported that continuous marketing and re-marketing to potential stakeholders has been important for the ongoing success of the program as practice environments, colleagues, and strategic plans continuously evolve.

Research Questions	Findings from August 2014 through July 2015
What were the challenges in implementing the innovation as designed?	• Fitting L2 services into pharmacist workflow was an ongoing challenge of the WPQC program. According to program leaders and pharmacists, redesigned staffing models, better use of pharmacy technicians and support staff, and the implementation of WI DHS beneficiary pushes through the Aprexis system have helped with L2 service implementation. • Another common challenge for pharmacies was motivating the entire pharmacy staff to buy into the program, indicating that culture change is an important component of program implementation. o Pharmacists reported that they understood the value of the program, but other pharmacy staff members, particularly pharmacy technicians, were more reluctant but also needed to be fully committed to the program for it to function optimally. • PSW encountered an issue with the accuracy of the initial WI DHS pushes through the Aprexis system. o The Aprexis system sent the initial WI DHS pushes on November 10, 2014. Almost immediately, PSW received feedback from pharmacists that the pushes did not follow the correct logic. PSW worked with Aprexis to correct the issue, which was due to a glitch in the way the data were sent from WI DHS. Aprexis retracted the pushes, corrected the data file, re-ran the logic, and then resent the appropriate pushes on November 25, 2014. o Program leaders report that one lesson learned from this experience was the value of having pharmacists know in advance what to expect from pushes. This enabled the pharmacists to detect the discrepancies in the pushes they received. • Pharmacies experienced difficulties processing billing through the Aprexis system for services delivered to WI DHS patients. o In early February, Aprexis released a new claim functionality designed to address these billing issues and PSW provided additional training and RIS support. As a result, these difficulties were resolved. • Organizational factors in two of PSW's partner pharmacy chains, Walgreens and Shopko, impacted their ongoing involvement in the WPQC program. o Efforts to expand the innovation to all 220 Walgreens pharmacies were halted due to a merger between Walgreens and Alliance Boots, a United Kingdom-based retail pharmacy chain. As of May 2015, the WPQC program was implemented in only 36 Walgreens practice sites. o Beginning in fall 2015, Shopko experienced high-level leadership instability that resulted in ongoing corporate change. PSW program leaders are unsure if involvement in the WPQC program will continue to be a priority for the organization as a result.

Research Questions	Findings from August 2014 through July 2015
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• PSW added insurance partners UnitedHealthcare, Wisconsin Physician Services, and Gunderson Health to increase the number of program participants. As of May 2015, program leaders reported they were actively pursuing opportunities to add more payers to the program so that pharmacies are able to service more beneficiaries. PSW was planning to have discussions with Security Health Plan and WEA Trust about joining the WPQC program. • As noted above, the implementation of the electronic pushes for WI DHS beneficiaries was intended to increase the enrollment of WI DHS patients and the volume of services provided to them. • In October, PSW began offering small incentives for pharmacies to provide a targeted number of L1 and L2 services. Ten pharmacies are heavily engaged in the incentive process and have well exceeded their targets. • Program leaders continued to pursue opportunities to increase physician and health system referrals. o Pharmacists pursued individual efforts to form relationships with the providers in their areas, and PSW leaders made a presentation to Wisconsin health systems focusing on the WPQC program, participation, and referral opportunities • PSW finalized a policy for delivering Transition of Care L2 services. The Transition of Care L2 must be delivered in person, and the scope of the service is the same as an initial L2 service (with an additional focus on reconciliation of patient medications between the institutional setting and the community pharmacy), but does not include any follow-up visits. o According to the policy, any patient who is covered by a participating payer, regardless of whether the patient has one of PSW's targeted conditions, can receive a Transition of Care L2 service within 14 days of discharge from a hospital or long-term care facility. o While regular L2 services are limited to four per year, there is no limit on the number of times a pharmacist can provide the Transition of Care L2 service for beneficiaries of most payers. WI DHS patients are, however, limited to four Transition of Care L2 services each year, though there is an override process. • In spring 2015, PSW sent a re-engagement letter that was approved by the WPQC Steering Committee to WPQC-accredited pharmacies. The objective of this letter was to boost pharmacy performance with regard to the volume of services delivered to beneficiaries and billed to payers.

Research Questions	Findings from August 2014 through July 2015
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• PSW surveyed participating pharmacies about their staffing models and service hours and compared this information with performance data to determine optimal staffing models for the program. Findings suggested that the following staffing factors contributed to successful delivery of L2 services: o having more than one pharmacist available at any given time; o having two certified pharmacy technicians; and o having a staffing model dedicated to L2 services. • As a condition of ongoing accreditation, pharmacies undergo a semi-annual quality assurance survey evaluation, and the results are used to identify opportunities for improvement. This process is overseen by the Operations Managers. o The Operations Managers noted that pharmacies have consistently increased and maintained their scores over time. • The RISs use abbreviated versions of the Aprexis system-generated performance reports to monitor individual pharmacy performance with regard to acting on pushed opportunities and key program metrics related to L1 and L2 pushes. • In winter 2015, Aprexis, PSW, and the University of Wisconsin School of Pharmacy did a thorough quality assurance review of the program's data, which resulted in changes to some of the program's metrics.

[a] Source: Lewin Quarterly Awardee Dashboard Report, PSW (January-March 2015)
[b] Source: Lewin Quarterly Awardee Measurement Report, PSW (January-March 2015)

10.5 Workforce

This section updates findings on workforce issues related to the PSW intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. PSW offered additional training to prepare pharmacies for the WI DHS pushes through the Aprexis system and held two additional workgroups for participating pharmacists and pharmacy technicians focused on the provision of L2 services. PSW experienced some staff turnover this past year. Two part-time project assistants resigned in early January 2015, and one of the RISs left the program in spring 2015. As of May 2015, PSW reported that the WPQC board of directors decided to keep the core staff of the WPQC program intact at least through the end of September 2015 despite the HCIA grant ending on June 30, 2015. Table 10-4 summarizes updates from August 2014 through July 2015, unless otherwise noted.

Table 10-4: PSW Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through July 2015
What type and level of workforce training does the innovation provide?	• In fall 2015, PSW offered additional training on the Aprexis system and WI DHS's policies in advance of the WI DHS beneficiary pushes. o This included live trainings across the state, a Webinar series through PSW Web sites, and an in-person training at PSW headquarters. • The RISs indicated that they did not receive formal training for their role, but they were able to leverage their previous experience to perform the role successfully.

Research Questions	Findings from August 2014 through July 2015
What type of support structure is available for staff?	• PSW developed a Collaborative Practice Agreement Toolkit and Webinar as a resource for participating pharmacists to help them manage medications under physician-supervised protocols. • PSW provided additional workgroups for participating pharmacists and pharmacy technicians starting in December and March 2015 that focused on the provision of L2 services. o According to program leaders the workgroups resulted in an increase in the number of L2 services provided by participating pharmacists. • PSW held its annual WPQC pre-conference and conference in April 2015. The pre-conference focused on delivery of L2 follow-up services, ways to incorporate the WPQC program into pharmacy workflow, and development of partnerships with physicians. o According to program leaders, the conferences were positively received overall. Approximately 30 certified WPQC pharmacy team members attended the pre-conference, which aligned with PSW's expectations. Program leaders indicated that those who participated in the pre-conference were new attendees and were pleased that they were able to reach a new group that could benefit from training. • As of May 2015, program leaders, reported that they, in conjunction with the Steering Committee, were considering ways to simplify and centralize the support services that PSW provides to accredited pharmacies following the June 30, 2015 conclusion of grant funding. o RISs will no longer provide intense support through site visits, and PSW is looking to centralize its performance reports and streamline its semi-annual quality assurance survey evaluation process.
What type of support structure is effective for staff deployment?	• Participating pharmacists and pharmacy staff overwhelmingly emphasized the importance of the RIS's support (by phone, email, and site visits) in helping them implement the program. Additional effective support structures include: o the PSW "starter kit," which is given to new pharmacies to orient them to the program and includes suggestions for optimizing pharmacy workflow; o WPQC pre-conferences; o marketing materials; o clinical toolkits; o WPQC workgroups; and o the online tools and resources available through PSW's Web site. • Pharmacists interviewed during the site visit reported that participating in hands-on training with pharmacists experienced in delivering L1 and L2 services was a helpful support structure. • Pharmacists also reported that robust pharmacy staffing models that allow time dedicated to complete PSW's training and conduct services are necessary to successfully deliver the program.
How does the innovation affect staff satisfaction?	• PSW does not formally measure staff satisfaction. All pharmacists interviewed as part of the site visit expressed satisfaction with their roles in the innovation and felt that the program helps to maximize their skill set.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• PSW experienced some staff turnover this past year. Two part-time project assistants resigned in early January 2015, and one RIS left the program in spring 2015. PSW does not formally report participating pharmacist turnover. • PSW's board of directors decided to keep the core staff of the WPQC program intact at least through the end of September 2015. As a result, PSW did not experience significant additional staff turnover in anticipation of HCIA grant funding ending.

Research Questions	Findings from August 2014 through July 2015
What workforce changes were made by the innovation, and did these changes help improve patient outcomes and experience or reduce expenditures and health service use?	• PSW created a number of new positions within its staff to support the implementation of the innovation. Key roles include the RIS position, Clinical Manager, and Operations Manager. o RISs serve as an accountability factor for participants, providing individualized training as needed and identifying and solving problems within pharmacy workflows to efficiently deliver the WPQC program. The RISs conduct site visits to each pharmacy in their region about twice per year and communicate regularly with each pharmacy via email, phone, or in person to problem-solve and motivate each pharmacy. o The Clinical Manager is responsible for the WPQC Program clinical training, Aprexis system training, and payer program training. The Clinical Manager works with the Clinical Advisory Group to develop and maintain the toolkits and also evaluates data and how it impacts pharmacy practice, coordinates newsletter communication to the WPQC participants, and communicates directly with Aprexis on development, functionality, problem identification and resolution. o Two Operations Managers are responsible for the day-to-day operations of the WPQC program, which includes registration, accreditation, and certification; payer MTM plans and policy development; quality evaluation survey process; recruitment of pharmacies and staff; managing and delivering workgroups; development of performance reports; and meeting with payers and pharmacies to align expectations and deliverables. Both Operations Managers are also RISs.

10.6 Context

This section updates findings on context issues related to the PSW intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. Over the course of program, PSW has brought together many different organizations, stakeholders, and payers to support implementation of the program, including WI DHS, which has facilitated the program's statewide expansion. PSW's payers have made a commitment to reimburse for L1 and L2 services but are awaiting additional program evaluation data, particularly Return on Investment information, before committing financial support to fund PSW's infrastructure and resources. As of May 2015, PSW was exploring ways keep program components operational, including the Aprexis system, after the end of HCIA grant funding on June 30, 2015. Table 10-5 summarizes findings from August 2014 through July 2015, unless otherwise noted.

Table 10-5: PSW Context Research Questions and Findings

Research Questions	Findings from August 2014 through July 2015
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• PSW leveraged its position as a professional association to convene different organizations, stakeholders, and payers, and PSW leadership and believes this created synergies and collaboration across these organizations that would have been otherwise difficult to achieve. • WI DHS is the largest participating payer in the PSW program. Its authority to make decisions about pharmacy-related services for WI DHS beneficiaries across the state has been helpful for the expansion of PSW's program across Wisconsin. • Chain and health system pharmacies sometimes have more rigid staffing and workflow requirements that inhibit the ability to train staff and fully integrate the WPQC program when compared with independent pharmacies. • Differences across the rural and urban regions of Wisconsin regarding care models, patient populations, and transportation affect the approaches used to implement the program. • Some pharmacists have been successful in implementing collaborative practice agreements with physicians while others have not. Pharmacists interviewed during the site visit indicated that these agreements, which allow pharmacists to make adjustments to patients' medications without physician pre-approval, would make providing services more efficient. • As of May 2015, program leaders were unclear about the Aprexis system's future role in the innovation, which has significant implications for program operations following the conclusion of the HCIA grant on June 30, 2015. o PSW's private insurer partners pay for the Aprexis system for their beneficiaries. (Private insurers have contracts with Aprexis that extend beyond June 30.) However, the HCIA grant pays for the use of the Aprexis system for WI DHS beneficiaries. o Program leaders proposed a budget amendment to the Wisconsin Joint Finance Committee to request state funding to cover the use of the Aprexis system for WI DHS beneficiaries after the conclusion of the HCIA grant. o If PSW is unable to find funds to cover the utilization of the Aprexis system, participating pharmacies may need to either absorb the cost of the Aprexis system or stop using it. Program leaders believe this will significantly impact pharmacy participation because the Aprexis system creates numerous efficiencies, by providing a comprehensive platform for patient identification, documentation, billing, and performance reporting. If pharmacies have to revert back to a manual process for identifying eligible individuals and using separate systems for data tracking and billing, this might reduce efficiency, increase pharmacy workload, and create a disincentive for pharmacies to continue to participating in the WPQC program. • Program leaders reported that the substantial drop in the number of certified pharmacists that occurred after the March 31 renewal deadline was largely due to a strategic decision by Walgreens not to reimburse WPQC certification renewal fees for pharmacists in the Walgreens stores that are not currently active in the WPQC program. o When the innovation started, staff at all of Walgreens's 220 locations became WPQC-certified (in preparation for full expansion of the program across all sites). As previously discussed, plans to expand the innovation to all of these Walgreens locations were not fully executed due to the merger between Walgreens and Alliance Boots. As a result, the corporation decided not to pay for the certification renewal of pharmacists at stores not actively participating in the innovation.

Research Questions	Findings from August 2014 through July 2015
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• WPQC staff and participating pharmacists interviewed during the site visit indicate that program leadership has been organized, effective, and integral to the implementation of the program.

How can successful innovation components be scaled and replicated in other settings?	• Program leaders reported that the ongoing involvement of current payers and the addition of new payers are critical to the sustainability and scalability of the program since sufficient volume of L1 and L2 services is an important factor for determining the continued participation of pharmacies.
	• Program leaders viewed PSW's infrastructure and resources as integral to the expansion of the program and its sustainability; however, payers did not include funding for these aspects of the innovation in their 2015 budget projections.
	  o Participating payers are waiting to see if the program achieves significant Return on Investment (ROI) as service volumes increase. The plans budgeted for L1 and L2 service payments, but did not include funding for PSW's supports and infrastructure in their 2015 budget projections. The payers will consider support of the program in future budget periods if program evaluation findings are positive.
	  o Payers are also tracking how the program connects to improvements on CMS Star Ratings, PQRS measures, and/or HEDIS measures.
	• As of May 2015, PSW was actively participating in the roll out of the State Innovation Models (SIM) grant. The grant was in its preliminary phases, but PSW had representation on two of the six different taskforce groups responsible for executing the grant. Additionally, four PSW senior leaders were serving on advisory panels for several of the other supporting groups for the grant. Program leaders did not have a concrete sense of how the SIMS grant would contribute to the sustainability or scalability of the WPQC program but believed there was a possibility of incorporating the program into the state's overall innovation plan and test models.
	• Program leaders initially reported that expanding the WPQC program to its private payers' prescription drug plan beneficiaries was a possible sustainability strategy, but as of May 2015, this did not come to fruition because there was not sufficient volume of services to make expansion to additional patient populations justifiable.
	• As of May 2015, program leaders were considering establishing dues for WPQC participation for pharmacies and staff to support the infrastructure of the program.
	  o They indicated that the feasibility of this approach will largely be determined by the proposed fee structure that pharmacies would need to pay to use the Aprexis system for WI DHS patients. If pharmacies and staff are asked to pay dues in addition to paying for the Aprexis system, it may no longer make participation financially advantageous for pharmacies.

11 EVALUATION OF THE PHARM2PHARM HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the University of Hawaii at Hilo's "pharmacist-to-pharmacist" or "Pharm2Pharm" program reflecting new analytic results from August 2014 through August 2015 unless noted otherwise. Section 11.1 provides a high-level overview of the key qualitative and quantitative findings for Pharm2Pharm. Section 11.2 summarizes innovation components of the awardee. Section 11.3 provides the most recent information available on the evaluability of the Pharm2Pharm program. The remaining sections provide additional detail on the key findings described in Section 11.1. Section 11.4 summarizes findings relating to Pharm2Pharm's program effectiveness (for more comprehensive quantitative results, see Appendix F). Section 11.5 highlights findings related to the awardee's implementation effectiveness. Finally, Sections 11.6 and 11.7 highlight, respectively, updated findings on the evaluation categories of workforce and context.

11.1 Key Findings

Preliminary analyses show that the Pharm2Pharm intervention was not generally associated with statistically significant cumulative effects on mortality and inpatient readmissions among Medicare beneficiaries over the first four quarters after program enrollment. However, there was a statistically significant mortality decrease of about 40 deaths per 1,000 beneficiaries in the intervention group relative to controls in the first quarter after program enrollment. Consistent with the cumulative findings, the Pharm2Pharm intervention was not associated with statistically significant effects on inpatient readmissions in any of the four quarters after program enrollment for Medicare beneficiaries.

Preliminary analysis showed a statistically significant cumulative increase in inpatient admissions in the intervention group relative to the matched comparison group for Medicare beneficiaries, but there is no clear mechanism through which the program would be expected to increase inpatient admissions. Unobserved differences between intervention beneficiaries and the matched comparison group may have influenced these results. The intervention group consisted of beneficiaries who chose to engage in the Pharm2Pharm program, and randomized comparison groups were unavailable for these beneficiaries. A comparison group was thus matched to the intervention group using demographic and health status variables observed in claims data. Beneficiaries who chose to engage with the Pharm2Pharm intervention may have been particularly different from the comparison groups on behavioral or other health-related factors that are not observable in claims or other data sources. The intervention and comparison groups are well-matched on observable characteristics, and Acumen will continue to refine the matching model in future reports.

The preliminary analysis results of Pharm2Pharm's impact on medication adherence were inconclusive. Statistically significant effects on medication adherence measures for Pharm2Pharm participants were not detected relative to controls. However, Medicare beneficiaries eligible for measures of adherence for each of the selected therapeutic classes represented only 39 to 146 program participants for a given class, which may have contributed to insufficient power to detect effects. Acumen will include additional program participants in our analysis as more data become available to increase statistical power, and continue to refine our comparison matching criteria to eliminate any additional baseline differences or differential trends between intervention and control groups.

The preliminary analysis is also subject to the following limitations. Because the number of Medicare beneficiaries in the Pharm2Pharm intervention group was not adequate to analyze Medicare FFS and MA beneficiaries separately, the two cohorts were combined, and only a limited set of outcomes that were available for both MA and FFS beneficiaries were assessed. Thus the preliminary analysis does not account for potential effects of the program on resource use outcomes in non-inpatient settings, such as outpatient ER visits, or expenditures. Acumen will include additional Medicare beneficiaries and assess potential program effects on appropriate outcomes as additional data become available in future reports.

With respect to implementation, Pharm2Pharm has steadily increased enrollment over the past year, reaching levels close to projected targets after expanding the intervention to additional locations, including the more urban Honolulu County. One key change in referral practice over the past year is that Pharm2Pharm has begun accepting direct physician referrals, though the number of referrals is below expectations. Program leaders believe that this may be attributed to physician workflow issues and competing activities related to quality measures, new payment initiatives, and changes in the health care delivery climate. Program leaders continue to leverage ways to communicate with and engage physicians without overburdening them.

Community consulting pharmacists have faced some implementation challenges balancing their Pharm2Pharm responsibilities and medication dispensing activities. During site visits, some community consulting pharmacists reported challenges conducting and documenting Pharm2Pharm services while also performing their traditional dispensing roles. An additional challenge is that in the past year, Pharm2Pharm implemented minimum standards that community pharmacies must meet before receiving payment from the program. Some community consulting pharmacists reported difficulty in obtaining information technology assistance and adequate explanation regarding the performance standards and payments associated with them. Recently, one pharmacy chain chose to end its participation in the Pharm2Pharm program because involvement in the Pharm2Pharm program did not align with the pharmacy chain's ongoing business operations. Program leaders reported that successful

implementation of the program in the community pharmacy settings requires developing staffing models that allow pharmacists to provide clinical services in addition to dispensing services. Some pharmacies have adapted and made necessary workflow changes, but others have struggled to fit the model into their ongoing business operations.

Pharm2Pharm has made some notable process improvements over the past year. Hospital consulting pharmacists now send all care transition documents to community consulting pharmacists via secure email. This process replaces the previous approach of sending the documents via fax, and it was enabled through the execution of data sharing agreements between the Hawaii Health Information Exchange (HHIE) and community pharmacies. Pharm2Pharm also launched a registry tool through HHIE that helps pharmacists avoid duplicative data entry, allows pharmacists to track patients over time, and assists with the handoff between hospital consulting pharmacists and community consulting pharmacists. According to program leaders, pharmacists report that the tool has improved their workflow and saved time. Pharmacists must still manually add patient information in networks that are not a part of HHIE (including Kaiser Permanente [Kaiser] and the Veterans Administration); however, Kaiser and Pharm2Pharm are in discussions about improving pharmacist access to Kaiser's electronic health record and electronic pharmacy fill history, which should help to address documentation challenges among Kaiser beneficiaries. Additionally, Pharm2Pharm implemented an "early graduation" process for patients who were determined to be progressing extremely well prior to the one-year mark after program enrollment, which has helped to make efficient use of Pharm2Pharm resources.

Pharm2Pharm's workforce reported positive experiences delivering the intervention. In interviews conducted during the site visit, pharmacists generally reported being satisfied with the program, indicating that the program fully utilizes their skill sets, compared to the traditional dispensing role. Interviews also revealed that, overall, physicians have responded positively to the program and that Pharm2Pharm is providing a unique set of services to its participants.

Pharm2Pharm has engaged in several discussions and partnerships in an effort to sustain the program. These include securing reimbursement for pharmacy services, adapting program services and processes based on the needs of payer populations, and systematically developing a sustainable pharmacist workforce. Pharm2Pharm is launching a pilot program to assess the feasibility of implementing beneficiary out-of-pocket fees for Pharm2Pharm services. Pharm2Pharm has also aligned pilots with the pay-for-quality program implemented by BlueCross BlueShield of Hawaii, also known as Hawaii Medical Service Association (HMSA), to implement an adaptation of the Pharm2Pharm program to help increase revenue for physicians. Pharm2Pharm has additionally created a care transition student rotation pilot for fourth year pharmacy students that will help to prepare these students for working in the Pharm2Pharm model.

As of July 1, 2015, Pharm2Pharm transitioned into a one-year, no-cost extension of its HCIA award with CMS. During the no-cost extension year, Pharm2Pharm will continue to provide services to patients (through December 2015) and focus on its sustainability partnerships and pilot efforts described above, as well as on program evaluation.

11.2 Innovation Components

The Pharm2Pharm program is a formal hospital pharmacist to community pharmacist care coordination model designed to address medication management risks that occur during transitions of care. Medication management and care coordination services are provided by hospital consulting pharmacist (HCPs) and community consulting pharmacists (CCPs). HCPs identify eligible patients during hospitalization and perform in-depth medication reconciliation for program participants prior to hospital discharge. Immediately after patient discharge, HCPs follow up with patients to check on their medication status and arrange a visit with one of the program's CCPs. Once this communication occurs, HCPs provide a formal handoff to the CCP by transmitting care transition documents either by fax or secure electronic messaging. Post-handoff, the CCP has an initial face-to-face visit with the patient. The CCP then has an average of twelve follow-up visits (typically conducted by telephone or in-person) over the course of the subsequent year with more frequent visits occurring immediately after hospital discharge. These visits focus on the patient's health status; recent acute care visits; progress toward personal health goals; medication reconciliation, appropriateness, effectiveness, safety, and adherence; and patient education. CCPs contact prescribers on a quarterly basis to provide patient updates and as needed to make recommendations to optimize medications. Community physicians and hospital care providers may also refer patients to Pharm2Pharm. Beginning in September 2014, Pharm2Pharm implemented an early graduation process for patients who were determined to be progressing extremely well prior to the one-year mark after program enrollment.

According to program leaders and staff, Pharm2Pharm is viewed as a fundamental change in care in rural settings, such as Maui and Kauai, since hospitals are required to include pharmacists in its inpatient care teams to conduct medication management services. In contrast, the program is seen as consistent with existing practices in urban parts of Oahu, where one hospital already has a program focused on medication management.

11.3 Evaluability

This section provides the latest information on the primary factors affecting the evaluability of Pharm2Pharm. Table 11-1 describes the intervention and comparison group data availability and program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch.

Table 11-1: Pharm2Pharm Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Intervention Group Data Availability	• For this report, Pharm2Pharm was able to provide intervention data on 1,634 individuals enrolled in the program through November 2014.[a] • Acumen linked intervention group beneficiaries in the program data to their Medicare records for the payer mix figures reported in Table 11-2.
Comparison Group Data Availability	• Pharm2Pharm does not identify a comparison group. • Acumen constructed a comparison group of Medicare beneficiaries drawn from CMS administrative files who match Pharm2Pharm intervention group beneficiaries on important demographic and health characteristics.
Program Maturity	• The core components of the awardee innovation have undergone a few changes since the launch of the HCIA project. Program leaders have changed processes for patient identification and enrollment and modified program components and workflow since the program was implemented in February 2013.

[a] The evaluation team did not receive complete intervention data through November 30, 2014 on three intervention beneficiaries in time from HHIC and thus excluded these three beneficiaries from the payer mix and descriptive statistics presented in this report

Table 11-2 provides the enrollment and payer mix figures for Pharm2Pharm's intervention group beneficiaries through November 30, 2014. Pharm2Pharm's data partner, Hawaii Health Information Corporation (HHIC), provided data on a total of 1,634 individuals participating in the Pharm2Pharm program through November 30, 2014. However, as Table 11-2 shows, only 957 of these individuals were enrolled in Medicare Parts A and B or Medicare Advantage as well as Medicare Part D, and only these individuals were eligible for inclusion in this report.

Table 11-2: Payer Mix of Partial Pharm2Pharm Program Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A, B, and D		Medicare Advantage and Part D		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jan-Mar 2013	*	*	*	*	*	*	*	*	13
Apr-Jun 2013	29	23%	43	35%	23	19%	29	23%	124
Jul-Sep 2013	51	23%	84	38%	40	18%	48	22%	223
Oct-Dec 2013	73	22%	125	37%	65	19%	71	21%	334
Jan-Mar 2014	75	24%	105	34%	61	20%	68	22%	309
Apr-Jun 2014	52	24%	68	32%	36	17%	57	27%	213
Jul-Sep 2014	61	25%	81	33%	42	17%	59	24%	243
Oct-Nov 30 2014	47	27%	56	32%	30	17%	42	24%	175
Total	391	24%	566	35%	298	18%	379	23%	1,634

Notes: The enrollment counts include individuals who were determined to be eligible for the Pharm2Pharm program by a hospital consulting pharmacist (HCP), consented to participate, and had their care transition documents sent to the community consulting pharmacist (CCP) on or before November 30, 2014, regardless of whether or not they attended their first visit with the CCP.
"Other Medicare Enrolled" may include dual-eligible beneficiaries and beneficiaries enrolled in Medicare Part A only, Part B only, and/or Part D only.

"Medicare Parts A, B, and D" and "Medicare Advantage and Part D" may include dual-eligible beneficiaries. "Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they entered the Pharm2Pharm program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

11.4 Program Effectiveness

This section provides the findings on the impact of the Pharm2Pharm MM intervention on care quality, mortality, inpatient readmissions, health service utilization, and medication adherence for Medicare beneficiaries. Acumen analyzed outcomes for Pharm2Pharm beneficiaries who entered the Pharm2Pharm program on or before September 30, 2014, using Medicare claims data through December 2014. The analysis was restricted to individuals who had sufficient personal identifiers to be linked to their Medicare records and who were also continuously enrolled in Medicare Parts A, B, and D ("Medicare FFS") or Medicare Advantage and Part D ("MA") for at least one year prior to their enrollment in the Pharm2Pharm program through the quarter of interest after enrollment. The cohort was further restricted to beneficiaries who had at least one hospital admission in the year prior to their Pharm2Pharm program enrollment and who met the targeting criteria set by the Pharm2Pharm program.[10] After applying these restrictions and combining the Medicare FFS and MA intervention cohorts to create a sufficient sample size, there were a total of 577 beneficiaries available for analysis ("combined intervention cohort"). Applying the same restrictions, Acumen matched comparison groups to these beneficiaries using a propensity score matching model described in Section 1.2.2. Matching was performed separately for the Medicare FFS and MA intervention cohorts. Appendix F.1 includes the demographic and baseline health characteristics for the intervention and matched comparison groups for both the Medicare FFS and MA cohorts Acumen will continue to refine our matching criteria to eliminate any additional baseline differences or differential trends between the intervention and control groups.

The remainder of this section highlights our key quantitative findings for Pharm2Pharm. Sections 11.4.1, 11.4.2, and 11.4.3 highlight notable results for mortality and inpatient readmissions, resource use, and medication adherence respectively. Since expenditure and non-inpatient resource use data were not available for the MA beneficiaries, this report does not include an analysis on medical expenditures and non-inpatient resource use outcomes for the combined intervention group. Each of the following sections presents cumulative findings for the entire study period on key outcomes in tables, followed by findings for each individual

[10] Based on Pharm2Pharm targeting criteria, additional restrictions to the analytic cohort include at least one inpatient stay 365 days before program enrollment and any one of the following conditions: (i) have 15 or more different drug prescriptions; (ii) have 10 or more different drug prescriptions and at least one high-risk (i.e., narrow therapeutic index) drug prescription; or (iii) have two or more different drug prescriptions and a chronic condition.

intervention quarter in graphs. The focus is on examining differences between intervention and comparison groups, before and after the intervention. Thus, the included figures display single difference or difference-in-difference (DiD) estimates. Statistically significant results for key outcomes are noted in the narrative for the intervention group relative to controls. Complete results of our analyses are provided in Appendix F, which also includes tables and figures tracking the meta-evaluation measures required by CMS for both intervention and comparison groups beginning four quarters prior to the intervention and continuing through December 2014. A detailed description of the analytic method is provided in Section 1.2.2, and definitions of outcome measures are included in Appendix A.

11.4.1 Mortality and Inpatient Readmissions

As shown in Table 11-3, cumulative effects on mortality and inpatient readmissions across the four quarters after program enrollment were not statistically significant for the combined Pharm2Pharm intervention cohort. These findings should be interpreted with caution, given the relative small number of beneficiaries available for inclusion in the evaluation; the lack of significant findings may be due to insufficient statistical power.

Table 11-3: Cumulative Difference Estimate of Mortality and Readmissions from Program Launch through 2014

Measure	Number of Beneficiaries	Cumulative Difference Estimate	95% Confidence Interval	p-value
All-Cause Mortality	577	-3.25	(-26.3 | 19.8)	0.782
30-Day Hospital Readmissions	251	-6.32	(-30.4 | 17.8)	0.608

* Statistically significant at the five percent level.

However, in the analysis of quarterly fixed effects, the Pharm2Pharm intervention was associated with a statistically significant decrease in mortality in the first quarter after program enrollment. As Figure 11-1 shows, a statistically significant decrease in mortality of about 40 deaths per 1,000 beneficiaries per quarter was observed in Q1 for the combined intervention cohort compared to controls, but this was inconsistent with non-significant increases in mortality in later quarters. Consistent with the cumulative findings, the quarterly association between the Pharm2Pharm intervention and inpatient readmissions was not statistically significant in any of the four quarters after program enrollment (Figure 11-2).

Figure 11-1: Pharm2Pharm Quarterly Difference in Mortality after Program Enrollment

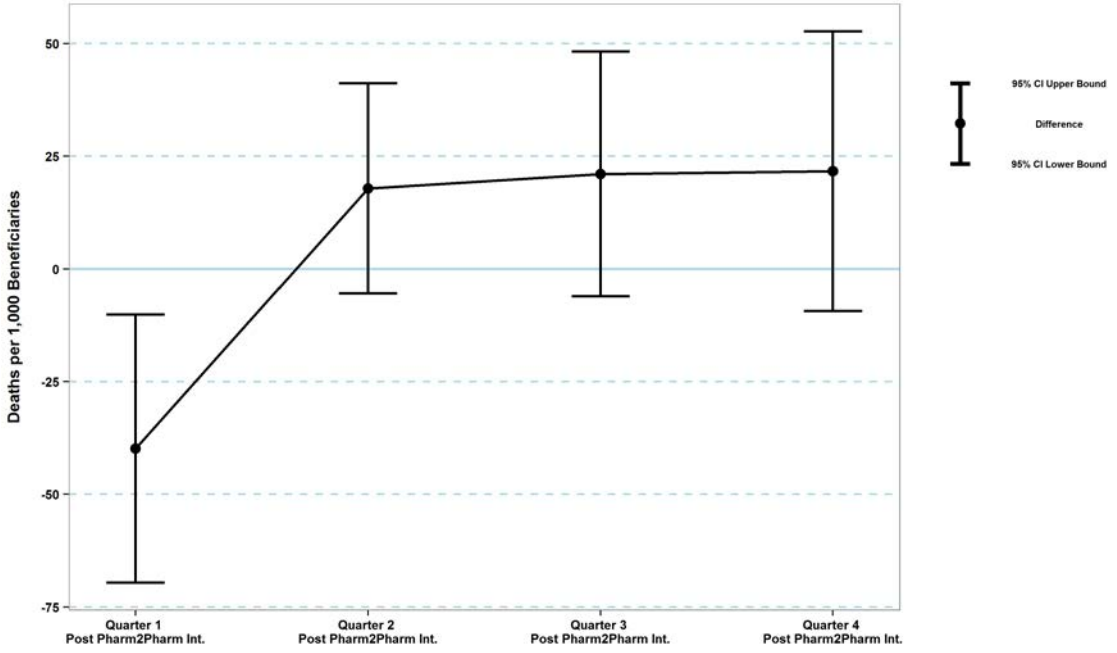
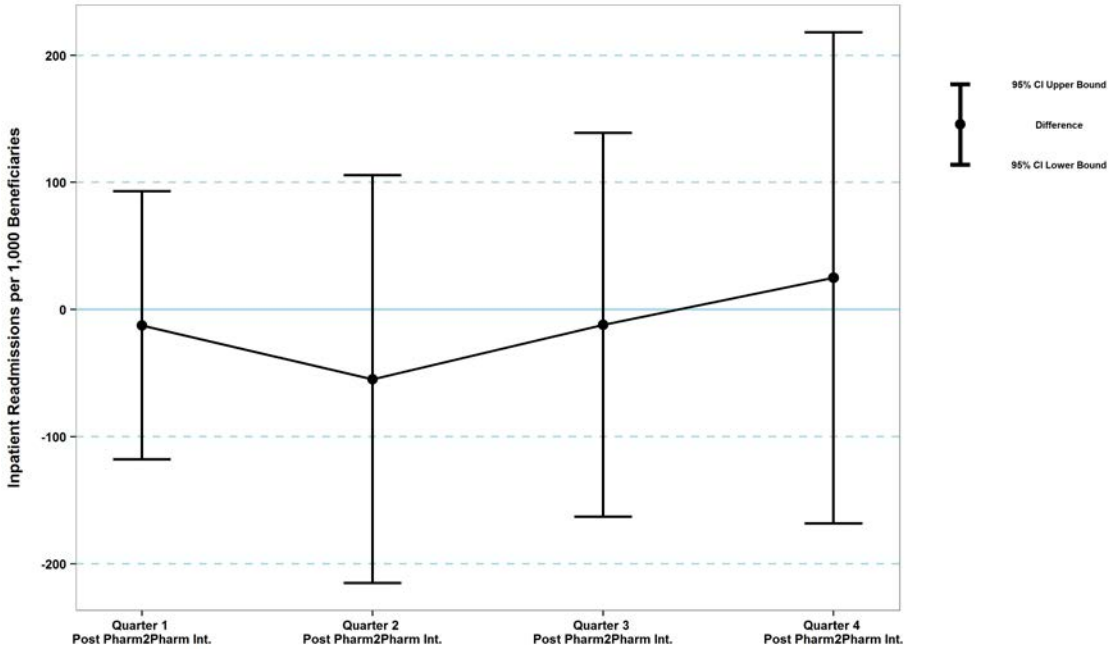


Figure 11-2: Pharm2Pharm Quarterly Difference in Readmissions after Program Enrollment



11.4.2 Health Service Resource Use

Cumulatively across the four quarters after program enrollment, the Pharm2Pharm intervention was associated with a statistically significant increase in inpatient admissions for the combined Medicare intervention cohort. As shown in Table 11-4, among the 577 beneficiaries who received the Pharm2Pharm intervention for at least one quarter during the study period,

there was a statistically significant increase of about 127 inpatient admissions cumulatively over four quarters, for the intervention group relative to the comparison group. The association between the Pharm2Pharm intervention and unplanned inpatient admissions or hospital days was not statistically significant cumulatively across the four quarters after program enrollment. ER and other non-inpatient resource use data were not available for analysis for the combined intervention cohort.

Table 11-4: Cumulative Difference Estimate of Health Service Resource Use from Program Launch through 2014

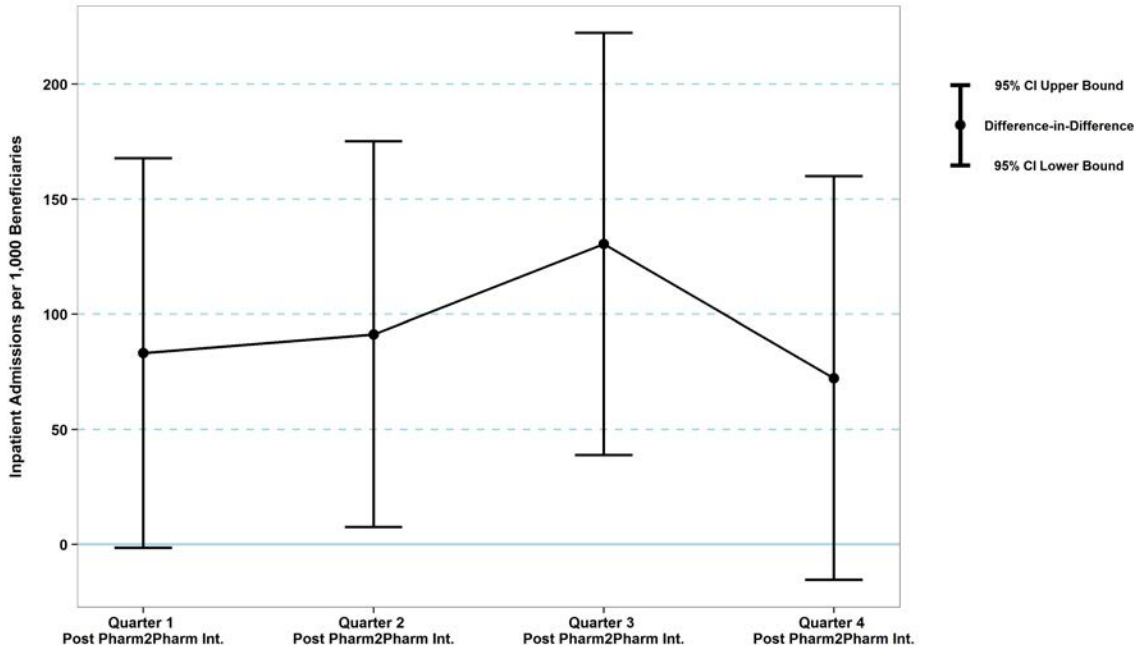
Measure	Number of Beneficiaries	Cumulative Difference Estimate	Confidence Interval	p-value
Inpatient Admissions	577	127.07*	(49.4 | 204.8)	0.001
Unplanned Inpatient Admissions	577	74.63	(-1.2 | 150.5)	0.054
Hospital Days	577	639.97	(-96.1 | 1,376.0)	0.088

* Statistically significant at the five percent level.

In the analysis of quarterly fixed effects, the Pharm2Pharm intervention was associated with a statistically significant increase in inpatient admissions in the second and third quarters after program enrollment. As Figure 11-3 shows, a statistically significant increase of around 91 inpatient admissions per 1,000 beneficiaries was observed in Q2 and a statistically significant increase of around 131 inpatient admissions per 1,000 beneficiaries was observed in Q3 for the combined intervention cohort relative to controls. Other quarters also showed increases in inpatient admissions, although they were not statistically significant.

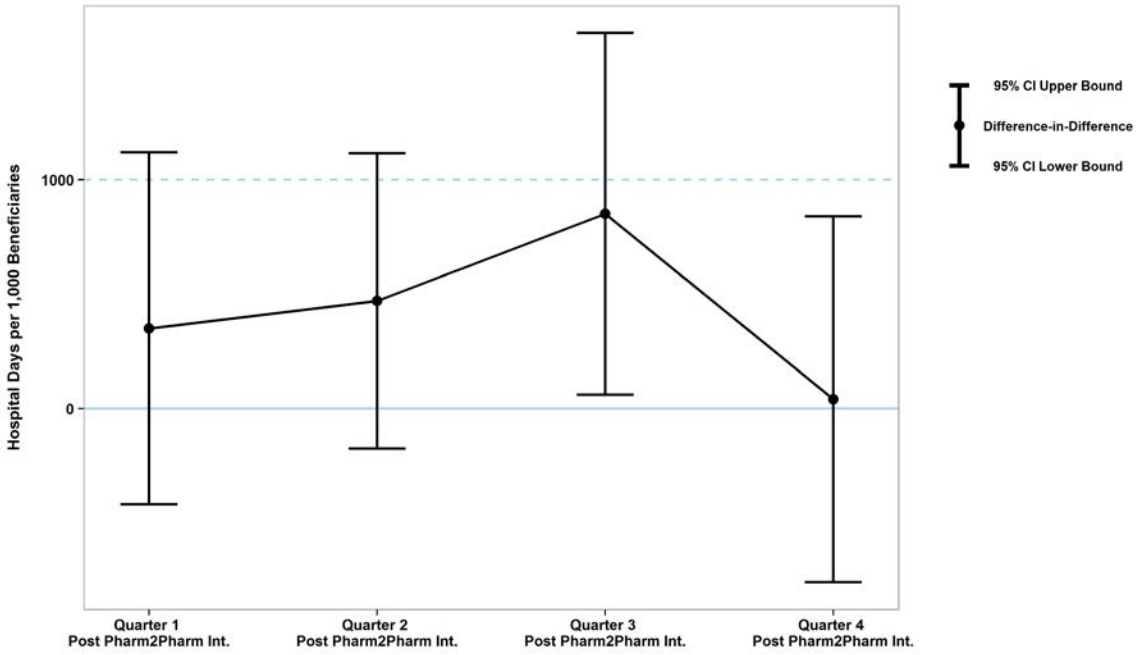
As discussed in Section 11.1, there is no clear mechanism through which the program would be expected to increase inpatient admissions, and these results may have been influenced by unobserved differences between the non-randomized intervention and matched comparison groups. Beneficiaries who chose to engage with the Pharm2Pharm intervention are likely to be particularly different from their matched comparison groups on behavioral or other health-related factors that influenced outcomes. The comparison group matching model may have not captured all predictive characteristics and trends differing between the comparator groups, and this may have influenced outcomes. Acumen will further refine the comparison group matching model for future reports.

Figure 11-3: Pharm2Pharm Quarterly Difference-in-Difference Estimate of Inpatient Admission Rate



The Pharm2Pharm intervention was associated with a statistically significant increase in hospital days in the third quarter after enrollment in the analysis of quarterly fixed effects; however, increases observed in the other quarters were not significant. As Figure 11-4 shows, there was a statistically significant increase of 851 hospital days per 1,000 beneficiaries in Q3 and non-significant increases in the other quarters for the combined intervention cohort relative to controls.

Figure 11-4: Pharm2Pharm Quarterly Difference-in-Difference Estimate of Number of Hospital Days

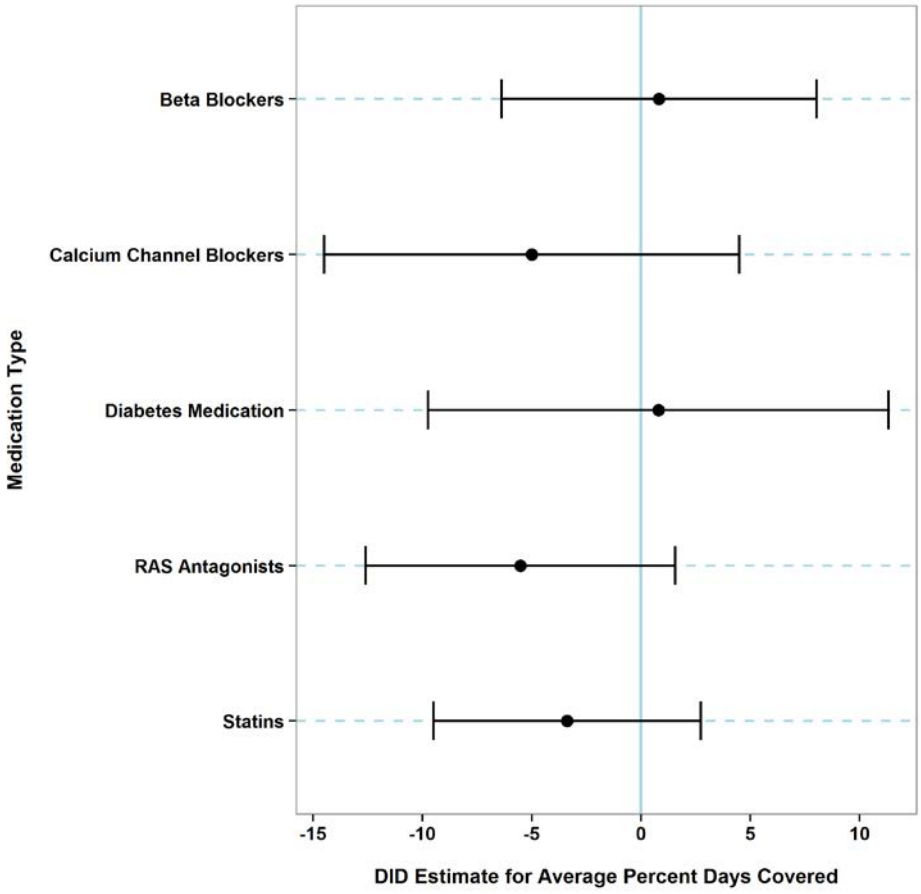


There is no clear mechanism through which the Pharm2Pharm intervention would be expected to increase use of health resources, and consequently the above results should be interpreted with caution. The treatment and comparison populations are well-matched on observable characteristics, and Acumen plans to continue to refine matching models as additional data become available in future iterations of the analysis to limit the chance that results are due to differences in observables across the two populations. However, Acumen cannot eliminate the possibility that the significant result may be due to differences in unobservable characteristics between treatment and control beneficiaries.

11.4.3 Medication Adherence

The Pharm2Pharm intervention was not associated with statistically significant changes in medication adherence for any of the five selected therapeutic drug classes in the year following program enrollment for the combined intervention cohort. As shown in Figure 11-5, insignificant changes in medication adherence varied by therapeutic drug class in both magnitude and direction. However, because the population was restricted to beneficiaries who had two prescriptions for drugs within the therapeutic class during the one-year baseline period and another two during the first year of the intervention, individuals eligible for measures of medication adherence for each of the therapeutic classes represent a small sample of between 39 and 146 program participants for a given therapeutic class. This may have contributed to insufficient power to detect effects at the five percent significance level.

Figure 11-5: Pharm2Pharm DiD Estimate of Average Percent Days Covered by Therapeutic Drug Class (Percentage Points)



11.5 Implementation Effectiveness

This section summarizes updated findings on Pharm2Pharm's implementation effectiveness, based on qualitative information obtained from interviews with program leaders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. Pharm2Pharm made substantial progress with its enrollment levels over the past year, which is attributable to improved recruitment approaches and the addition of participating hospitals. Pharm2Pharm implemented minimum standards that community pharmacies must achieve before receiving payment from the program, explored strategies for increasing physician referrals of eligible patients to the program, and also undertook numerous actions to improve communication between pharmacists and prescribers. Though community pharmacies are generally engaged in the program, some pharmacies have struggled with balancing medication dispensing roles and Pharm2Pharm responsibilities. One pharmacy chain discontinued accepting new patients and ended participation in the intervention after June 2015.

Table 11-5 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 11-5: Pharm2Pharm Implementation Effectiveness Research Questions and Findings

Research Questions	New Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• Over the past year, Pharm2Pharm substantially increased enrollment. According to program data provided to Acumen by the awardee, Pharm2Pharm enrolled 2,483 individuals in the program through April 30, 2015.[a] o Beneficiaries are considered enrolled in the program if they were determined to be eligible for the Pharm2Pharm program by an HCP, if they agreed to participate, and if they had their care transition documents sent to the CCP, regardless of whether or not they attended their first visit with the CCP.[b] • Interviews conducted during the site visit in November 2014 indicated that lower than expected enrollment in the early phases of the project was possibly due to an overestimation of the available population of eligible patients rather than a failure to recruit them. Most HCPs reported enrolling approximately 80 percent of eligible patients, and this figure has improved over time as the HCPs have refined recruiting approaches. • Based on information provided in May 2015, Pharm2Pharm plans to provide services to patients through December 2015.
What were key successes in implementing the innovation as designed and factors associated with success?	• HCPs interviewed during the site visit attributed improved program recruitment to approaches that demonstrate the value of the program to patients before enrollment is proposed. For example, several pharmacists reported that an initial review and discussion of patients' medication was helpful in introducing the program. • HCPs now send all care transition documents to CCPs via secure email. • To ensure program fidelity and standardization, Pharm2Pharm implemented minimum standards that must be met before it will pay community pharmacies. CCPs must complete patient visits at least once every two months, reconcile medications within 30 days post-discharge for at least 80 percent of new patients, and contact primary care providers at least quarterly for 80 percent of patients. Additionally, at least 50 percent of new patients must have their first visit within three days of discharge. • Kaiser and Pharm2Pharm are in discussions about improving pharmacist access to Kaiser's electronic health record and electronic pharmacy fill history, which should help address information exchange and documentation challenges related to patient information for Kaiser beneficiaries that is unavailable in the fill history system used to support Pharm2Pharm.

Research Questions	New Findings from August 2014 through August 2015
What were the challenges in implementing the innovation as designed?	• During the site visit, some CCPs and community pharmacy owners reported difficulty implementing the minimum performance standards. o Some perceived that the minimum standards required for payment are set too high or are not always a function of their performance. For example, some patients fail to attend their initial appointments with CCPs. o Low volume community pharmacies especially struggle with minimum standards because one or two missed patient appointments may result in a failure to meet percentage-based standards. o Some community pharmacists reported difficulty in obtaining information technology assistance and adequate explanation regarding the performance standards. • Program leaders reported that success of Pharm2Pharm in pharmacies requires thinking through staffing models that allow pharmacists to conduct clinical services in addition to dispensing services. This finding was supported by observations from the site visit in November 2014, which found that pharmacists with work days dedicated to Pharm2Pharm activities appeared better able to manage the workload. o One pharmacy chain discontinued accepting new patients and ended participation with the Pharm2Pharm program beyond June 2015 because involvement in Pharm2Pharm did not align with the pharmacy chain's ongoing business operations. o A larger pharmacy chain already participating in Pharm2Pharm was able to quickly increase capacity to handle the patient volume from this pharmacy chain. • The time limitations of the program for enrolling and handing off patients have resulted in some eligible patients, especially those with very short hospital stays, being missed. As a result, HCPs suggested the need for more flexibility in enrollment windows. o While Pharm2Pharm tried to make the enrollment windows more flexible, program leaders and HCPs were not able to reach consensus about or formalize a set of criteria to implement. As a result, the standardized three-day post-discharge handoff is still in use. • Pharm2Pharm began accepting physician referrals, but has not received as many referrals as expected. o Pharm2Pharm targeted physicians who had high volumes of Pharm2Pharm patients to promote and discuss the added value of referrals. Pharm2Pharm also developed a referral guide and mailed it to physicians. o Feedback from physicians indicates they are challenged by workflow issues related to quality measures, new payment initiatives, and changes in the healthcare delivery climate. o Pharm2Pharm is attempting to implement strategies to minimize the physician workflow burden related to the referral process.

Research Questions	New Findings from August 2014 through August 2015
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• This past year, Pharm2Pharm focused on actions to improve communication between pharmacists and prescribers in an effort to promote better care coordination for Pharm2Pharm participants and increase physician referrals to the program. Program leaders: o developed and piloted communication tools for high volume prescribers; o engaged several local leaders who represent different regions to help identify optimal communication strategies; o held a weekend meeting with prescribers to discuss ideal communication methods; o conducted continuing medical education (CME) events to engage physicians; o and held monthly workgroups of high-volume community pharmacists to discuss methods of increasing both physician and patient engagement. • The addition of participating hospitals (Pali Momi Medical The addition of participating hospitals (Pali Momi Medical Center and Castle Medical Center, both located on Oahu, in June 2014 and North Hawaii Community Hospital, located on Hawaii Island, in early November 2014) increased Pharm2Pharm's enrollment over the past year.
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Program leaders identified top performing pharmacists and compared patient outcomes based on program data on patient retention, frequency of physician contact, and patient visits with CCPs within three days after discharge. This information was used to identify the minimum performance standards for CCPs described earlier in this section. • Program leaders leveraged quarterly learning collaboratives to collect qualitative information from HCPs and CCPs regarding program effectiveness, successful engagement strategies, and skills to inform ongoing implementation of the program. • Pharm2Pharm analyses indicated that medication non-adherence due to patient choice has been the largest contributor to potentially preventable medication-related readmissions among Pharm2Pharm patients. These findings supported the need for motivational interviewing techniques, which were piloted to HCPs and CCPs, to change health-related behavior. Pharm2Pharm is also exploring ways to leverage advice from physicians to change patient behavior. • Pharm2Pharm has found that "indication problems" make up the largest percentage of the over 4,500 drug therapy problems identified by Pharm2Pharm pharmacists. Approximately one-third of these indication problems relate to a medication no longer being indicated for a patient, and the other two-thirds relate to a patient having an untreated indication.

[a]Source: Email from the awardee's data partner, HHIC, June 9, 2015.
[b]Source: Email from the awardee's data partner, HHIC, April 30, 2015.

11.6 Workforce

This section updates findings on workforce issues related to the Pharm2Pharm intervention, based on qualitative information obtained from interviews with program leaders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. Pharm2Pharm's staff turnover this past year was minimal, with only one HCP leaving the program. Pharm2Pharm provided a pilot group of HCPs and CCPs with additional training in motivational interviewing and, based on information provided in May 2015, had plans to develop a state-wide care transition student rotation pilot for fourth-year pharmacy students in an effort to create a sustainable workforce for Pharm2Pharm. During interviews conducted

during the site visit, HCPs and CCPs generally reported being satisfied with the program, indicating that the innovation fully utilizes their skill sets, compared to the traditional dispensing role. Table 11-6 summarizes updates from August 2014 through August 2015, unless otherwise noted.

Table 11-6: Pharm2Pharm Workforce Research Questions and Findings

Research Questions	New Findings from August 2014 through August 2015

What type and level of workforce training does the innovation provide?	• HCPs and CCPs reported during site visit interviews that training has improved over the course of the project.
	  o Case studies or vignettes were viewed as particularly valuable as they provided an opportunity to discuss different approaches to patient problems in a group setting.
	• A pilot group of HCPs and CCPs received a five-hour training on motivational interviewing in winter 2015.
	  o Program leaders indicated that feedback was positive from the HCPs and CCPs who received the motivational interviewing training. Program leaders felt strongly that it is critical for pharmacists to receive this training to help support patients with behavior change.
	• In May 2015, program leaders reported that Pharm2Pharm would implement a state-wide care transition student rotation pilot for fourth-year pharmacy students as part of its one-year no-cost extension.
	  o Program leaders believe the pilot will contribute to the sustainability of Pharm2Pharm's hospital component and will help to develop a pharmacy workforce prepared to deliver Pharm2Pharm services. As of May 2015, Pharm2Pharm was actively recruiting hospitals to participate in the pilot.

What type of support structure is available for staff?	• Pharmacists with longer tenure in the Pharm2Pharm program noted that the tools available for implementing the program in both the hospital and community pharmacy settings (tracking spreadsheets, enrollment scripts, and standard operating procedures [SOPs]) have improved over time.

What type of support structure is effective for staff deployment?	• HCPs and CCPs have had very favorable views of the Quarterly Learning Collaboratives, indicating that these have been a helpful ongoing support structure; during the site visit, several pharmacists made special mention of the learning collaborative that included information about motivational interviewing.
	• HCPs and CCPs reported that the SOPs have been a useful tool for implementing the innovation. .
	• Many pharmacists interviewed during the site visit felt that additional support staff were needed to reduce the burden of documentation and to free up time for a larger patient load.
	  o Pharmacy technicians were repeatedly cited as preferred support staff for documentation.
	  o Pharmacy students were also identified as potentially helpful, but their rotations and limited availability make students a less viable option for consistent documentation support.

Research Questions	New Findings from August 2014 through August 2015
How does the innovation affect staff satisfaction?	• During interviews conducted as part of the site visit, most pharmacists reported that they were satisfied with their Pharm2Pharm work. o Pharmacists found the level and content of interactions with patients to be meaningful for patient outcomes. o Pharmacists enjoyed building long-term relationships with patients and following their progress. • Pharmacists believe that the innovation fully utilizes their skill sets, compared to the traditional dispensing role.
Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Pharm2Pharm had minimal staff turnover this past year, with only one HCP leaving the program. o An HCP at Pali Momi accepted a job offer at another hospital in the Hawaii Pacific Health network, and an HCP at Hilo moved into the open Pali Momi position.
Did workforce changes made by the innovation improve patient outcomes and experience, or reduce expenditures and health service use?	• HCPs interviewed during the site visit reported that they are correcting a large number of errors on patient medication lists that may otherwise have gone unnoticed. They also reported catching several potentially dangerous drug interactions. • A primary care physician with patients enrolled in Pharm2Pharm reported that the program has enhanced outcomes for patients and provides a needed service for very busy primary care providers.

11.7 Context

This section updates findings on context issues related to the Pharm2Pharm intervention, based on qualitative information obtained from interviews with program leaders and awardee progress reports provided by the Lewin Group, and a site visit conducted in November 2014. Pharm2Pharm successfully expanded the program into urban locations in Hawaii and has worked with its partner, HHIE, to develop technological enhancements to improve pharmacist workflow and exchange of information. Feedback from the site visit revealed that, overall, physicians have responded positively to the program and that Pharm2Pharm is providing a unique set of services to its participants. Program leaders have continued to meet with numerous payers to explore sustainability options and advocate for reimbursement for pharmacy services provided by Pharm2Pharm, and as part of its one-year no-cost extension, Pharm2Pharm will pilot an out-of-pocket fee schedule for program services and a pay-for-performance program with a partner insurer. Table 11-7 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 11-7: Pharm2Pharm Context Research Questions and Findings

Research Questions	New Findings from August 2014 through August 2015

What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• Pharm2Pharm was originally implemented largely in rural settings but was able to successfully expand to urban locations.
	  o Pharm2Pharm used grant funding for this expansion and relied on a Community Health Needs Assessment to determine which underserved areas within the urban county should be targeted for program expansion.
	• Elements of the cultural context in Hawaii have impacted the implementation of the program.
	  o Ethnic enclaves are strong on rural islands, and this has made it difficult to gain the trust of patients from these neighborhoods.
	  o There is a culture of deference to physicians in Hawaii, leading to concern over adopting pharmacist recommendations or discussing them with physicians, and reluctance to admit failure to adhere to physician directives.
	• Use of complementary and alternative medicine is frequent in Hawaii, but patients often omit any supplements or herbs used when discussing their medication history.
	• The majority of Pharm2Pharm patients do not have medication access problems, likely due to the high percentage of the population in Hawaii with health care insurance coverage.
	• Differences in data platforms across hospitals have made automating the screening process for patient enrollment more difficult, according to HCPs interviewed.
	• Beginning in spring 2015, Pharm2Pharm pharmacists received access to a registry tool through the HHIE. The tool helps pharmacists avoid duplicative data entry, allows pharmacists to track patients over time, and assists with the HCP-to-CCP handoff. According to program leaders, pharmacists report the tool has improved their workflow and saved them time.
	  o Previously, HCPs and CCPs reported that program documentation involved duplicative entry of data into different systems and markedly decreased their efficiency and time available to serve patients.
	  o Program leaders are working on an improved tool through HHIE that will support pharmacists in documenting their identification and resolution of drug therapy problems.
	  o Technology improvements during the course of the program have been received differently across the different islands implementing Pharm2Pharm. Facilities in more rural areas and those with a longer tenure in the program were least likely to regard technological changes favorably.
	• As of spring 2015, a new regulatory framework interpretation began allowing patients to authorize CCPs to access their lab data. Previously, physicians needed to provide this authorization.
	  o Program leaders reported that hundreds of Pharm2Pharm patients have authorized CCPs to access their lab data, which allows CCPs to better perform their tasks.

Research Questions	New Findings from August 2014 through August 2015

How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• Qualitative data collected during the site visit provided details and perspective on program leadership.
	  o The lead HCP conducts weekly calls with all HCPs to discuss enrollment, readmissions, and strategies for improvement.
	  o Most Pharm2Pharm pharmacists feel supported by program leadership and report that they received updates to SOPs in a timely fashion.
	  o The Quarterly Learning Collaborative provides structured time for CCPs to engage with program leadership and is well received.
	• Details of the program's status and performance are made available to Pharm2Pharm pharmacists.

How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• During the site visit, pharmacists reported largely positive reactions from physicians with patients enrolled in the program, but some pharmacists felt that physicians were unaware of or unresponsive to their communications. A few pharmacists recalled experiencing negative reactions from physicians to the pharmacists' involvement in patient care. • Program leaders reported that feedback from physicians has been positive and that overall, physicians are happy with Pharm2Pharm services.
Are there unintended negative consequences of the innovation? If so, how can they be mitigated in similar models in the future?	• Although the program reported that pharmacies are becoming more efficient and many are nearing a financial break-even point, interviews conducted during the site visit indicate that some pharmacies believe they will never break even with Pharm2Pharm. • Pharmacy owners report that they have not seen a marked increase in new patients filling prescriptions as a result of the program.
To what extent does the innovation duplicate practices or programs that are already existent?	• Interviews conducted during the site visit confirmed that the majority of stakeholders see the Pharm2Pharm program as offering a unique set of services. • Pali Momi Medical Center reported that a medication reconciliation program already existed at the facility, but Pharm2Pharm pharmacists have designed their services to complement and not duplicate the efforts of the existing program. For example, a non-program medication reconciliation technician performs the initial medication reconciliation, but Pharm2Pharm HCPs provide daily reviews of changes to medications and more comprehensive patient education.

Research Questions	New Findings from August 2014 through August 2015
How can successful innovation components be scaled and replicated in other settings?	• Over the past year, program leaders have continued to meet with numerous payers, including Medicaid, BlueCross BlueShield, Kaiser, University Health Alliance, and WellCare, to explore sustainability options and advocate for reimbursement for pharmacy services provided by Pharm2Pharm. o Program leaders believe that sharing data on outcomes and utilization for Pharm2Pharm with participating health plans will demonstrate the value of the program and convince these plans to sustain and/or scale up the program. o In interviews conducted during the site visit, community pharmacists felt that partnerships with payers were the best option for sustainability and scaling, but also highlighted the need for recognition of pharmacists as providers by the state of Hawaii. • Pharm2Pharm continued collaboration with the governor's healthcare transformation leadership on a State Innovation Models (SIM) planning grant application, which will focus on behavioral and oral health. • In May 2015, program leaders reported that some pharmacies would pilot an out-of-pocket fee schedule for delivering Pharm2Pharm services starting July 1, 2015. o Program leaders believe this is a feasible model since patient experience ratings have been very positive but are unsure that counties with lower socioeconomic status populations will be able to support an out-of-pocket model. • Pharm2Pharm is aligning with HMSA to pilot an adaptation of the Pharm2Pharm model for HMSA's pay-for-quality program. As part of this process, high-performing Pharm2Pharm pharmacists will partner with physicians to improve performance on medication-related pay-for-quality measures. • While program leaders continue to consider billing codes as a potential way to financially support Pharm2Pharm sustainability, discussions with physicians through May 2015 indicate lack of support for this option. o After asking for physician input, program leaders reported that physicians do not have the capacity or infrastructure to adapt work flow and resources to accommodate pharmacist use of existing or new billing codes. • Program leaders reported that they are hopeful the private hospitals will pay for current HCPs after grant funding ends. Other hospitals, especially the state-run, rural community hospitals, have more financial challenges and most likely will not be able to support the HCPs' salaries.

12 EVALUATION OF THE SAFEMED HEALTH CARE INNOVATION AWARD

This section provides recent evaluation findings for the University of Tennessee Health Science Center's SafeMed award, reflecting new analytic results from August 2014 through August 2015, unless noted otherwise. Section 12.1 provides a high-level overview of key qualitative findings. Section 12.2 summarizes innovation components of the awardee. Section 12.3 provides the most recent information available on the evaluability of the program. The remaining sections provide additional detail on the key findings described in Section 12.1. Sections 12.4 highlights findings related to the awardee's implementation effectiveness. Sections 12.5 and 12.6 highlight, respectively, updated findings on the evaluation categories of workforce and context. In this report there are no findings on SafeMed's program effectiveness. Though Acumen received data on program participants, at the time this report was written, Acumen did not have data on a sufficient number of SafeMed participants for a credible quantitative analysis of program effectiveness.

12.1 Key Findings

During initial phases of implementation, SafeMed struggled with low enrollment levels, and though total cumulative participation was below initial program projections, SafeMed met or was close to meeting its revised enrollment goal of 20 patients per month since readjusting targets in March 2014 to better align with staffing levels. To increase enrollment, SafeMed re-enrolled previous participants and enrolled patients with only one major chronic condition, though the latter resulted in few additional enrollees. Beginning in winter 2015, SafeMed also expanded enrollment to uninsured patients, including those who were eligible for Medicare or Medicaid but had not processed their paperwork. Again, this added only a few additional enrollees–this time because the criteria excluded those with severe mental illness or homelessness. However, program leaders reported that the staff, resources, and services that SafeMed had established over the course of its implementation were sufficient for serving this uninsured patient population.

Program leaders found that teamwork between SafeMed team members, as well as between the University of Tennessee and its partner organization, Methodist LeBonheur Healthcare system, was critical to successful implementation. To improve team function and communication, program leaders moved offices for all core SafeMed staff to a central location at Methodist University Hospital to enable daily team huddles, frequent discussions of patient cases, and more informal group trainings. The change has enriched relationships between University of Tennessee and Methodist staff and, according to staff surveys, enhanced program operations, improved individual and team effectiveness, and created higher quality patient care.

In addition, program leaders implemented team-building activities, most notably a one-day staff retreat to enhance team cohesion and communication. Finally, program leaders reported that the social worker hired in January 2015 following the unexpected departure of SafeMed's previous social worker in October 2014 contributed positively to the team dynamic, demonstrating skills in respectful team communication.

SafeMed also focused on strategies to promote patient engagement in the program. SafeMed staff worked persistently to overcome patient barriers to achieving positive health status, including navigating complex social, educational, and financial issues, since many SafeMed patients had difficulty following through with medication plans, lifestyle changes, and follow-up appointments. SafeMed increased interactions at one participating hospital with enrollees identified as not fully engaging in the program. Unfortunately, these efforts did not have any impact on patient engagement, which program leaders attributed to the community health workers at this site not being as skilled as other SafeMed staff at engaging patients. Program leaders believe this finding reiterates the importance of having staff with strong communication skills and suggests that increasing touch points is not effective unless patients are meaningfully engaged with the program. Additionally, SafeMed tested the impact of eliminating incentives payment for participants to attend group support sessions and comprehensive medication reviews but was unable to reach a firm conclusion about the effects of this change. Attendance at the sessions dropped once SafeMed removed the financial incentive, but program leaders believe other factors, such as poor weather, may have affected attendance. Though the results were inconclusive, SafeMed team members strongly supported removing the incentive because they felt those who attended the sessions only to receive the incentive did not fully participate.

Despite a heavy workload, program staff reported high levels of satisfaction with the program, citing the bonds formed with patients and expanded health care roles as key factors. Although the program initially experienced high turnover rates, this past year the social worker was the only staff member to leave prior to the end of the program. Though a replacement was hired a few months later, the social worker's absence created a gap in services for SafeMed patients and validated the importance of having a social worker to address patient needs after they are discharged from the hospital. SafeMed staff received additional formal training in summer and fall 2014, and staff reported that among the training activities that initially prepared them for the SafeMed role, the opportunity to shadow existing employees was the most valuable. Staff also reported that other stakeholders, including hospital leaders and physicians, were satisfied with the program and felt it improved both patient outcomes and health care workflow.

Despite actively pursuing multiple approaches to sustaining and expanding the program, program leaders reported in May 2015 that the SafeMed project would end on June 30, 2015.

SafeMed enrolled its last patient on May 1, 2015, and patients who were enrolled between March and May 1st received only the core 45-day services and did not have the option to receive the additional three months of services. Though the primary sustainability strategy of having SafeMed staff become part of individual hospital-based readmission reduction teams had the support of Methodist leadership, the individual hospitals did not proceed with hiring SafeMed team members. The project director believes that a failed push for Medicaid expansion in Tennessee and the associated budget implications for Methodist LeBonheur Healthcare system, as the largest provider of uninsured care in the state, largely contributed to this lack of action. During site visit interviews, some program staff reported that an outpatient clinic, as originally envisioned for the program, may have contributed to sustainability of the program by increasing the program's return on investment. The clinic would likely have reduced the amount of time staff spent scheduling outpatient appointments, provided a resource for patients who would otherwise visit the emergency department, and helped avoid preventable readmissions. Program leaders indicated that the focus of the no-cost extension year will be on completing the analysis of the impact of the SafeMed program and disseminating information about SafeMed.

12.2 Innovation Components

The SafeMed project is designed to offer a patient-centered approach to expanding patient access to inpatient and community-based medication and disease management. A registered nurse or advance practice nurse enrolls eligible patients during hospital admission after reviewing daily electronic health record (EHR)-generated patient eligibility reports and screening patients. Patients enroll for an initial 45-day period and then can opt to receive services for an additional three months.

Once enrolled, a community health pharmacist working in the hospital outpatient center provides medication management services, including a comprehensive medication review while the patient is still in the hospital, and a social worker, along with a registered nurse or advance practice nurse, provides education, case management, and discharge planning and support. After patient discharge, an outreach team consisting of a licensed practical nurse and community health pharmacist technician conducts a home visit within 72 hours of discharge. This visit typically lasts between one and two hours and is designed to review and reinforce the discharge plan. During this visit, the licensed practical nurse performs a brief, condition-specific assessment, and the community health pharmacist technician reviews medications, discusses medication side effects, and oversees the disposal of unnecessary or expired medications. The outreach team also conducts a second home visit (usually lasting about 30 minutes) and continues to periodically call the patient to assess medication problems, symptom exacerbations, and psychosocial issues and makes referrals to the advance practice nurse, registered nurse, social worker, or community health pharmacist as necessary. The community health pharmacist

provides more extensive ongoing medication therapy management services, including a post-discharge comprehensive medication review, ideally performed after the patient visits the primary care provider. Finally, patients attend group support sessions where they share experiences and challenges related to managing their diseases and medications.

The program targets hospitalized Medicaid and Medicare beneficiaries with chronic physical and mental health conditions, high rates of inpatient utilization, and high costs. This includes individuals that have been diagnosed with a targeted chronic or medical health condition, have had two or more hospital admissions, or who have had one hospital admission and two or more ED visits within the past six months. This past year, in an effort to increase enrollment, SafeMed expanded program enrollment to include patients with only one major chronic condition instead of two; however, the relaxation of the criteria only increased enrollment by a few patients. SafeMed also began to allow patients who previously participated in the program to re-enroll and started enrolling uninsured patients, including those who are Medicaid/Medicare eligible but do not have coverage, though few of these patients were enrolled largely because SafeMed's screening process excludes those with severe mental illness or homelessness.

12.3 Evaluability

This section provides updated information on the primary factors affecting the evaluability of SafeMed. Table 12-1provides detailed information on the program's sample size—enrollment and payer mix based on participant-level program data provided by the awardee. From January through March 2015, SafeMed enrolled 46 new patients, of which half were Medicare beneficiaries.

Table 12-1: Payer Mix of SafeMed Program Enrollment by Calendar Quarter

Calendar Quarter	Medicare Parts A/B/D FFS		Medicare Advantage And Part D		Other Medicare Enrolled		Not Medicare-Enrolled/ Unknown		Total
Jan-Mar 2013	*	*	*	*	*	*	*	*	22
Apr-Jun 2013	*	*	*	*	*	*	*	*	28
Jul-Sep 2013	16	50%	*	*	*	*	11	34%	32
Oct-Dec 2013	11	37%	*	*	*	*	*	*	30
Jan-Mar 2014	13	32%	*	*	*	*	14	34%	41
Apr-Jun 2014	20	*	18	*	*	*	17	*	*
Jul-Sep 2014	18	*	12	*	*	*	22	*	*
Oct-Dec 2014	*	*	12	26%	*	*	16	35%	46
Jan-Mar 2015	14	30%	*	*	*	*	23	50%	46
Total	118	33%	85	24%	33	9%	123	34%	359

Source: Program data provided by SafeMed in April 2015.

Notes: Beneficiaries in the Medicare Parts A/B/D FFS and the Medicare Advantage/Part D categories will be analyzed quantitatively to assess program effectiveness once there is sufficient sample size. "Not Medicare-Enrolled/Unknown" includes beneficiaries who were not enrolled in Medicare on the day they

entered the SafeMed program or for whom the awardee did not provide sufficient personally identifiable information to link to Medicare claims.
*All cell counts less than eleven have been suppressed to protect participant confidentiality

Table 12-2 highlights information related to the program's comparison group, data availability, and program maturity, which is defined by the program's stage of implementation and the extent to which the innovation has changed since launch. At the time this report was written, Acumen had not analyzed data on a sufficient number of SafeMed beneficiaries to conduct quantitative analysis of program effectiveness.

Table 12-2: SafeMed Program Comparison Group and Program Data Availability

Evaluability Factor	Status
Comparison Group	• SafeMed has identified a non-randomized comparison group consisting of patients who refused the program, patients who met EHR eligibility requirements but were discharged before staff could screen them, and patients who met eligibility requirements in EHR screening but did not qualify for the study.
Data Availability	• Acumen has used program data on intervention group beneficiaries provided by the awardee and linked these data to Medicare data files. However, at the time this report was written, Acumen did not have data on a sufficient number of SafeMed participants for a credible quantitative analysis of program effectiveness.
Program Maturity	• The core components of the awardee innovation are mature and have been relatively stable for the duration of the project.

12.4 Implementation Effectiveness

This section summarizes updated findings on SafeMed's implementation effectiveness, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in October 2014. SafeMed enrolled its last patient on May 1, and enrollment levels, though below initial projections, were at or near monthly targets since program leaders revised enrollment goals in March 2014. Program leaders reported that SafeMed was successful in implementing the group support sessions and improved collaboration and communication among SafeMed team members by moving offices for all core SafeMed staff to a central location at Methodist University Hospital. SafeMed encountered ongoing challenges with implementing a screening process to detect depression and anxiety in program participants and found that generally SafeMed participants were complex, sometimes difficult to engage, and required substantial staff resources and support. As of May 2015, program leaders reported that SafeMed would stop providing services to patients after June 30, 2015. Table 12-3 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 12-3: SafeMed Implementation Effectiveness Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
Was the intervention delivered as intended to the target population in doses associated with effectiveness?	• SafeMed enrolled a total of 359 unique participants through March 2015.[a] o This figure is below initial program projections; however, program leaders found that initial enrollment expectations were unrealistic given program staff size. As a result, program leaders lowered enrollment goals to 20 patients per month, and the program has met or been close to meeting this revised goal since making this change in March 2014. o SafeMed enrolled its last patient on May 1, 2015. Patients enrolled between March and May 1st received only the core 45-day services and did not have the option to receive the additional 3 months of services. o In May 2015, program leaders reported that SafeMed would stop providing services to patients after June 30, 2015.
What were key successes in implementing the innovation as designed and factors associated with success?	• SafeMed support sessions, conducted monthly, were well-received by patients. o Patients who attended one monthly support session often continued to do so. o Support sessions offered an opportunity for pharmacists to address patient questions and concerns about medications. They also provided a convenient time for patients' second comprehensive medication review, since patients were already onsite at the hospital. o Peer champions were identified and used during support sessions to encourage their fellow patients to contribute during discussions. • Program leaders reported that the social worker who joined the program in January 2015 (after the previous social worker resigned in October 2014) has been effective in working with SafeMed's socially complex patients and was pivotal in helping the team meet the needs of the uninsured patients enrolled in SafeMed. o The social worker boosted the team's confidence in providing services to the uninsured and helped team members overcome initial concerns about their ability to serve this patient population. • Moving offices for all core SafeMed staff to a central location at Methodist University Hospital and other team-building activities improved program operations. o Results from a formal survey conducted by program leaders indicated that these efforts improved program operations through better team communication and effectiveness. • Program leaders reported that respectful communication among multidisciplinary team members is critically important to the optimal functioning of the SafeMed program. o SafeMed staff reported that communication with team members was not a strength of the previous social worker, and this negatively affected the team dynamic. The new social worker was skilled in team communication, and as a result, team members responded very positively to her. o Program leaders emphasized that an evaluation of a potential employee should focus not only on practical skills but on other factors such as personality, communication skills, ability to fit well with the team, belief in the program mission, and ability/capacity around using techniques such as motivational interviewing.

Research Questions	Findings from August 2014 through August 2015
What were the challenges in implementing the innovation as designed?	• The level of effort needed to serve the patients enrolled in the program was greater than was initially expected by program leaders. o The screening process took a substantial amount of time, which made it difficult for the advance practice nurse or registered nurse to reach and enroll eligible patients prior to their discharge. o Staff members reported spending a substantial amount of time tracking down patients and facilitating their follow-up appointments outside of the program. Patients provided incorrect contact information and missed appointments regularly. The complexity of the health care and insurance systems extended the amount of time staff members were on the phone. • The algorithm used to generate a daily list of eligible patients did not reliably produce accurate information. Of about 20 patients on the list each day, only one or two patients were actually eligible to enroll. Program staff worked with IT staff to improve the algorithm, but this was an ongoing challenge. • SafeMed leaders and staff reported that a "one size fits all" approach does not meet patient needs. o Program staff and leaders reported that tailoring the program for each participant based on how ready they are to self-manage their health conditions would make the program more effective. • SafeMed found it challenging to implement a screening process to detect depression and anxiety in program participants. o The program initially used a 7- and 9-item screening tool (GAD-7 and PHQ-9) but switched to a less-sensitive 2-item screening tool due to burden on the SafeMed team. o Program leaders reported that it was much harder than anticipated for staff to consistently administer the screening instruments and found that cultural biases skewed interpretation of the screening results and led to underreporting. SafeMed staff also found that the one-time screening process was not adequate in detecting ongoing patient mental health issues. o Staff attempted to develop an abbreviated screening process as a supplement to the initial screening; however, this did not come to fruition, as the team did not have adequate time to focus on this effort relative to other project activities. • The SafeMed social worker resigned unexpectedly in October 2014, and the program struggled to address participants' social needs (e.g., food, housing, transportation, medication access) in her absence. o Program leaders reported that the social worker's departure validated the importance of the social work role within SafeMed to address the social needs of patients once they are discharged. • Increasing interactions with enrollees identified as not fully engaging in the program did not have any impact on patient engagement (e.g., likelihood to schedule follow-up visits, attend support sessions, and attend outpatient medication reviews). o Outreach workers had a second interaction with these patients while they were in the hospital, in person or by phone, with the goal of reinforcing the outreach teams' relationships with patients prior to discharge. Additionally, outreach workers contacted these patients by phone post-discharge. o Program leaders believe that the inability to improve patient engagement was due to the community health workers at the location where this outreach occurred being the least skilled of the SafeMed staff at engaging patients. Leaders believe this finding demonstrates that increasing touch points is not effective unless patients are meaningfully engaged with the program. • SafeMed was unable to discern the impact of eliminating the incentive payment for participants to attend group support sessions and comprehensive medication reviews. o Program leaders reported that attendance dropped once SafeMed removed the financial incentive, but they believe other factors, such as poor weather, may have affected attendance. o Though results were inconclusive, SafeMed team members strongly supported removing the incentive because they felt those who attended the sessions only to receive the incentive did not fully participate.

Research Questions	Findings from August 2014 through August 2015
What changes were made to the innovation to increase enrollment, improve care, or reduce expenditures?	• SafeMed restructured its group support session to allow ongoing participation by all current SafeMed enrollees. o SafeMed was limiting the sessions to those who were in the first 45 days of the program in an effort to control the class size but realized the sessions had the potential to serve as a long-term source of support for all SafeMed participants. As a result, SafeMed recruited all actively enrolled patients, while limiting class sizes to 20 people per month (i.e., 10 people per session).
Did the innovation use internal evaluation findings to inform the implementation process, when necessary?	• Program leaders conducted an audit of the SafeMed database and determined that staff members were not consistently documenting patient contact correctly. As a result, they provided training to correct the problem.

[a] Source: Program data provided by SafeMed in April 2015.

12.5 Workforce

This section updates findings on workforce issues related to the SafeMed intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in October 2014. Though SafeMed experienced significant staff turnover during its early implementation, staff turnover this past year was minimal, with only one staff departure; the program's only social worker left the project in October 2014, and a replacement was hired in January 2015. SafeMed staff received additional formal training in summer and fall 2014 and used the move to one centralized location as an opportunity to provide additional disease-specific training to outreach workers and conduct daily huddles to discuss patient cases, which helped improve quality of services and care coordination. Additionally, SafeMed staff reported being satisfied with their roles during interviews conducted as part of the site visit. Table 12-4 summarizes updates from findings from August 2014 through August 2015, unless otherwise noted.

Table 12-4: SafeMed Workforce Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015

What type and level of workforce training does the innovation provide?	• Program leaders reported that staff received approximately 20 hours of training between July and September 2014, including:
	  o Ongoing OARS (open questions, affirming, reflection, and summarizing) training
	  o Screening, Brief Intervention, and Referral to Treatment (SBIRT) model training
	  o Team-building retreat
	• SafeMed reported that additional training and the use of a consultant, who assessed staff skills and provided individualized coaching, improved the motivational interviewing skills of SafeMed staff.
	• SafeMed nursing and pharmacy staff used the move to one centralized location as an opportunity to provide additional disease-specific training to outreach workers. According to program leaders, feedback from staff about the training was positive.
	• Program leaders found that using Methodist staff to provide training (as opposed to staff from the University of Tennessee) worked well.

What type of support structure is effective for staff deployment?	• Outreach workers interviewed during the site visit reported that shadowing existing staff was the most useful component of their preparation for SafeMed. • Outreach staff and pharmacists were generally positive about the training and preparation they received, as well as their ongoing training and support. • While in the minority, some other staff expressed a need for better orientation training and role clarification. • The SafeMed team implemented daily huddles to discuss patient cases and troubleshoot any ongoing issues related to patient care or implementation of the program, and program leaders reported that this approach has strengthened teamwork and the quality of services and care coordination.

How does the innovation affect staff satisfaction?	• Outreach workers interviewed during the site visit were very satisfied with their roles.
	  o Pharmacy technicians reported enjoying the increased contact with patients as compared with traditional pharmacy technician roles.
	  o Licensed practical nurses reported enjoying the opportunity to form bonds with patients during home visits.
	• Some staff indicated that satisfaction would increase with additional role clarification between outreach workers and other staff.
	• Pharmacists reported satisfaction with their role in the program but noted that they had a heavy workload and struggled to keep up with program documentation.

Has the innovation experienced high staff turnaround? If so, what measures have been taken to remedy the problem?	• Though SafeMed experienced significant staff turnover during its early implementation, staff turnover this past year was minimal, with only the program's social worker leaving unexpectedly in October 2014.
	  o Program leaders attribute the reduction in staff turnover to efforts to promote team function.
	  o In January 2015, SafeMed hired a replacement social worker with a mental health background.
	• Program leaders indicated that an ideal hiring process would include taking a potential hire on a home visit along with existing team members to gauge the candidate's comfort level working with patients in the home environment. SafeMed was not able to implement this process due to Methodist requirements for confidentiality training, but program leaders strongly recommended this approach to avoid high staff turnover.

12.6 Context

This section updates findings on context issues related to the SafeMed intervention, based on qualitative information obtained from interviews with awardee program leaders and staff members, awardee progress reports provided by the Lewin Group, and a site visit conducted in October 2014. SafeMed staff worked persistently to overcome patient barriers to achieving positive health status, including navigating complex social and financial issues. SafeMed's patients generally have multiple chronic conditions, low health literacy and education levels, low socioeconomic status, and limited resources, which have created unmet health and social needs and led to poorly managed conditions and high inpatient utilization. Program leaders also worked to improve communication between the University of Tennessee and Methodist Health System to assist with effective program implementation. As of May 2015, SafeMed's efforts to sustain the program were unsuccessful. The program's primary strategy for sustaining the program was to have staff become part of individual hospital-based readmission reduction teams within the Methodist system. Though the hospitals expressed interest, none took concrete steps toward hiring SafeMed staff members. Program leaders believe this is largely due to the failed push for Medicaid expansion in Tennessee and the associated budget implications for Methodist LeBonheur Healthcare system, as the largest provider of uninsured care in the state. Table 12-5 summarizes findings from August 2014 through August 2015, unless otherwise noted.

Table 12-5: SafeMed Context Research Questions and Findings

Research Questions	Findings from August 2014 through August 2015
What endogenous (e.g. organizational) and exogenous (policy and environmental) factors affect implementation?	• SafeMed serves patients with limited education, limited financial means, and few social supports. These patients have difficulty following through with medication plans, lifestyle changes, and follow-up appointments. To address this challenge, staff members had to be persistent and creative in helping patients overcome barriers to success. o For example, pharmacists struggled to assist Medicaid patients in obtaining needed medications under the TennCare program. With some exceptions, TennCare's pharmacy benefit covers only five prescriptions per month, only two of which can be brand name drugs, so pharmacists assisted patients in prioritizing the more expensive medications for TennCare reimbursement. • The Tennessee governor's push for Medicaid expansion was rejected by a state legislative committee in February 2015, which made it more difficult for the Methodist LeBonheur Healthcare system, the largest provider of uninsured care in the state, to provide ongoing financial support to SafeMed. This had significant implications for SafeMed's sustainability since its primary model relied on Methodist Hospital hiring SafeMed team members. • Methodist LeBonheur Healthcare system does not have a central model to address readmissions across the system's hospitals. As a result, each hospital pursues and evaluates separate initiatives to reduce readmissions. This has had implications for SafeMed's data reporting and sustainability activities since SafeMed reports measures at the system level and has had limited ability to provide detailed hospital-level data regarding the impact of the program.

Research Questions	Findings from August 2014 through August 2015
How is the senior management structured, and how does it lead and communicate innovation changes to implementers?	• Some hospital staff members reported that increased integration between the University of Tennessee leadership and the hospitals implementing the program would be beneficial, particularly as leadership priorities change. o Program leaders reported that the centralization of the SafeMed team has helped further integrate and improve communication between the University of Tennessee leadership and the hospitals implementing the program. • Hospital staff reported adequate support from hospital leadership within the three participating hospitals.
How does the innovation affect existing hospitals, medical practices, or other settings that provide health care to participants?	• During the site visit, implementation staff reported that the hospitals were very positive about the impact of the program on patient care and that SafeMed staff were well integrated into the flow of patient care at the hospital. • A physician reported during the site visits that the innovation had a positive impact on his patients' outcomes and that SafeMed services reduced his workload.
To what extent does the innovation duplicate practices or programs that are already existent?	• All interviews conducted during the site visit confirmed that SafeMed provided unique services for patients that no other programs provide.

How can successful innovation components be scaled and replicated in other settings?	• Program leaders reported that an accountable care organization (ACO) model would help the sustainability and scalability of SafeMed since it would likely emphasize payment for care coordination across settings as opposed to reimbursing for discrete services provided by the SafeMed program.
	  o The Methodist area does not currently have a robust ACO structure, and opportunities to incorporate SafeMed in an ACO through Methodist's physician-hospital organization did not come to fruition before the conclusion of the SafeMed program.
	• Program leaders emphasized the importance of having return-on-investment information to secure buy-in from hospitals and payers for sustaining or expanding the program.
	  o Small program enrollment numbers made it difficult to show the return on investment of SafeMed.
	  o Some program staff reported that an outpatient clinic, as originally envisioned for the program, would have been a great benefit for patients and the program's return on investment, as it would have reduced the amount of time staff spent scheduling outpatient appointments, provided a resource for patients who would otherwise go to the ED, and helped avoid preventable readmissions.
	• As of May 12, 2015, SafeMed's efforts to sustain the program have been unsuccessful.
	  o SafeMed's primary strategy for sustaining the program was to have SafeMed staff become part of individual hospital-based readmission reduction teams within the Methodist system. Though the hospitals expressed interest in doing this, none took concrete steps toward hiring SafeMed staff members.
	  o Anticipated health plan funding also did not come to fruition. Program leaders had been hopeful to receive a grant from a health plan to sustain the program; however, the health plan was unresponsive to follow-up contacts. Program leaders suspect the health plan was reluctant to proceed with the grant since SafeMed is not continuing in its current form.

APPENDIX A: OUTCOME MEASURE SPECIFICATIONS BY AWARDEE

The tables below define the outcome measures presented for the Welvie, IHARP, MedExpert, USC, and Pharm2Pharm programs. Table Appendix A-1 provides definitions of key terms used in the outcome measure definitions, and Table Appendix A-2 provides definitions of the outcome measures themselves.

Table Appendix A-1: Definitions of Terms Used in Outcome Measure Definitions

Term	Definition	Relevant Awardees
Expenditure	All expenditure measures represent Medicare payments. Cost data are payment standardized using the CMS payment standardization methodology to remove differences due to geographic variation in Medicare payment rates and variation among classes of providers. All costs are adjusted monthly for inflation from a 2011 base year using the Bureau of labor Statistics Consumer Price Index for medical care services. Cost data are not risk adjusted.	MedExpert, Welvie, IHARP
Beneficiary	Beneficiaries must be continuously enrolled in Medicare Parts A and B (Fee For Service, FFS) or C (Medicare Advantage, MA) for one year prior to the program's intervention date through the intervention quarter of interest. For USC and IHARP, beneficiaries must also be continuously enrolled in Medicare Part D for one year prior to the program's intervention date through the intervention quarter of interest. Beneficiaries who switch between FFS and MA are included in the MA analysis. If a beneficiary dies, the beneficiary will be included in the quarter in which he or she died and not in any subsequent quarters.	MedExpert, USC, Welvie, IHARP, Pharm2Pharm
Inpatient Surgery	Inpatient surgery stays (hospital inpatient claim only). Includes inpatient stays billed with a surgical MS-DRG. Excludes stays with ICD-9-CM diagnosis codes indicating a trauma/accident. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery	Inpatient preference-sensitive orthopedic surgery stays. Includes inpatient stays billed with a preference-sensitive orthopedic MS-DRG from major diagnostic category (MDC) 08: diseases and disorders of the musculoskeletal system and connective tissue. Also includes all Part B carrier claims billed during the surgical stay. Excludes stays with ICD-9-CM diagnosis codes for trauma/accident or fracture. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie
Inpatient Preference-Sensitive Cardiac Surgery	Inpatient preference-sensitive cardiac surgery stays. Includes inpatient stays billed with a preference-sensitive cardiac MS-DRG from MDC 05: diseases and disorders of the circulatory system. Also includes all Part B carrier claims billed during the surgical stay. Excludes stays with ICD-9-CM diagnosis codes for trauma/accident or acute coronary syndrome. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs and ICD-9-CM diagnosis codes.	Welvie

Term	Definition	Relevant Awardees
Episode-Based Inpatient Surgery	Inpatient surgery stays and associated Part B Carrier and post-acute care claims. Includes (a) inpatient stays billed with a surgical MS-DRG, (b) all Part B carrier claims billed during the surgical stays, (c) SNF stays linked to the surgical stays (i.e., the surgical stay qualified the beneficiary for SNF care), (d) home health claims beginning within 30 days of surgical stay discharge, and (e) inpatient rehabilitation facility claims beginning within 30 days of surgical stay discharge.[a] SNF, home health, and inpatient rehabilitation facility costs are prorated to include only costs incurred in the 30 days following surgical stay discharge; the average stay/claim cost per day is attributed to each day that falls in the 30 day post-discharge window. Excludes inpatient stays, inpatient rehabilitation facility stays, and home health claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes Part B Carrier ambulance claims. See supplementary *Surgery_Codes* Excel file for list of MS-DRGs, ICD-9-CM diagnosis codes, and HCPCS codes.	Welvie
Outpatient Surgery	Outpatient surgery claims. Includes outpatient claims billed with a surgical HCPCS/CPT code and associated outpatient and Part B Carrier claims billed on the same date.[b] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes costs for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie
Outpatient Preference-Sensitive Orthopedic Surgery	Outpatient preference-sensitive orthopedic surgery claims. Includes outpatient claims billed with a preference-sensitive orthopedic HCPCS/CPT code.[c] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes costs for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie
Outpatient Preference-Sensitive Cardiac Surgery	Outpatient preference-sensitive cardiac surgery claims. Includes outpatient claims billed with a preference-sensitive cardiac HCPCS/CPT code.[d] Excludes claims with ICD-9-CM diagnosis codes indicating a trauma/ accident. Also excludes costs for ambulance services. See supplementary *Surgery_Codes* Excel file for list of HCPCS/CPT codes, and ICD-9-CM diagnosis codes.	Welvie

[a]Inpatient rehabilitation facilities defined as inpatient claims with the last four digits of PROVIDER (CCN) in 3025-3099 OR third digit of "R" (CAH) or "T" (acute hospital)

[b]Outpatient surgical HCPCS/CPT codes include all HCPCS/CPTs in BETOS categories P1-P3 (major procedure), P4 (eye procedure), P5 (ambulatory procedure), P8 (endoscopy), and additional codes from the surgical CPT range 10000-70000

[c]Outpatient preference-sensitive orthopedic surgery HCPS/CPT codes include selected HCPCS/CPTs in BETOS categories P3 (major procedure – orthopedic), P5B (ambulatory procedures – musculoskeletal), and P8A (endoscopy – arthroscopy)

[d]Outpatient preference-sensitive cardiac surgery HCPS/CPT codes include selected HCPCS/CPTs in BETOS categories P2D (major procedure – cardiovascular – coronary angioplasty) and P2F (major procedure – cardiovascular – other)

Table Appendix A-2: Definitions of Outcome Measures

Measure	Relevant Population	Definition	Relevant Awardees
All-Cause Mortality per 1,000 Beneficiaries	FFS and MA	Numerator: Number of deaths * 1,000 Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Total Medicare Expenditures Per Beneficiary (1 of 4 core meta-evaluation measures)	FFS	Numerator: Total Medicare Parts A and B claim costs. Part D costs are not included. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Total Medicare Parts A, B, and D Expenditures Per Beneficiary	FFS	Numerator: Total Medicare Parts A, B, and D[a] claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Inpatient Expenditures Per Beneficiary	FFS	Numerator: Total inpatient stay costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Outpatient ER Expenditures Per Beneficiary	FFS	Numerator: Total emergency room (ER)-only outpatient claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Outpatient Non-ER Expenditures Per Beneficiary	FFS	Numerator: Total non-ER outpatient claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Carrier/PB Expenditures Per Beneficiary	FFS	Numerator: Total physician/carrier claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Skilled Nursing Facility Expenditures Per Beneficiary	FFS	Numerator: Total skilled nursing facility claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Home Health Expenditures Per Beneficiary	FFS	Numerator: Total home health claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Hospice Expenditures Per Beneficiary	FFS	Numerator: Total hospice claim costs. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Total Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient surgery cost. Denominator: Total number of beneficiaries.	Welvie
Total Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient preference-sensitive orthopedic surgery cost. Denominator: Total number of beneficiaries.	Welvie
Total Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient and inpatient preference-sensitive cardiac surgery cost. Denominator: Total number of beneficiaries.	Welvie
Inpatient Surgery Cost Per Beneficiary	FFS	Numerator: Total inpatient surgery stay cost. Denominator: Total number of beneficiaries.	Welvie
Episode-Based Inpatient Surgery Expenditures Per Beneficiary	FFS	Numerator: Total episode-based inpatient surgery stay cost. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total inpatient preference-sensitive orthopedic surgery stay cost. Denominator: Total number of beneficiaries.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
Inpatient Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total inpatient preference-sensitive cardiac surgery cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Preference-Sensitive Orthopedic Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient preference-sensitive orthopedic surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
Outpatient Preference-Sensitive Cardiac Surgery Expenditures Per Beneficiary	FFS	Numerator: Total outpatient preference-sensitive cardiac surgery claim cost. Denominator: Total number of beneficiaries.	Welvie
ER Visit Rate Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS	Numerator: Number of beneficiaries with at least one outpatient ER claim with no inpatient admission on the same day * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Number of ER Visits Per 1,000 Beneficiaries	FFS	Numerator: Number of days with an ER claim for beneficiaries with no inpatient admission on the same day * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP
Inpatient Admission Rate Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient stay * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Number of Inpatient Admissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient stays * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Unplanned Inpatient Admission Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one unplanned inpatient stay * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Unplanned Inpatient Admissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of unplanned inpatient stays * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
30-Day Hospital Readmissions Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from a previous inpatient stay * 1,000. Denominator: Number of beneficiaries with an inpatient stay.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
30-Day Hospital Readmissions Following Inpatient Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient surgery stay.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
30-Day Hospital Readmissions Following Preference-Sensitive Orthopedic Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient preference-sensitive orthopedic surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient preference-sensitive orthopedic surgery stay.	Welvie
30-Day Hospital Readmissions Following Preference-Sensitive Cardiac Surgery Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with an inpatient stay admission within 30 days of discharge from an inpatient preference-sensitive cardiac surgery stay * 1,000. Denominator: Number of beneficiaries with an inpatient preference-sensitive cardiac surgery stay.	Welvie
30-Day Hospital Unplanned Readmissions Per 1,000 Beneficiaries (1 of 4 core meta-evaluation measures)	FFS and MA	Numerator: Number of beneficiaries with an unplanned inpatient stay admission within 30 days of discharge from a previous inpatient stay * 1,000 Denominator: Number of beneficiaries with an inpatient stay.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Number of Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Total number of inpatient days * 1,000. Denominator: Total number of beneficiaries.	MedExpert, Welvie, IHARP, USC, Pharm2Pharm
Total Surgery Rate Per 1,000 Beneficiaries	FFS	Numerator: Number of beneficiaries with at least one inpatient surgery stay or outpatient surgery claim * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of All Surgeries Per 1,000 Beneficiaries	FFS	Numerator: Number of inpatient surgery stays and outpatient surgery claims * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie
Outpatient Surgery Rate Per 1,000 Beneficiaries	FFS	Numerator: Number of beneficiaries with at least one outpatient surgery claim * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Outpatient Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of outpatient surgery claims * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Surgical Hospital Days Per 1,000 Beneficiaries	FFS and MA	Number of inpatient surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Orthopedic Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient preference-sensitive orthopedic surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie

Measure	Relevant Population	Definition	Relevant Awardees
Number of Inpatient Orthopedic Preference-Sensitive Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive orthopedic surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Preference-Sensitive Orthopedic Surgery Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive orthopedic surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie
Inpatient Preference-Sensitive Cardiac Surgery Rate Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of beneficiaries with at least one inpatient preference-sensitive cardiac surgery stay * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Cardiac Preference-Sensitive Surgeries Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive cardiac surgery stays * 1,000. Denominator: Total number of beneficiaries.	Welvie
Number of Inpatient Preference-Sensitive Cardiac Surgery Hospital Days Per 1,000 Beneficiaries	FFS and MA	Numerator: Number of inpatient preference-sensitive cardiac surgery stay days * 1,000. Denominator: Total number of beneficiaries.	Welvie
Proportion of Days Covered (PDC) measure for adherence to diabetes medications	FFS and MA	Numerator: Number of days the patient was covered by at least one drug in the class based on prescription fill dates and days of supply * 100. Denominator: Number of days in patient's measurement period (index prescription date to the end of calendar year, disenrollment, or death).	USC, IHARP, Pharm2Pharm
PDC measure for adherence to RAS antagonists	FFS and MA	Numerator: Number of days the patient was covered by at least one drug in the class based on prescription fill dates and days of supply * 100. Denominator: Number of days in patient's measurement period (index prescription date to the end of calendar year, disenrollment, or death).	USC, IHARP, Pharm2Pharm
PDC measure for adherence to Beta Blockers	FFS and MA	Numerator: Number of days the patient was covered by at least one drug in the class based on prescription fill dates and days of supply * 100. Denominator: Number of days in patient's measurement period (index prescription date to the end of calendar year, disenrollment, or death).	USC, IHARP, Pharm2Pharm
PDC measure for adherence to Calcium Channel Blockers	FFS and MA	Numerator: Number of days the patient was covered by at least one drug in the class based on prescription fill dates and days of supply * 100. Denominator: Number of days in patient's measurement period (index prescription date to the end of calendar year, disenrollment, or death).	USC, IHARP, Pharm2Pharm

Measure	Relevant Population	Definition	Relevant Awardees
PDC Measure of adherence to statins	FFS and MA	Numerator: Number of days the patient was covered by at least one drug in the class based on prescription fill dates and days of supply * 100. Denominator: Number of days in patient's measurement period (index prescription date to the end of calendar year, disenrollment, or death).	USC, IHARP, Pharm2Pharm

[a](a) For beneficiaries without a low-income subsidy, Part D costs are estimated as (0.75*Covered D Plan Paid prior to the catastrophic phase) + [0.75*(Covered D Plan Paid in the catastrophic phase – 80% Above Out of Pocket Threshold)] + 80% Above Out of Pocket Threshold + Low Income Cost-Sharing Subsidy Amount.
(b) For beneficiaries with a low-income subsidy, Part D costs are estimated as Covered D Plan Paid + Low Income Cost-Sharing Subsidy Amount.
[b]Unplanned readmissions are defined using the QualityNet *Planned Readmissions Algorithm Flow Diagram*, available for download at: .cos://www.qualitynet.org/dcs/ContentServer?cid=1228772504995&pagename=QnetPublic%2FPage%2FQnetTier4&c=Page

APPENDIX B: RESULTS FOR WELVIE

The following tables provide the baseline demographic and health characteristics for intervention and comparison group beneficiaries in the Welvie Medicare Parts A and B Ohio and Medicare Advantage Ohio cohorts. Subsequent tables provide mortality and readmission rates; health service utilization; and medical costs results for these cohorts.

B.1 Demographic and Health Characteristics

Table Appendix B-1: Welvie Baseline Demographic and Health Characteristics, Medicare Parts A and B Ohio Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	62,531	52,559		
Average Age (Years)	76.34	76.62	-0.28	0.04
Age under 65	0%	0%	0.00	0.00
Gender				
Male	43%	42%	1%	0.01
Female	57%	58%	-1%	0.01
Race				
White	91%	91%	0%	0.00
Black	7%	7%	0%	0.00
Other	2%	2%	0%	0.00
Dual Eligible	9%	11%	-2%	0.08
Medicare Eligibility				
Disabled	9%	10%	-1%	0.02
ESRD	0%	0%	0%	0.00
Aged	90%	90%	1%	0.02
Potential Risk Indicators for Preference-sensitive Surgeries Targeted by Program Name				
Any targeted diagnosis	91%	92%	0%	0.01
Knee diagnosis	25%	25%	-1%	0.02
Hip diagnosis	23%	23%	-1%	0.01
Back diagnosis	35%	34%	1%	0.01
Heart diagnosis	41%	41%	-1%	0.01
Evaluation and Management (E&M) Visits				
E&M Visits: 0	9%	10%	-1%	0.04
E&M Visits: 1-5	33%	34%	0%	0.01
E&M Visits: 6-10	27%	27%	1%	0.01
E&M Visits: 11-15	15%	14%	1%	0.02
E&M Visits: 16+	15%	15%	0%	0.01

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	94%	93%	1%	0.03
1 SNF Stay (Prior Year)	3%	3%	0%	0.01
2+ SNF Stays (Prior Year)	3%	4%	-1%	0.03
IP Stay before study enrollment				
0 IP Stays (1Q Prior)	93%	93%	0%	0.01
1 IP Stay (Prior Year)	5%	6%	0%	0.01
2+ IP Stays (Prior Year)	2%	2%	0%	0.01
0 IP Stays (Prior Year)	80%	80%	0%	0.01
1 IP Stay (Prior Year)	13%	13%	0%	0.00
2+ IP Stays (Prior Year)	7%	7%	0%	0.01
ER Visits (Pre-Enrollment Quarter)				
ER Visits: 0	92%	91%	0%	0.01
ER Visits: 1	7%	7%	0%	0.01
ER Visits: 2+	1%	1%	0%	0.00
Medical Cost per Beneficiary				
Cost (4Q Prior)	1,917	2,061	-143	0.02
Cost (3Q Prior)	1,936	1,999	-63	0.01
Cost (2Q Prior)	2,123	2,177	-54	0.01
Cost (1Q Prior)	2,217	2,334	-117	0.02
IP Cost (Prior Year)	2,493	2,568	-75	0.01
IP Cost (1Q Prior)	741	763	-22	0.00
Frailty Measures				
Home Oxygen	4%	4%	0%	0.00
Urinary Catheter	1%	1%	0%	0.01
Wheelchair Use	1%	1%	0%	0.02
Walker Use	1%	1%	0%	0.01
Charlson Score	0.29	0.30	-0.01	0.01
Area Depravation Index (ADI)	101.19	101.26	-0.07	0.00
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP)	1%	1%	0%	0.01
Acute cerebrovascular disease (IP, 30 days prior)	0%	0%	0%	0.00
AMI (IP)	1%	1%	0%	0.01
AMI (IP, 30 days prior)	0%	0%	0%	0.00
Cerebrovascular disease	15%	16%	-1%	0.02
Parkinson's disease and multiple sclerosis	2%	2%	0%	0.02

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Asthma	22%	23%	-1%	0.01
Coagulation and hemorrhagic disorders	5%	5%	0%	0.01
Congestive heart failure (All Settings)	12%	13%	-1%	0.04
Congestive heart failure (IP)	1%	1%	0%	0.01
Coronary atherosclerosis	28%	28%	0%	0.01
Dementia	9%	11%	-2%	0.06
Diabetes mellitus without complication	34%	35%	-1%	0.02
Diabetes mellitus with complications	15%	16%	-1%	0.02
Cardiac dysrhythmias, arrest and ventricular fibrillation	27%	28%	0%	0.01
Fluid and electrolyte disorders	15%	15%	-1%	0.02
Gastrointestinal hemorrhage (All Settings)	5%	5%	0%	0.00
Gastrointestinal hemorrhage (IP)	1%	1%	0%	0.01
Other heart disease	48%	48%	0%	0.01
Heart valve disorders	14%	14%	0%	0.01
Hepatitis	1%	1%	0%	0.01
Hypertension with complications	12%	12%	0%	0.01
Stomach, pancreas and lung cancer	2%	1%	0%	0.01
Peri- endo- and myocarditis	5%	5%	0%	0.01
Disorders of nervous system	10%	12%	-1%	0.04
Other cancers	16%	16%	0%	0.01
Paralysis	1%	1%	0%	0.01
Pneumonia	11%	11%	0%	0.01
Pneumonia (IP, 30 days prior)	0%	0%	0%	0.01
Pulmonary heart disease	4%	4%	0%	0.00
Renal failure	14%	15%	0%	0.01
Respiratory failure (IP)	0%	0%	0%	0.00
Respiratory failure (IP, 30 days prior)	0%	0%	0%	0.00
Rheumatoid arthritis and related disease	3%	3%	0%	0.00
Septicemia	2%	2%	0%	0.01
Shock	0%	1%	0%	0.01
Tuberculosis	0%	0%	0%	0.01
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP)	1%	1%	0%	0.00
Heart valve procedures (IP)	0%	0%	0%	0.00
Hemodialysis	1%	1%	0%	0.00
Peritoneal dialysis	1%	1%	0%	0.00
Procedures on vessels of head and neck (IP)	3%	3%	0%	0.01
Radiology and chemotherapy	3%	3%	0%	0.01
Respiratory intubation and mechanical ventilation	1%	1%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Blood transfusion	3%	3%	0%	0.01
Blood transfusion (IP)	2%	3%	0%	0.01
Transportation	18%	20%	-3%	0.07
Comorbidity Categories (Pre-Enrollment Quarter)				
Depression	3%	3%	0%	0.02
AIDS HIV	0%	0%	0%	0.00
Alcohol Abuse	0%	0%	0%	0.01
Cardiac Arrhythmias	15%	15%	-1%	0.02
Congestive heart failure	7%	8%	-1%	0.04
Chronic pulmonary disease	13%	13%	0%	0.01
Coagulopathy	2%	2%	0%	0.02
Deficiency Anemia	4%	4%	0%	0.01
Diabetes complicated	21%	22%	-1%	0.02
Diabetes uncomplicated	0%	0%	0%	0.00
Dementia	3%	4%	-1%	0.05
Drug Abuse	0%	0%	0%	0.01
Fluid and Electrolyte Disorders	6%	6%	0%	0.01
Hypothyroidism	11%	12%	0%	0.01
Hypertension complicated	4%	4%	0%	0.01
Hypertension uncomplicated	46%	47%	-1%	0.02
Liver Disease	1%	1%	0%	0.00
Lymphoma	1%	1%	0%	0.00
Metastatic Cancer	1%	1%	0%	0.00
Myocardial infraction	3%	3%	0%	0.00
Obesity	3%	3%	0%	0.01
Other neurological disorders	3%	4%	-1%	0.04
Paralysis	0%	1%	0%	0.01
Peptic Ulcer Disease excluding bleeding	1%	1%	0%	0.00
Peripheral vascular disorders	8%	9%	-1%	0.04
Psychosis	2%	2%	-1%	0.05
Pulmonary Circulation Disorders	1%	1%	0%	0.00
Renal Failure	7%	7%	0%	0.01
Rheumatoid arthritis collagen vascular disease	3%	3%	0%	0.01
Solid Tumor without metastasis	7%	6%	0%	0.01
Valvular Disease	5%	5%	0%	0.01
Weight loss	2%	2%	0%	0.02

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

Table Appendix B-2: Welvie Baseline Demographic and Health Characteristics, Medicare Advantage Ohio Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	92,341	90,162		
Average Age (Years)	74.88	74.95	-0.07	0.01
Age under 65	0%	0%	0%	0.00
Gender				
Male	43%	43%	0%	0.00
Female	57%	57%	0%	0.00
Race				
White	91%	91%	0%	0.01
Black	8%	7%	0%	0.01
Other	2%	2%	0%	0.00
Dual Eligible	6%	6%	0%	0.00
Medicare Eligibility				
Disabled	11%	12%	-1%	0.02
ESRD	0%	0%	0%	0.00
Aged	89%	88%	1%	0.02
Potential Risk Indicators for Preference-sensitive Surgeries Targeted by Program Name				
Any targeted diagnosis	86%	87%	-1%	0.01
Knee diagnosis	19%	19%	0%	0.00
Hip diagnosis	17%	17%	0%	0.00
Back diagnosis	28%	28%	0%	0.00
Heart diagnosis	33%	33%	0%	0.01
Evaluation and Management (E&M) Visits				
E&M Visits: 0	13%	12%	0%	0.02
E&M Visits: 1-5	41%	41%	0%	0.01
E&M Visits: 6-10	26%	26%	0%	0.00
E&M Visits: 11-15	12%	12%	0%	0.00
E&M Visits: 16+	9%	9%	0%	0.00
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	96%	96%	0%	0.01
1 SNF Stay (Prior Year)	2%	3%	0%	0.01
2+ SNF Stays (Prior Year)	1%	1%	0%	0.00
IP Stay before study enrollment				
0 IP Stays (1Q Prior)	95%	95%	0%	0.00
1 IP Stay (Prior Year)	4%	4%	0%	0.00
2+ IP Stays (Prior Year)	1%	1%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
0 IP Stays (Prior Year)	85%	85%	0%	0.01
1 IP Stay (Prior Year)	10%	10%	0%	0.01
2+ IP Stays (Prior Year)	5%	5%	0%	0.01
ER Visits (Pre-Enrollment Quarter)				
ER Visits: 0	93%	93%	0%	0.02
ER Visits: 1	6%	6%	0%	0.01
ER Visits: 2+	1%	1%	0%	0.01
Medical Cost per Beneficiary				
Cost (4Q Prior)	1,264	1,281	-17	0.00
Cost (3Q Prior)	1,326	1,363	-37	0.01
Cost (2Q Prior)	1,435	1,499	-64	0.01
Cost (1Q Prior)	1,572	1,595	-23	0.00
IP Cost (Prior Year)	1,894	1,943	-49	0.01
IP Cost (1Q Prior)	546	540	7	0.00
Frailty Measures				
Home Oxygen	3%	4%	0%	0.00
Urinary Catheter	0%	0%	0%	0.00
Wheelchair Use	0%	0%	0%	0.01
Walker Use	1%	1%	0%	0.01
Charlson Score	0.11	0.12	-0.01	0.01
Area Depravation Index (ADI)	100.55	100.65	-0.11	0.01
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP)	1%	1%	0%	0.01
Acute cerebrovascular disease (IP, 30 days prior)	0%	0%	0%	0.00
AMI (IP)	1%	1%	0%	0.00
AMI (IP, 30 days prior)	0%	0%	0%	0.00
Cerebrovascular disease	12%	12%	0%	0.01
Parkinson's disease and multiple sclerosis	1%	1%	0%	0.00
Asthma	18%	18%	0%	0.00
Coagulation and hemorrhagic disorders	3%	3%	0%	0.00
Congestive heart failure (All Settings)	8%	9%	0%	0.00
Congestive heart failure (IP)	1%	1%	0%	0.00
Coronary atherosclerosis	21%	22%	0%	0.01
Dementia	5%	5%	0%	0.01
Diabetes mellitus without complication	30%	30%	0%	0.00
Diabetes mellitus with complications	13%	13%	0%	0.00
Cardiac dysrhythmias, arrest and ventricular fibrillation	21%	21%	0%	0.00
Fluid and electrolyte disorders	10%	10%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Gastrointestinal hemorrhage (All Settings)	4%	4%	0%	0.01
Gastrointestinal hemorrhage (IP)	0%	0%	0%	0.01
Other heart disease	39%	40%	0%	0.00
Heart valve disorders	11%	10%	0%	0.00
Hepatitis	0%	0%	0%	0.00
Hypertension with complications	8%	8%	0%	0.00
Stomach, pancreas and lung cancer	1%	1%	0%	0.00
Peri- endo- and myocarditis	3%	4%	0%	0.01
Disorders of nervous system	7%	7%	0%	0.00
Other cancers	12%	12%	0%	0.01
Paralysis	1%	1%	0%	0.01
Pneumonia	8%	8%	0%	0.00
Pneumonia (IP, 30 days prior)	0%	0%	0%	0.00
Pulmonary heart disease	3%	3%	0%	0.00
Renal failure	10%	10%	0%	0.00
Respiratory failure (IP)	0%	0%	0%	0.00
Respiratory failure (IP, 30 days prior)	0%	0%	0%	0.01
Rheumatoid arthritis and related disease	2%	2%	0%	0.00
Septicemia	1%	1%	0%	0.00
Shock	0%	0%	0%	0.00
Tuberculosis	0%	0%	0%	0.01
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP)	1%	1%	0%	0.00
Heart valve procedures (IP)	0%	0%	0%	0.01
Hemodialysis	0%	0%	0%	0.00
Peritoneal dialysis	0%	0%	0%	0.00
Procedures on vessels of head and neck (IP)	2%	2%	0%	0.00
Radiology and chemotherapy	2%	2%	0%	0.00
Respiratory intubation and mechanical ventilation	1%	1%	0%	0.00
Blood transfusion	2%	2%	0%	0.01
Blood transfusion (IP)	2%	2%	0%	0.01
Transportation	12%	12%	0%	0.01
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories				
HCC1 HIV/AIDS	0%	0%	0%	0.01
HCC2 SEPTICEMIA, SEPSIS, SYSTEMIC INFLAM RESPONSE SYNDROME/SHOCK	2%	2%	0%	0.00
HCC6 OPPORTUNISTIC INFECTIONS	0%	0%	0%	0.00
HCC8 METASTATIC CANCER AND ACUTE LEUKEMIA	1%	1%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC9 LUNG AND OTHER SEVERE CANCERS	1%	1%	0%	0.01
HCC10 LYMPHOMA AND OTHER CANCERS	1%	1%	0%	0.00
HCC11 COLORECTAL, BLADDER, AND OTHER CANCERS	2%	2%	0%	0.01
HCC12 BREAST, PROSTATE, AND OTHER CANCERS AND TUMORS	6%	6%	0%	0.00
HCC17 DIABETES WITH ACUTE COMPLICATIONS	0%	0%	0%	0.00
HCC18 DIABETES WITH CHRONIC COMPLICATIONS	10%	10%	0%	0.00
HCC19 DIABETES WITHOUT COMPLICATION	17%	17%	0%	0.00
HCC21 PROTEIN-CALORIE MALNUTRITION	2%	2%	0%	0.01
HCC22 MORBID OBESITY	3%	3%	0%	0.01
HCC23 OTHER SIGNIFICANT ENDOCRINE AND METABOLIC DISORDERS	3%	3%	0%	0.00
HCC27 END-STAGE LIVER DISEASE	0%	0%	0%	0.01
HCC28 CIRRHOSIS OF LIVER	0%	0%	0%	0.00
HCC29 CHRONIC HEPATITIS	0%	0%	0%	0.00
HCC33 INTESTINAL OBSTRUCTION/PERFORATION	1%	2%	0%	0.01
HCC34 CHRONIC PANCREATITIS	0%	0%	0%	0.00
HCC35 INFLAMMATORY BOWEL DISEASE	1%	1%	0%	0.01
HCC39 BONE/JOINT/MUSCLE INFECTIONS/NECROSIS	1%	1%	0%	0.01
HCC40 RHEUMATOID ARTHRITIS AND INFLAM CONNECTIVE TISSUE DISEASE	5%	5%	0%	0.01
HCC46 SEVERE HEMATOLOGICAL DISORDERS	0%	0%	0%	0.01
HCC47 DISORDERS OF IMMUNITY	1%	1%	0%	0.01
HCC48 COAGULATION DEFECTS & OTH SPECIFIED HEMATOLOGICAL DISORDRS	4%	4%	0%	0.01
HCC51 DEMENTIA WITH COMPLICATIONS	1%	1%	0%	0.01
HCC52 DEMENTIA WITHOUT COMPLICATION	5%	6%	0%	0.00
HCC54 DRUG/ALCOHOL PSYCHOSIS	0%	0%	0%	0.00
HCC55 DRUG/ALCOHOL DEPENDENCE	0%	0%	0%	0.00
HCC57 SCHIZOPHRENIA	0%	0%	0%	0.01
HCC58 MAJOR DEPRESSIVE, BIPOLAR, AND PARANOID DISORDERS	3%	3%	0%	0.00
HCC70 QUADRIPLEGIA	0%	0%	0%	0.01
HCC71 PARAPLEGIA	0%	0%	0%	0.00
HCC72 SPINAL CORD DISORDERS/INJURIES	0%	0%	0%	0.01
HCC73 AMYOTROPHIC LATERAL SCLEROSIS & OTH MOTOR NEURON DISEASE	0%	0%	0%	0.00
HCC74 CEREBRAL PALSY	0%	0%	0%	0.01

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC75 POLYNEUROPATHY	6%	6%	0%	0.00
HCC76 MUSCULAR DYSTROPHY	0%	0%	0%	0.00
HCC77 MULTIPLE SCLEROSIS	0%	0%	0%	0.00
HCC78 PARKINSONS AND HUNTINGTONS DISEASES	1%	1%	0%	0.00
HCC79 SEIZURE DISORDERS AND CONVULSIONS	2%	2%	0%	0.00
HCC80 COMA, BRAIN COMPRESSION/ANOXIC DAMAGE	0%	0%	0%	0.00
HCC82 RESPIRATOR DEPENDENCE/TRACHEOSTOMY STATUS	0%	0%	0%	0.00
HCC83 RESPIRATORY ARREST	0%	0%	0%	0.00
HCC84 CARDIO-RESPIRATORY FAILURE AND SHOCK	3%	3%	0%	0.00
HCC85 CONGESTIVE HEART FAILURE	12%	12%	0%	0.01
HCC86 ACUTE MYOCARDIAL INFARCTION	1%	1%	0%	0.00
HCC87 UNSTABLE ANGINA & OTH ACUTE ISCHEMIC HEART DISEASE	2%	2%	0%	0.00
HCC88 ANGINA PECTORIS	2%	2%	0%	0.00
HCC96 SPECIFIED HEART ARRHYTHMIAS	14%	14%	0%	0.00
HCC99 CEREBRAL HEMORRHAGE	0%	0%	0%	0.00
HCC100 ISCHEMIC OR UNSPECIFIED STROKE	3%	3%	0%	0.01
HCC103 HEMIPLEGIA/HEMIPARESIS	1%	1%	0%	0.00
HCC104 MONOPLEGIA, OTHER PARALYTIC SYNDROMES	0%	0%	0%	0.00
HCC106 ATHEROSCLEROSIS OF EXTREMITIES W/ULCERATION OR GANGRENE	0%	0%	0%	0.01
HCC107 VASCULAR DISEASE WITH COMPLICATIONS	2%	2%	0%	0.00
HCC108 VASCULAR DISEASE	13%	13%	0%	0.00
HCC110 CYSTIC FIBROSIS	0%	0%	0%	0.00
HCC111 CHRONIC OBSTRUCTIVE PULMONARY DISEASE	15%	15%	0%	0.00
HCC112 FIBROSIS OF LUNG AND OTHER CHRONIC LUNG DISORDERS	1%	1%	0%	0.00
HCC114 ASPIRATION AND SPECIFIED BACTERIAL PNEUMONIAS	1%	1%	0%	0.01
HCC115 PNEUMOCOCCAL PNEUMONIA, EMPYEMA, LUNG ABSCESS	0%	0%	0%	0.01
HCC122 PROLIFERATIVE DIABTIC RETINOPATHY & VITREOUS HEMORR	1%	1%	0%	0.00
HCC124 EXUDATIVE MACULAR DEGENERATION	2%	2%	0%	0.01
HCC134 DIALYSIS STATUS	0%	0%	0%	0.01
HCC135 ACUTE RENAL FAILURE	4%	4%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC136 CHRONIC KIDNEY DISEASE, STAGE 5	0%	0%	0%	0.00
HCC137 CHRONIC KIDNEY DISEASE, SEVERE (STAGE 4)	1%	1%	0%	0.00
HCC138 CHRONIC KIDNEY DISEASE, MODERATE (STAGE 3)	3%	3%	0%	0.00
HCC139 CHRONIC KIDNEY DIS, MILD OR UNSPEC (STG 1-2 OR UNSPEC)	3%	3%	0%	0.00
HCC140 UNSPECIFIED RENAL FAILURE	0%	0%	0%	0.00
HCC141 NEPHRITIS	0%	0%	0%	0.00
HCC157 PRESS ULCER OF SKN W/NECROSIS THR TO MUSCLE,TENDON, BONE	0%	0%	0%	0.00
HCC158 PRESSURE ULCER OF SKIN WITH FULL THICKNESS SKIN LOSS	0%	0%	0%	0.01
HCC159 PRESSURE ULCER OF SKIN WITH PARTIAL THICKNESS SKIN LOSS	0%	0%	0%	0.01
HCC160 PRESSURE PRE-ULCER SKIN CHANGES OR UNSPECIFIED STAGE	1%	1%	0%	0.00
HCC161 CHRONIC ULCER OF SKIN, EXCEPT PRESSURE	2%	2%	0%	0.00
HCC162 SEVERE SKIN BURN OR CONDITION	0%	0%	0%	0.00
HCC166 SEVERE HEAD INJURY	0%	0%	0%	0.01
HCC167 MAJOR HEAD INJURY	0%	0%	0%	0.00
HCC169 VERTEBRAL FRACTURES WITHOUT SPINAL CORD INJURY	1%	1%	0%	0.01
HCC170 HIP FRACTURE/DISLOCATION	1%	1%	0%	0.00
HCC173 TRAUMATIC AMPUTATIONS AND COMPLICATIONS	0%	0%	0%	0.00
HCC176 COMPLICATIONS OF SPECIFIED IMPLANTED DEVICE OR GRAFT	1%	1%	0%	0.01
HCC186 MAJOR ORGAN TRANSPLANT OR REPLACEMENT STATUS	0%	0%	0%	0.00
HCC188 ARTIFICIAL OPENINGS FOR FEEDING OR ELIMINATION	1%	1%	0%	0.01
HCC189 AMPUTATION STATUS, LOWER LIMB/AMPUTATION COMPLICATIONS	0%	0%	0%	0.00
Comorbidity Categories (Pre-Enrollment Quarter)				
Depression	1%	1%	0%	0.00
AIDS HIV	0%	0%	0%	0.00
Alcohol Abuse	0%	0%	0%	0.00
Cardiac Arrhythmias	11%	11%	0%	0.00
Congestive heart failure	5%	5%	0%	0.00
Chronic pulmonary disease	10%	10%	0%	0.00
Coagulopathy	1%	1%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Deficiency Anemia	3%	3%	0%	0.00
Diabetes complicated	19%	19%	0%	0.01
Diabetes uncomplicated	0%	0%	0%	0.00
Dementia	1%	1%	0%	0.00
Drug Abuse	0%	0%	0%	0.01
Fluid and Electrolyte Disorders	3%	3%	0%	0.00
Hypothyroidism	9%	9%	0%	0.01
Hypertension complicated	2%	2%	0%	0.00
Hypertension uncomplicated	40%	41%	-1%	0.01
Liver Disease	1%	1%	0%	0.01
Lymphoma	1%	1%	0%	0.01
Metastatic Cancer	1%	1%	0%	0.00
Myocardial infraction	1%	1%	0%	0.01
Obesity	2%	2%	0%	0.00
Other neurological disorders	2%	2%	0%	0.00
Paralysis	0%	0%	0%	0.01
Peptic Ulcer Disease excluding bleeding	0%	0%	0%	0.01
Peripheral vascular disorders	5%	5%	0%	0.01
Psychosis	1%	1%	0%	0.01
Pulmonary Circulation Disorders	1%	1%	0%	0.01
Renal Failure	5%	5%	0%	0.00
Rheumatoid arthritis collagen vascular disease	2%	2%	0%	0.00
Solid Tumor without metastasis	5%	5%	0%	0.00
Valvular Disease	4%	4%	0%	0.01
Weight loss	2%	2%	0%	0.00

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

Table Appendix B-3: Welvie Baseline Demographic and Health Characteristics, High-dose Intervention Cohorts

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
Number of Beneficiaries	1,197	3,598
Average Age (Years)	73.40	72.55
Age under 65	0%	1%
Gender		
Male	48%	46%
Female	52%	54%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
Race		
White	92%	91%
Black	6%	6%
Other	2%	3%
Dual Eligible	8%	7%
Medicare Eligibility		
Disabled	11%	11%
ESRD	0%	0%
Aged	88%	89%
Potential Risk Indicators for Preference-sensitive Surgeries Targeted by Program Name		
Any targeted diagnosis	95%	90%
Knee diagnosis	30%	22%
Hip diagnosis	25%	19%
Back diagnosis	41%	33%
Heart diagnosis	40%	30%
Evaluation and Management (E&M) Visits		
E&M Visits: 0	5%	8%
E&M Visits: 1-5	33%	41%
E&M Visits: 6-10	31%	27%
E&M Visits: 11-15	17%	13%
E&M Visits: 16+	14%	10%
Resource Use per Beneficiary (Pre-Enrollment Year)		
0 SNF Stays (Prior Year)	96%	98%
1 SNF Stay (Prior Year)	2%	2%
2+ SNF Stays (Prior Year)	2%	1%
IP Stay before study enrollment		
0 IP Stays (1Q Prior)	95%	96%
1 IP Stay (Prior Year)	4%	3%
2+ IP Stays (Prior Year)	1%	1%
0 IP Stays (Prior Year)	85%	88%
1 IP Stay (Prior Year)	11%	9%
2+ IP Stays (Prior Year)	5%	3%
ER Visits (Pre-Enrollment Quarter)		
ER Visits: 0	93%	94%
ER Visits: 1	6%	5%
ER Visits: 2+	1%	1%
Medical Cost per Beneficiary		

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
Cost (4Q Prior)	1,749	1,327
Cost (3Q Prior)	1,942	1,250
Cost (2Q Prior)	1,703	1,195
Cost (1Q Prior)	1,648	1,266
IP Cost (Prior Year)	1,985	1,486
IP Cost (1Q Prior)	451	343
Frailty Measures		
Home Oxygen	3%	2%
Urinary Catheter	0%	0%
Wheelchair Use	0%	0%
Walker Use	1%	1%
Charlson Score	0.15	0.06
Area Depravation Index (ADI)	100.45	99.84
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)		
Acute cerebrovascular disease (IP)	1%	0%
Acute cerebrovascular disease (IP, 30 days prior)	0%	0%
AMI (IP)	0%	0%
AMI (IP, 30 days prior)	0%	0%
Cerebrovascular disease	13%	9%
Parkinson's disease and multiple sclerosis	1%	1%
Asthma	23%	17%
Coagulation and hemorrhagic disorders	5%	3%
Congestive heart failure (All Settings)	7%	6%
Congestive heart failure (IP)	1%	0%
Coronary atherosclerosis	27%	19%
Dementia	5%	2%
Diabetes mellitus without complication	33%	29%
Diabetes mellitus with complications	14%	11%
Cardiac dysrhythmias, arrest and ventricular fibrillation	25%	20%
Fluid and electrolyte disorders	11%	8%
Gastrointestinal hemorrhage (All Settings)	5%	3%
Gastrointestinal hemorrhage (IP)	0%	0%
Other heart disease	47%	38%
Heart valve disorders	14%	9%
Hepatitis	0%	1%
Hypertension with complications	11%	7%
Stomach, pancreas and lung cancer	1%	1%
Peri- endo- and myocarditis	4%	3%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
Disorders of nervous system	9%	6%
Other cancers	16%	12%
Paralysis	1%	0%
Pneumonia	7%	5%
Pneumonia (IP, 30 days prior)	0%	0%
Pulmonary heart disease	4%	2%
Renal failure	13%	8%
Respiratory failure (IP)	0%	0%
Respiratory failure (IP, 30 days prior)	0%	0%
Rheumatoid arthritis and related disease	3%	2%
Septicemia	1%	1%
Shock	1%	0%
Tuberculosis	0%	0%
Procedures (Pre-Enrollment Year)		
Bypass and PTCA (IP)	0%	1%
Heart valve procedures (IP)	0%	0%
Hemodialysis	0%	0%
Peritoneal dialysis	0%	0%
Procedures on vessels of head and neck (IP)	2%	1%
Radiology and chemotherapy	3%	2%
Respiratory intubation and mechanical ventilation	1%	0%
Blood transfusion	2%	1%
Blood transfusion (IP)	2%	1%
Transportation	11%	9%
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories		
HCC1 HIV/AIDS		0%
HCC2 SEPTICEMIA, SEPSIS, SYSTEMIC INFLAM RESPONSE SYNDROME/SHOCK		1%
HCC6 OPPORTUNISTIC INFECTIONS		0%
HCC8 METASTATIC CANCER AND ACUTE LEUKEMIA		0%
HCC9 LUNG AND OTHER SEVERE CANCERS		1%
HCC10 LYMPHOMA AND OTHER CANCERS		1%
HCC11 COLORECTAL, BLADDER, AND OTHER CANCERS		2%
HCC12 BREAST, PROSTATE, AND OTHER CANCERS AND TUMORS		6%
HCC17 DIABETES WITH ACUTE COMPLICATIONS		0%
HCC18 DIABETES WITH CHRONIC COMPLICATIONS		8%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
HCC19 DIABETES WITHOUT COMPLICATION		14%
HCC21 PROTEIN-CALORIE MALNUTRITION		0%
HCC22 MORBID OBESITY		4%
HCC23 OTHER SIGNIFICANT ENDOCRINE AND METABOLIC DISORDERS		2%
HCC27 END-STAGE LIVER DISEASE		0%
HCC28 CIRRHOSIS OF LIVER		0%
HCC29 CHRONIC HEPATITIS		0%
HCC33 INTESTINAL OBSTRUCTION/PERFORATION		1%
HCC34 CHRONIC PANCREATITIS		0%
HCC35 INFLAMMATORY BOWEL DISEASE		1%
HCC39 BONE/JOINT/MUSCLE INFECTIONS/NECROSIS		1%
HCC40 RHEUMATOID ARTHRITIS AND INFLAM CONNECTIVE TISSUE DISEASE		5%
HCC46 SEVERE HEMATOLOGICAL DISORDERS		0%
HCC47 DISORDERS OF IMMUNITY		1%
HCC48 COAGULATION DEFECTS & OTH SPECIFIED HEMATOLOGICAL DISORDRS		3%
HCC51 DEMENTIA WITH COMPLICATIONS		0%
HCC52 DEMENTIA WITHOUT COMPLICATION		2%
HCC54 DRUG/ALCOHOL PSYCHOSIS		0%
HCC55 DRUG/ALCOHOL DEPENDENCE		0%
HCC57 SCHIZOPHRENIA		0%
HCC58 MAJOR DEPRESSIVE, BIPOLAR, AND PARANOID DISORDERS		3%
HCC70 QUADRIPLEGIA		0%
HCC71 PARAPLEGIA		0%
HCC72 SPINAL CORD DISORDERS/INJURIES		0%
HCC73 AMYOTROPHIC LATERAL SCLEROSIS & OTH MOTOR NEURON DISEASE		0%
HCC74 CEREBRAL PALSY		0%
HCC75 POLYNEUROPATHY		5%
HCC76 MUSCULAR DYSTROPHY		0%
HCC77 MULTIPLE SCLEROSIS		0%
HCC78 PARKINSONS AND HUNTINGTONS DISEASES		1%
HCC79 SEIZURE DISORDERS AND CONVULSIONS		1%
HCC80 COMA, BRAIN COMPRESSION/ANOXIC DAMAGE		0%
HCC82 RESPIRATOR DEPENDENCE/TRACHEOSTOMY STATUS		0%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
HCC83 RESPIRATORY ARREST		0%
HCC84 CARDIO-RESPIRATORY FAILURE AND SHOCK		2%
HCC85 CONGESTIVE HEART FAILURE		8%
HCC86 ACUTE MYOCARDIAL INFARCTION		1%
HCC87 UNSTABLE ANGINA & OTH ACUTE ISCHEMIC HEART DISEASE		2%
HCC88 ANGINA PECTORIS		2%
HCC96 SPECIFIED HEART ARRHYTHMIAS		11%
HCC99 CEREBRAL HEMORRHAGE		0%
HCC100 ISCHEMIC OR UNSPECIFIED STROKE		2%
HCC103 HEMIPLEGIA/HEMIPARESIS		0%
HCC104 MONOPLEGIA, OTHER PARALYTIC SYNDROMES		0%
HCC106 ATHEROSCLEROSIS OF EXTREMITIES W/ULCERATION OR GANGRENE		0%
HCC107 VASCULAR DISEASE WITH COMPLICATIONS		1%
HCC108 VASCULAR DISEASE		10%
HCC110 CYSTIC FIBROSIS		0%
HCC111 CHRONIC OBSTRUCTIVE PULMONARY DISEASE		12%
HCC112 FIBROSIS OF LUNG AND OTHER CHRONIC LUNG DISORDERS		1%
HCC114 ASPIRATION AND SPECIFIED BACTERIAL PNEUMONIAS		0%
HCC115 PNEUMOCOCCAL PNEUMONIA, EMPYEMA, LUNG ABSCESS		0%
HCC122 PROLIFERATIVE DIABTIC RETINOPATHY & VITREOUS HEMORR		1%
HCC124 EXUDATIVE MACULAR DEGENERATION		1%
HCC134 DIALYSIS STATUS		0%
HCC135 ACUTE RENAL FAILURE		2%
HCC136 CHRONIC KIDNEY DISEASE, STAGE 5		0%
HCC137 CHRONIC KIDNEY DISEASE, SEVERE (STAGE 4)		0%
HCC138 CHRONIC KIDNEY DISEASE, MODERATE (STAGE 3)		3%
HCC139 CHRONIC KIDNEY DIS, MILD OR UNSPEC (STG 1-2 OR UNSPEC)		2%
HCC140 UNSPECIFIED RENAL FAILURE		0%
HCC141 NEPHRITIS		0%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
HCC157 PRESS ULCER OF SKN W/NECROSIS THR TO MUSCLE,TENDON, BONE		0%
HCC158 PRESSURE ULCER OF SKIN WITH FULL THICKNESS SKIN LOSS		0%
HCC159 PRESSURE ULCER OF SKIN WITH PARTIAL THICKNESS SKIN LOSS		0%
HCC160 PRESSURE PRE-ULCER SKIN CHANGES OR UNSPECIFIED STAGE		0%
HCC161 CHRONIC ULCER OF SKIN, EXCEPT PRESSURE		1%
HCC162 SEVERE SKIN BURN OR CONDITION		0%
HCC166 SEVERE HEAD INJURY		0%
HCC167 MAJOR HEAD INJURY		0%
HCC169 VERTEBRAL FRACTURES WITHOUT SPINAL CORD INJURY		1%
HCC170 HIP FRACTURE/DISLOCATION		1%
HCC173 TRAUMATIC AMPUTATIONS AND COMPLICATIONS		0%
HCC176 COMPLICATIONS OF SPECIFIED IMPLANTED DEVICE OR GRAFT		1%
HCC186 MAJOR ORGAN TRANSPLANT OR REPLACEMENT STATUS		0%
HCC188 ARTIFICIAL OPENINGS FOR FEEDING OR ELIMINATION		0%
HCC189 AMPUTATION STATUS, LOWER LIMB/AMPUTATION COMPLICATIONS		0%
Comorbidity Categories (Pre-Enrollment Quarter)		
Depression	2%	1%
AIDS HIV	0%	0%
Alcohol Abuse	0%	0%
Cardiac Arrhythmias	14%	10%
Congestive heart failure	6%	3%
Chronic pulmonary disease	12%	9%
Coagulopathy	1%	1%
Deficiency Anemia	3%	2%
Diabetes complicated	21%	17%
Diabetes uncomplicated	0%	0%
Dementia	1%	1%
Drug Abuse	0%	0%
Fluid and Electrolyte Disorders	5%	3%
Hypothyroidism	11%	9%
Hypertension complicated	4%	2%

Characteristics	Medicare Parts A & B Ohio	Medicare Advantage Ohio
Hypertension uncomplicated	45%	38%
Liver Disease	1%	1%
Lymphoma	1%	1%
Metastatic Cancer	1%	0%
Myocardial infraction	2%	1%
Obesity	4%	3%
Other neurological disorders	2%	1%
Paralysis	0%	0%
Peptic Ulcer Disease excluding bleeding	1%	0%
Peripheral vascular disorders	8%	4%
Psychosis	1%	0%
Pulmonary Circulation Disorders	1%	1%
Renal Failure	6%	4%
Rheumatoid arthritis collagen vascular disease	4%	3%
Solid Tumor without metastasis	7%	5%
Valvular Disease	6%	4%
Weight loss	1%	1%

Note: High-dose intervention cohorts consist of beneficiaries who completed at least one of the six steps of the Welvie decision aid

B.2 Mortality and Readmissions

Table Appendix B-4: Difference in Mortality per 1,000 Beneficiaries after Welvie Enrollment, Medicare Parts A and B Ohio and Medicare Advantage Ohio Cohorts

Medicare Cohort	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Medicare Parts A and B Ohio								
Number of Participant Beneficiaries	62531	62531	61660	60800	59929	58990	58121	57285
Difference[b]	-808.48*	-3.99*	-1.26	-1.67*	-2.52*	-2.57*	-0.33	-1.01
95% Confidence Interval	(-1,042.5 | -574.5)	(-5.4 | -2.5)	(-2.7 | 0.1)	(-3.1 | -0.2)	(-4.1 | -1.0)	(-4.1 | -1.1)	(-1.8 | 1.1)	(-2.6 | 0.5)
P-Value	<0.001	<0.001	0.078	0.023	0.001	<0.001	0.659	0.199
Medicare Advantage Ohio								
Number of Participant Beneficiaries	92341	92341	91223	90224	83927	83130	80812	79594
Difference	-57.06	0.18	-0.25	-0.49	-0.25	0.09	0.21	-0.11
95% Confidence Interval	(-277.8 | 163.7)	(-0.7 | 1.1)	(-1.2 | 0.7)	(-1.4 | 0.4)	(-1.2 | 0.7)	(-0.9 | 1.1)	(-0.8 | 1.3)	(-1.2 | 0.9)
P-Value	0.612	0.685	0.613	0.296	0.597	0.865	0.701	0.831

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b] The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Table Appendix B-5: Difference in Readmissions per 1,000 Beneficiaries after Welvie Enrollment, Medicare Parts A and B Ohio Cohort

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	62531	62531	61660	60800	59929	58990	58121	57285
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:								
All Inpatient Admissions	19,413	4,485	4,232	4,250	4,236	4,292	3,869	4,012
Difference[b]	-121.18	-5.05	6.63	-24.33*	-7.58	18.91*	0.46	-18.45
95% Confidence Interval	(-326.1 | 83.7)	(-22.6 | 12.5)	(-11.8 | 25.1)	(-42.8 | -5.9)	(-26.4 | 11.2)	(0.4 | 37.4)	(-18.5 | 19.4)	(-37.0 | 0.1)

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.246	0.572	0.482	0.010	0.429	0.045	0.962	0.051
Inpatient Surgery Admissions	7,861	1,292	1,309	1,371	1,302	1,268	1,218	1,218
Difference	-118.34*	-21.78	-8.99	-49.66*	-14.23	14.99	3.81	-12.73
95% Confidence Interval	(-230.9 | -5.8)	(-54.4 | 10.9)	(-41.6 | 23.6)	(-82.0 | -17.4)	(-47.8 | 19.4)	(-18.7 | 48.7)	(-30.6 | 38.2)	(-45.6 | 20.2)
P-Value	0.039	0.191	0.589	0.003	0.407	0.384	0.828	0.448
Inpatient PS[c] Orthopedic Surgery Admissions	1,999	311	297	371	305	293	291	299
Difference	-55.97*	-55.49	-12.26	-34.86	-41.34	25.73	9.68	-66.49*
95% Confidence Interval	(-104.1 | -7.8)	(-114.1 | 3.1)	(-71.2 | 46.7)	(-89.4 | 19.7)	(-104.2 | 21.5)	(-33.7 | 85.2)	(-46.3 | 65.7)	(-127.7 | -5.3)
P-Value	0.023	0.063	0.683	0.211	0.197	0.396	0.735	0.033
Inpatient PS Cardiac Surgery Admissions	1,105	176	191	175	156	148	152	144
Difference	-0.45	-56.55	22.33	56.34	-71.12	3.97	-3.61	44.71
95% Confidence Interval	(-40.7 | 39.8)	(-143.4 | 30.3)	(-61.9 | 106.6)	(-27.3 | 140.0)	(-170.8 | 28.5)	(-98.6 | 106.5)	(-103.8 | 96.5)	(-55.1 | 144.5)
P-Value	0.983	0.202	0.604	0.187	0.162	0.940	0.944	0.380
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission	19,413	4,485	4,232	4,250	4,236	4,292	3,869	4,012
Difference	-115.19	-2.05	2.62	-19.08*	-5.48	13.67	-1.53	-16.33
95% Confidence Interval	(-308.3 | 77.9)	(-18.6 | 14.5)	(-14.8 | 20.1)	(-36.4 | -1.8)	(-23.2 | 12.2)	(-3.8 | 31.1)	(-19.4 | 16.3)	(-33.7 | 1.1)
P-Value	0.242	0.808	0.768	0.031	0.545	0.125	0.867	0.066

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b] The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

[c] PS = Preference-sensitive.

Table Appendix B-6: Difference in Readmissions per 1,000 Beneficiaries after Welvie Enrollment, Medicare Advantage Ohio Cohort

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	92341	92341	91223	90224	83927	83130	80812	79594
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:								
All Inpatient Admissions	20732	5282	5156	4553	3878	3850	3578	3417
Difference[b]	-62.21	-0.70	0.39	-13.49	-4.89	-2.88	11.95	-3.45
95% Confidence Interval	(-256.1 | 131.6)	(-16.3 | 14.9)	(-15.4 | 16.1)	(-30.1 | 3.1)	(-22.7 | 12.9)	(-21.0 | 15.3)	(-6.9 | 30.8)	(-22.6 | 15.7)
P-Value	0.529	0.929	0.961	0.112	0.591	0.756	0.214	0.724
Inpatient Surgery Admissions	9300	2,055	1,907	1,663	1,501	1,102	1,369	1,341
Difference	-44.58	6.42	-19.05	-20.10	-9.40	-1.63	22.22	-1.89
95% Confidence Interval	(-159.1 | 69.9)	(-18.0 | 30.9)	(-44.7 | 6.6)	(-46.7 | 6.5)	(-37.3 | 18.5)	(-34.1 | 30.9)	(-7.3 | 51.7)	(-31.4 | 27.6)
P-Value	0.445	0.607	0.145	0.139	0.509	0.922	0.140	0.900
Inpatient PS[c] Orthopedic Surgery Admissions	3373	754	664	628	513	418	447	459
Difference	-9.96	-8.61	-27.69	-26.56	-10.41	17.43	70.97*	-4.50
95% Confidence Interval	(-73.1 | 53.2)	(-46.1 | 28.9)	(-67.0 | 11.6)	(-65.7 | 12.6)	(-55.5 | 34.6)	(-32.2 | 67.0)	(23.5 | 118.5)	(-52.6 | 43.6)
P-Value	0.757	0.652	0.167	0.183	0.650	0.491	0.003	0.854
Inpatient PS Cardiac Surgery Admissions	1958	433	408	364	263	244	254	228
Difference	-17.60	-18.61	5.72	-44.86	-35.94	2.59	29.19	25.71
95% Confidence Interval	(-69.3 | 34.1)	(-74.7 | 37.4)	(-48.2 | 59.7)	(-100.8 | 11.1)	(-104.3 | 32.4)	(-68.4 | 73.6)	(-41.8 | 100.2)	(-41.9 | 93.3)
P-Value	0.505	0.515	0.835	0.116	0.303	0.943	0.420	0.456
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission	20732	5282	5156	4553	3878	3850	3578	3417

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Difference	-50.69	-4.00	6.89	-13.31	-3.12	-3.98	11.18	-4.98
95% Confidence Interval	(-235.9 | 134.5)	(-18.9 | 10.9)	(-8.2 | 22.0)	(-29.2 | 2.6)	(-20.2 | 13.9)	(-21.2 | 13.3)	(-6.9 | 29.2)	(-23.1 | 13.1)
P-Value	0.592	0.599	0.371	0.101	0.720	0.651	0.225	0.590

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b] The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

[c] PS = Preference-sensitive.

Figure B-1: Welvie Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort

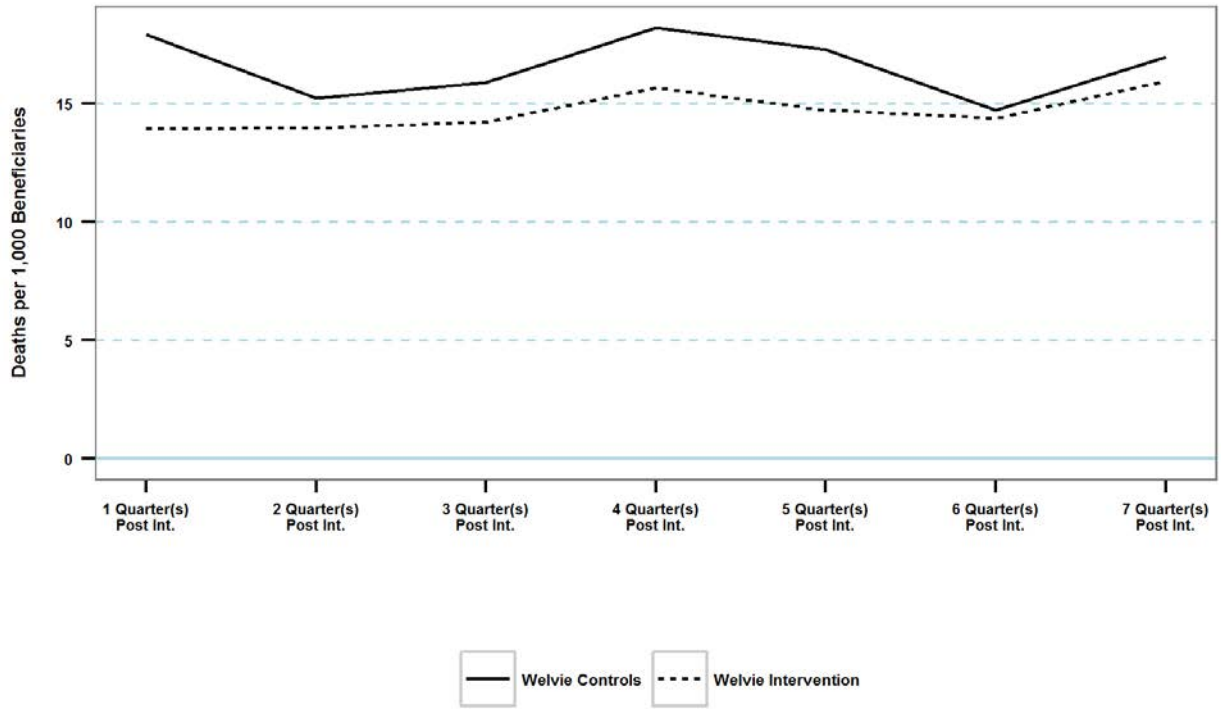


Figure B-2: Welvie Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Advantage Ohio Cohort

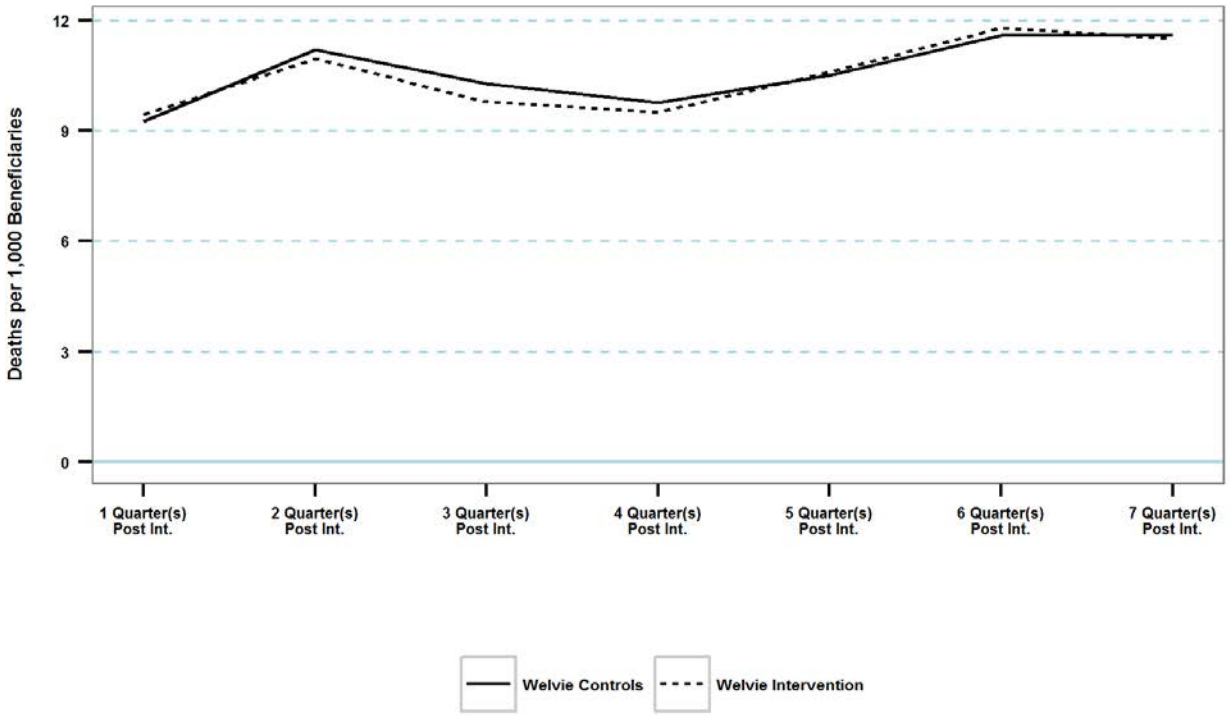


Figure B-3: Welvie Readmissions per 1,000 beneficiaries by Quarter, Medicare Parts A and B Ohio Cohort

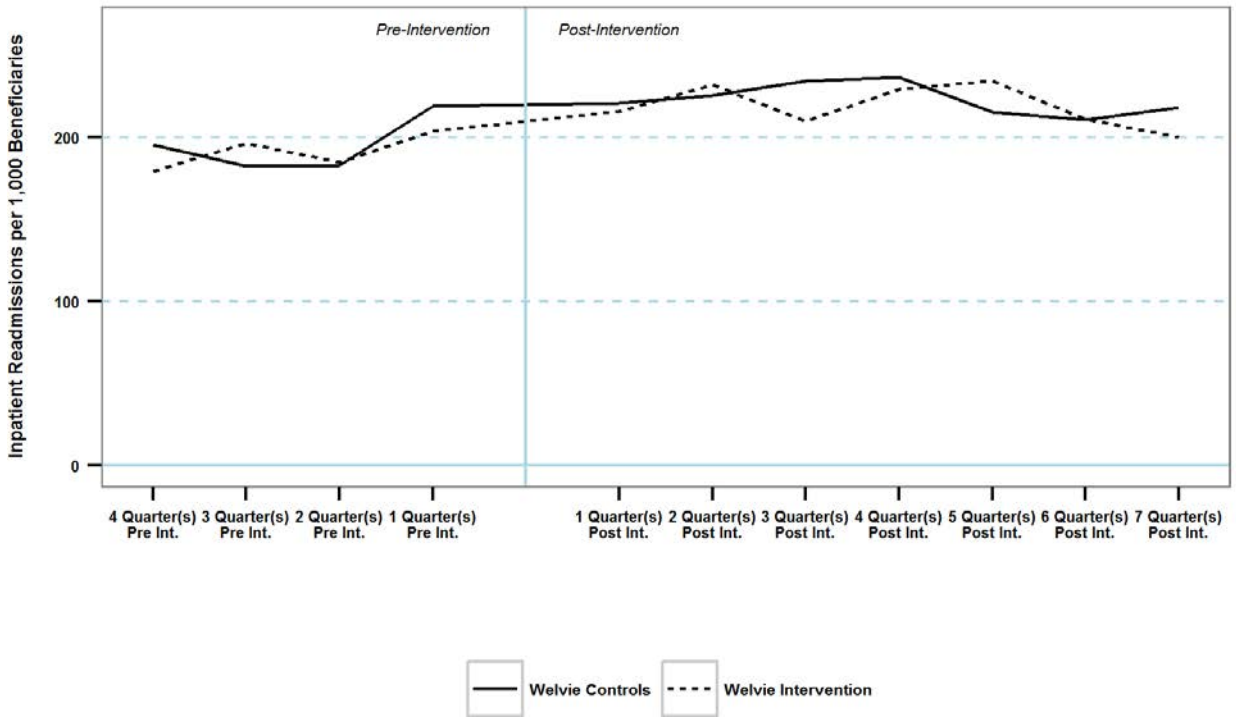


Figure B-4: Welvie Readmissions per 1,000 beneficiaries by Quarter, Medicare Advantage Ohio Cohort

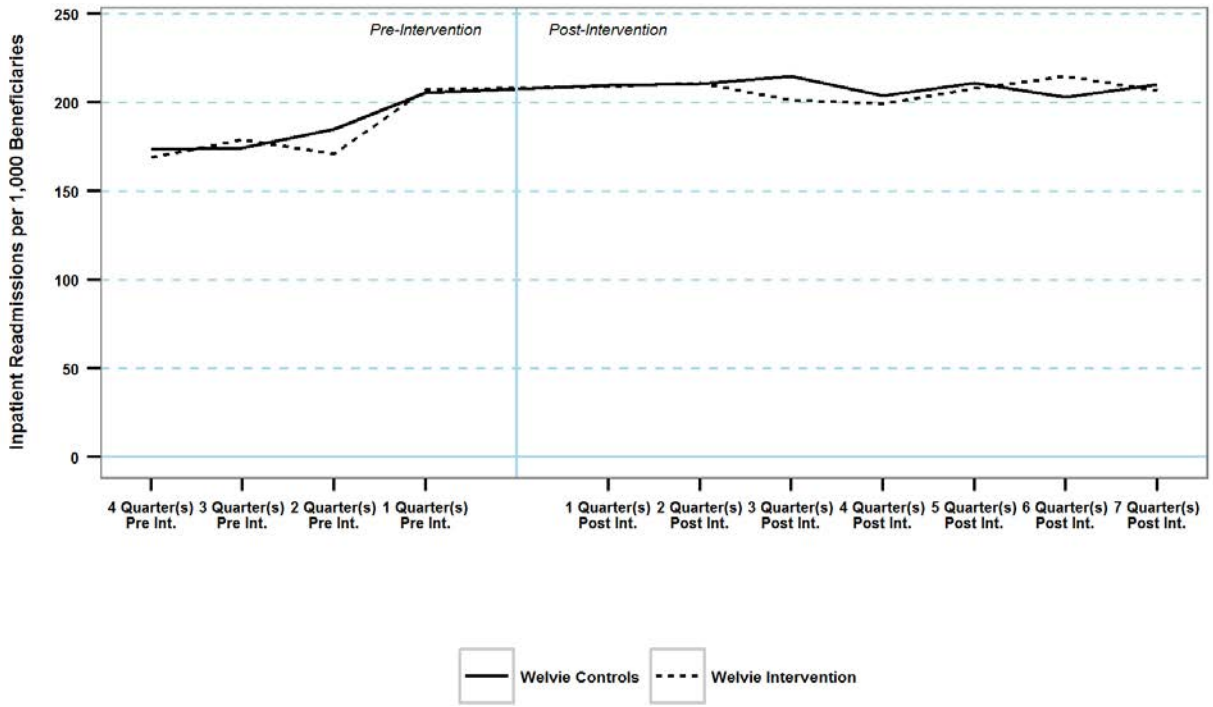


Table Appendix B-7: Welvie Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q1 to Q4

Measures	Q1		Q2		Q3		Q4	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	62531	52559	61660	51617	60800	50832	59929	50018
All-Cause Mortality per 1,000 Beneficiaries	13.9	17.9	13.9	15.2	14.2	15.9	15.7	18.2
30-Day Hospital Readmission per 1,000 Beneficiaries Following:								
All Inpatient Admissions	215.8	220.9	231.8	225.2	209.6	234.0	229.0	236.6
Inpatient Surgery Admissions	205.9	227.7	209.3	218.3	188.2	237.8	220.4	234.7
Inpatient PS[a] Orthopedic Surgery Admissions	112.5	168.0	134.7	146.9	124.0	158.8	150.8	192.2
Inpatient PS Cardiac Surgery Admissions	187.5	244.0	209.4	187.1	188.6	132.2	198.7	269.8
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	186.4	188.5	196.1	193.5	177.9	197.0	195.5	200.9

[a]PS = Preference-sensitive

Table Appendix B-8: Welvie Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q5 to Q7

Measures	Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	58990	49108	58121	48257	57285	47547
All-Cause Mortality per 1,000 Beneficiaries	14.7	17.3	14.4	14.7	15.9	17.0
30-Day Hospital Readmission per 1,000 Beneficiaries Following:						
All Inpatient Admissions	234.2	215.2	211.2	210.7	199.7	218.1
Inpatient Surgery Admissions	224.8	209.8	215.9	212.1	180.9	193.6
Inpatient PS[a] Orthopedic Surgery Admissions	150.2	124.4	123.7	114.0	107.0	173.5
Inpatient PS Cardiac Surgery Admissions	250.0	246.0	230.3	233.9	243.1	198.3
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	199.2	185.5	179.4	180.9	169	185.3

[a]PS = Preference-sensitive

Table Appendix B-9: Welvie Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q1 to Q4

Measures	Q1		Q2		Q3		Q4	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	92341	90162	91223	88831	90224	87836	83927	81744
All-Cause Mortality per 1,000 Beneficiaries	9.4	9.2	11.0	11.2	9.8	10.3	9.5	9.7
30-Day Hospital Readmission per 1,000 Beneficiaries Following:								
All Inpatient Admissions	208.8	209.5	210.6	210.2	201.2	214.7	198.8	203.7
Inpatient Surgery Admissions	203.4	197.0	197.2	216.2	188.8	208.9	179.9	189.3
Inpatient PS[a] Orthopedic Surgery Admissions	157.8	166.4	141.6	169.3	133.8	160.3	148.1	158.6
Inpatient PS Cardiac Surgery Admissions	224.0	242.6	196.1	190.4	170.3	215.2	201.5	237.5
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	184.6	188.6	191.0	184.2	179.2	192.5	177.2	180.3

[a]PS = Preference-sensitive

Table Appendix B-10: Welvie Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q5 to Q7

Measures	Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	83130	80947	80812	78630	79594	77342
All-Cause Mortality per 1,000 Beneficiaries	10.6	10.5	11.8	11.6	11.5	11.6
30-Day Hospital Readmission per 1,000 Beneficiaries Following:						
All Inpatient Admissions	207.8	210.7	214.6	202.7	206.6	210.1
Inpatient Surgery Admissions	191.5	193.1	200.1	177.9	184.2	186.1
Inpatient PS[a] Orthopedic Surgery Admissions	160.3	142.9	187.9	116.9	152.5	157.0
Inpatient PS Cardiac Surgery Admissions	213.1	210.5	224.4	195.2	193.0	167.3
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	181	185	192	180.8	177.6	182.6

[a]PS = Preference-sensitive

B.3 Health Service Resource Use

Table Appendix B-11: Difference-in-Difference Estimates of Welvie's Effects on Resource Use, Medicare Parts A and B Ohio Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	62531	62531	61660	60800	59929	58990	58121	57285
ER Visits	-1,103.69	0.21	-4.04	-6.08*	-1	-3.46	-1.56	-2.41
95% Confidence Interval	(-2,331.5 | 124.1)	(-5,6)	(-10,2)	(-12,-1)	(-6,4)	(-9,2)	(-7,4)	(-8,3)
P-Value	0.078	0.941	0.165	0.028	0.719	0.233	0.602	0.405
Inpatient Admissions	-235.61	-4.89	-2.81	-2.01	0.67	3.68	0.57	-3.29
95% Confidence Interval	(-1,363.9 | 892.7)	(-10,0)	(-8,2)	(-7,3)	(-4,6)	(-1,9)	(-4,6)	(-8,2)
P-Value	0.682	0.061	0.275	0.430	0.795	0.160	0.821	0.204
Unplanned Inpatient Admissions	-2.36	-3.89	-1.83	-1.39	1.66	4.32	0.31	-3.2
95% Confidence Interval	(-1,024.0 | 1,019.3)	(-9,1)	(-6,3)	(-6,3)	(-3,6)	(0,9)	(-4,5)	(-8,1)
P-Value	0.996	0.103	0.432	0.547	0.483	0.070	0.892	0.171
Hospital Days	2,496.43	-35.77	6.98	-6.48	-5.55	24.74	24.7	-21.14
95% Confidence Interval	(-6,401.9 | 11,394.8)	(-76,5)	(-32,46)	(-46,33)	(-47,36)	(-14,64)	(-13,63)	(-58,15)
P-Value	0.582	0.085	0.729	0.746	0.795	0.214	0.201	0.257
All Surgeries	23.31	-1.56	-2.59	-1.68	-3.81	0.99	-0.14	4.9
95% Confidence Interval	(-1,396.7 | 1,443.3)	(-8,4)	(-9,4)	(-8,5)	(-10,2)	(-6,8)	(-7,6)	(-2,12)
P-Value	0.974	0.606	0.406	0.603	0.231	0.781	0.967	0.169
Inpatient Surgeries	-216.54	-2.02	-1.65	-0.29	-0.59	-0.15	0.04	0.18
95% Confidence Interval	(-691.4 | 258.3)	(-4,0)	(-4,0)	(-2,2)	(-3,2)	(-2,2)	(-2,2)	(-2,2)
P-Value	0.371	0.050	0.115	0.782	0.581	0.892	0.971	0.867
Surgical Hospital Days	-561.09	-19.64	-2.57	-2.94	-6.01	-1.38	0.59	1.49
95% Confidence Interval	(-5,139.8 | 4,017.7)	(-41,1)	(-21,16)	(-22,16)	(-26,14)	(-20,17)	(-18,19)	(-17,20)
P-Value	0.810	0.068	0.790	0.766	0.565	0.885	0.950	0.873

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Outpatient Surgeries	239.85	0.46	-0.94	-1.38	-3.21	1.13	-0.18	4.72
95% Confidence Interval	(-1,073.0 | 1,552.7)	(-5,6)	(-7,5)	(-7,4)	(-9,3)	(-5,8)	(-6,6)	(-2,11)
P-Value	0.720	0.869	0.743	0.642	0.272	0.732	0.954	0.156
All PS[b] Orthopedic Surgeries	-12.07	0.22	-0.37	0.22	-0.34	0.14	-0.24	0.17
95% Confidence Interval	(-250.7 | 226.6)	(-1,1)	(-1,1)	(-1,1)	(-1,1)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.921	0.657	0.474	0.686	0.517	0.792	0.657	0.754
Inpatient PS Orthopedic Surgeries	60.95	0.17	-0.13	0.54	-0.16	0.26	0.02	0.41
95% Confidence Interval	(-163.7 | 285.6)	(-1,1)	(-1,1)	(0,2)	(-1,1)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.595	0.725	0.787	0.306	0.751	0.596	0.964	0.422
PS Orthopedic Surgery Hospital Days	22.23	-0.58	-0.72	5.04	-4.17	2.44	-1.84	-1.28
95% Confidence Interval	(-1,342.6 | 1,387.0)	(-6,5)	(-6,5)	(-2,12)	(-10,2)	(-3,8)	(-8,4)	(-8,5)
P-Value	0.975	0.829	0.800	0.159	0.185	0.393	0.548	0.695
Outpatient PS Orthopedic Surgeries	-73.02	0.06	-0.24	-0.31	-0.18	-0.12	-0.26	-0.24
95% Confidence Interval	(-152.9 | 6.9)	(0,0)	(-1,0)	(-1,0)	(-1,0)	(0,0)	(-1,0)	(-1,0)
P-Value	0.073	0.732	0.214	0.070	0.281	0.491	0.138	0.169
All PS Cardiac Surgeries	-165.92	-1.17*	-0.32	0.33	-0.18	-0.6	-0.44	-0.03
95% Confidence Interval	(-420.6 | 88.7)	(-2,0)	(-1,1)	(-1,1)	(-1,1)	(-2,1)	(-2,1)	(-1,1)
P-Value	0.202	0.036	0.570	0.551	0.740	0.287	0.448	0.958
Inpatient PS Cardiac Surgeries	-67.86	-0.62	-0.13	0.28	-0.01	-0.35	-0.17	-0.21
95% Confidence Interval	(-233.8 | 98.0)	(-1,0)	(-1,1)	(0,1)	(-1,1)	(-1,0)	(-1,1)	(-1,1)
P-Value	0.423	0.094	0.721	0.423	0.985	0.326	0.637	0.561
Inpatient PS Cardiac Surgical Hospital Days	450.08	-0.71	-2.07	1.71	-0.67	-3.52	-1.01	-0.63
95% Confidence Interval	(-1,278.8 | 2,179.0)	(-7,6)	(-8,4)	(-4,7)	(-7,5)	(-9,2)	(-6,4)	(-6,5)

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.610	0.827	0.492	0.555	0.826	0.235	0.709	0.827
Outpatient PS Cardiac Surgeries	-98.06	-0.55	-0.19	0.05	-0.17	-0.25	-0.27	0.18
95% Confidence Interval	(-276.6 | 80.5)	(-1,0)	(-1,1)	(-1,1)	(-1,1)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.282	0.158	0.625	0.899	0.643	0.534	0.515	0.648

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b]PS = Preference-sensitive.

Table Appendix B-12: Difference-in-Difference Estimates of Welvie's Effects on Resource Use, Medicare Advantage Ohio Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	92341	92341	91223	90224	83927	83130	80812	79594
ER Visits	-13.55	0.76	1.73	-0.53	0.8	0.31	-0.81	-2.61
95% Confidence Interval	(-1,172.8 | 1,145.7)	(-3,4)	(-2,5)	(-4,3)	(-3,5)	(-3,4)	(-4,3)	(-6,1)
P-Value	0.982	0.676	0.341	0.774	0.686	0.870	0.658	0.182
Inpatient Admissions	-234.04	-0.09	-0.01	-1.56	-0.71	-0.51	0.63	-1.72
95% Confidence Interval	(-1,300.9 | 832.8)	(-4,3)	(-3,3)	(-5,2)	(-4,3)	(-4,3)	(-3,4)	(-5,2)
P-Value	0.667	0.961	0.994	0.357	0.672	0.762	0.706	0.299
Unplanned Inpatient Admissions	-458.19	-0.93	0.08	-1.73	-1.04	-0.13	-0.82	-2.25
95% Confidence Interval	(-1,433.1 | 516.7)	(-4,2)	(-3,3)	(-5,1)	(-4,2)	(-3,3)	(-4,2)	(-5,1)
P-Value	0.357	0.568	0.960	0.268	0.498	0.935	0.589	0.137
Hospital Days	-973.73	-1.34	12.13	-22.27	-6.86	-10.41	5.32	-4.14
95% Confidence Interval	(-8,853.7 | 6,906.3)	(-27,24)	(-13,37)	(-49,4)	(-31,18)	(-34,14)	(-19,29)	(-28,20)
P-Value	0.809	0.918	0.345	0.097	0.584	0.397	0.662	0.739

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
All Surgeries	-211.10	-0.88	0.87	-2.14	-0.38	-0.2	0.94	-0.82
95% Confidence Interval	(-1,113.3 | 691.1)	(-4,2)	(-2,4)	(-5,1)	(-3,2)	(-3,3)	(-2,4)	(-4,2)
P-Value	0.647	0.561	0.550	0.125	0.791	0.890	0.498	0.566
Inpatient Surgeries	-463.23	-0.86	-1.11	-2.08*	-0.49	-1.2	0.47	-0.29
95% Confidence Interval	(-1,004.1 | 77.6)	(-3,1)	(-3,1)	(-4,0)	(-2,1)	(-3,0)	(-1,2)	(-2,1)
P-Value	0.093	0.337	0.202	0.014	0.565	0.117	0.577	0.734
Surgical Hospital Days	-2,839.25	-4.67	-3.44	-12.19	-7.35	-10.95	2.83	-0.38
95% Confidence Interval	(-7,297.0 | 1,618.5)	(-19,10)	(-17,10)	(-28,3)	(-21,6)	(-24,2)	(-10,16)	(-14,14)
P-Value	0.212	0.524	0.619	0.124	0.292	0.087	0.677	0.958
Outpatient Surgeries	252.13	-0.02	1.99	-0.06	0.11	1	0.46	-0.53
95% Confidence Interval	(-456.9 | 961.2)	(-2,2)	(0,4)	(-2,2)	(-2,2)	(-1,3)	(-2,3)	(-3,2)
P-Value	0.486	0.986	0.083	0.954	0.926	0.423	0.664	0.636
All PS[b] Orthopedic Surgeries	9.16	-0.37	-0.35	-0.66	0.18	0.07	0.2	0
95% Confidence Interval	(-332.0 | 350.3)	(-1,1)	(-1,1)	(-2,0)	(-1,1)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.958	0.510	0.510	0.211	0.740	0.886	0.696	0.996
Inpatient PS Orthopedic Surgeries	23.68	-0.22	-0.27	-0.62	0.15	-0.01	0.21	-0.01
95% Confidence Interval	(-303.4 | 350.7)	(-1,1)	(-1,1)	(-2,0)	(-1,1)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.887	0.681	0.599	0.219	0.767	0.976	0.667	0.988
PS Orthopedic Surgery Hospital Days	419.41	0.16	-0.96	-0.73	-1.87	-1.76	-0.88	-0.18
95% Confidence Interval	(-1,576.2 | 2,415.0)	(-6,6)	(-7,5)	(-8,6)	(-8,4)	(-8,4)	(-7,5)	(-6,6)
P-Value	0.680	0.960	0.743	0.835	0.516	0.569	0.763	0.954
Outpatient PS Orthopedic Surgeries	-14.52	-0.15	-0.08	-0.04	0.03	0.09	-0.01	0.01
95% Confidence Interval	(-111.3 | 82.3)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
P-Value	0.769	0.336	0.569	0.791	0.866	0.590	0.927	0.938
All PS Cardiac Surgeries	-211.94	-0.23	0.11	-1.11*	-0.66	-0.59	0.26	-0.85
95% Confidence Interval	(-533.3 | 109.4)	(-1,1)	(-1,1)	(-2,0)	(-2,0)	(-2,0)	(-1,1)	(-2,0)
P-Value	0.196	0.661	0.828	0.024	0.174	0.223	0.586	0.076
Inpatient PS Cardiac Surgeries	-178.10	-0.19	-0.36	-0.59	-0.53	-0.2	-0.02	-0.77*

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-434.0 | 77.8)	(-1,1)	(-1,0)	(-1,0)	(-1,0)	(-1,1)	(-1,1)	(-2,0)
P-Value	0.173	0.655	0.374	0.135	0.156	0.582	0.949	0.041
Inpatient PS Cardiac Surgical Hospital Days	-75.12	-1.08	2.73	-3.6	-2.91	-0.38	0.25	-3.37
95% Confidence Interval	(-1,976.0 | 1,825.7)	(-7,5)	(-3,8)	(-9,2)	(-8,2)	(-6,5)	(-5,6)	(-9,3)
P-Value	0.938	0.736	0.348	0.228	0.269	0.894	0.931	0.261
Outpatient PS Cardiac Surgeries	-33.84	-0.04	0.47	-0.52	-0.13	-0.38	0.29	-0.08
95% Confidence Interval	(-215.9 | 148.3)	(-1,1)	(0,1)	(-1,0)	(-1,0)	(-1,0)	(0,1)	(-1,0)
P-Value	0.716	0.886	0.083	0.057	0.661	0.186	0.291	0.764

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b] PS = Preference-sensitive.

Table Appendix B-13: IV Regression Estimates of Welvie's Effects on Resource Use, Medicare Parts A and B Ohio High-dose Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	1204	1200	1188	1172	1111	945	280
ER Visits	23.78	-221.08	-317.51*	-29.07	-180.67	-92.64	-460.33
95% Confidence Interval	(-259.93,307.49)	(-513.47,71.31)	(-595.92,-39.09)	(-307.02,248.88)	(-482.45,121.10)	(-451.22,265.94)	(-1605.60,684.94)
P-Value	0.870	0.138	0.025	0.838	0.241	0.613	0.431
Inpatient Admissions	-236.38	-143.00	-98.08	41.70	169.24	54.21	-626.24
95% Confidence Interval	(-502.41,29.65)	(-402.45,116.45)	(-353.69,157.54)	(-219.08,302.49)	(-102.77,441.25)	(-249.13,357.54)	(-1652.85,400.37)
P-Value	0.082	0.280	0.452	0.754	0.223	0.726	0.232
Unplanned Inpatient Admissions	-204.02	-96.16	-53.56	92.17	201.69	39.71	-585.33
95% Confidence Interval	(-446.83,38.79)	(-331.65,139.33)	(-284.99,177.88)	(-144.65,328.99)	(-45.48,448.85)	(-234.15,313.57)	(-1511.86,341.20)
P-Value	0.100	0.424	0.650	0.446	0.110	0.776	0.216
Hospital Days	-1871.65	338.42	-334.58	-243.53	1174.61	1609.97	-4345.07
95% Confidence Interval	(-3981.33,238.03)	(-1689.11,2365.95)	(-2345.51,1676.36)	(-2386.98,1899.91)	(-889.85,3239.08)	(-708.50,3928.44)	(-11744.55,3054.41)
P-Value	0.082	0.744	0.744	0.824	0.265	0.174	0.250
All Surgeries	-43.01	-143.73	-105.65	-194.31	52.35	-28.10	970.69
95% Confidence Interval	(-351.75,265.73)	(-457.88,170.42)	(-428.47,217.18)	(-513.23,124.61)	(-316.79,421.49)	(-421.78,365.57)	(-441.28,2382.66)
P-Value	0.785	0.370	0.521	0.232	0.781	0.889	0.178
Inpatient Surgeries	-85.84	-84.80	-22.41	-30.23	-12.09	-3.26	32.75
95% Confidence Interval	(-191.22,19.55)	(-190.62,21.03)	(-128.93,84.12)	(-137.76,77.29)	(-123.19,99.01)	(-130.72,124.21)	(-388.37,453.87)
P-Value	0.110	0.116	0.680	0.582	0.831	0.960	0.879
Surgical Hospital Days	-962.76	-157.03	-171.91	-298.39	-138.25	26.97	214.46
95% Confidence Interval	(-2058.87,133.35)	(-1127.42,813.37)	(-1164.30,820.47)	(-1346.99,750.22)	(-1123.34,846.85)	(-1099.07,1153.00)	(-3502.45,3931.38)
P-Value	0.085	0.751	0.734	0.577	0.783	0.963	0.910
Outpatient Surgeries	42.83	-58.94	-83.24	-164.07	64.44	-24.84	937.94
95% Confidence Interval	(-239.81,325.48)	(-346.78,228.91)	(-380.73,214.26)	(-457.34,129.19)	(-280.24,409.11)	(-389.54,339.85)	(-383.90,2259.78)
P-Value	0.766	0.688	0.583	0.273	0.714	0.894	0.164
All PS[a] Orthopedic Surgeries	34.47	-24.48	4.25	-17.28	9.49	-18.53	32.41
95% Confidence Interval	(-17.62,86.57)	(-76.44,27.47)	(-50.70,59.20)	(-70.17,35.60)	(-44.78,63.76)	(-82.62,45.56)	(-178.20,243.02)
P-Value	0.195	0.356	0.880	0.522	0.732	0.571	0.763

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Inpatient PS Orthopedic Surgeries	27.97	-8.96	20.86	-8.11	15.74	-3.56	81.31
95% Confidence Interval	(-21.00,76.94)	(-57.10,39.18)	(-31.26,72.99)	(-58.10,41.88)	(-35.23,66.72)	(-63.88,56.77)	(-117.76,280.38)
P-Value	0.263	0.715	0.433	0.751	0.545	0.908	0.423
PS Orthopedic Surgery Hospital Days	61.86	-48.94	246.64	-223.60	151.50	-134.40	-221.31
95% Confidence Interval	(-214.82,338.53)	(-330.91,233.02)	(-112.34,605.61)	(-536.62,89.42)	(-146.08,449.08)	(-501.92,233.12)	(-1521.02,1078.41)
P-Value	0.661	0.734	0.178	0.161	0.318	0.474	0.739
Outpatient PS Orthopedic Surgeries	6.50	-15.52	-16.61	-9.17	-6.26	-14.97	-48.90
95% Confidence Interval	(-10.90,23.90)	(-34.74,3.69)	(-33.80,0.58)	(-26.23,7.88)	(-24.67,12.16)	(-36.11,6.16)	(-116.76,18.97)
P-Value	0.464	0.113	0.058	0.292	0.505	0.165	0.158
All PS Cardiac Surgeries	-62.60*	-14.16	19.54	-14.42	-34.16	-22.96	-4.18
95% Confidence Interval	(-119.55,-5.65)	(-71.74,43.42)	(-36.54,75.62)	(-69.08,40.24)	(-92.77,24.45)	(-92.60,46.68)	(-228.88,220.51)
P-Value	0.031	0.630	0.495	0.605	0.253	0.518	0.971
Inpatient PS Cardiac Surgeries	-31.09	-4.00	14.05	0.07	-20.61	-8.94	-42.40
95% Confidence Interval	(-69.00,6.81)	(-42.07,34.07)	(-21.33,49.44)	(-35.66,35.81)	(-57.54,16.31)	(-52.64,34.76)	(-187.17,102.37)
P-Value	0.108	0.837	0.436	0.997	0.274	0.688	0.566
Inpatient PS Cardiac Surgical Hospital Days	-9.73	-118.88	91.67	-13.01	-217.79	-33.56	-171.30
95% Confidence Interval	(-345.27,325.82)	(-417.20,179.45)	(-199.95,383.28)	(-320.14,294.13)	(-521.77,86.18)	(-361.89,294.77)	(-1312.84,970.25)
P-Value	0.955	0.435	0.538	0.934	0.160	0.841	0.769
Outpatient PS Cardiac Surgeries	-31.51	-10.16	5.49	-14.49	-13.55	-14.02	38.22
95% Confidence Interval	(-71.21,8.19)	(-49.20,28.89)	(-33.79,44.76)	(-52.04,23.06)	(-55.52,28.43)	(-63.53,35.50)	(-120.51,196.95)
P-Value	0.120	0.610	0.784	0.449	0.527	0.579	0.637

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a]PS = Preference-sensitive.

Table Appendix B-14: IV Regression Estimates of Welvie's Effects on Resource Use, Medicare Advantage Ohio High-dose Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	3598	3269	2717	2550	2246	2148	1706
Total Medicare Parts A, B, and D Expenditures[a]	-244.41	-946.40	-2226.89	-1609.57	-2290.45	-307.90	-297.92
95% Confidence Interval	(-2521.58,2032.77)	(-3245.42,1352.61)	(-4512.39,58.62)	(-3969.86,750.71)	(-5262.57,681.68)	(-3145.25,2529.46)	(-3246.26,2650.42)
P-Value	0.833	0.420	0.056	0.181	0.131	0.832	0.843
Total Medicare Parts A and B Expenditures	-96.83	-983.37	-2264.74*	-1468.66	-2091.12	-135.94	-180.83
95% Confidence Interval	(-2313.70,2120.03)	(-3211.63,1244.88)	(-4485.82,-43.66)	(-3765.87,828.54)	(-4987.86,805.63)	(-2899.76,2627.87)	(-2998.04,2636.39)
P-Value	0.932	0.387	0.046	0.210	0.157	0.923	0.900
Inpatient Expenditures	36.30	-343.83	-1627.86*	-528.50	-713.02	40.46	-111.11
95% Confidence Interval	(-1525.14,1597.73)	(-1926.55,1238.88)	(-3151.03,-104.69)	(-2065.49,1008.49)	(-2680.87,1254.84)	(-1830.75,1911.67)	(-1889.13,1666.92)
P-Value	0.964	0.670	0.036	0.500	0.478	0.966	0.903
Outpatient ER Expenditures	-128.86	-23.96	-40.12	-48.04	-172.57	106.62	-28.72
95% Confidence Interval	(-289.62,31.91)	(-181.88,133.96)	(-195.02,114.77)	(-257.18,161.09)	(-428.86,83.72)	(-119.39,332.63)	(-269.75,212.31)
P-Value	0.116	0.766	0.612	0.653	0.187	0.355	0.815
Outpatient Non-ER Expenditures	-366.10	-203.09	-45.80	-248.57	-439.56	-127.96	332.01
95% Confidence Interval	(-899.20,167.00)	(-694.66,288.48)	(-597.96,506.36)	(-854.34,357.20)	(-1189.06,309.93)	(-760.54,504.63)	(-370.79,1034.81)
P-Value	0.178	0.418	0.871	0.421	0.250	0.692	0.354
Carrier/PB Expenditures	61.80	-347.73	-188.93	-238.24	-327.39	9.43	-158.82
95% Confidence Interval	(-436.96,560.55)	(-875.51,180.05)	(-733.66,355.81)	(-813.79,337.31)	(-1028.52,373.73)	(-680.59,699.46)	(-945.43,627.78)
P-Value	0.808	0.197	0.497	0.417	0.360	0.979	0.692
Skilled Nursing Facility Expenditures	313.64	-14.15	-345.44	-417.78*	-388.18	-168.00	-151.35
95% Confidence Interval	(-98.55,725.83)	(-359.94,331.63)	(-716.26,25.38)	(-815.30,-20.27)	(-929.28,152.92)	(-639.49,303.50)	(-678.54,375.85)
P-Value	0.136	0.936	0.068	0.039	0.160	0.485	0.574
Home Health Expenditures	-10.89	-54.33	-19.32	-3.20	-55.46	-2.82	-49.25

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-182.43,160.65)	(-212.21,103.55)	(-187.72,149.08)	(-183.75,177.35)	(-301.26,190.35)	(-224.27,218.62)	(-279.20,180.69)
P-Value	0.901	0.500	0.822	0.972	0.658	0.980	0.675
Total Surgery Expenditures	-674.83	-324.23	-1271.66*	-1076.23	-1168.87	-317.89	75.68
95% Confidence Interval	(-1885.49,535.83)	(-1404.41,755.95)	(-2388.98,-154.33)	(-2244.86,92.40)	(-2577.44,239.69)	(-1734.70,1098.92)	(-1259.82,1411.18)
P-Value	0.275	0.556	0.026	0.071	0.104	0.660	0.912
Inpatient Surgery Expenditures	-317.18	-88.58	-1073.60*	-649.51	-1019.02	-343.64	-63.38
95% Confidence Interval	(-1465.74,831.37)	(-1109.92,932.77)	(-2133.78,-13.43)	(-1746.27,447.24)	(-2326.91,288.87)	(-1683.85,996.56)	(-1306.60,1179.85)
P-Value	0.588	0.865	0.047	0.246	0.127	0.615	0.920
Episode-Based Inpatient Surgery Expenditures	-316.19	-84.93	-1058.42	-678.43	-1051.57	-348.77	-42.73
95% Confidence Interval	(-1465.54,833.16)	(-1107.50,937.63)	(-2120.61,3.78)	(-1777.47,420.60)	(-2361.60,258.46)	(-1690.00,992.46)	(-1289.31,1203.84)
P-Value	0.590	0.871	0.051	0.226	0.116	0.610	0.946
Outpatient Surgery Expenditures	-357.65*	-235.65	-198.06	-426.71*	-149.85	25.76	139.05
95% Confidence Interval	(-706.06,-9.24)	(-562.06,90.75)	(-510.65,114.54)	(-794.33,-59.10)	(-644.11,344.41)	(-394.78,446.30)	(-297.99,576.10)
P-Value	0.044	0.157	0.214	0.023	0.552	0.904	0.533
PS[b] Orthopedic Surgery Expenditures	322.89	-115.25	-18.20	-86.08	253.03	-45.67	207.48
95% Confidence Interval	(-43.81,689.59)	(-491.01,260.51)	(-385.56,349.16)	(-480.88,308.72)	(-189.96,696.01)	(-519.73,428.39)	(-301.11,716.06)
P-Value	0.084	0.548	0.923	0.669	0.263	0.850	0.424
Inpatient PS[b] Orthopedic Surgery Expenditures	281.66	-76.38	-21.00	-44.92	247.83	28.59	195.86
95% Confidence Interval	(-29.21,592.54)	(-392.15,239.39)	(-326.44,284.43)	(-376.94,287.11)	(-133.05,628.70)	(-365.06,422.24)	(-229.62,621.33)
P-Value	0.076	0.635	0.893	0.791	0.202	0.887	0.367
Outpatient PS Orthopedic Surgery Expenditures	-9.69	-9.23	20.12	-11.58	-14.13	-48.38	-11.85
95% Confidence Interval	(-27.57,8.19)	(-27.96,9.50)	(-17.94,58.19)	(-33.51,10.36)	(-51.94,23.68)	(-127.29,30.53)	(-40.98,17.29)
P-Value	0.288	0.334	0.300	0.301	0.464	0.229	0.426
PS Cardiac Surgery Expenditures	-34.97	396.00	-238.55	-582.71*	-239.07	99.87	-516.20
95% Confidence Interval	(-541.05,471.12)	(-121.21,913.20)	(-715.97,238.87)	(-1065.83,-99.60)	(-889.84,411.69)	(-538.89,738.64)	(-1121.15,88.76)

Measures (Number of Events or Days per 1,000 Beneficiaries)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.892	0.133	0.327	0.018	0.472	0.759	0.094
Inpatient PS Cardiac Surgery Expenditures	3.15	302.05	-154.42	-496.38*	-128.01	-15.79	-472.08
95% Confidence Interval	(-434.90,441.20)	(-143.43,747.54)	(-555.81,246.97)	(-902.20,-90.56)	(-693.60,437.58)	(-553.87,522.29)	(-977.68,33.52)
P-Value	0.989	0.184	0.451	0.017	0.657	0.954	0.067
Outpatient PS Cardiac Surgery Expenditures	-48.08	44.85	-76.38	-27.36	-116.49	78.44	28.22
95% Confidence Interval	(-151.86,55.71)	(-47.78,137.47)	(-162.18,9.41)	(-125.11,70.39)	(-234.44,1.46)	(-46.08,202.97)	(-95.64,152.08)
P-Value	0.364	0.343	0.081	0.583	0.053	0.217	0.655

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.

*Statistically significant at the 5% level

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D

[b]PS = Preference-sensitive

Figure B-5: Welvie Difference-in-Difference Estimate of Number of Hospital Days, Medicare Parts A and B Ohio Cohort

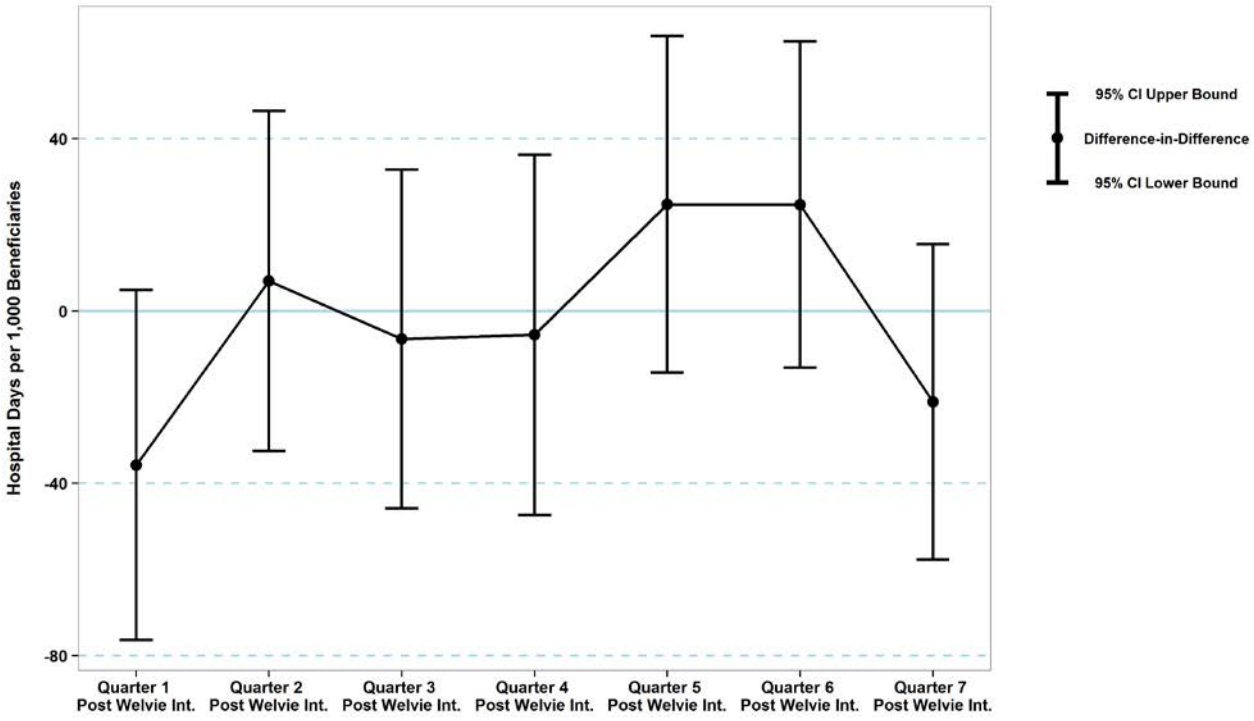


Figure B-6: Welvie Difference-in-Difference Estimate of Number of Hospital Days, Medicare Advantage Ohio Cohort

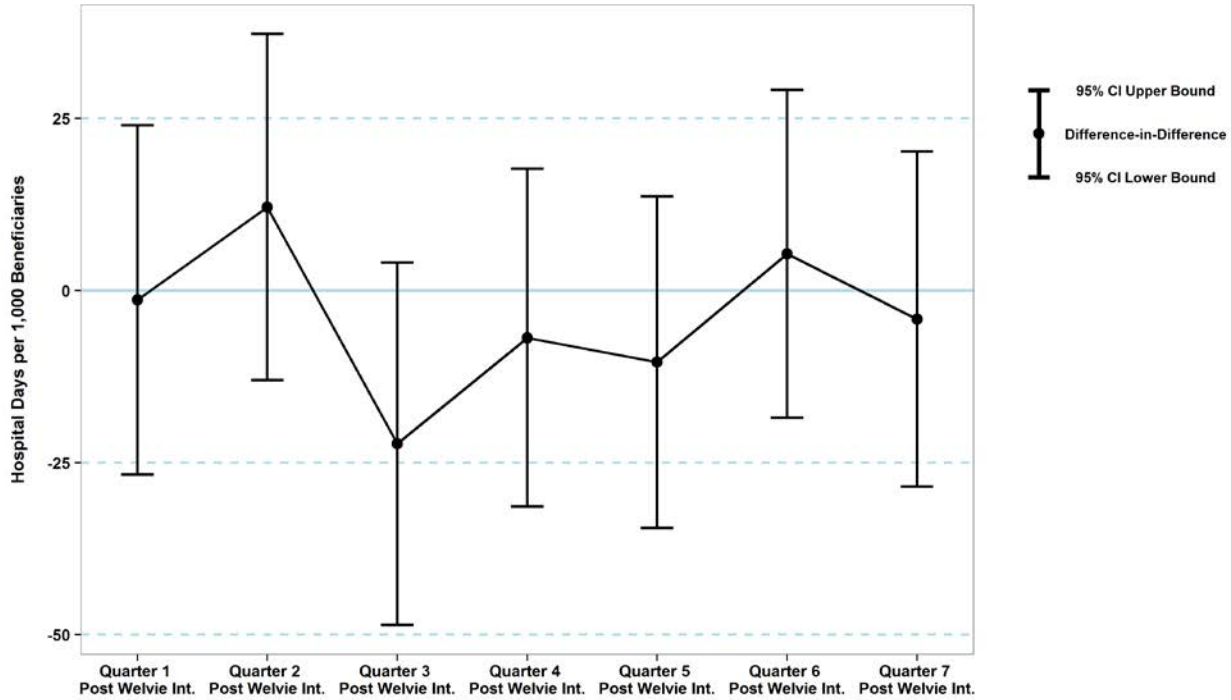


Figure B-7: Welvie Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare Parts A and B Ohio Cohort

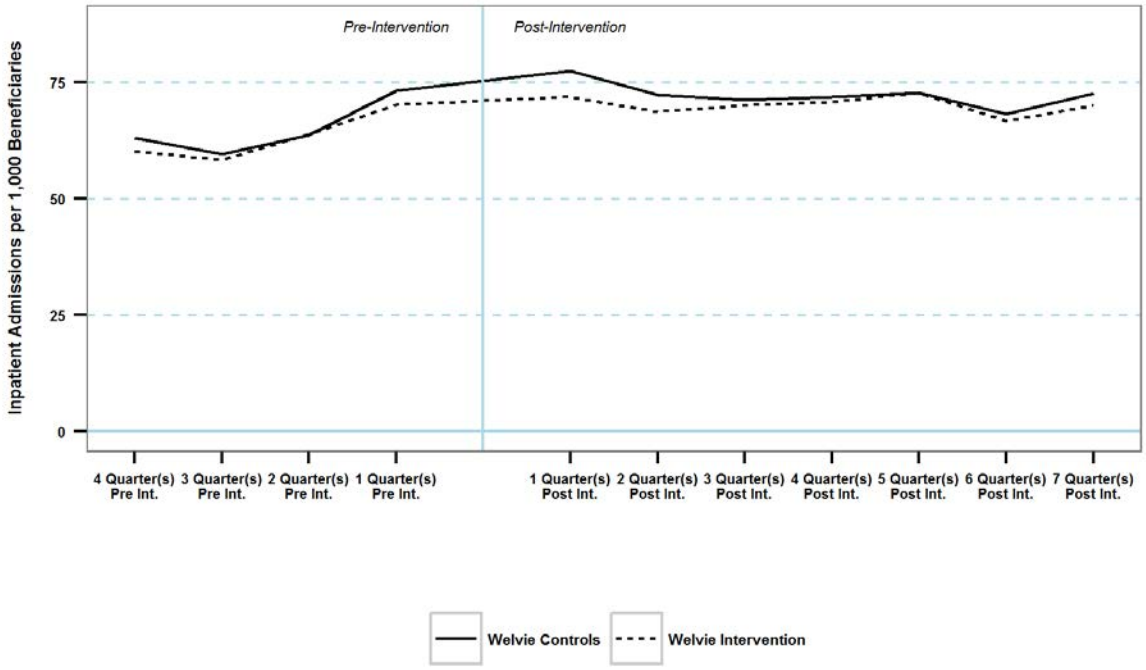


Figure B-8: Welvie Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare Advantage Ohio Cohort

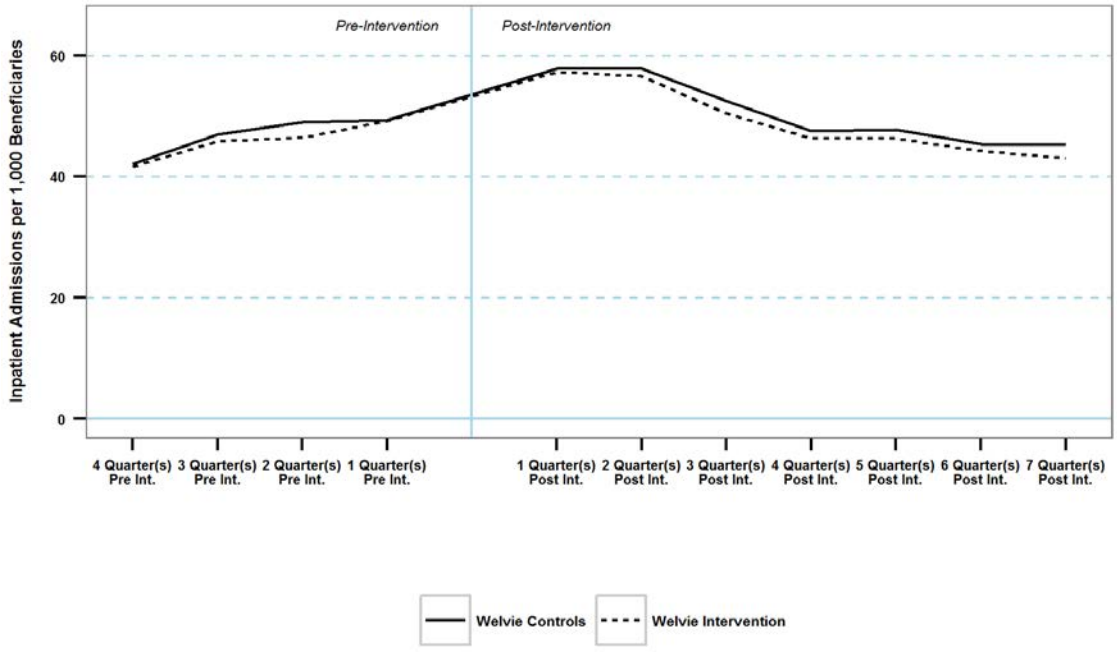


Figure B-9: Welvie Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare Parts A and B Ohio Cohort

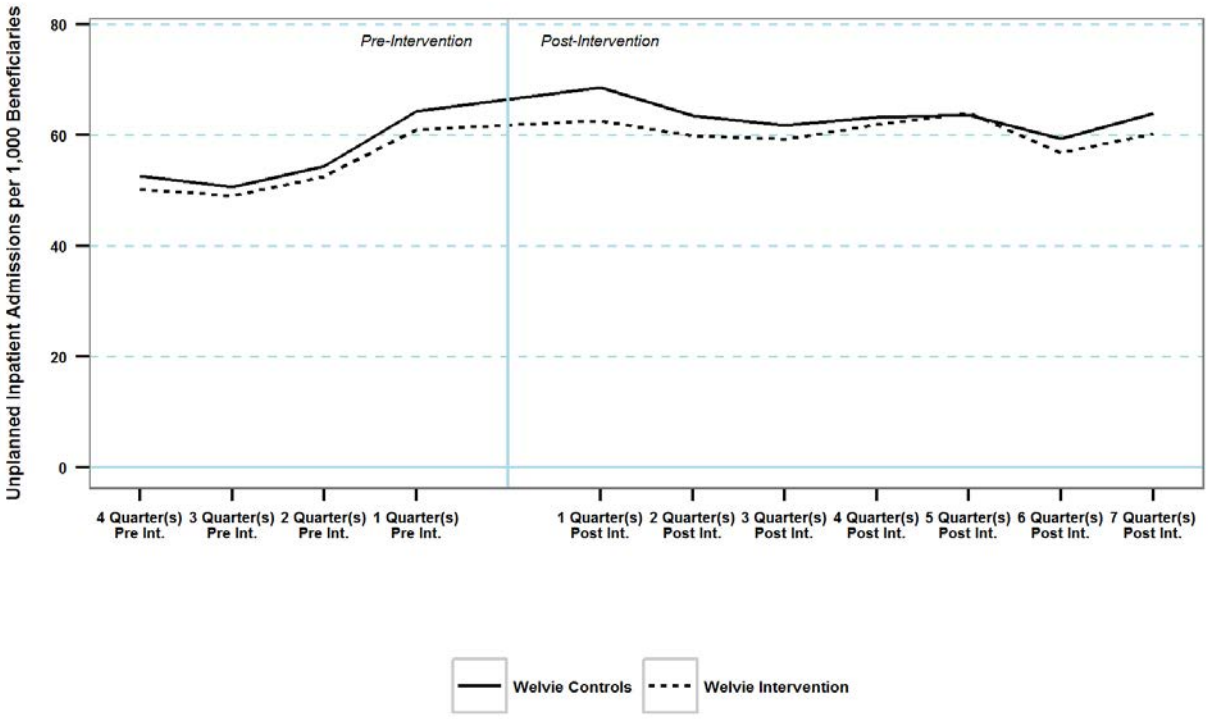


Figure B-10: Welvie Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare Advantage Ohio Cohort

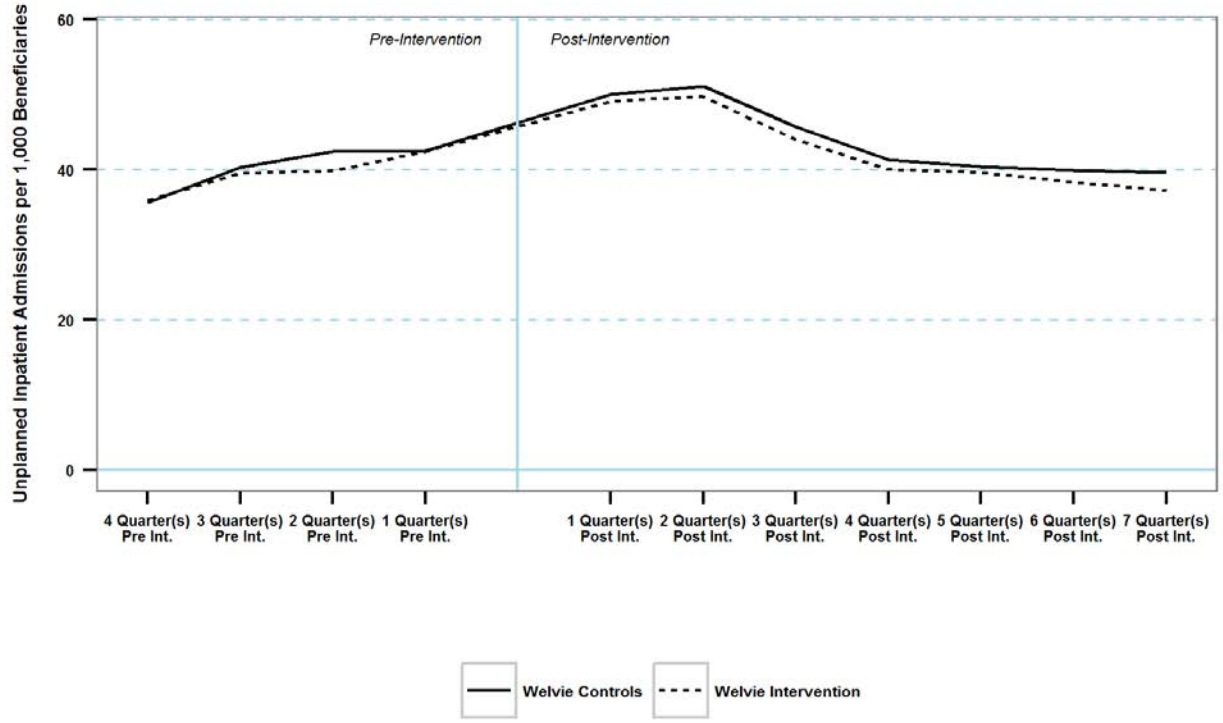


Figure B-11: Welvie ER Visits per 1,000 Beneficiaries by Quarter, Medicare Parts A and B Ohio Cohort

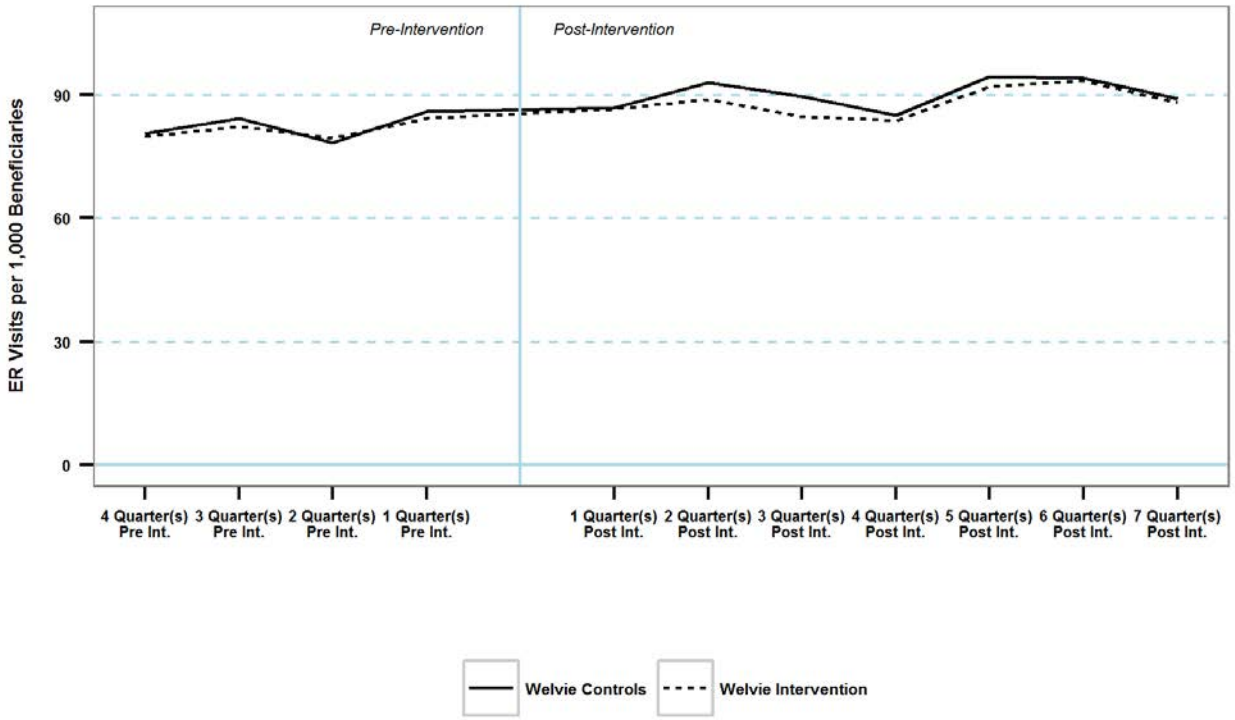


Figure B-12: Welvie ER Visits per 1,000 Beneficiaries by Quarter, Medicare Advantage Ohio Cohort

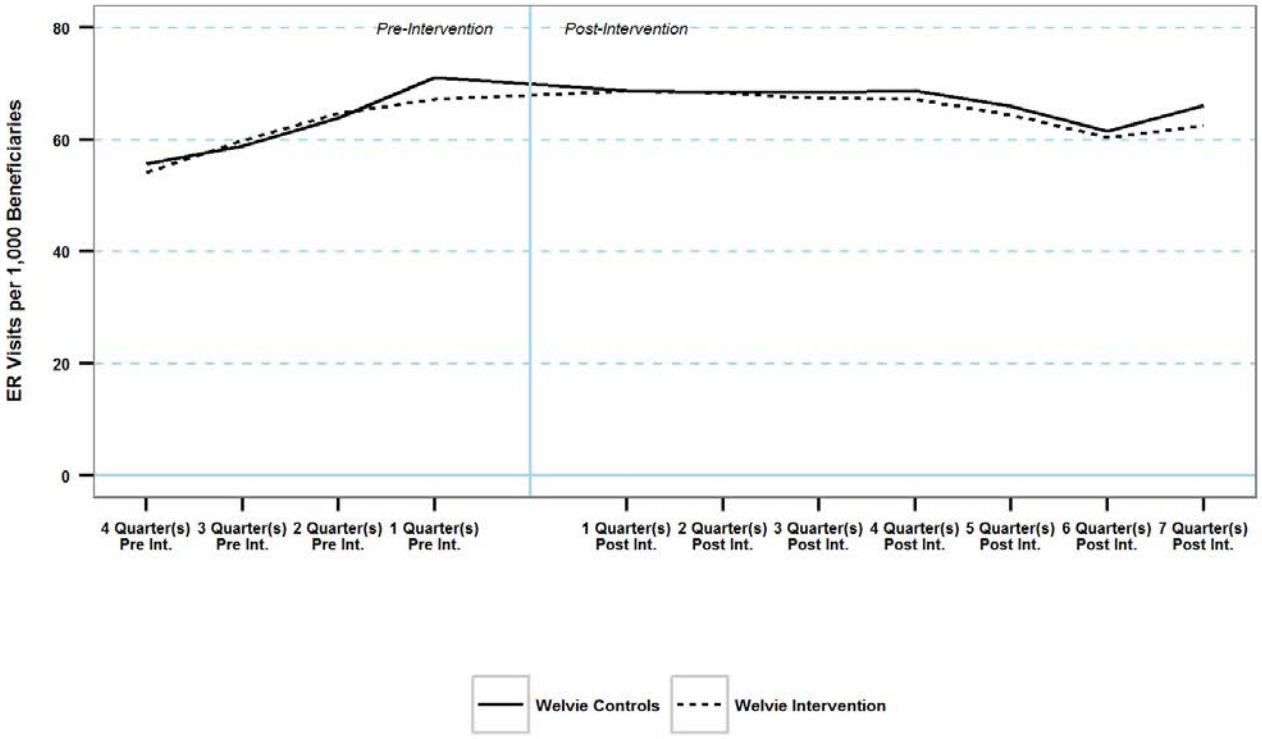


Table Appendix B-15: Welvie Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Health Service Use Rate per 1,000 Beneficiaries								
ER Visits	249.7	251.4	86.5	86.9	88.9	92.9	84.6	89.6
All Inpatient Admissions	195.4	197.9	71.7	77.4	68.6	72.2	69.9	71.2
Unplanned Inpatient Admissions	164.6	169.6	62.6	68.6	59.9	63.4	59.3	61.7
All Surgeries	237.0	235.9	80.8	82.0	80.9	81.5	85.2	84.6
Inpatient Surgeries	75.0	73.9	20.7	22.1	21.2	22.0	22.5	22.2
Outpatient Surgeries	188.7	188.0	63.4	63.5	63.1	63.3	66.3	66.0
All PS Orthopedic Surgeries[a]	24.1	22.6	5.6	5.1	5.5	5.6	6.6	6.1
Inpatient PS Orthopedic Surgeries	21.4	20.4	5.0	4.6	4.8	4.7	6.1	5.4
Outpatient PS Orthopedic Surgeries	2.9	2.4	0.7	0.5	0.7	0.9	0.5	0.6
All PS Cardiac Surgeries	22.4	21.8	5.8	6.6	5.9	6.0	5.7	5.2
Inpatient PS Cardiac Surgeries	11.3	10.7	2.8	3.2	3.1	3.0	2.9	2.4
Outpatient PS Cardiac Surgeries	12.8	12.7	3.2	3.7	3.2	3.3	3.2	3.2

[a]PS= Preference-sensitive

Table Appendix B-16: Welvie Resource Use Rate by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q4 to Q7

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Health Service Use Rate per 1,000 Beneficiaries								

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
ER Visits	83.7	85.0	92.0	94.5	93.3	94.1	88.1	89.1
All Inpatient Admissions	70.7	71.8	72.8	72.7	66.6	68.2	70.0	72.5
Unplanned Inpatient Admissions	61.9	63.2	64.0	63.7	56.8	59.3	60.3	63.9
All Surgeries	77.7	77.7	84.2	81.7	82.2	81.3	86.7	82.4
Inpatient Surgeries	21.7	22.2	21.5	21.3	21.0	20.5	21.2	20.5
Outpatient Surgeries	59.3	58.7	66.6	64.0	64.2	64.2	68.8	65.5
All PS Orthopedic Surgeries[a]	5.6	5.7	5.6	5.2	5.5	5.4	5.7	5.2
Inpatient PS Orthopedic Surgeries	5.1	5.1	5.0	4.6	5.0	4.7	5.2	4.6
Outpatient PS Orthopedic Surgeries	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.6
All PS Cardiac Surgeries	5.2	5.2	5.4	5.8	5.6	5.8	5.5	5.3
Inpatient PS Cardiac Surgeries	2.6	2.5	2.5	2.6	2.6	2.6	2.5	2.5
Outpatient PS Cardiac Surgeries	2.9	3.0	3.3	3.5	3.3	3.6	3.2	3.0

[a]PS= Preference-sensitive

Table Appendix B-17: Welvie Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Health Service Use Rate per 1,000 Beneficiaries								
ER Visits	195.3	198.4	68.5	68.8	68.3	68.4	67.3	68.4
All Inpatient Admissions	146.3	149.8	57.2	57.8	56.5	57.8	50.5	52.5
Unplanned Inpatient Admissions	125.6	128.0	49.0	49.9	49.6	51.1	43.9	45.7
All Surgeries	130.6	132.9	46.2	47.7	41.9	42.3	40.5	43.4
Inpatient Surgeries	62.7	63.6	22.3	22.8	20.9	21.7	18.4	20.4

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Outpatient Surgeries	75.7	78.0	25.3	26.4	21.9	21.7	22.9	24.1
All PS Orthopedic Surgeries[a]	28.9	29.0	8.9	9.0	7.9	8.0	7.7	8.0
Inpatient PS Orthopedic Surgeries	25.9	25.9	8.2	8.1	7.3	7.2	7.0	7.2
Outpatient PS Orthopedic Surgeries	3.2	3.3	0.8	0.9	0.7	0.8	0.8	0.8
All PS Cardiac Surgeries	26.5	26.9	7.4	7.9	6.9	6.9	6.1	7.2
Inpatient PS Cardiac Surgeries	17.3	17.5	4.7	4.9	4.5	4.7	4.0	4.5
Outpatient PS Cardiac Surgeries	10.2	10.9	3.0	3.2	2.7	2.4	2.2	2.9

[a]PS= Preference-sensitive

Table Appendix B-18: Welvie Resource Use Rate by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q4 to Q7

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Health Service Use Rate per 1,000 Beneficiaries								
ER Visits	67.3	68.7	64.4	66.0	60.3	61.5	62.5	66.1
All Inpatient Admissions	46.2	47.5	46.3	47.7	44.3	45.4	42.9	45.2
Unplanned Inpatient Admissions	40.0	41.3	39.5	40.3	38.3	39.9	37.2	39.6
All Surgeries	37.6	38.8	34.8	35.6	33.6	33.6	34.4	35.7
Inpatient Surgeries	17.9	18.0	13.3	14.3	16.9	16.9	16.8	17.1
Outpatient Surgeries	20.7	21.8	22.1	22.1	17.4	17.4	18.5	19.4
All PS Orthopedic Surgeries[a]	6.9	6.5	5.8	5.5	6.0	5.8	6.2	5.8
Inpatient PS Orthopedic Surgeries	6.1	5.8	5.0	4.8	5.5	5.3	5.8	5.4
Outpatient PS Orthopedic Surgeries	0.7	0.7	0.8	0.7	0.4	0.5	0.5	0.5
All PS Cardiac Surgeries	5.5	6.3	5.1	6.0	5.1	5.0	4.7	5.6

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Inpatient PS Cardiac Surgeries	3.1	3.7	2.9	3.3	3.1	3.2	2.9	3.6
Outpatient PS Cardiac Surgeries	2.5	2.8	2.3	2.9	2.2	2.1	1.9	2.2

[a]PS= Preference-sensitive

Table Appendix B-19: Welvie Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	62531	52559	62531	52559	61660	51617	60800	50832
Mean Number of Events per 1,000 Beneficiaries								
ER Visits	395.6	402.2	106.0	107.4	109.6	115.6	103.0	111.0
All Inpatient Admissions	318.9	329.1	93.7	101.2	90.7	95.1	89.9	93.9
Unplanned Inpatient Admissions	262.2	276.0	80.1	87.5	77.1	81.6	75.0	79.3
Hospital Days	1,598.2	1,699.2	498.4	559.5	498.8	507.4	508.8	532.9
All Surgeries	394.3	397.4	103.4	105.7	103.5	106.2	109.4	111.3
Inpatient Surgeries	85.3	85.0	21.4	23.4	22.1	23.5	23.5	23.4
Surgical Hospital Days	490.3	509.9	132.2	156.7	139.0	142.5	150.6	153.9
Outpatient Surgeries	309.0	312.3	81.9	82.3	81.3	82.7	86.0	87.9
All PS[a] Orthopedic Surgeries	25.6	24.3	5.7	5.1	5.6	5.7	6.7	6.2
Inpatient PS Orthopedic Surgeries	22.6	21.8	5.0	4.7	4.9	4.8	6.2	5.5
PS Orthopedic Surgery Hospital Days	92.9	84.7	20.0	18.5	21.1	19.6	30.0	22.6
Outpatient PS Orthopedic Surgeries	3.0	2.4	0.7	0.5	0.8	0.9	0.5	0.7
All PS Cardiac Surgeries	25.4	24.2	6.1	6.9	6.4	6.4	6.2	5.6

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Inpatient PS Cardiac Surgeries	11.9	11.2	2.8	3.3	3.1	3.1	2.9	2.4
PS Cardiac Surgery Hospital Days	65.5	72.7	14.8	17.3	16.9	18.5	17.1	15.5
Outpatient PS Cardiac Surgeries	13.5	13.0	3.2	3.7	3.2	3.3	3.3	3.2

[a]PS= Preference-sensitive

Table Appendix B-20: Welvie Mean Resource Use by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q4 to Q7

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	59929	50018	58990	49108	58121	48257	57285	47547
Mean Number of Events per 1,000 Beneficiaries								
ER Visits	102.4	105.3	112.4	117.3	115.7	118.6	107.8	111.7
All Inpatient Admissions	93.3	94.5	96.2	94.3	86.3	87.6	89.7	94.7
Unplanned Inpatient Admissions	79.8	80.9	82.6	81.0	72.1	74.6	75.4	81.3
Hospital Days	533.8	554.9	526.6	518.3	487.9	479.1	483.2	518.5
All Surgeries	99.0	102.9	110.4	109.2	106.4	106.3	114.6	109.6
Inpatient Surgeries	22.9	23.4	22.6	22.6	21.9	21.7	22.0	21.6
Surgical Hospital Days	151.8	160.7	141.2	144.4	138.4	138.8	137.7	136.3
Outpatient Surgeries	76.1	79.5	87.8	86.7	84.5	84.6	92.6	88.0
All PS[a] Orthopedic Surgeries	5.7	5.7	5.7	5.2	5.6	5.5	5.7	5.3
Inpatient PS Orthopedic Surgeries	5.2	5.1	5.0	4.6	5.1	4.8	5.2	4.7
PS Orthopedic Surgery Hospital Days	21.1	23.0	22.2	17.5	22.2	21.7	22.3	21.4
Outpatient PS Orthopedic Surgeries	0.6	0.6	0.7	0.6	0.6	0.7	0.5	0.6
All PS Cardiac Surgeries	5.6	5.5	5.8	6.2	6.0	6.2	5.8	5.6
Inpatient PS Cardiac Surgeries	2.7	2.5	2.5	2.7	2.6	2.6	2.6	2.6

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
PS Cardiac Surgery Hospital Days	16.4	17.3	15.9	18.4	16.4	16.2	16.4	15.4
Outpatient PS Cardiac Surgeries	2.9	3.0	3.3	3.5	3.4	3.6	3.2	3.0

[a]PS= Preference-sensitive

Table Appendix B-21: Welvie Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	92341	90162	92341	90162	91223	88831	90224	87836
Mean Number of Events per 1,000 Beneficiaries								
ER Visits	292.7	297.7	82.5	83.0	82.0	81.6	81.3	83.1
All Inpatient Admissions	227.5	234.1	73.4	75.1	72.9	74.5	64.6	67.6
Unplanned Inpatient Admissions	192.6	197.4	61.8	64.0	63.4	64.4	55.6	58.3
Hospital Days	1,093.3	1,138.8	386.3	399.0	386.7	384.9	355.2	386.1
All Surgeries	174.2	178.4	53.6	55.5	48.9	49.1	46.5	49.7
Inpatient Surgeries	77.2	77.4	24.4	25.3	22.7	23.8	20.2	22.3
Surgical Hospital Days	404.3	410.4	141.6	147.8	132.4	137.0	123.3	136.9
Outpatient Surgeries	97.0	100.9	29.2	30.2	26.2	25.3	26.3	27.4
All PS[a] Orthopedic Surgeries	35.5	35.4	9.4	9.7	8.4	8.6	8.1	8.6
Inpatient PS Orthopedic Surgeries	32.2	32.0	8.6	8.8	7.7	7.9	7.3	7.7
PS Orthopedic Surgery Hospital Days	133.2	134.2	36.3	36.4	31.4	32.1	32.7	32.7
Outpatient PS Orthopedic Surgeries	3.3	3.4	0.8	0.9	0.7	0.8	0.8	0.9
All PS Cardiac Surgeries	31.3	32.6	8.0	8.6	7.4	7.6	6.5	7.8
Inpatient PS Cardiac Surgeries	20.7	21.2	5.0	5.3	4.7	5.1	4.2	4.9

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
PS Cardiac Surgery Hospital Days	103.8	112.7	27.2	30.5	27.4	26.5	23.9	28.9
Outpatient PS Cardiac Surgeries	10.6	11.4	3.0	3.2	2.7	2.4	2.2	3.0

[a]PS= Preference-sensitive

Table Appendix B-22: Welvie Mean Resource Use by Quarter Following Enrollment, Medicare Advantage Ohio, Q4 to Q7

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	83927	81744	83130	80947	80812	78630	79594	77342
Mean Number of Events per 1,000 Beneficiaries								
ER Visits	82.5	83.0	78.7	79.6	71.8	73.8	77.0	81.0
All Inpatient Admissions	58.6	60.6	59.2	61.0	56.9	57.7	54.5	57.8
Unplanned Inpatient Admissions	50.0	51.9	50.0	51.0	48.3	50.1	46.5	49.8
Hospital Days	324.0	338.0	319.0	337.8	311.5	315.3	310.5	322.8
All Surgeries	44.0	45.4	40.7	41.8	38.6	38.7	39.7	41.4
Inpatient Surgeries	19.4	19.8	14.4	15.5	18.7	18.4	18.5	18.6
Surgical Hospital Days	114.3	122.0	85.1	96.7	110.4	109.2	111.8	112.1
Outpatient Surgeries	24.6	25.6	26.3	26.3	19.9	20.3	21.3	22.8
All PS[a] Orthopedic Surgeries	7.4	7.0	6.3	5.9	6.5	6.1	6.6	6.3
Inpatient PS Orthopedic Surgeries	6.7	6.2	5.4	5.2	6.0	5.6	6.2	5.8
PS Orthopedic Surgery Hospital Days	28.0	27.8	23.6	23.2	26.1	25.0	27.5	25.0
Outpatient PS Orthopedic Surgeries	0.7	0.7	0.8	0.7	0.4	0.5	0.5	0.5
All PS Cardiac Surgeries	5.9	6.7	5.6	6.4	5.6	5.6	5.1	6.1
Inpatient PS Cardiac Surgeries	3.3	3.9	3.2	3.5	3.4	3.5	3.1	3.8
PS Cardiac Surgery Hospital Days	19.0	22.7	19.2	20.3	21.3	21.8	19.4	23.1

Measures	Q4		Q5		Q6		Q7	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Outpatient PS Cardiac Surgeries	2.5	2.8	2.3	2.9	2.2	2.1	2.0	2.3

[a]PS= Preference-sensitive

B.4 Medical Expenditures

Table Appendix B-23: Difference-in-Difference Estimates of Welvie's Effects on Expenditures, Medicare Parts A and B Ohio Cohort

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	62531	62531	61660	60800	59929	58990	58121	57285
Total Medicare Parts A, B, and D Expenditures	-3,057,633.36	-114.7*	-57.88	-79.34	12.73	21.09	10.35	-25.3
95% Confidence Interval	(-25,379,149.4 | 19,263,882.7)	(-218,-12)	(-161,45)	(-182,23)	(-91,117)	(-83,125)	(-91,112)	(-123,73)
P-Value	0.788	0.029	0.269	0.130	0.810	0.691	0.841	0.613
Total Medicare Parts A and B Expenditures	-3,181,052.67	-106.97*	-50.26	-73.49	13.85	28.17	10.66	-21.32
95% Confidence Interval	(-25,002,682.6 | 18,640,577.3)	(-207,-7)	(-150,50)	(-173,26)	(-87,115)	(-73,129)	(-87,109)	(-116,73)
P-Value	0.775	0.037	0.323	0.149	0.789	0.584	0.831	0.659
Inpatient Expenditures	-3,748,179.92	-83.6*	-30.97	-38.4	18.3	27.01	23.68	-28.52
95% Confidence Interval	(-17,378,881.9 | 9,882,522.1)	(-144,-23)	(-93,31)	(-99,22)	(-43,80)	(-34,88)	(-36,83)	(-86,29)
P-Value	0.590	0.007	0.327	0.214	0.560	0.388	0.435	0.331
Outpatient ER Expenditures	-1,012,924.70	-3.71	-3.33	-0.96	-3.45	-0.73	-3.27	-3.59
95% Confidence Interval	(-2,331,720.1 | 305,870.7)	(-9,2)	(-8,2)	(-7,5)	(-10,3)	(-7,6)	(-9,3)	(-10,3)
P-Value	0.132	0.166	0.197	0.748	0.293	0.827	0.302	0.261
Outpatient Non-ER Expenditures	2,718,088.17	10.1	7.22	-5.83	6.51	4.19	-5.88	19.79
95% Confidence Interval	(-1,788,245.7 | 7,224,422.0)	(-11,31)	(-14,28)	(-27,15)	(-15,28)	(-17,26)	(-27,15)	(-1,41)
P-Value	0.237	0.339	0.499	0.592	0.549	0.702	0.585	0.065
Carrier/PB Expenditures	-1,360,184.10	-14.34	-10.31	-10.86	-0.24	-0.04	3.66	-10.36

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-5,492,770.3 | 2,772,402.1)	(-34,6)	(-30,9)	(-30,8)	(-20,19)	(-20,20)	(-15,23)	(-30,9)
P-Value	0.519	0.159	0.295	0.269	0.980	0.996	0.707	0.293
Skilled Nursing Facility Expenditures	2,014,339.93	-19.27	-0.38	-9.17	15.4	12	4.19	8.87
95% Confidence Interval	(-4,948,187.5 | 8,976,867.3)	(-50,11)	(-30,30)	(-40,22)	(-16,46)	(-20,44)	(-27,35)	(-20,38)
P-Value	0.571	0.219	0.980	0.562	0.332	0.456	0.790	0.553
Durable Medical Equipment Expenditures	-66,045.10	2.29	-0.85	0.8	-3.11	-2.01	-1.19	-2.85
95% Confidence Interval	(-1,285,283.9 | 1,153,193.7)	(-4,8)	(-7,5)	(-5,7)	(-9,3)	(-8,4)	(-7,5)	(-8,3)
P-Value	0.915	0.466	0.786	0.796	0.300	0.510	0.691	0.320
Home Health Expenditures	-592,508.51	3.57	0.98	6.63	-3.3	-5.9	-7.15	-2.45
95% Confidence Interval	(-2,743,487.7 | 1,558,470.7)	(-6,13)	(-9,11)	(-3,17)	(-14,7)	(-16,4)	(-17,3)	(-11,6)
P-Value	0.589	0.480	0.847	0.189	0.530	0.258	0.167	0.583
Hospice Expenditures	-860,025.74	-1.16	-11.6	-14.95	-15.28	-6.42	-3.43	-1.16
95% Confidence Interval	(-4,258,931.5 | 2,538,880.0)	(-19,17)	(-29,5)	(-32,2)	(-31,1)	(-22,9)	(-20,13)	(-14,12)
P-Value	0.620	0.898	0.181	0.079	0.059	0.429	0.676	0.859
Total Surgery Expenditures	-3,442,872.60	-56.92*	-15.26	-15.61	-0.16	13.6	-7.29	3.33
95% Confidence Interval	(-13,559,100.5 | 6,673,355.3)	(-102,-12)	(-59,29)	(-60,29)	(-45,44)	(-32,59)	(-51,36)	(-40,47)
P-Value	0.505	0.014	0.496	0.488	0.994	0.555	0.742	0.880
Inpatient Surgery Expenditures	-3,532,157.14	-57.31*	-17.53	-13.95	5.97	5.69	-0.5	-2.7
95% Confidence Interval	(-13,133,741.1 | 6,069,426.9)	(-100,-14)	(-59,24)	(-56,28)	(-36,48)	(-37,48)	(-41,40)	(-43,38)
P-Value	0.471	0.009	0.411	0.512	0.782	0.794	0.981	0.896
Episode-Based Inpatient Surgery Expenditures	-4,552,303.12	-58.03*	-20.5	-22.22	4.46	7.4	0.96	-11.74

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-14,617,231.8 | 5,512,625.5)	(-103,-13)	(-64,23)	(-66,21)	(-40,49)	(-37,52)	(-42,44)	(-54,31)
P-Value	0.375	0.011	0.358	0.319	0.845	0.746	0.965	0.589
Outpatient Surgery Expenditures	89,284.54	0.39	2.27	-1.66	-6.13	7.91	-6.79	6.03
95% Confidence Interval	(-2,839,171.1 | 3,017,740.2)	(-12,12)	(-10,14)	(-15,11)	(-19,7)	(-6,21)	(-20,6)	(-7,19)
P-Value	0.952	0.949	0.710	0.802	0.357	0.251	0.308	0.378
PS[b] Orthopedic Surgery Expenditures	82,672.33	0.75	-3.36	1.21	-9.49	7.42	2.02	2.87
95% Confidence Interval	(-3,375,315.5 | 3,540,660.1)	(-13,14)	(-17,11)	(-15,17)	(-26,7)	(-7,22)	(-13,17)	(-12,18)
P-Value	0.963	0.912	0.638	0.882	0.255	0.319	0.792	0.701
Inpatient PS Orthopedic Surgery Expenditures	266,542.18	0.88	-2.55	1.73	-7.77	7.08	2.05	3.38
95% Confidence Interval	(-2,711,134.0 | 3,244,218.3)	(-10,12)	(-15,9)	(-12,16)	(-22,6)	(-5,20)	(-11,15)	(-9,16)
P-Value	0.861	0.880	0.677	0.806	0.284	0.270	0.755	0.599
Outpatient PS Orthopedic Surgery Expenditures	-104,633.48	0.22	-0.34	-0.89*	-0.65	-0.12	0.04	-0.2
95% Confidence Interval	(-296,683.0 | 87,416.0)	(0,1)	(-1,1)	(-2,0)	(-1,0)	(-1,1)	(-1,1)	(-1,1)
P-Value	0.286	0.520	0.449	0.042	0.090	0.795	0.930	0.663
PS Cardiac Surgery Expenditures	-2,069,802.82	-22.99*	-0.56	8.77	-5.86	-9.01	-2.94	-4.56
95% Confidence Interval	(-6,472,626.1 | 2,333,020.5)	(-42,-4)	(-20,19)	(-10,27)	(-25,13)	(-29,11)	(-22,16)	(-23,14)
P-Value	0.357	0.016	0.955	0.352	0.548	0.369	0.761	0.628
Inpatient PS Cardiac Surgery Expenditures	-1,506,284.07	-18.79*	0.44	7.49	-4.07	-6.46	-2.09	-4.58
95% Confidence Interval	(-5,386,179.1 | 2,373,610.9)	(-35,-2)	(-17,18)	(-9,24)	(-21,13)	(-24,11)	(-19,14)	(-21,12)

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.447	0.027	0.961	0.362	0.634	0.464	0.805	0.580
Outpatient PS Cardiac Surgery Expenditures	-418,406.49	-2.4	-0.82	0.67	-1.57	-1.61	-1.33	0.89
95% Confidence Interval	(-1,066,139.6 | 229,326.6)	(-5,0)	(-3,2)	(-2,3)	(-5,1)	(-4,1)	(-4,2)	(-2,4)
P-Value	0.205	0.082	0.529	0.636	0.305	0.268	0.366	0.524

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b] PS = Preference-sensitive

Table Appendix B-24: Difference-in-Difference Estimates of Welvie's Effects on Expenditures, Medicare Advantage Ohio Cohort

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	92341	92341	91223	90224	83927	83130	80812	79594
Total Medicare Parts A, B, and D Expenditures	-16,999,062.72	-12.69	-25.29	-58.4	-43.2	-56.29	7.52	-3.3
95% Confidence Interval	(-40,761,990.4 | 6,763,865.0)	(-100,75)	(-107,56)	(-128,11)	(-115,29)	(-138,26)	(-71,86)	(-68,61)
P-Value	0.161	0.777	0.542	0.099	0.241	0.179	0.851	0.920
Total Medicare Parts A and B Expenditures	-18,072,213.30	-10.58	-27.6	-61.61	-41.53	-57.85	4.9	-3.18
95% Confidence Interval	(-41,209,839.1 | 5,065,412.5)	(-97,76)	(-107,52)	(-129,6)	(-112,29)	(-137,21)	(-69,79)	(-64,58)
P-Value	0.126	0.810	0.498	0.072	0.245	0.150	0.897	0.919
Inpatient Expenditures	-8,961,099.33	-5.17	-11.8	-47.11*	-14.09	-19.56	2.02	-3.48
95% Confidence Interval	(-25,108,578.6 | 7,186,379.9)	(-66,55)	(-69,45)	(-93,-1)	(-61,33)	(-73,34)	(-48,52)	(-42,35)

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.277	0.867	0.684	0.045	0.556	0.474	0.937	0.859
Outpatient ER Expenditures	-1,282,753.51	-5.75	0.14	-1.36	-1.46	-5.15	3.06	-0.05
95% Confidence Interval	(-3,147,656.5 | 582,149.5)	(-12,0)	(-6,6)	(-6,3)	(-8,5)	(-12,2)	(-3,9)	(-5,5)
P-Value	0.178	0.064	0.963	0.568	0.652	0.147	0.322	0.986
Outpatient Non-ER Expenditures	-3,324,499.09	-14.24	-5.39	-0.38	-7.42	-13.11	-0.83	8.27
95% Confidence Interval	(-8,873,351.1 | 2,224,353.0)	(-35,6)	(-23,12)	(-17,16)	(-26,11)	(-33,7)	(-18,16)	(-7,23)
P-Value	0.240	0.178	0.548	0.965	0.432	0.206	0.923	0.287
Carrier/PB Expenditures	-1,106,979.17	3.25	-8.55	-2.49	-6.35	-8.15	4.11	-2.84
95% Confidence Interval	(-6,605,197.0 | 4,391,238.6)	(-16,23)	(-27,10)	(-19,14)	(-24,11)	(-27,11)	(-14,23)	(-20,14)
P-Value	0.693	0.743	0.376	0.768	0.478	0.401	0.663	0.744
Skilled Nursing Facility Expenditures	-2,918,738.84	12.27	-1.04	-9.9	-12.89*	-11.06	-3.9	-3.94
95% Confidence Interval	(-7,093,912.1 | 1,256,434.5)	(-4,28)	(-13,11)	(-21,1)	(-25,-1)	(-26,4)	(-17,9)	(-15,7)
P-Value	0.171	0.134	0.870	0.084	0.037	0.141	0.546	0.499
Home Health Expenditures	-526,112.71	-0.8	-1.07	-0.45	0.18	-0.91	0.3	-0.88
95% Confidence Interval	(-2,290,754.7 | 1,238,529.3)	(-7,6)	(-7,5)	(-6,5)	(-5,6)	(-8,6)	(-6,6)	(-6,4)
P-Value	0.559	0.813	0.710	0.864	0.949	0.791	0.922	0.73
Total Surgery Expenditures	-14,855,285.83*	-33.81	-9.58	-35.3*	-27.02	-33.8	-3.72	2.21
95% Confidence Interval	(-26,794,847.3 | -2,915,724.3)	(-81,13)	(-48,29)	(-69,-2)	(-63,9)	(-72,4)	(-42,34)	(-27,31)
P-Value	0.015	0.158	0.628	0.041	0.138	0.083	0.848	0.881
Inpatient Surgery Expenditures	-10,731,429.41	-18.62	-3.74	-30.07	-15.04	-28.67	-6.43	-1.99
95% Confidence Interval	(-21,986,038.5 | 523,179.6)	(-63,26)	(-40,33)	(-62,2)	(-49,19)	(-64,7)	(-42,29)	(-29,25)
P-Value	0.062	0.413	0.841	0.066	0.380	0.114	0.726	0.885

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Episode-Based Inpatient Surgery Expenditures	-10,780,040.57	-18.58	-3.61	-29.61	-15.92	-29.55	-6.56	-1.55
95% Confidence Interval	(-22,051,634.2 | 491,553.1)	(-63,26)	(-40,33)	(-62,3)	(-50,18)	(-65,6)	(-43,29)	(-29,25)
P-Value	0.061	0.414	0.847	0.071	0.353	0.104	0.721	0.911
Outpatient Surgery Expenditures	-4,123,856.43*	-15.2*	-5.84	-5.23	-11.99*	-5.13	2.71	4.2
95% Confidence Interval	(-7,832,558.4 | -415,154.5)	(-29,-2)	(-18,6)	(-15,4)	(-23,-1)	(-19,8)	(-9,14)	(-5,14)
P-Value	0.029	0.027	0.332	0.277	0.037	0.453	0.639	0.387
PS[b] Orthopedic Surgery Expenditures	1,754,746.55	7.14	-2.8	0.86	0.81	7.01	2.28	4.99
95% Confidence Interval	(-2,229,244.3 | 5,738,737.4)	(-7,21)	(-16,11)	(-10,12)	(-11,13)	(-5,19)	(-11,15)	(-6,16)
P-Value	0.388	0.321	0.685	0.879	0.896	0.254	0.726	0.376
Inpatient PS Orthopedic Surgery Expenditures	1,852,093.97	6.33	-1.58	0.49	1.33	6.75	3.71	4.68
95% Confidence Interval	(-1,494,220.5 | 5,198,408.4)	(-6,18)	(-13,10)	(-9,10)	(-9,12)	(-4,17)	(-7,14)	(-5,14)
P-Value	0.278	0.299	0.785	0.918	0.798	0.201	0.494	0.321
Outpatient PS Orthopedic Surgery Expenditures	-172,933.37	-0.33	-0.24	0.61	-0.27	-0.4	-1.27	-0.29
95% Confidence Interval	(-507,056.6 | 161,189.8)	(-1,0)	(-1,0)	(-1,2)	(-1,0)	(-1,1)	(-3,1)	(-1,0)
P-Value	0.310	0.354	0.508	0.299	0.429	0.446	0.238	0.363
PS Cardiac Surgery Expenditures	-2,101,274.04	-1.35	12.76	-5.51	-17.38*	-6.42	1.74	-11.33
95% Confidence Interval	(-7,441,196.9 | 3,238,648.9)	(-21,18)	(-6,31)	(-20,9)	(-32,-3)	(-24,11)	(-15,19)	(-24,2)
P-Value	0.441	0.893	0.174	0.462	0.021	0.478	0.842	0.091
Inpatient PS Cardiac Surgery Expenditures	-1,690,402.24	-0.14	9.71	-3.11	-14.82*	-3.15	-1.27	-10.36

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-6,243,174.6 | 2,862,370.1)	(-17,17)	(-6,26)	(-15,9)	(-27,-2)	(-19,12)	(-16,13)	(-21,1)
P-Value	0.467	0.987	0.230	0.622	0.019	0.688	0.863	0.064
Outpatient PS Cardiac Surgery Expenditures	-401,749.99	-1.52	1.31	-2.32	-0.84	-3.34*	2.1	0.6
95% Confidence Interval	(-1,473,426.9 | 669,926.9)	(-6,3)	(-2,5)	(-5,0)	(-4,2)	(-7,0)	(-1,5)	(-2,3)
P-Value	0.462	0.466	0.439	0.08	0.582	0.042	0.218	0.664

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b] PS= Preference-sensitive

Table Appendix B-25: IV Regression Estimates of Welvie's Effects on Expenditures, Medicare Parts A and B Ohio High-dose Cohort

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	1204	1200	1188	1172	1111	945	280
Total Medicare Parts A, B, and D Expenditures	-5602.27*	-3121.08	-4107.78	943.09	760.17	780.42	-4955.41
95% Confidence Interval	(-10950.24,-254.29)	(-8395.14,2152.98)	(-9366.76,1151.21)	(-4374.98,6261.16)	(-4735.08,6255.42)	(-5427.53,6988.37)	(-24796.13,14885.31)
P-Value	0.040	0.246	0.126	0.728	0.786	0.805	0.624
Total Medicare Parts A and B Expenditures	-5199.20	-2727.95	-3805.43	1033.20	1152.11	756.40	-4247.00
95% Confidence Interval	(-10407.71,9.31)	(-7851.71,2395.82)	(-8913.03,1302.16)	(-4153.92,6220.31)	(-4188.47,6492.70)	(-5245.14,6757.95)	(-23428.57,14934.57)
P-Value	0.050	0.297	0.144	0.696	0.672	0.805	0.664
Inpatient Expenditures	-4244.05*	-1647.92	-2013.96	1102.04	1152.34	1528.67	-5964.98
95% Confidence Interval	(-7406.17,-1081.93)	(-4824.26,1528.43)	(-5116.86,1088.94)	(-2053.77,4257.85)	(-2081.50,4386.17)	(-2101.60,5158.94)	(-17606.86,5676.91)
P-Value	0.009	0.309	0.203	0.494	0.485	0.409	0.315
Outpatient ER Expenditures	-143.74	-180.72	-84.99	-166.76	-39.22	-187.72	-731.22
95% Confidence Interval	(-420.91,133.43)	(-440.94,79.50)	(-378.97,208.98)	(-495.50,161.98)	(-387.72,309.28)	(-569.66,194.23)	(-2001.44,539.00)
P-Value	0.309	0.173	0.571	0.320	0.825	0.335	0.259
Outpatient Non-ER Expenditures	575.23	314.52	-249.31	321.80	200.07	-425.48	3967.60
95% Confidence Interval	(-499.91,1650.36)	(-758.30,1387.35)	(-1342.46,843.83)	(-766.38,1409.97)	(-937.90,1338.05)	(-1719.12,868.16)	(-290.99,8226.20)
P-Value	0.294	0.566	0.655	0.562	0.730	0.519	0.068
Carrier/PB Expenditures	-652.80	-508.70	-600.49	144.85	-7.20	253.95	-1955.22
95% Confidence Interval	(-1689.45,383.86)	(-1499.19,481.78)	(-1584.64,383.66)	(-841.45,1131.15)	(-1054.36,1039.96)	(-915.26,1423.16)	(-5855.66,1945.23)
P-Value	0.217	0.314	0.232	0.773	0.989	0.670	0.326
Skilled Nursing Facility Expenditures	-934.87	-67.52	-452.76	758.71	571.61	288.89	1879.02
95% Confidence Interval	(-2531.97,662.23)	(-1608.88,1473.84)	(-2037.63,1132.10)	(-830.99,2348.41)	(-1101.00,2244.22)	(-1606.39,2184.16)	(-4059.91,7817.94)
P-Value	0.251	0.932	0.576	0.350	0.503	0.765	0.535

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Durable Medical Equipment Expenditures	112.27	-53.35	39.85	-151.64	-92.78	-65.63	-667.74
95% Confidence Interval	(-206.80,431.34)	(-369.55,262.85)	(-272.33,352.03)	(-452.10,148.83)	(-411.55,225.99)	(-426.81,295.54)	(-1791.92,456.43)
P-Value	0.490	0.741	0.802	0.323	0.568	0.722	0.244
Home Health Expenditures	189.68	72.93	345.74	-158.45	-334.22	-437.13	-478.63
95% Confidence Interval	(-324.42,703.79)	(-438.00,583.86)	(-160.32,851.79)	(-684.90,368.00)	(-875.91,207.46)	(-1058.81,184.54)	(-2248.28,1291.02)
P-Value	0.470	0.780	0.181	0.555	0.227	0.168	0.596
Hospice Expenditures	-55.49	-604.83	-752.23	-773.09	-298.44	-202.92	-66.63
95% Confidence Interval	(-976.62,865.63)	(-1478.13,268.48)	(-1605.79,101.32)	(-1585.49,39.32)	(-1142.68,545.80)	(-1190.95,785.11)	(-2669.00,2535.74)
P-Value	0.906	0.175	0.084	0.062	0.488	0.687	0.960
Total Surgery Expenditures	-2737.54*	-894.46	-887.69	78.29	497.51	-452.45	343.66
95% Confidence Interval	(-5089.90,-385.18)	(-3147.51,1358.59)	(-3147.73,1372.34)	(-2211.78,2368.35)	(-1888.01,2883.02)	(-3115.46,2210.56)	(-8381.19,9068.52)
P-Value	0.023	0.437	0.441	0.947	0.683	0.739	0.938
Inpatient Surgery Expenditures	-2791.12*	-963.08	-789.01	418.90	97.01	-22.13	-856.14
95% Confidence Interval	(-5035.13,-547.11)	(-3106.24,1180.07)	(-2924.72,1346.70)	(-1750.00,2587.80)	(-2154.26,2348.29)	(-2536.78,2492.52)	(-9047.78,7335.51)
P-Value	0.015	0.378	0.469	0.705	0.933	0.986	0.838
Episode-Based Inpatient Surgery Expenditures	-2823.58*	-1071.10	-1236.87	336.36	227.89	45.53	-2674.55
95% Confidence Interval	(-5159.14,-488.01)	(-3311.78,1169.57)	(-3471.69,997.95)	(-1956.99,2629.71)	(-2137.28,2593.06)	(-2609.03,2700.10)	(-11274.32,5925.22)
P-Value	0.018	0.349	0.278	0.774	0.850	0.973	0.542
Outpatient Surgery Expenditures	53.58	68.63	-98.69	-340.62	400.49	-430.32	1199.80
95% Confidence Interval	(-568.32,675.47)	(-543.49,680.74)	(-762.80,565.43)	(-1006.83,325.59)	(-314.74,1115.73)	(-1231.54,370.91)	(-1509.64,3909.24)
P-Value	0.866	0.826	0.771	0.316	0.272	0.293	0.385
PS[a] Orthopedic Surgery Expenditures	274.68	-200.33	-12.56	-475.49	399.19	90.05	556.74
95% Confidence Interval	(-422.24,971.59)	(-918.48,517.82)	(-831.97,806.84)	(-1311.49,360.52)	(-373.95,1172.33)	(-827.25,1007.35)	(-2397.62,3511.11)
P-Value	0.440	0.585	0.976	0.265	0.312	0.847	0.712
Inpatient PS[a] Orthopedic Surgery Expenditures	243.44	-152.22	25.40	-387.40	376.93	91.36	666.37
95% Confidence Interval	(-353.03,839.91)	(-767.69,463.25)	(-680.44,731.24)	(-1113.75,338.95)	(-288.18,1042.03)	(-697.50,880.22)	(-1868.78,3201.53)
P-Value	0.424	0.628	0.944	0.296	0.267	0.820	0.606

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Outpatient PS Orthopedic Surgery Expenditures	17.42	-22.08	-46.88*	-32.81	-5.75	6.60	-31.92
95% Confidence Interval	(-18.62,53.46)	(-66.93,22.76)	(-90.58,-3.17)	(-71.15,5.52)	(-51.80,40.31)	(-47.77,60.97)	(-210.79,146.94)
P-Value	0.343	0.335	0.036	0.093	0.807	0.812	0.726
PS Cardiac Surgery Expenditures	-1108.06*	-56.94	458.13	-249.67	-578.36	-85.27	-1011.14
95% Confidence Interval	(-2098.35,-117.78)	(-1049.54,935.65)	(-487.81,1404.08)	(-1236.50,737.15)	(-1607.89,451.17)	(-1254.57,1084.04)	(-4722.33,2700.05)
P-Value	0.028	0.910	0.343	0.620	0.271	0.886	0.593
Inpatient PS Cardiac Surgery Expenditures	-890.33*	-7.87	384.17	-151.06	-429.20	-47.07	-1025.46
95% Confidence Interval	(-1771.23,-9.43)	(-884.10,868.35)	(-440.16,1208.50)	(-1015.86,713.74)	(-1334.42,476.01)	(-1071.07,976.93)	(-4281.70,2230.79)
P-Value	0.048	0.986	0.361	0.732	0.353	0.928	0.537
Outpatient PS Cardiac Surgery Expenditures	-129.15	-39.55	39.87	-94.69	-85.74	-78.14	187.67
95% Confidence Interval	(-269.68,11.39)	(-171.44,92.35)	(-102.25,181.99)	(-247.38,58.00)	(-236.55,65.06)	(-255.76,99.48)	(-365.06,740.40)
P-Value	0.072	0.557	0.582	0.224	0.265	0.389	0.506

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a]PS = Preference-sensitive

Table Appendix B-26: IV Regression Estimates of Welvie's Effects on Expenditures, Medicare Advantage Ohio High-dose Cohort

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Number of Participant Beneficiaries	3598	3269	2717	2550	2246	2148	1706
Total Medicare Parts A, B, and D Expenditures[a]	-244.41	-946.40	-2226.89	-1609.57	-2290.45	-307.90	-297.92
95% Confidence Interval	(-2521.58,2032.77)	(-3245.42,1352.61)	(-4512.39,58.62)	(-3969.86,750.71)	(-5262.57,681.68)	(-3145.25,2529.46)	(-3246.26,2650.42)
P-Value	0.833	0.420	0.056	0.181	0.131	0.832	0.843
Total Medicare Parts A and B Expenditures	-96.83	-983.37	-2264.74*	-1468.66	-2091.12	-135.94	-180.83

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-2313.70,2120.03)	(-3211.63,1244.88)	(-4485.82,-43.66)	(-3765.87,828.54)	(-4987.86,805.63)	(-2899.76,2627.87)	(-2998.04,2636.39)
P-Value	0.932	0.387	0.046	0.210	0.157	0.923	0.900
Inpatient Expenditures	36.30	-343.83	-1627.86*	-528.50	-713.02	40.46	-111.11
95% Confidence Interval	(-1525.14,1597.73)	(-1926.55,1238.88)	(-3151.03,-104.69)	(-2065.49,1008.49)	(-2680.87,1254.84)	(-1830.75,1911.67)	(-1889.13,1666.92)
P-Value	0.964	0.670	0.036	0.500	0.478	0.966	0.903
Outpatient ER Expenditures	-128.86	-23.96	-40.12	-48.04	-172.57	106.62	-28.72
95% Confidence Interval	(-289.62,31.91)	(-181.88,133.96)	(-195.02,114.77)	(-257.18,161.09)	(-428.86,83.72)	(-119.39,332.63)	(-269.75,212.31)
P-Value	0.116	0.766	0.612	0.653	0.187	0.355	0.815
Outpatient Non-ER Expenditures	-366.10	-203.09	-45.80	-248.57	-439.56	-127.96	332.01
95% Confidence Interval	(-899.20,167.00)	(-694.66,288.48)	(-597.96,506.36)	(-854.34,357.20)	(-1189.06,309.93)	(-760.54,504.63)	(-370.79,1034.81)
P-Value	0.178	0.418	0.871	0.421	0.250	0.692	0.354
Carrier/PB Expenditures	61.80	-347.73	-188.93	-238.24	-327.39	9.43	-158.82
95% Confidence Interval	(-436.96,560.55)	(-875.51,180.05)	(-733.66,355.81)	(-813.79,337.31)	(-1028.52,373.73)	(-680.59,699.46)	(-945.43,627.78)
P-Value	0.808	0.197	0.497	0.417	0.360	0.979	0.692
Skilled Nursing Facility Expenditures	313.64	-14.15	-345.44	-417.78*	-388.18	-168.00	-151.35
95% Confidence Interval	(-98.55,725.83)	(-359.94,331.63)	(-716.26,25.38)	(-815.30,-20.27)	(-929.28,152.92)	(-639.49,303.50)	(-678.54,375.85)
P-Value	0.136	0.936	0.068	0.039	0.160	0.485	0.574
Home Health Expenditures	-10.89	-54.33	-19.32	-3.20	-55.46	-2.82	-49.25
95% Confidence Interval	(-182.43,160.65)	(-212.21,103.55)	(-187.72,149.08)	(-183.75,177.35)	(-301.26,190.35)	(-224.27,218.62)	(-279.20,180.69)
P-Value	0.901	0.500	0.822	0.972	0.658	0.980	0.675
Total Surgery Expenditures	-674.83	-324.23	-1271.66*	-1076.23	-1168.87	-317.89	75.68
95% Confidence Interval	(-1885.49,535.83)	(-1404.41,755.95)	(-2388.98,-154.33)	(-2244.86,92.40)	(-2577.44,239.69)	(-1734.70,1098.92)	(-1259.82,1411.18)
P-Value	0.275	0.556	0.026	0.071	0.104	0.660	0.912
Inpatient Surgery Expenditures	-317.18	-88.58	-1073.60*	-649.51	-1019.02	-343.64	-63.38
95% Confidence Interval	(-1465.74,831.37)	(-1109.92,932.77)	(-2133.78,-13.43)	(-1746.27,447.24)	(-2326.91,288.87)	(-1683.85,996.56)	(-1306.60,1179.85)
P-Value	0.588	0.865	0.047	0.246	0.127	0.615	0.920
Episode-Based Inpatient Surgery Expenditures	-316.19	-84.93	-1058.42	-678.43	-1051.57	-348.77	-42.73
95% Confidence Interval	(-1465.54,833.16)	(-1107.50,937.63)	(-2120.61,3.78)	(-1777.47,420.60)	(-2361.60,258.46)	(-1690.00,992.46)	(-1289.31,1203.84)
P-Value	0.590	0.871	0.051	0.226	0.116	0.610	0.946
Outpatient Surgery Expenditures	-357.65*	-235.65	-198.06	-426.71*	-149.85	25.76	139.05

Measures (2012 USD per Person)	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-706.06,-9.24)	(-562.06,90.75)	(-510.65,114.54)	(-794.33,-59.10)	(-644.11,344.41)	(-394.78,446.30)	(-297.99,576.10)
P-Value	0.044	0.157	0.214	0.023	0.552	0.904	0.533
PS[a] Orthopedic Surgery Expenditures	322.89	-115.25	-18.20	-86.08	253.03	-45.67	207.48
95% Confidence Interval	(-43.81,689.59)	(-491.01,260.51)	(-385.56,349.16)	(-480.88,308.72)	(-189.96,696.01)	(-519.73,428.39)	(-301.11,716.06)
P-Value	0.084	0.548	0.923	0.669	0.263	0.850	0.424
Inpatient PS[a] Orthopedic Surgery Expenditures	281.66	-76.38	-21.00	-44.92	247.83	28.59	195.86
95% Confidence Interval	(-29.21,592.54)	(-392.15,239.39)	(-326.44,284.43)	(-376.94,287.11)	(-133.05,628.70)	(-365.06,422.24)	(-229.62,621.33)
P-Value	0.076	0.635	0.893	0.791	0.202	0.887	0.367
Outpatient PS Orthopedic Surgery Expenditures	-9.69	-9.23	20.12	-11.58	-14.13	-48.38	-11.85
95% Confidence Interval	(-27.57,8.19)	(-27.96,9.50)	(-17.94,58.19)	(-33.51,10.36)	(-51.94,23.68)	(-127.29,30.53)	(-40.98,17.29)
P-Value	0.288	0.334	0.300	0.301	0.464	0.229	0.426
PS Cardiac Surgery Expenditures	-34.97	396.00	-238.55	-582.71*	-239.07	99.87	-516.20
95% Confidence Interval	(-541.05,471.12)	(-121.21,913.20)	(-715.97,238.87)	(-1065.83,-99.60)	(-889.84,411.69)	(-538.89,738.64)	(-1121.15,88.76)
P-Value	0.892	0.133	0.327	0.018	0.472	0.759	0.094
Inpatient PS Cardiac Surgery Expenditures	3.15	302.05	-154.42	-496.38*	-128.01	-15.79	-472.08
95% Confidence Interval	(-434.90,441.20)	(-143.43,747.54)	(-555.81,246.97)	(-902.20,-90.56)	(-693.60,437.58)	(-553.87,522.29)	(-977.68,33.52)
P-Value	0.989	0.184	0.451	0.017	0.657	0.954	0.067
Outpatient PS Cardiac Surgery Expenditures	-48.08	44.85	-76.38	-27.36	-116.49	78.44	28.22
95% Confidence Interval	(-151.86,55.71)	(-47.78,137.47)	(-162.18,9.41)	(-125.11,70.39)	(-234.44,1.46)	(-46.08,202.97)	(-95.64,152.08)
P-Value	0.364	0.343	0.081	0.583	0.053	0.217	0.655

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a]PS = Preference-sensitive

Figure B-13: Welvie Total Medicare Parts A, B, and D Expenditures per Beneficiary, Medicare Parts A and B Ohio Cohort

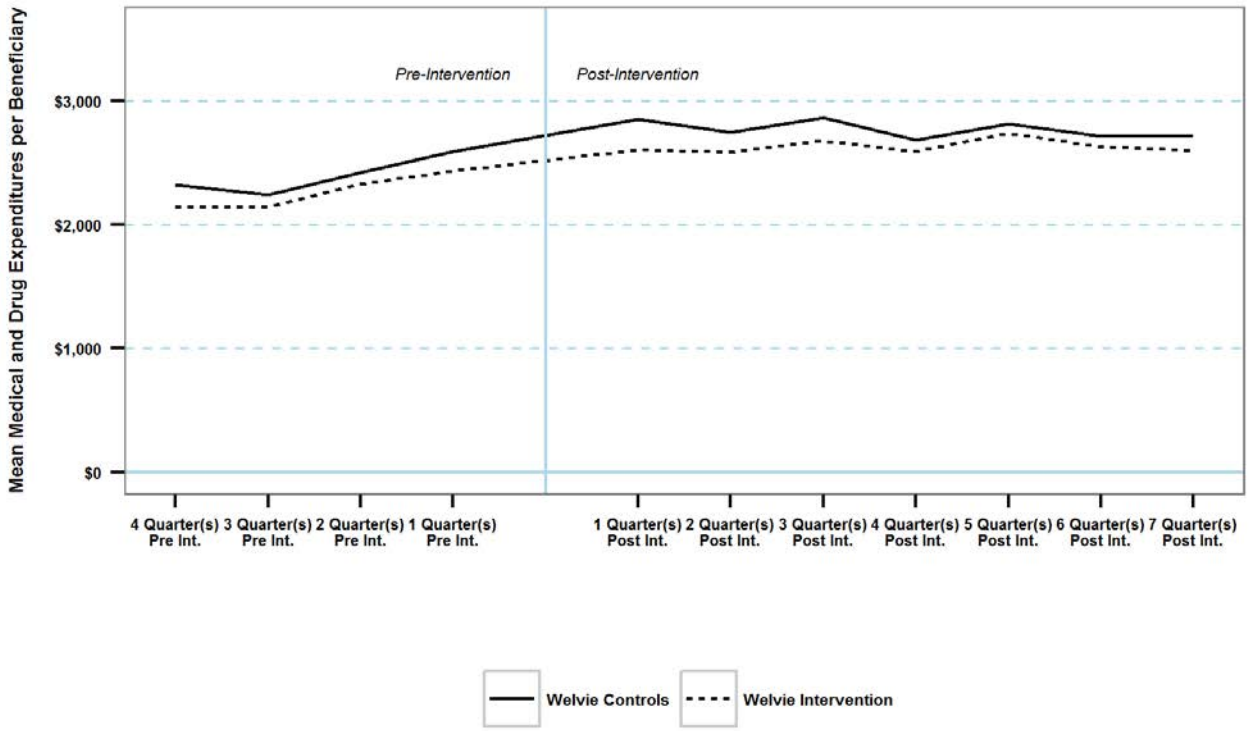


Figure B-14: Welvie Total Medicare Parts A, B, and D Expenditures per Beneficiary, Medicare Advantage Ohio Cohort

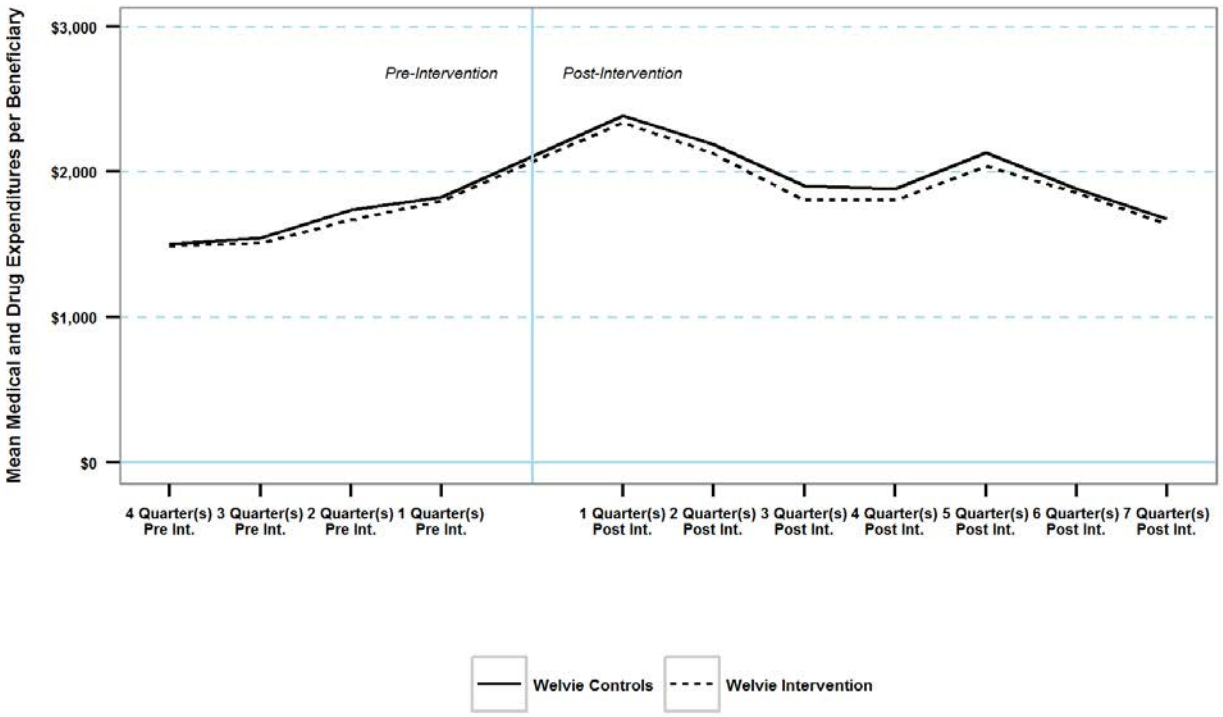


Figure B-15: Welvie Total Medicare Parts A and B Expenditures per Beneficiary, Medicare Parts A and B Ohio Cohort

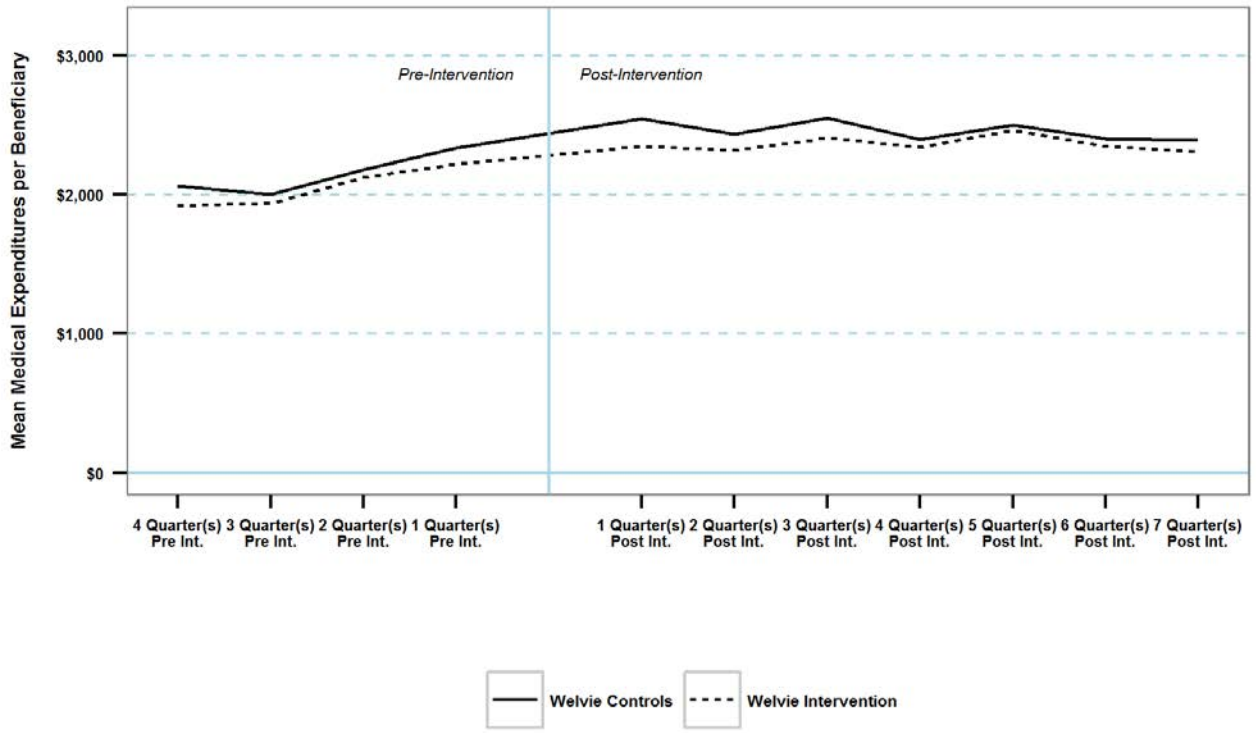


Figure B-16: Welvie Total Medicare Parts A and B Expenditures per Beneficiary, Medicare Advantage Ohio Cohort

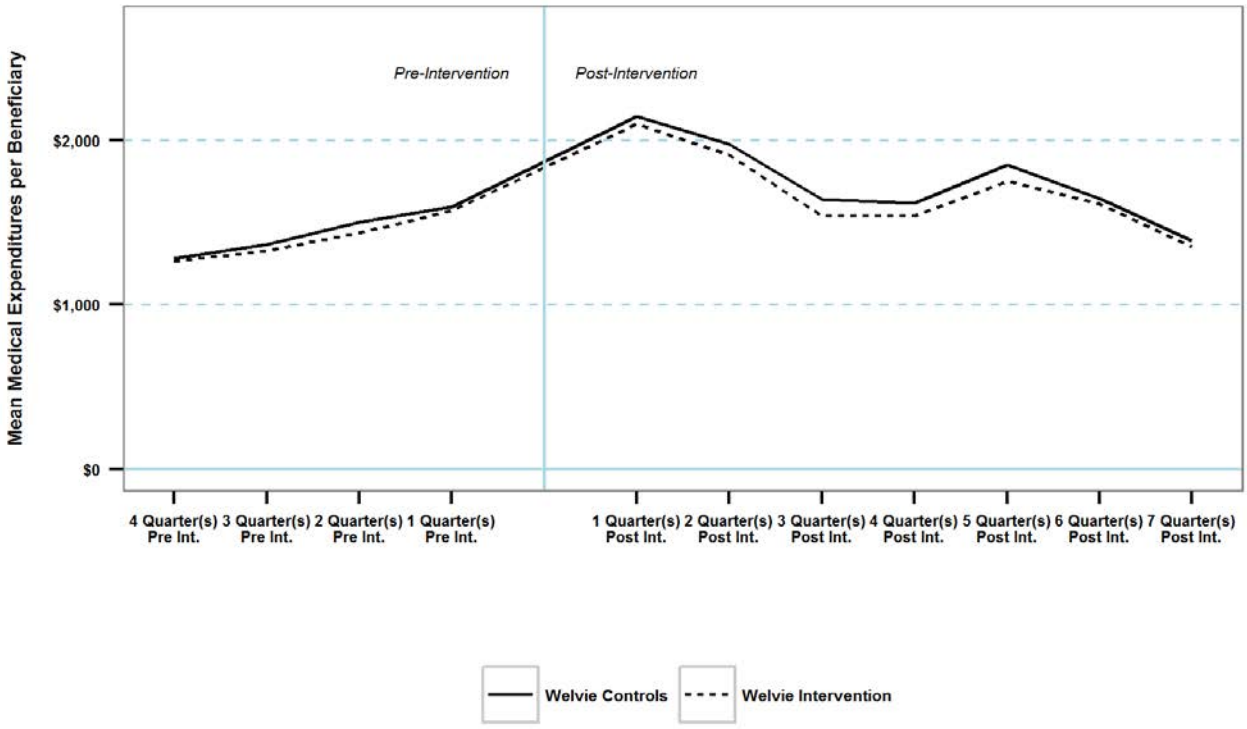


Table Appendix B-27: Welvie Total Medicare Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Total Medicare Parts A, B, and D Expenditures								
Mean	$9,037	$9,571	$2,604	$2,853	$2,581	$2,747	$2,676	$2,864
Median	$2,638	$2,806	$497	$534	$494	$531	$531	$560
90th percentile	$25,274	$27,012	$6,004	$6,720	$5,721	$6,325	$6,072	$6,549
99th percentile	$85,215	$89,526	$35,619	$37,577	$36,176	$36,322	$36,635	$37,768
Total Medicare Parts A and B Expenditures								
Mean	$8,193	$8,571	$2,343	$2,545	$2,316	$2,436	$2,404	$2,550
Median	$2,091	$2,190	$322	$339	$324	$338	$378	$387
90th percentile	$23,440	$24,827	$5,293	$5,871	$4,980	$5,460	$5,214	$5,571
99th percentile	$81,024	$85,013	$34,772	$36,849	$35,169	$35,391	$35,577	$36,813

Table Appendix B-28: Welvie Total Medicare Expenditures by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Total Medicare Parts A, B, and D Expenditures								
Mean	$2,592	$2,683	$2,738	$2,816	$2,629	$2,716	$2,595	$2,712
Median	$343	$374	$514	$547	$509	$530	$543	$559
90th percentile	$5,851	$6,330	$6,265	$6,743	$5,909	$6,344	$6,018	$6,477
99th percentile	$37,863	$38,033	$37,274	$36,781	$36,695	$35,698	$34,423	$34,336

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Total Medicare Parts A and B Expenditures								
Mean	$2,340	$2,397	$2,459	$2,499	$2,342	$2,399	$2,306	$2,391
Median	$217	$227	$329	$346	$338	$345	$390	$395
90th percentile	$5,113	$5,475	$5,530	$5,808	$5,078	$5,339	$5,141	$5,463
99th percentile	$37,225	$37,110	$36,281	$35,927	$35,787	$34,898	$33,281	$33,451

Table Appendix B-29: Welvie Total Medicare Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Total Medicare Parts A, B, and D Expenditures								
Mean	$6,470	$6,612	$2,338	$2,387	$2,127	$2,190	$1,804	$1,901
Median	$1,933	$1,979	$408	$411	$298	$304	$313	$313
90th percentile	$16,277	$16,967	$4,095	$4,304	$3,848	$4,028	$3,360	$3,487
99th percentile	$69,322	$70,415	$36,397	$36,896	$34,095	$35,599	$28,203	$29,806
Total Medicare Parts A and B Expenditures								
Mean	$5,597	$5,738	$2,099	$2,144	$1,911	$1,976	$1,540	$1,639
Median	$1,270	$1,292	$240	$242	$167	$174	$155	$157
90th percentile	$14,520	$15,176	$3,501	$3,683	$3,260	$3,418	$2,670	$2,793
99th percentile	$64,678	$66,602	$35,517	$36,072	$33,448	$35,006	$27,103	$28,643

Table Appendix B-30: Welvie Total Medicare Expenditures by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Total Medicare Parts A, B, and D Expenditures								
Mean	$1,807	$1,885	$2,036	$2,129	$1,855	$1,883	$1,638	$1,674
Median	$307	$309	$340	$346	$235	$237	$260	$266
90th percentile	$3,259	$3,399	$3,493	$3,699	$3,244	$3,277	$3,001	$3,109
99th percentile	$28,528	$29,580	$32,530	$34,509	$31,419	$31,861	$26,662	$26,918
Total Medicare Parts A and B Expenditures								
Mean	$1,539	$1,617	$1,753	$1,848	$1,610	$1,644	$1,353	$1,390
Median	$138	$139	$168	$175	$106	$111	$107	$112
90th percentile	$2,556	$2,694	$2,735	$2,948	$2,528	$2,594	$2,249	$2,350
99th percentile	$27,682	$28,552	$31,612	$33,402	$30,583	$31,110	$24,707	$25,048

Table Appendix B-31: Welvie Inpatient and Outpatient Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Inpatient Expenditures								
Mean	$2,493	$2,568	$741	$844	$750	$788	$766	$813
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$7,916	$7,965	$0	$0	$0	$0	$0	$0
99th percentile	$39,161	$40,250	$17,579	$19,479	$18,456	$18,653	$18,839	$19,297
Outpatient ER Expenditures								

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	$205	$205	$55	$59	$57	$61	$61	$62
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$552	$562	$0	$0	$0	$0	$0	$0
99th percentile	$2,962	$2,980	$1,271	$1,385	$1,322	$1,398	$1,395	$1,437
Outpatient Non-ER Expenditures								
Mean	$1,320	$1,372	$350	$352	$344	$347	$355	$373
Median	$265	$270	$9	$12	$1	$6	$24	$26
90th percentile	$2,758	$2,966	$677	$712	$641	$691	$682	$726
99th percentile	$21,922	$22,214	$6,818	$6,643	$6,791	$6,726	$6,746	$6,916

Table Appendix B-32: Welvie Inpatient and Outpatient Expenditures by Quarter Following Enrollment, Medicare Parts A and B Ohio Cohort, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Inpatient Expenditures								
Mean	$809	$800	$793	$778	$731	$718	$728	$765
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$19,720	$19,456	$18,802	$18,254	$18,447	$17,838	$17,885	$17,907
Outpatient ER Expenditures								
Mean	$64	$67	$73	$73	$69	$71	$66	$69
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$1,490	$1,600	$1,665	$1,669	$1,608	$1,635	$1,557	$1,612
Outpatient Non-ER Expenditures								

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Mean	$333	$338	$366	$372	$355	$373	$365	$357
Median	$0	$0	$16	$19	$12	$14	$25	$25
90th percentile	$588	$618	$713	$738	$690	$742	$730	$744
99th percentile	$6,463	$6,584	$6,666	$6,841	$6,741	$6,971	$6,513	$6,046

Table Appendix B-33: Welvie Inpatient and Outpatient Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Inpatient Expenditures								
Mean	$1,894	$1,943	$801	$818	$792	$816	$573	$634
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$4,950	$5,178	$0	$0	$0	$0	$0	$0
99th percentile	$32,456	$33,771	$19,539	$19,566	$20,409	$20,662	$14,922	$16,126
Outpatient ER Expenditures								
Mean	$199	$201	$65	$72	$69	$70	$59	$61
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$468	$481	$0	$0	$0	$0	$0	$0
99th percentile	$3,318	$3,301	$1,625	$1,687	$1,772	$1,785	$1,606	$1,663
Outpatient Non-ER Expenditures								
Mean	$1,002	$1,040	$332	$355	$276	$291	$254	$265
Median	$136	$141	$0	$0	$0	$0	$0	$0
90th percentile	$2,045	$2,134	$546	$574	$467	$483	$447	$460
99th percentile	$14,520	$15,793	$6,083	$6,876	$5,439	$5,624	$4,602	$4,977

Table Appendix B-34: Welvie Inpatient and Outpatient Expenditures by Quarter Following Enrollment, Medicare Advantage Ohio Cohort, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Inpatient Expenditures								
Mean	$565	$591	$636	$670	$620	$632	$478	$491
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$15,358	$15,297	$16,540	$17,648	$18,190	$17,686	$12,888	$13,674
Outpatient ER Expenditures								
Mean	$66	$68	$72	$78	$75	$73	$66	$68
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$1,719	$1,731	$1,890	$2,030	$2,102	$2,074	$1,974	$1,995
Outpatient Non-ER Expenditures								
Mean	$260	$279	$295	$318	$240	$250	$224	$226
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$438	$455	$471	$507	$351	$366	$358	$378
99th percentile	$4,611	$5,298	$5,248	$6,171	$4,896	$4,857	$4,292	$4,367

Table Appendix B-35: Welvie Expenditures for Other Settings in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Carrier/PB Expenditures								
Mean	$2,201	$2,238	$588	$612	$578	$594	$621	$637

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$1,152	$1,180	$194	$203	$201	$208	$244	$247
90th percentile	$4,981	$5,014	$1,444	$1,510	$1,425	$1,447	$1,517	$1,517
99th percentile	$16,409	$16,441	$5,917	$6,289	$5,756	$5,810	$5,729	$6,075
Skilled Nursing Facility Expenditures								
Mean	$981	$1,103	$286	$336	$280	$306	$297	$333
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$26,979	$28,276	$12,165	$13,779	$12,041	$12,716	$12,157	$13,776
Durable Medical Equipment Expenditures								
Mean	$229	$237	$56	$56	$53	$55	$50	$51
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$558	$572	$130	$125	$128	$125	$112	$108
99th percentile	$3,312	$3,291	$867	$861	$779	$824	$786	$809
Home Health Expenditures								
Mean	$474	$476	$132	$129	$130	$129	$133	$128
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$199	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,899	$10,209	$4,062	$3,993	$4,006	$3,985	$3,950	$3,852
Hospice Expenditures								
Mean	$277	$359	$131	$152	$121	$149	$117	$148
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$3,847	$8,991	$5,554	$7,843	$4,419	$7,513	$4,081	$7,048

Table Appendix B-36: Welvie Expenditures for Other Settings by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Carrier/PB Expenditures								
Mean	$517	$523	$596	$600	$579	$581	$621	$637
Median	$120	$125	$194	$204	$204	$208	$249	$251
90th percentile	$1,339	$1,353	$1,509	$1,479	$1,426	$1,436	$1,505	$1,538
99th percentile	$5,797	$5,776	$5,943	$5,951	$5,717	$5,419	$5,629	$5,910
Skilled Nursing Facility Expenditures								
Mean	$319	$332	$320	$335	$299	$322	$279	$295
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$13,343	$13,262	$13,210	$13,621	$12,657	$13,161	$11,963	$11,861
Durable Medical Equipment Expenditures								
Mean	$45	$49	$50	$52	$49	$50	$45	$49
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$92	$91	$115	$110	$111	$104	$89	$89
99th percentile	$729	$757	$769	$827	$802	$825	$776	$791
Home Health Expenditures								
Mean	$138	$143	$138	$144	$131	$139	$104	$107
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$4,174	$4,220	$4,058	$4,227	$4,111	$4,080	$3,312	$3,333
Hospice Expenditures								
Mean	$112	$140	$119	$139	$123	$139	$93	$107
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$4,019	$6,501	$4,566	$6,485	$4,919	$6,357	$4,081	$5,202

Table Appendix B-37: Welvie Expenditures for Other Settings in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Carrier/PB Expenditures								
Mean	$1,851	$1,898	$623	$632	$565	$585	$481	$495
Median	$841	$850	$186	$188	$128	$133	$119	$119
90th percentile	$4,219	$4,253	$1,392	$1,422	$1,295	$1,307	$1,095	$1,118
99th percentile	$15,462	$15,759	$6,979	$7,417	$7,308	$7,476	$5,837	$6,107
Skilled Nursing Facility Expenditures								
Mean	$424	$424	$182	$170	$128	$130	$104	$114
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$13,423	$12,853	$6,847	$6,374	$4,917	$5,127	$3,860	$4,460
Durable Medical Equipment Expenditures								
Mean	$0	$0	$0	$0	$0	$0	$0	$0
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Home Health Expenditures								
Mean	$217	$219	$92	$94	$77	$79	$66	$68
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$5,214	$5,276	$3,246	$3,229	$2,624	$2,632	$2,302	$2,318
Hospice Expenditures								
Mean	$0	$0	$0	$0	$0	$0	$0	$0
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Table Appendix B-38: Welvie Expenditures for Other Settings by Quarter Following Enrollment, Medicare Advantage Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Carrier/PB Expenditures								
Mean	$475	$491	$531	$548	$486	$492	$423	$437
Median	$103	$104	$127	$133	$80	$83	$80	$85
90th percentile	$1,076	$1,109	$1,196	$1,227	$1,095	$1,100	$975	$1,006
99th percentile	$6,125	$6,112	$6,653	$6,795	$6,717	$6,774	$5,435	$5,554
Skilled Nursing Facility Expenditures								
Mean	$100	$114	$132	$144	$114	$119	$96	$101
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$3,765	$4,184	$4,613	$5,075	$4,400	$4,755	$3,839	$3,993
Durable Medical Equipment Expenditures								
Mean	$0	$0	$0	$0	$0	$0	$0	$0
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Home Health Expenditures								
Mean	$69	$69	$84	$86	$74	$74	$62	$63
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$2,368	$2,400	$2,836	$2,910	$2,487	$2,488	$2,194	$2,222
Hospice Expenditures								
Mean	$0	$0	$0	$0	$0	$0	$0	$0
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Table Appendix B-39: Welvie Total Inpatient, Outpatient, and Episode Based Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Total Surgery Expenditures								
Mean	$1,695	$1,705	$433	$493	$451	$463	$482	$493
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$3,802	$3,605	$0	$0	$0	$0	$0	$0
99th percentile	$29,050	$28,752	$11,429	$13,181	$12,345	$12,617	$12,957	$13,422
Inpatient Surgery Expenditures								
Mean	$1,221	$1,223	$313	$370	$331	$344	$353	$360
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$27,200	$27,072	$10,135	$12,168	$10,940	$11,414	$12,095	$11,902
Episode-Based Inpatient Surgery Expenditures								
Mean	$1,296	$1,285	$333	$389	$350	$363	$370	$383
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$28,439	$28,291	$10,368	$12,702	$11,846	$12,279	$12,326	$12,712
Outpatient Surgery Expenditures								
Mean	$474	$482	$121	$122	$120	$119	$129	$133
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$1,159	$1,176	$0	$0	$0	$0	$0	$0
99th percentile	$8,273	$8,575	$2,758	$2,878	$2,811	$2,762	$2,913	$3,058

Table Appendix B-40: Welvie Total Inpatient, Outpatient, and Episode Based Surgery by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Total Surgery Expenditures								
Mean	$485	$485	$485	$471	$455	$462	$460	$455
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$13,475	$13,325	$13,183	$12,914	$12,240	$12,659	$12,540	$12,169
Inpatient Surgery Expenditures								
Mean	$364	$356	$348	$340	$329	$326	$324	$322
Median	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$12,162	$11,821	$11,774	$11,653	$11,017	$11,022	$11,003	$10,928
Episode-Based Inpatient Surgery Expenditures								
Mean	$387	$378	$371	$357	$352	$345	$338	$342
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$12,826	$12,490	$12,145	$12,238	$12,037	$11,849	$11,481	$11,444
Outpatient Surgery Expenditures								
Mean	$120	$128	$138	$132	$126	$135	$136	$133
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$2,877	$3,038	$3,132	$3,068	$3,106	$3,146	$3,088	$3,103

Table Appendix B-41: Welvie Total Inpatient, Outpatient, and Episode Based Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Total Surgery Expenditures								
Mean	$1,320	$1,317	$555	$589	$502	$512	$380	$420
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$2,210	$2,255	$0	$0	$0	$0	$0	$0
99th percentile	$25,243	$25,758	$14,317	$15,480	$13,743	$14,730	$10,707	$11,749
Inpatient Surgery Expenditures								
Mean	$868	$854	$398	$413	$367	$368	$269	$300

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$21,519	$22,477	$11,884	$12,404	$11,997	$12,246	$10,232	$10,683
Episode-Based Inpatient Surgery Expenditures								
Mean	$872	$858	$399	$414	$367	$368	$270	$301
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$21,904	$22,678	$11,884	$12,447	$12,050	$12,254	$10,262	$10,685
Outpatient Surgery Expenditures								
Mean	$452	$463	$157	$175	$135	$144	$110	$120
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$1,004	$1,017	$0	$0	$0	$0	$0	$0
99th percentile	$8,253	$8,556	$3,333	$3,931	$3,231	$3,277	$2,556	$2,739

Table Appendix B-42: Welvie Total Inpatient, Outpatient, and Episode Based Surgery Expenditures by Quarter Following Enrollment, Medicare Advantage Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Total Surgery Expenditures								
Mean	$388	$419	$374	$412	$410	$420	$330	$333
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,843	$11,521	$9,891	$10,707	$11,675	$11,756	$10,363	$10,572
Inpatient Surgery Expenditures								
Mean	$271	$286	$234	$263	$294	$302	$227	$229
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,138	$10,243	$6,580	$9,134	$10,391	$10,496	$9,769	$9,836
Episode-Based Inpatient Surgery Expenditures								
Mean	$272	$287	$234	$264	$294	$302	$228	$229
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,141	$10,259	$6,597	$9,168	$10,391	$10,496	$9,785	$9,836
Outpatient Surgery Expenditures								
Mean	$117	$133	$140	$149	$116	$118	$103	$104
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$2,678	$2,916	$2,956	$3,116	$2,936	$2,694	$2,580	$2,526

Table Appendix B-43: Welvie Orthopedic Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Total PS[a] Orthopedic Surgery Expenditures								
Mean	$324	$311	$66	$62	$67	$67	$87	$82
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$12,050	$12,012	$0	$0	$0	$0	$0	$0
Inpatient PS Orthopedic Surgery Expenditures								
Mean	$271	$262	$55	$52	$56	$56	$73	$69
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,219	$10,219	$0	$0	$0	$0	$0	$0
Outpatient PS Orthopedic Surgery Expenditures								
Mean	$6	$5	$1	$1	$2	$2	$1	$2
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS = Preference-sensitive

Table Appendix B-44: Welvie Orthopedic Surgery Expenditures by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Total PS[a] Orthopedic Surgery Expenditures								
Mean	$72	$79	$72	$62	$73	$67	$72	$66
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Inpatient PS Orthopedic Surgery Expenditures								
Mean	$61	$67	$61	$52	$61	$57	$60	$55
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Outpatient PS Orthopedic Surgery Expenditures								
Mean	$1	$1	$1	$1	$1	$1	$1	$1
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS = Preference-sensitive

Table Appendix B-45: Welvie Orthopedic Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Total PS[a] Orthopedic Surgery Expenditures								
Mean	$214	$215	$97	$90	$79	$82	$66	$65
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
99th percentile	$11,850	$11,848	$0	$0	$0	$0	$0	$0
Inpatient PS Orthopedic Surgery Expenditures								
Mean	$171	$173	$80	$74	$64	$67	$53	$53
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,851	$9,875	$0	$0	$0	$0	$0	$0
Outpatient PS Orthopedic Surgery Expenditures								
Mean	$6	$6	$2	$2	$1	$2	$2	$1
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS = Preference-sensitive

Table Appendix B-46: Welvie Orthopedic Surgery Expenditures by Quarter Following Enrollment, Medicare Advantage Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342
Total PS[a] Orthopedic Surgery Expenditures								
Mean	$62	$62	$53	$46	$66	$63	$56	$50
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Inpatient PS Orthopedic Surgery Expenditures								
Mean	$51	$50	$43	$37	$55	$51	$46	$41
Median	$0	$0	$0	$0	$0	$0	$0	$0

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Outpatient PS Orthopedic Surgery Expenditures								
Mean	$1	$1	$1	$2	$1	$2	$1	$1
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS = Preference-sensitive

Table Appendix B-47: Welvie Cardiac Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	62,531	52,559	62,531	52,559	61,660	51,617	60,800	50,832
Total PS[a] Cardiac Surgery Expenditures								
Mean	$297	$279	$66	$84	$80	$75	$76	$63
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$10,851	$10,656	$0	$0	$0	$0	$0	$0
Inpatient PS Cardiac Surgery Expenditures								
Mean	$230	$216	$51	$67	$64	$60	$59	$48
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$9,613	$9,473	$0	$0	$0	$0	$0	$0
Outpatient PS Cardiac Surgery Expenditures								
Mean	$40	$37	$9	$10	$8	$9	$10	$8

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$1,791	$1,786	$0	$0	$0	$0	$0	$0

[a]PS= Preference-sensitive

Table Appendix B-48: Welvie Cardiac Surgery Expenditures by Quarter Following Enrollment, Medicare Parts A and B Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	59,929	50,018	58,990	49,108	58,121	48,257	57,285	47,547
Total PS[a] Cardiac Surgery Expenditures								
Mean	$71	$73	$69	$73	$73	$71	$66	$64
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Inpatient PS Cardiac Surgery Expenditures								
Mean	$55	$56	$54	$57	$57	$54	$51	$50
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Outpatient PS Cardiac Surgery Expenditures								
Mean	$9	$10	$9	$10	$9	$10	$9	$7
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS= Preference-sensitive

Table Appendix B-49: Welvie Cardiac Surgery Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare Advantage Ohio, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	92,341	90,162	92,341	90,162	91,223	88,831	90,224	87,836
Total PS[a] Cardiac Surgery Expenditures								
Mean	$240	$262	$90	$97	$91	$84	$59	$70
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$6,798	$8,158	$0	$0	$0	$0	$0	$0
Inpatient PS Cardiac Surgery Expenditures								
Mean	$166	$182	$66	$70	$69	$63	$45	$52
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Outpatient PS Cardiac Surgery Expenditures								
Mean	$48	$50	$15	$17	$12	$12	$8	$10
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$1,807	$2,209	$0	$0	$0	$0	$0	$0

[a]PS= Preference-sensitive

Table Appendix B-50: Welvie Cardiac Surgery Expenditures by Quarter Following Enrollment, Medicare Advantage Ohio, Q4 to Q7

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	83,927	81,744	83,130	80,947	80,812	78,630	79,594	77,342

Measures (2012 USD)	Q4		Q5		Q6		Q7	
	Intervention	Controls	Intervention	Controls	Intervention	Controls	Intervention	Controls
Total PS[a] Cardiac Surgery Expenditures								
Mean	$47	$70	$59	$71	$65	$69	$40	$57
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Inpatient PS Cardiac Surgery Expenditures								
Mean	$32	$51	$44	$51	$46	$51	$28	$42
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0
Outpatient PS Cardiac Surgery Expenditures								
Mean	$10	$11	$9	$13	$11	$9	$8	$8
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$0	$0	$0	$0	$0	$0

[a]PS= Preference-sensitive

APPENDIX C: RESULTS FOR MEDEXPERT

The following tables provide the baseline demographic and health characteristics; mortality, and readmission rates; health service utilization, and medical costs results for intervention and comparison group beneficiaries in the MedExpert FFS and MA cohorts.

C.1 Demographic and Health Characteristics

Table Appendix C-1: MedExpert Baseline Demographic and Health Characteristics, Medicare FFS Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	48,778	48,778		
Average Age (Years)	77.56	77.55	0.02	0.00
Age under 65[+]	8%	8%	0%	0.00
Gender				
Male[+]	45%	45%	0%	0.00
Female[+]	55%	55%	0%	0.00
Race				
White [+]	80%	80%	0%	0.00
Black[+]	6%	6%	0%	0.00
Other	14%	14%	0%	0.00
Dual Eligible[+]	20%	20%	0%	0.00
Medicare Eligibility				
Disabled[+]	16%	16%	0%	0.00
ESRD	0%	0%	0%	0.00
Aged[+]	84%	84%	0%	0.00
Evaluation and Management (E&M) Visits				
E&M Visits: 0[+]	8%	11%	-3%	0.10
E&M Visits: 1-5[+]	25%	28%	-3%	0.07
E&M Visits: 6-10[+]	25%	24%	1%	0.01
E&M Visits: 11-15[+]	17%	16%	1%	0.04
E&M Visits: 16+[+]	25%	21%	4%	0.09
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	95%	94%	1%	0.04
1 SNF Stay (Prior Year) [+]	3%	3%	0%	0.01
2+ SNF Stays (Prior Year) [+]	2%	3%	-1%	0.05
IP Stay before study enrollment				
0 IP Stays (1Q Prior)	93%	93%	0%	0.00
1 IP Stay (Prior Year) [+]	5%	5%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
2+ IP Stays (Prior Year)+	1%	1%	0%	0.00
0 IP Stays (Prior Year)	82%	81%	1%	0.01
1 IP Stay (Prior Year)+	12%	12%	0%	0.01
2+ IP Stays (Prior Year)+	7%	7%	0%	0.01
ER Visits (Pre-Enrollment Quarter)				
ER Visits: 0	93%	92%	0%	0.02
ER Visits: 1+	6%	6%	0%	0.01
ER Visits: 2++	1%	1%	0%	0.02
Medical Cost per Beneficiary				
Cost (4Q Prior)+	2,178	2,209	-31	0.00
Cost (3Q Prior)+	2,281	2,291	-10	0.00
Cost (2Q Prior)+	2,391	2,348	44	0.01
Cost (1Q Prior)+	2,601	2,516	86	0.01
IP Cost (Prior Year)	2,732	2,718	14	0.00
IP Cost (1Q Prior)+	785	744	41	0.01
Frailty Measures				
Home Oxygen+	3%	4%	0%	0.02
Urinary Catheter+	1%	1%	0%	0.00
Wheelchair Use+	0%	1%	0%	0.01
Walker Use+	1%	1%	0%	0.01
Charlson Score+	0.27	0.27	0.00	0.00
Area Depravation Index (ADI)	89.51	90.47	-0.96	0.04
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP)+	1%	1%	0%	0.00
Acute cerebrovascular disease (IP, 30 days prior)	0%	0%	0%	0.01
AMI (IP)	1%	1%	0%	0.01
AMI (IP, 30 days prior)	0%	0%	0%	0.01
Cerebrovascular disease+	19%	18%	1%	0.02
Parkinson's disease and multiple sclerosis+	3%	2%	0%	0.01
Asthma+	23%	22%	0%	0.01
Coagulation and hemorrhagic disorders+	6%	6%	0%	0.01
Congestive heart failure (All Settings)+	13%	13%	0%	0.01
Congestive heart failure (IP)+	1%	1%	0%	0.01
Coronary atherosclerosis+	29%	28%	2%	0.03
Dementia+	10%	11%	-1%	0.04
Diabetes mellitus without complication+	39%	36%	3%	0.05
Diabetes mellitus with complications+	19%	17%	2%	0.06

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Cardiac dysrhythmias, arrest and ventricular fibrillation+	33%	32%	1%	0.01
Fluid and electrolyte disorders+	15%	15%	0%	0.01
Gastrointestinal hemorrhage (All Settings)+	6%	5%	0%	0.01
Gastrointestinal hemorrhage (IP)+	0%	1%	0%	0.01
Other heart disease+	54%	52%	2%	0.04
Heart valve disorders+	20%	18%	2%	0.05
Hepatitis+	2%	2%	0%	0.00
Hypertension with complications+	20%	18%	2%	0.05
Stomach, pancreas and lung cancer+	2%	2%	0%	0.01
Peri- endo- and myocarditis+	5%	5%	0%	0.02
Disorders of nervous system+	14%	15%	0%	0.01
Other cancers+	18%	17%	1%	0.03
Paralysis+	2%	2%	0%	0.00
Pneumonia+	12%	12%	0%	0.01
Pneumonia (IP, 30 days prior)+	0%	0%	0%	0.00
Pulmonary heart disease+	4%	4%	0%	0.00
Renal failure+	19%	18%	1%	0.03
Respiratory failure (IP)+	0%	0%	0%	0.01
Respiratory failure (IP, 30 days prior)	0%	0%	0%	0.01
Rheumatoid arthritis and related disease+	4%	4%	0%	0.02
Septicemia+	3%	3%	0%	0.01
Shock+	1%	1%	0%	0.01
Tuberculosis+	0%	0%	0%	0.01
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP)+	1%	1%	0%	0.01
Heart valve procedures (IP)+	0%	0%	0%	0.02
Hemodialysis+	1%	1%	0%	0.01
Peritoneal dialysis+	1%	1%	0%	0.01
Procedures on vessels of head and neck (IP)+	2%	3%	0%	0.00
Radiology and chemotherapy+	4%	3%	0%	0.03
Respiratory intubation and mechanical ventilation+	1%	1%	0%	0.00
Blood transfusion+	3%	3%	0%	0.00
Blood transfusion (IP)	3%	3%	0%	0.00
Transportation+	17%	18%	-1%	0.03
Comorbidity Categories (Pre-Enrollment Quarter)				
Depression+	4%	4%	0%	0.00
AIDS HIV	0%	0%	0%	0.00
Alcohol Abuse+	0%	1%	0%	0.01

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Cardiac Arrhythmias	17%	17%	0%	0.00
Congestive heart failure[+]	8%	8%	0%	0.00
Chronic pulmonary disease	12%	12%	1%	0.02
Coagulopathy	2%	2%	0%	0.01
Deficiency Anemia[+]	7%	6%	1%	0.04
Diabetes complicated [+]	24%	22%	2%	0.05
Diabetes uncomplicated [+]	0%	0%	0%	0.00
Dementia[+]	2%	3%	-1%	0.03
Drug Abuse [+]	1%	1%	0%	0.02
Fluid and Electrolyte Disorders[+]	6%	6%	0%	0.01
Hypothyroidism	14%	14%	1%	0.02
Hypertension complicated[+]	7%	6%	1%	0.04
Hypertension uncomplicated	49%	46%	3%	0.06
Liver Disease	3%	2%	0%	0.02
Lymphoma	1%	1%	0%	0.01
Metastatic Cancer	1%	1%	0%	0.01
Myocardial infraction	2%	2%	0%	0.01
Obesity[+]	4%	3%	1%	0.03
Other neurological disorders	5%	5%	0%	0.01
Paralysis[+]	1%	1%	0%	0.00
Peptic Ulcer Disease excluding bleeding	1%	1%	0%	0.01
Peripheral vascular disorders	10%	10%	0%	0.01
Psychosis[+]	2%	2%	0%	0.03
Pulmonary Circulation Disorders	1%	1%	0%	0.00
Renal Failure	11%	10%	1%	0.04
Rheumatoid arthritis collagen vascular disease	4%	4%	0%	0.02
Solid Tumor without metastasis	8%	7%	1%	0.03
Valvular Disease[+]	8%	7%	1%	0.02
Weight loss[+]	2%	3%	0%	0.00

[+]Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

Table Appendix C-2: MedExpert Baseline Demographic and Health Characteristics, MA Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	165,017	165,017		
Average Age (Years)	73.30	73.29	0.00	0.00
Age under 65[+]	11%	11%	0%	0.00
Gender				
Male[+]	45%	45%	0%	0.00
Female[+]	55%	55%	0%	0.00
Race				
White[+]	83%	83%	0%	0.00
Black[+]	9%	9%	0%	0.00
Other	8%	8%	0%	0.00
Black or Other				
Dual Eligible[+]	12%	12%	0%	0.00
Medicare Eligibility				
Disabled[+]	21%	21%	0%	0.00
ESRD	0%	0%	0%	0.00
Aged[+]	79%	79%	0%	0.00
Resource Use per Beneficiary (Pre-Enrollment Year)				
IP Stay before study enrollment				
0 IP Stays (1Q Prior)	96%	96%	0%	0.00
1 IP Stay (Prior Year)[+]	3%	3%	0%	0.00
2+ IP Stays (Prior Year)[+]	1%	1%	0%	0.00
0 IP Stays (Prior Year)[+]	88%	87%	1%	0.02
1 IP Stay (Prior Year)[+]	9%	9%	0%	0.01
2+ IP Stays (Prior Year)	3%	4%	0%	0.01
Frailty Measures				
Area Depravation Index (ADI)	97.09	97.63	-0.54	0.03
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories				
HCC1 HIV/AIDS	0%	0%	0%	0.00
HCC2 SEPTICEMIA, SEPSIS, SYSTEMIC INFLAM RESPONSE SYNDROME/SHOCK	1%	1%	0%	0.00
HCC6 OPPORTUNISTIC INFECTIONS	0%	0%	0%	0.01
HCC8 METASTATIC CANCER AND ACUTE LEUKEMIA	1%	1%	0%	0.01
HCC9 LUNG AND OTHER SEVERE CANCERS[+]	1%	1%	0%	0.01

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC10 LYMPHOMA AND OTHER CANCERS	1%	1%	0%	0.01
HCC11 COLORECTAL, BLADDER, AND OTHER CANCERS+	2%	2%	0%	0.00
HCC12 BREAST, PROSTATE, AND OTHER CANCERS AND TUMORS+	5%	5%	0%	0.02
HCC17 DIABETES WITH ACUTE COMPLICATIONS	0%	0%	0%	0.00
HCC18 DIABETES WITH CHRONIC COMPLICATIONS+	12%	13%	-1%	0.02
HCC19 DIABETES WITHOUT COMPLICATION+	13%	13%	0%	0.01
HCC21 PROTEIN-CALORIE MALNUTRITION	1%	1%	0%	0.00
HCC22 MORBID OBESITY	4%	4%	0%	0.01
HCC23 OTHER SIGNIFICANT ENDOCRINE AND METABOLIC DISORDERS	2%	2%	0%	0.00
HCC27 END-STAGE LIVER DISEASE	0%	0%	0%	0.00
HCC28 CIRRHOSIS OF LIVER	0%	0%	0%	0.00
HCC29 CHRONIC HEPATITIS+	0%	0%	0%	0.01
HCC33 INTESTINAL OBSTRUCTION/PERFORATION	1%	1%	0%	0.00
HCC34 CHRONIC PANCREATITIS	0%	0%	0%	0.00
HCC35 INFLAMMATORY BOWEL DISEASE	1%	1%	0%	0.01
HCC39 BONE/JOINT/MUSCLE INFECTIONS/NECROSIS	1%	1%	0%	0.01
HCC40 RHEUMATOID ARTHRITIS AND INFLAM CONNECTIVE TISSUE DISEASE	5%	5%	0%	0.01
HCC46 SEVERE HEMATOLOGICAL DISORDERS	0%	0%	0%	0.00
HCC47 DISORDERS OF IMMUNITY	1%	1%	0%	0.00
HCC48 COAGULATION DEFECTS & OTH SPECIFIED HEMATOLOGICAL DISORDRS+	3%	3%	0%	0.01
HCC51 DEMENTIA WITH COMPLICATIONS+	1%	1%	0%	0.03
HCC52 DEMENTIA WITHOUT COMPLICATION+	4%	4%	0%	0.02
HCC54 DRUG/ALCOHOL PSYCHOSIS	0%	0%	0%	0.00
HCC55 DRUG/ALCOHOL DEPENDENCE	2%	2%	0%	0.01
HCC57 SCHIZOPHRENIA	1%	1%	0%	0.02
HCC58 MAJOR DEPRESSIVE, BIPOLAR, AND PARANOID DISORDERS+	7%	8%	-1%	0.03
HCC70 QUADRIPLEGIA	0%	0%	0%	0.01
HCC71 PARAPLEGIA	0%	0%	0%	0.00
HCC72 SPINAL CORD DISORDERS/INJURIES	0%	1%	0%	0.01
HCC73 AMYOTROPHIC LATERAL SCLEROSIS & OTH MOTOR NEURON DISEASE	0%	0%	0%	0.00
HCC74 CEREBRAL PALSY	0%	0%	0%	0.01
HCC75 POLYNEUROPATHY	9%	10%	-1%	0.03

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC76 MUSCULAR DYSTROPHY	0%	0%	0%	0.00
HCC77 MULTIPLE SCLEROSIS+	0%	1%	0%	0.01
HCC78 PARKINSONS AND HUNTINGTONS DISEASES+	1%	1%	0%	0.01
HCC79 SEIZURE DISORDERS AND CONVULSIONS+	2%	2%	0%	0.00
HCC80 COMA, BRAIN COMPRESSION/ANOXIC DAMAGE	0%	0%	0%	0.00
HCC82 RESPIRATOR DEPENDENCE/TRACHEOSTOMY STATUS	0%	0%	0%	0.00
HCC83 RESPIRATORY ARREST	0%	0%	0%	0.00
HCC84 CARDIO-RESPIRATORY FAILURE AND SHOCK+	2%	2%	0%	0.00
HCC85 CONGESTIVE HEART FAILURE+	9%	10%	0%	0.01
HCC86 ACUTE MYOCARDIAL INFARCTION+	1%	1%	0%	0.00
HCC87 UNSTABLE ANGINA & OTH ACUTE ISCHEMIC HEART DISEASE	1%	1%	0%	0.00
HCC88 ANGINA PECTORIS+	3%	3%	0%	0.00
HCC96 SPECIFIED HEART ARRHYTHMIAS+	10%	11%	-1%	0.02
HCC99 CEREBRAL HEMORRHAGE+	0%	0%	0%	0.01
HCC100 ISCHEMIC OR UNSPECIFIED STROKE	2%	2%	0%	0.01
HCC103 HEMIPLEGIA/HEMIPARESIS	1%	1%	0%	0.01
HCC104 MONOPLEGIA, OTHER PARALYTIC SYNDROMES	0%	0%	0%	0.00
HCC106 ATHEROSCLEROSIS OF EXTREMITIES W/ULCERATION OR GANGRENE	0%	0%	0%	0.00
HCC107 VASCULAR DISEASE WITH COMPLICATIONS	1%	2%	0%	0.00
HCC108 VASCULAR DISEASE	14%	14%	0%	0.01
HCC110 CYSTIC FIBROSIS	0%	0%	0%	0.00
HCC111 CHRONIC OBSTRUCTIVE PULMONARY DISEASE+	13%	13%	0%	0.00
HCC112 FIBROSIS OF LUNG AND OTHER CHRONIC LUNG DISORDERS	1%	1%	0%	0.01
HCC114 ASPIRATION AND SPECIFIED BACTERIAL PNEUMONIAS+	0%	0%	0%	0.01
HCC115 PNEUMOCOCCAL PNEUMONIA, EMPYEMA, LUNG ABSCESS+	0%	0%	0%	0.00
HCC122 PROLIFERATIVE DIABTIC RETINOPATHY & VITREOUS HEMORR	1%	1%	0%	0.00
HCC124 EXUDATIVE MACULAR DEGENERATION	1%	1%	0%	0.00
HCC134 DIALYSIS STATUS+	0%	0%	0%	0.01
HCC135 ACUTE RENAL FAILURE+	2%	2%	0%	0.01
HCC136 CHRONIC KIDNEY DISEASE, STAGE 5	1%	0%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC137 CHRONIC KIDNEY DISEASE, SEVERE (STAGE 4)+	1%	1%	0%	0.01
HCC138 CHRONIC KIDNEY DISEASE, MODERATE (STAGE 3)+	7%	8%	-1%	0.03
HCC139 CHRONIC KIDNEY DIS, MILD OR UNSPEC (STG 1-2 OR UNSPEC)+	4%	4%	0%	0.01
HCC140 UNSPECIFIED RENAL FAILURE	0%	0%	0%	0.00
HCC141 NEPHRITIS	0%	0%	0%	0.01
HCC157 PRESS ULCER OF SKN W/NECROSIS THR TO MUSCLE,TENDON, BONE	0%	0%	0%	0.00
HCC158 PRESSURE ULCER OF SKIN WITH FULL THICKNESS SKIN LOSS	0%	0%	0%	0.01
HCC159 PRESSURE ULCER OF SKIN WITH PARTIAL THICKNESS SKIN LOSS	0%	0%	0%	0.00
HCC160 PRESSURE PRE-ULCER SKIN CHANGES OR UNSPECIFIED STAGE	0%	0%	0%	0.01
HCC161 CHRONIC ULCER OF SKIN, EXCEPT PRESSURE+	1%	1%	0%	0.01
HCC162 SEVERE SKIN BURN OR CONDITION	0%	0%	0%	0.01
HCC166 SEVERE HEAD INJURY	0%	0%	0%	0.00
HCC167 MAJOR HEAD INJURY	0%	0%	0%	0.00
HCC169 VERTEBRAL FRACTURES WITHOUT SPINAL CORD INJURY	1%	1%	0%	0.00
HCC170 HIP FRACTURE/DISLOCATION	1%	1%	0%	0.01
HCC173 TRAUMATIC AMPUTATIONS AND COMPLICATIONS	0%	0%	0%	0.02
HCC176 COMPLICATIONS OF SPECIFIED IMPLANTED DEVICE OR GRAFT	1%	1%	0%	0.02
HCC186 MAJOR ORGAN TRANSPLANT OR REPLACEMENT STATUS	0%	0%	0%	0.01
HCC188 ARTIFICIAL OPENINGS FOR FEEDING OR ELIMINATION	1%	1%	0%	0.01
HCC189 AMPUTATION STATUS, LOWER LIMB/AMPUTATION COMPLICATIONS	0%	0%	0%	0.01

+Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

C.2 Mortality and Readmissions

Table Appendix C-3: Difference in Mortality per 1,000 Beneficiaries after MedExpert Enrollment, Medicare FFS and MA Cohorts

Medicare Cohort	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Medicare FFS							
Number of Participant Beneficiaries	48,778	48,778	45,539	26,515	26,140	25,744	8,267
Difference[a]	-234.81*	-1.48	-1.64*	-2.43*	0.21	-1.03	-0.31
95% Confidence Interval	(-377.5 | -92.1)	(-3.0 | 0.0)	(-3.3 | 0.0)	(-4.5 | -0.4)	(-1.9 | 2.3)	(-3.1 | 1.0)	(-3.8 | 3.2)
P-Value	0.001	0.057	0.047	0.019	0.843	0.321	0.864
Medicare Advantage							
Number of Participant Beneficiaries	165,017	165,017	91,041	37,108	36,607	36,158	11,734
Difference[a]	-148.29	-0.02	-1.12*	-0.10	-0.36	-0.13	-1.78
95% Confidence Interval	(-320.2 | 23.7)	(-0.7 | 0.6)	(-2.0 | -0.2)	(-1.7 | 1.5)	(-1.9 | 1.2)	(-1.8 | 1.5)	(-4.6 | 1.0)
P-Value	0.091	0.940	0.018	0.908	0.651	0.878	0.210

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

Table Appendix C-4: Difference in Readmissions per 1,000 Beneficiaries after MedExpert Enrollment, Medicare FFS Cohort

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	9,556	3,322	3,289	1,961	1,860	1,836	515
30-Day Hospital Readmissions per 1,000 Beneficiaries Following Any Inpatient Admission							
Difference[b]	42.65	1.05	8.43	0.32	-13.16	22.66	-12.30
95% Confidence Interval	(-89.8 | 175.1)	(-19.3 | 21.4)	(-12.2 | 29.1)	(-26.0 | 26.7)	(-40.1 | 13.8)	(-4.7 | 50.0)	(-62.7 | 38.1)
P-Value	0.528	0.919	0.423	0.981	0.339	0.104	0.633
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following Any Inpatient Admission							
Difference	-34.47	-5.01	1.62	-13.72	-16.88	19.72	-2.08
95% Confidence Interval	(-158.1 | 89.2)	(-23.9 | 13.9)	(-17.4 | 20.6)	(-38.6 | 11.2)	(-42.3 | 8.5)	(-6.2 | 45.6)	(-48.9 | 44.7)
P-Value	0.585	0.603	0.867	0.280	0.192	0.136	0.931

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Table Appendix C-5: Difference in Readmissions per 1,000 Beneficiaries after MedExpert Enrollment, MA Cohort

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	14352	7,086	4,016	1,857	1,741	1,655	520
30-Day Hospital Readmissions per 1,000 Beneficiaries Following Any Inpatient Admission							
Difference[b]	-155.86*	-9.12	-6.84	-22.46	-22.29	5.33	15.32
95% Confidence Interval	(-288.5 | -23.2)	(-21.1 | 2.8)	(-22.9 | 9.2)	(-46.9 | 1.9)	(-47.0 | 2.4)	(-20.3 | 30.9)	(-30.7 | 61.3)
P-Value	0.021	0.134	0.404	0.071	0.077	0.683	0.514
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following Any Inpatient Admission							
Difference	-118.76	-8.05	-1.38	-17.13	-15.81	-0.29	6.91
95% Confidence Interval	(-246.2 | 8.7)	(-19.4 | 3.3)	(-16.8 | 14.0)	(-40.9 | 6.6)	(-39.9 | 8.3)	(-25.3 | 24.7)	(-37.3 | 51.1)
P-Value	0.068	0.165	0.861	0.158	0.198	0.982	0.759

*Statistically significant at the 5% level.
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Figure C-1: MedExpert Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort

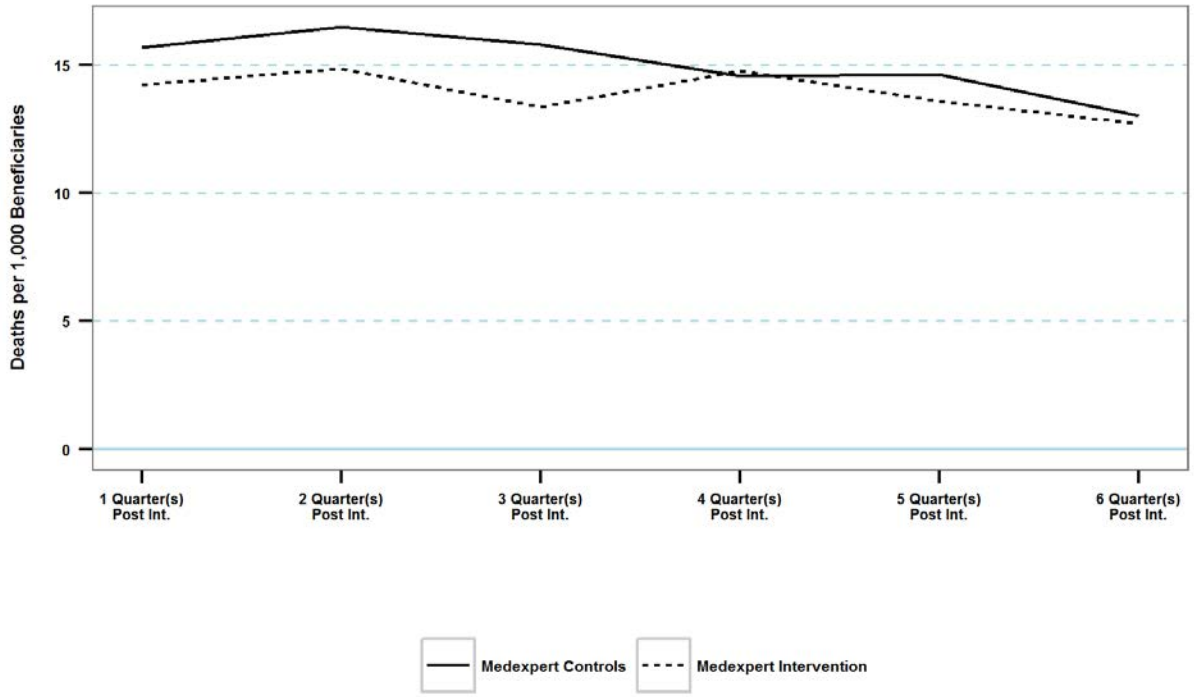


Figure C-2: MedExpert Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, MA Cohort

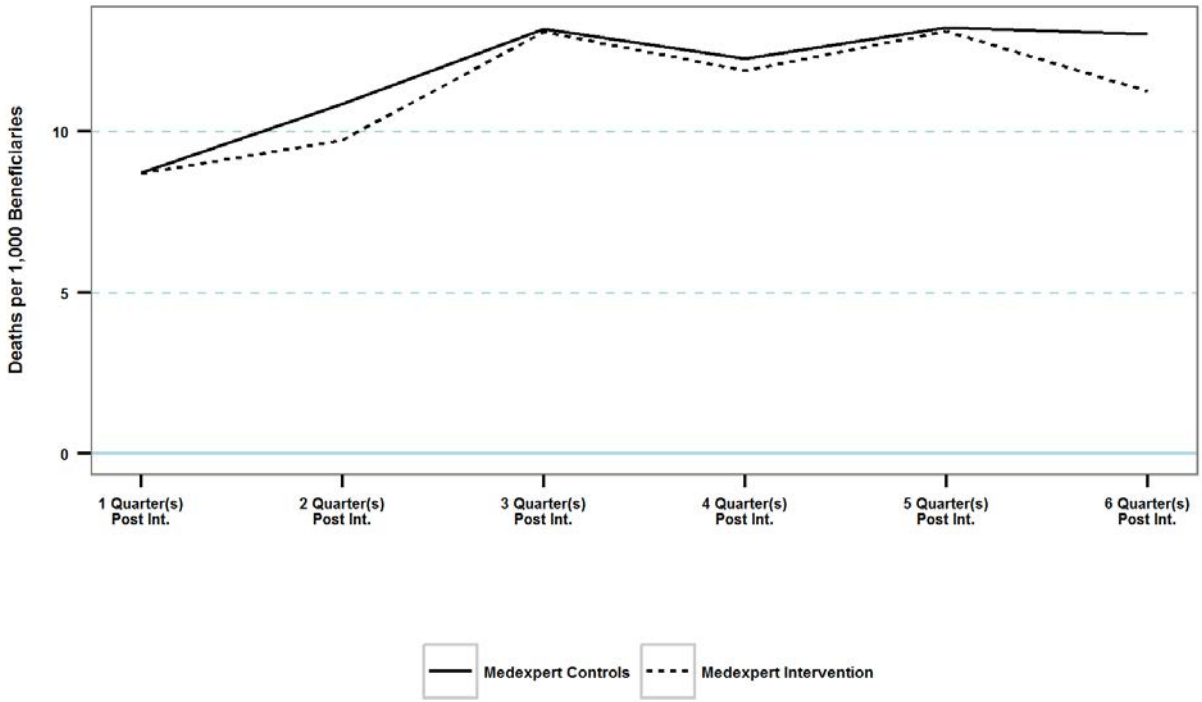


Figure C-3: MedExpert Readmissions per 1,000 beneficiaries by Quarter, Medicare FFS Cohort

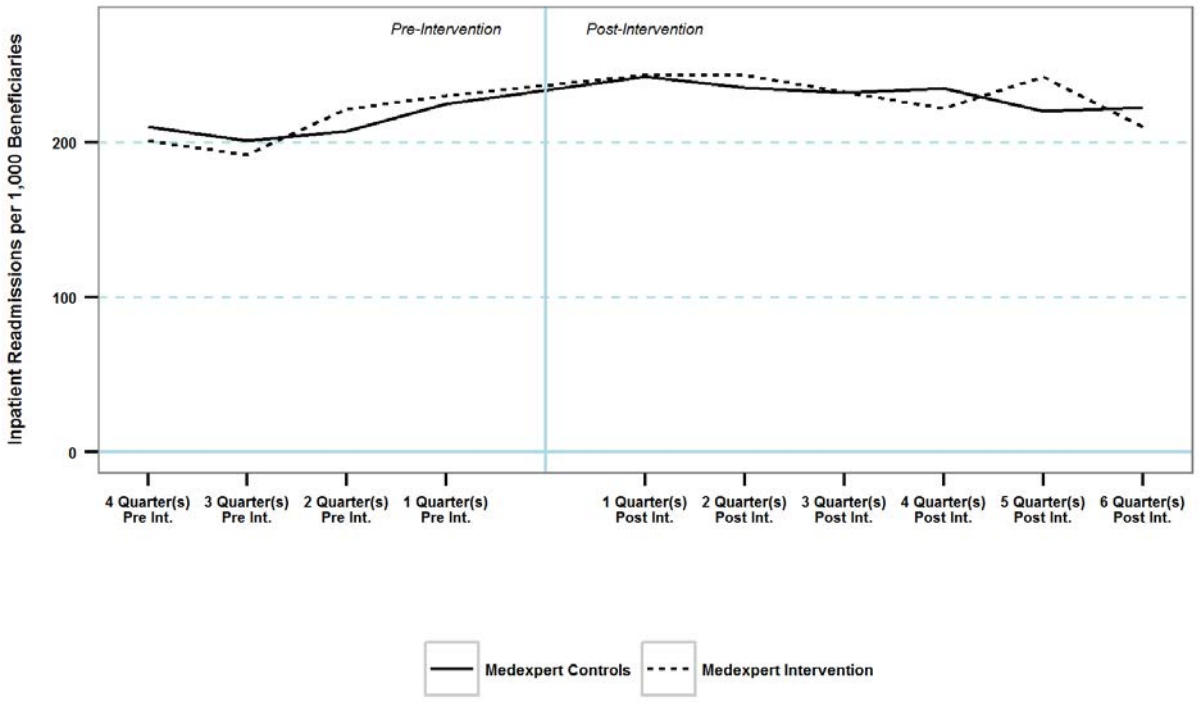


Figure C-4: MedExpert Readmissions per 1,000 beneficiaries by Quarter, MA Cohort

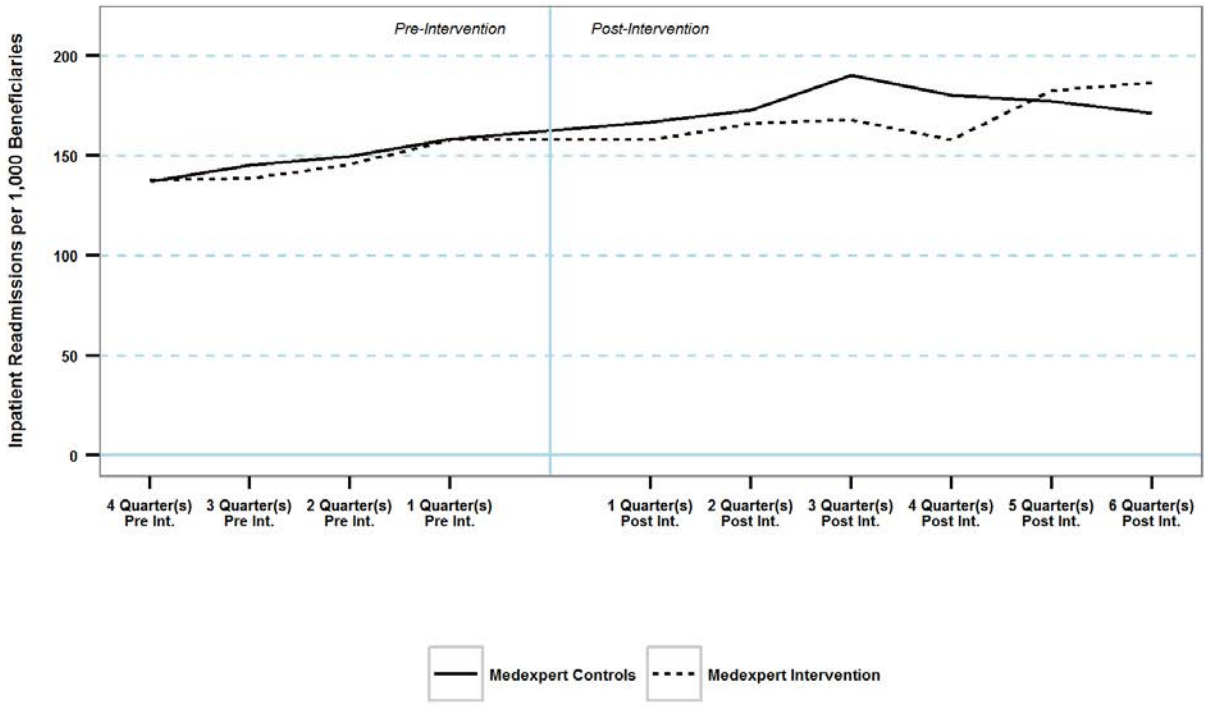


Table Appendix C-6: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	48,778	48,778	45,539	44,830	26,515	26,612
All-Cause Mortality per 1,000 Beneficiaries	14.2	15.7	14.8	16.5	13.4	15.8
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	243.2	242.2	243.2	234.8	232.0	231.7
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following Any Inpatient Admission	194.8	199.8	191.5	189.9	191.2	204.9

Table Appendix C-7: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	26,140	26,171	25,744	25,773	8,267	7,688
All-Cause Mortality per 1,000 Beneficiaries	14.8	14.6	13.6	14.6	12.7	13.0
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	221.5	234.7	242.4	219.7	209.7	222.0
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	184.9	201.8	209.2	189.4	176.7	178.8

Table Appendix C-8: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, MA Cohort, Q1 to Q3

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	165,017	165,017	91,041	92,710	37,108	38,431
All-Cause Mortality per 1,000 Beneficiaries	8.7	8.7	9.7	10.9	13.1	13.2
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	157.9	167.0	166.1	172.9	168.0	190.5
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	139.3	147.3	152.9	154.3	158.9	176.0

Table Appendix C-9: MedExpert Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, MA Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	36,607	37,889	36,158	37,392	11,734	11,892
All-Cause Mortality per 1,000 Beneficiaries	11.9	12.3	13.1	13.2	11.2	13.0
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	158.0	180.2	182.5	177.2	186.5	171.2
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	150.5	166.3	168.6	168.9	165.4	158.5

C.3 Health Service Resource Use

Table Appendix C-10: Difference-in-Difference Estimates of MedExpert's Effects on Resource Use, Medicare FFS Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative [a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	48778	48778	45539	26515	26140	25744	8267
ER Visits	60.73	-10.8*	-0.66	0.33	4.67	3.92	4.93
95% Confidence Interval	(-577.3 | 698.7)	(-17,-5)	(-7,5)	(-7,8)	(-3,12)	(-4,11)	(-8,18)
P-Value	0.852	<0.001	0.831	0.932	0.235	0.308	0.462
Inpatient Admissions	33.67	-4.17	1.3	1.94	1.26	5.29	4.49
95% Confidence Interval	(-564.8 | 632.2)	(-10,1)	(-4,7)	(-5,9)	(-6,9)	(-2,13)	(-8,17)
P-Value	0.912	0.146	0.657	0.605	0.737	0.156	0.473
Unplanned Inpatient Admissions	27.68	-3.18	0.71	-1.2	2.05	4.2	3.63
95% Confidence Interval	(-504.9 | 560.3)	(-8,2)	(-4,6)	(-8,6)	(-5,9)	(-3,11)	(-7,15)
P-Value	0.919	0.211	0.785	0.727	0.549	0.220	0.522
Hospital Days	1,219.69	-12.14	19.89	1.54	5.97	41.5	-3.48
95% Confidence Interval	(-4,293.0 | 6,732.3)	(-64,40)	(-32,72)	(-66,69)	(-64,76)	(-23,106)	(-106,99)
P-Value	0.665	0.645	0.455	0.964	0.867	0.206	0.947

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix C-11: Difference-in-Difference Estimates of MedExpert's Effects on Resource Use, MA Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative [a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	165,017	165,017	91,041	37,108	36,607	36,158	11,734
Inpatient Admissions	-419.34	-1.92	-3.19*	-1.37	-1.02	-3.97	-3.69
95% Confidence Interval	(-978.1 | 139.4)	(-4,0)	(-6,0)	(-6,3)	(-6,4)	(-9,1)	(-12,4)
P-Value	0.141	0.079	0.03	0.571	0.665	0.091	0.373
Unplanned Inpatient Admissions	-420.32	-1.58	-2.21	-1.53	-1.11	-4.77*	-3.9

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative [a]	Q1	Q2	Q3	Q4	Q5	Q6
95% Confidence Interval	(-926.0 | 85.4)	(-4,0)	(-5,0)	(-6,3)	(-5,3)	(-9,0)	(-11,4)
P-Value	0.103	0.111	0.1	0.498	0.611	0.03	0.309
Hospital Days	-599.12	-1.2	-9.83	-3.18	-5.23	-7.69	-15.78
95% Confidence Interval	(-4,561.9 | 3,363.7)	(-17,15)	(-31,11)	(-34,28)	(-36,25)	(-37,21)	(-68,37)
P-Value	0.767	0.883	0.353	0.841	0.737	0.602	0.556

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Figure C-5: Difference-in-Difference Estimate of Number of Hospital Days, MedExpert's Medicare FFS Cohort

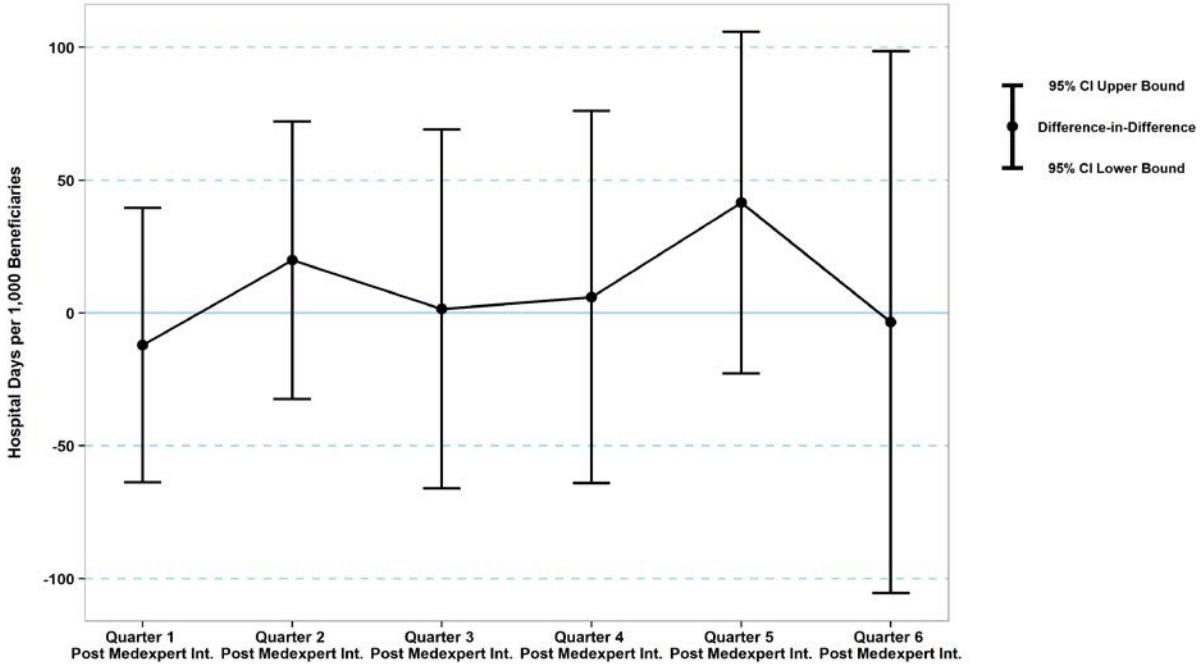


Figure C-6: Difference-in-Difference Estimate of Number of Hospital Days, MedExpert's MA Cohort

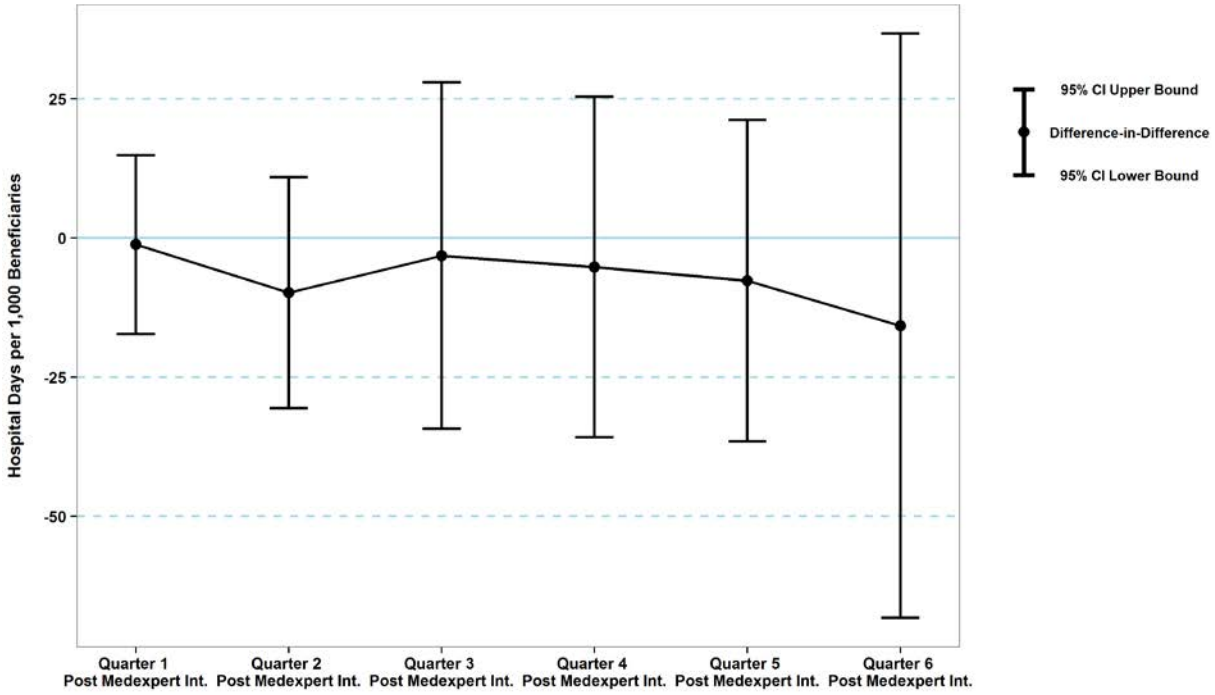


Figure C-7: MedExpert Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

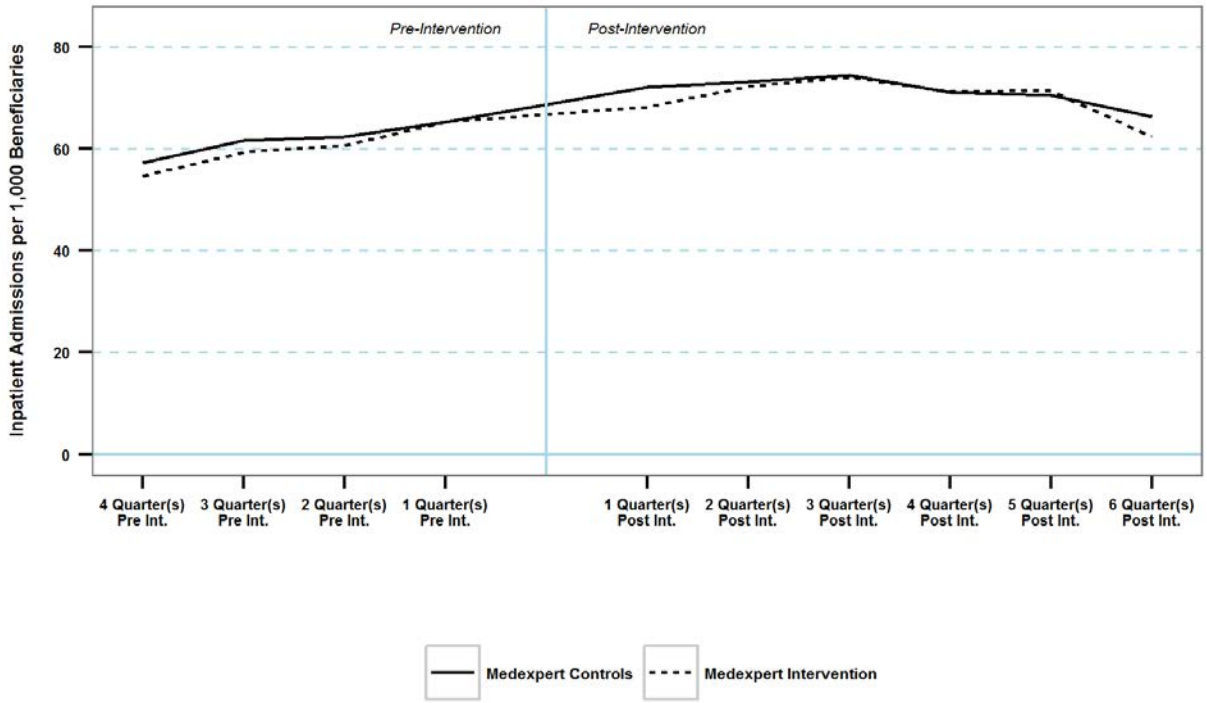


Figure C-8: MedExpert Inpatient Admissions per 1,000 Beneficiaries by Quarter, MA Cohort

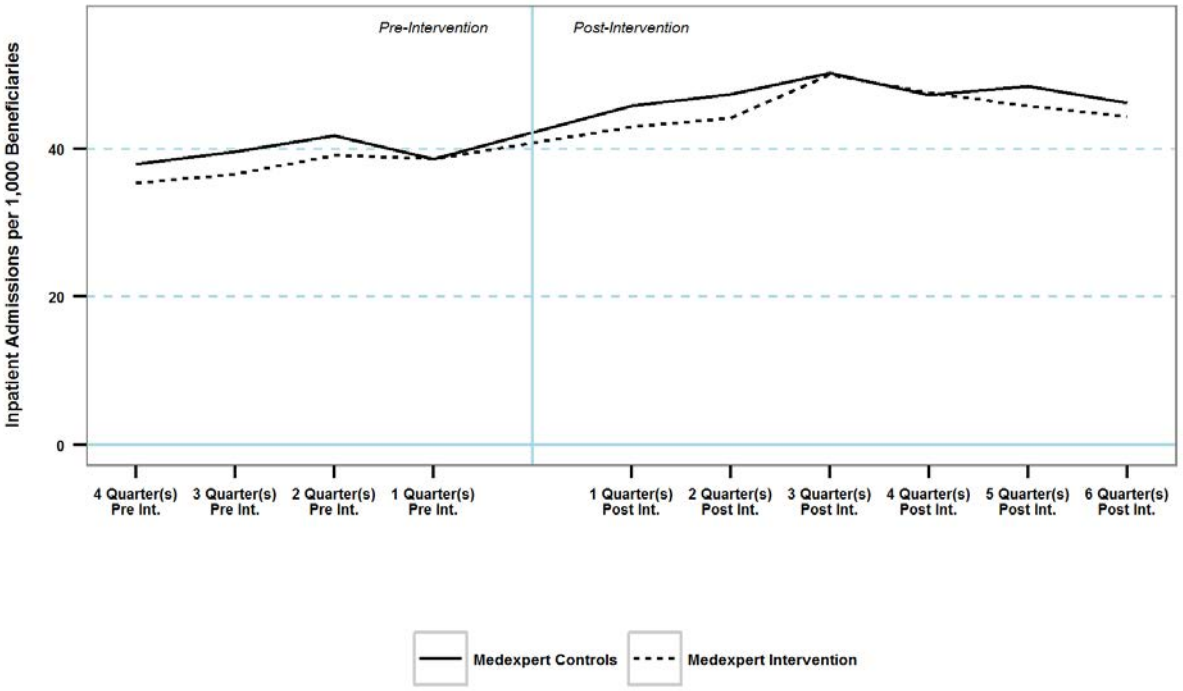


Figure C-9: MedExpert Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

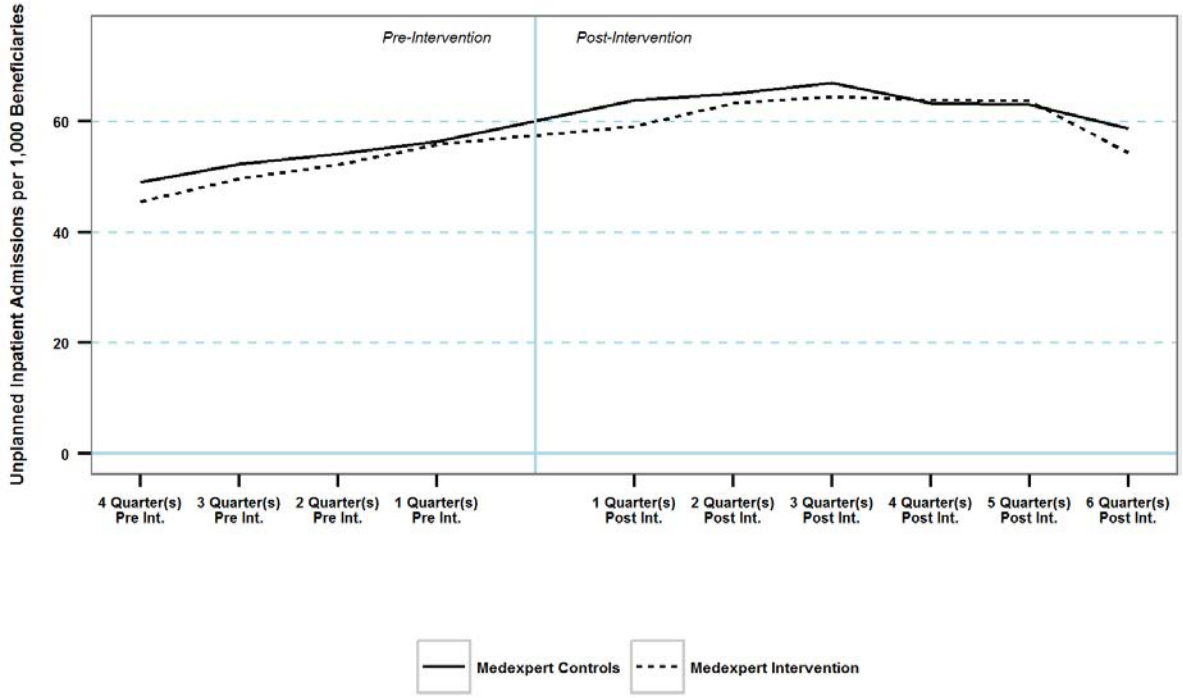


Figure C-10: MedExpert Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, MA Cohort

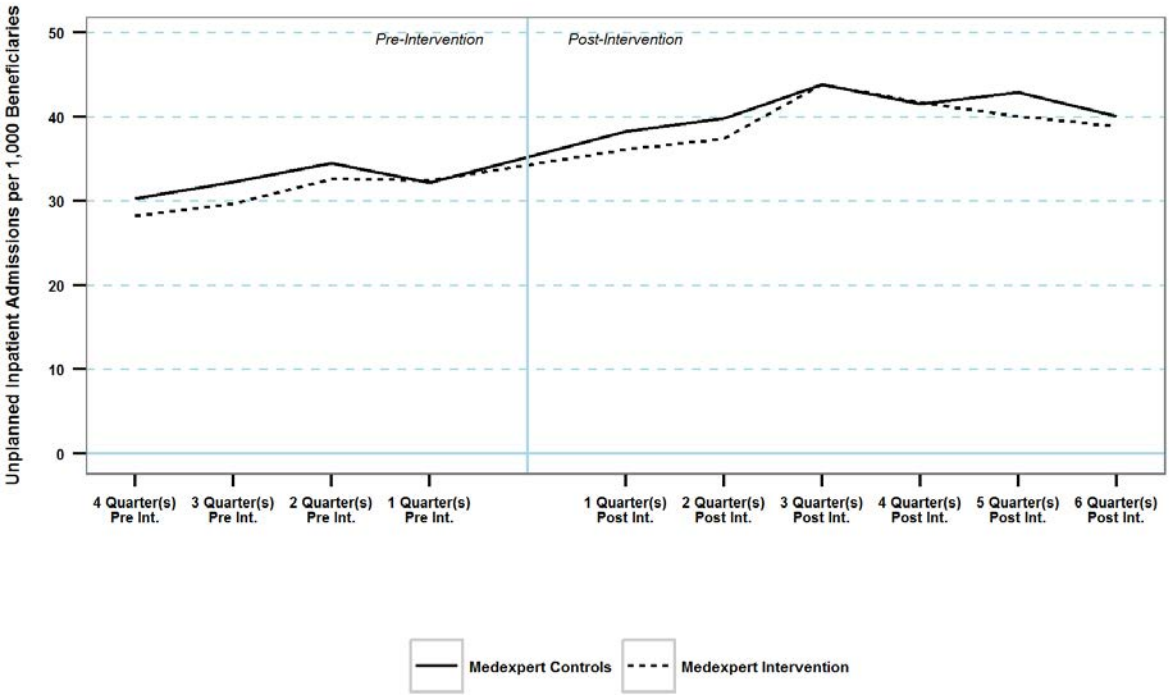


Figure C-11: MedExpert ER Visits per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

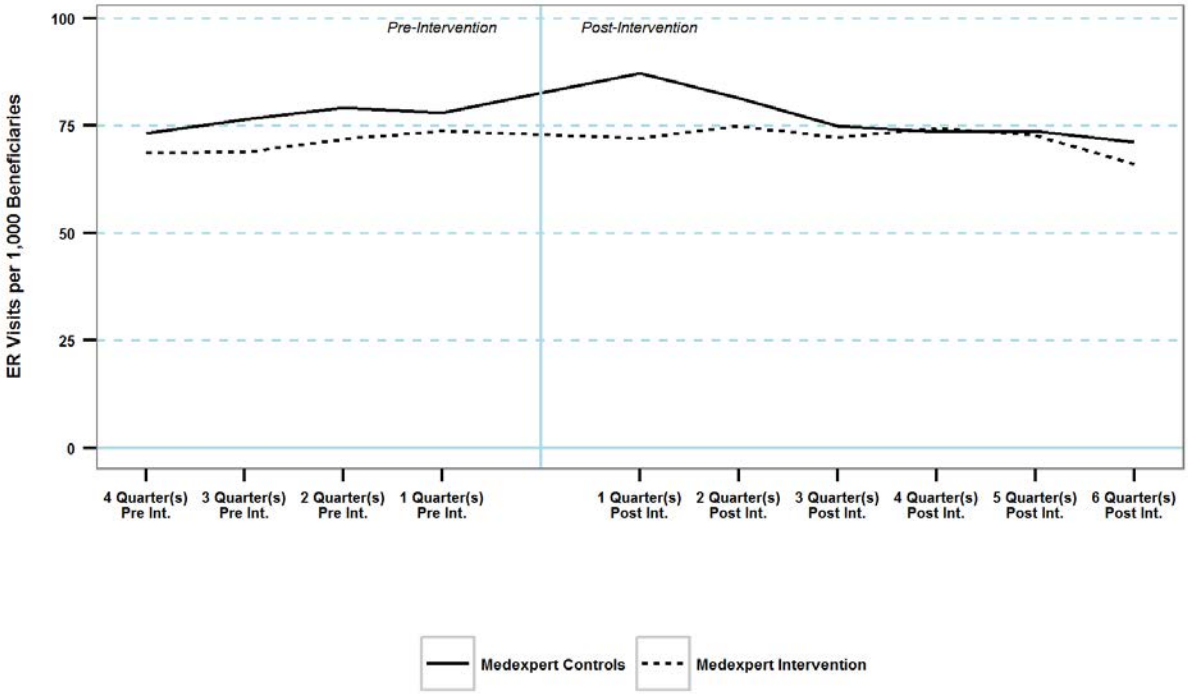


Table Appendix C-12: MedExpert Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	48,778	48,778	48,778	48,778	45,539	44,830	26,515	26,612
Health Service Use Rate per 1,000 Beneficiaries								
ER Visits	220.0	231.3	72.0	87.2	74.9	81.3	72.0	74.8
All Inpatient Admissions	184.5	189.6	68.1	72.0	72.2	73.1	74.0	74.4
Unplanned Inpatient Admissions	157.0	162.6	59.1	63.8	63.3	65.0	64.5	67.0

Table Appendix C-13: MedExpert Resource Use Rate by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	26,140	26,171	25,744	25,773	8,267	7,688
Health Service Use Rate per 1,000 Beneficiaries						
ER Visits	74.3	73.5	72.6	73.6	65.9	71.0
All Inpatient Admissions	71.2	71.0	71.3	70.5	62.3	66.2
Unplanned Inpatient Admissions	63.8	63.2	63.6	63.0	54.4	58.7

Table Appendix C-14: MedExpert Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, MA Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	165,017	165,017	165,017	165,017	91,041	92,710	37,108	38,431
Health Service Use Rate per 1,000 Beneficiaries								
All Inpatient Admissions	122.8	128.9	42.9	45.8	44.1	47.4	50.0	50.3
Unplanned Inpatient Admissions	100.9	105.1	36.1	38.3	37.4	39.8	43.9	43.8

Table Appendix C-15: MedExpert Resource Use Rate by Quarter Following Enrollment, MA Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	36,607	37,889	36,158	37,392	11,734	11,892
Health Service Use Rate per 1,000 Beneficiaries						
All Inpatient Admissions	47.6	47.3	45.8	48.5	44.3	46.2
Unplanned Inpatient Admissions	41.7	41.5	40.1	42.9	38.9	40.1

Table Appendix C-16: MedExpert Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	48778	48778	48778	48778	45539	44830	26515	26612
Mean Number of Events per 1,000 Beneficiaries								
ER Visits	348.5	388.5	90.4	111.2	93.5	104.1	89.1	94.4
All Inpatient Admissions	307.6	316.5	91.5	97.9	96.2	97.0	96.8	97.8
Unplanned Inpatient Admissions	248.9	261.8	76.2	82.6	80.4	82.8	81.9	86.2
Hospital Days	1,806.8	1,876.4	584.4	614.0	620.7	618.3	615.1	634.6

Table Appendix C-17: MedExpert Mean Resource Use by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	26140	26171	25744	25773	8267	7688
Mean Number of Events per 1,000 Beneficiaries						
ER Visits	92.2	92.6	89.8	90.9	81.4	89.9
All Inpatient Admissions	93.5	94.2	94.0	91.4	80.0	84.8
Unplanned Inpatient Admissions	81.3	81.5	81.8	80.4	67.4	73.1
Hospital Days	586.5	593.8	575.7	552.6	464.9	523.4

Table Appendix C-18: MedExpert Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, MA Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	165,017	165,017	165,017	165,017	91,041	92,710	37,108	38,431
Mean Number of Events per 1,000 Beneficiaries								
All Inpatient Admissions	178.6	188.6	52.0	56.4	53.7	58.1	61.3	62.6
Unplanned Inpatient Admissions	145.5	152.7	43.3	46.7	45.2	48.5	53.5	54.7
Hospital Days	831.0	882.2	264.5	278.5	267.2	286.4	269.8	279.4

Table Appendix C-19: MedExpert Mean Resource Use by Quarter Following Enrollment, MA Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	36,607	37,889	36,158	37,392	11,734	11,892
Mean Number of Events per 1,000 Beneficiaries						
All Inpatient Admissions	57.9	58.7	56.1	59.7	55.2	57.5
Unplanned Inpatient Admissions	50.5	51.3	48.8	52.9	47.7	50.2
Hospital Days	260.4	270.8	249.9	262.3	245.5	261.5

C.4 Medical Expenditures

Table Appendix C-20: Difference-in-Difference Estimates of MedExpert's Effects on Expenditures, Medicare FFS Cohort

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	48778	48778	45539	26515	26140	25744	8267
Total Medicare Parts A, B, and D Expenditures	10,798,553.37	-3.09	34.12	37.17	51.15	164.25	132.82
95% Confidence Interval	(-2,255,298.6 | 23,852,405.4)	(-127,121)	(-95,163)	(-142,216)	(-117,219)	(-8,337)	(-149,415)
P-Value	0.105	0.961	0.604	0.684	0.55	0.062	0.356
Total Medicare Parts A and B Expenditures	6,265,753.68	-22.12	23.62	15.98	29.97	131.24	84.82
95% Confidence Interval	(-6,271,337.2 | 18,802,844.5)	(-141,97)	(-99,147)	(-154,186)	(-128,188)	(-31,293)	(-179,349)
P-Value	0.327	0.716	0.707	0.854	0.709	0.112	0.529
Inpatient Expenditures	2,219,920.53	-25.2	6.19	18.48	4.77	69.96	-37.32
95% Confidence Interval	(-6,066,343.0 | 10,506,184.1)	(-102,52)	(-73,86)	(-93,130)	(-92,102)	(-38,178)	(-198,123)
P-Value	0.6	0.521	0.879	0.745	0.923	0.206	0.649
Outpatient ER Expenditures	-317,372.49	-7.69*	-0.08	-4.16	0.32	3.14	-2.06
95% Confidence Interval	(-941,638.8 | 306,893.8)	(-14,-2)	(-5,5)	(-11,2)	(-6,7)	(-4,11)	(-17,12)
P-Value	0.319	0.013	0.976	0.213	0.926	0.406	0.781
Outpatient Non-ER Expenditures	3,022,104.37*	15.19	2.15	8.98	7.73	18.85	25.22
95% Confidence Interval	(615,643.0 | 5,428,565.8)	(-8,38)	(-22,26)	(-24,42)	(-24,40)	(-13,50)	(-38,88)
P-Value	0.014	0.198	0.862	0.59	0.638	0.241	0.432
Carrier/PB Expenditures	1,004,469.85	8.38	20.84	-0.74	14.03	20.44	19.15
95% Confidence Interval	(-2,170,580.5 | 4,179,520.2)	(-22,39)	(-11,53)	(-45,44)	(-30,58)	(-23,64)	(-70,108)
P-Value	0.535	0.588	0.204	0.974	0.531	0.356	0.672
Skilled Nursing Facility Expenditures	2,655,972.88	0.46	8.53	-3.23	5.16	15.33	60.19
95% Confidence Interval	(-758,202.6 | 6,070,148.3)	(-31,32)	(-23,40)	(-47,41)	(-39,49)	(-28,58)	(-7,128)
P-Value	0.127	0.977	0.595	0.885	0.818	0.483	0.08
Durable Medical Equipment Expenditures	610,353.76	-1.84	1.42	1.22	3.67	2.34	3.76
95% Confidence Interval	(-118,018.2 | 1,338,725.7)	(-9,5)	(-6,9)	(-9,12)	(-7,14)	(-9,13)	(-12,20)
P-Value	0.101	0.604	0.696	0.817	0.493	0.676	0.647
Home Health Expenditures	-2,456,864.43*	-2.96	-6.82	13.06	-0.58	6.09	24.2
95% Confidence Interval	(-3,927,095.8 | -986,633.1)	(-17,12)	(-22,8)	(-5,31)	(-19,18)	(-10,22)	(-4,52)
P-Value	0.001	0.689	0.374	0.163	0.951	0.466	0.089

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Hospice Expenditures	-517,852.16	-8.2	-8.39	-16.83	-5.18	-4.93	-7.34
95% Confidence Interval	(-2,027,878.0 | 992,173.7)	(-24,7)	(-24,7)	(-37,4)	(-26,15)	(-24,14)	(-37,23)
P-Value	0.501	0.304	0.295	0.106	0.623	0.603	0.632

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Figure C-12: MedExpert Total Medicare Parts A, B, and D Expenditures per Beneficiary, Medicare FFS Cohort

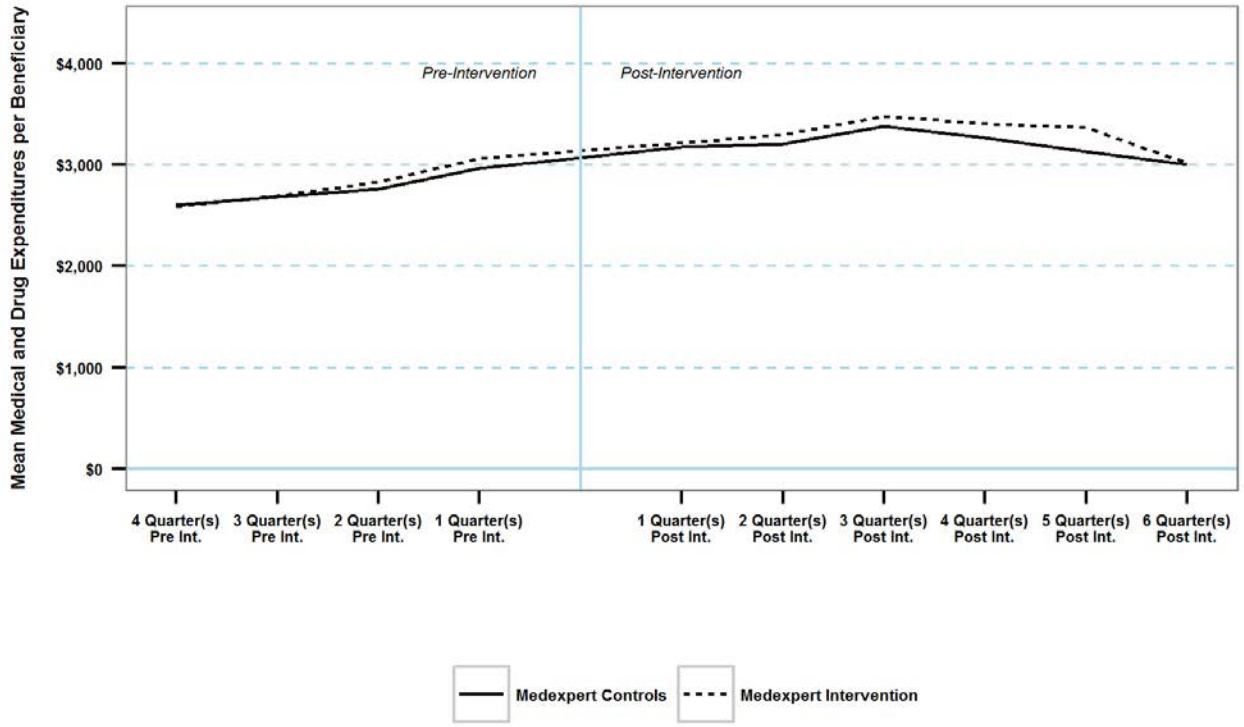


Figure C-13: MedExpert Total Medicare Parts A and B Expenditures per Beneficiary, Medicare FFS Cohort

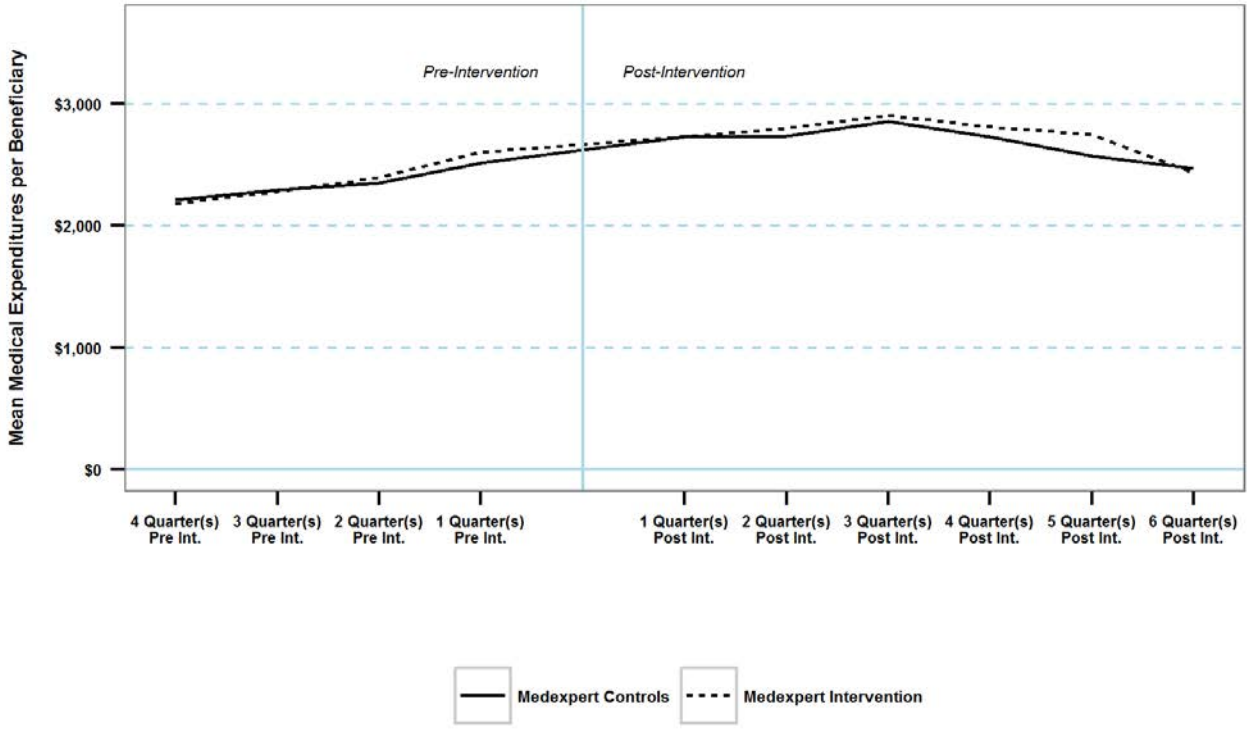


Table Appendix C-21: MedExpert Total Medicare Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	48,778	48,778	48,778	48,778	45,539	44,830	26,515	26,612
Total Medicare Parts A, B, and D Expenditures								
Mean	$11,159	$10,995	$3,211	$3,174	$3,296	$3,205	$3,477	$3,381
Median	$3,908	$3,740	$760	$709	$751	$689	$815	$786
90th percentile	$29,825	$29,843	$7,647	$7,519	$7,906	$7,766	$8,171	$7,978
99th percentile	$98,321	$97,988	$39,630	$39,894	$40,527	$39,929	$42,522	$42,971
Total Medicare Parts A and B Expenditures								
Mean	$9,452	$9,363	$2,732	$2,732	$2,796	$2,736	$2,907	$2,857
Median	$2,864	$2,710	$497	$456	$488	$439	$508	$482
90th percentile	$25,494	$26,142	$6,011	$6,202	$6,401	$6,263	$6,448	$6,461
99th percentile	$91,142	$91,148	$38,228	$38,537	$39,012	$38,514	$40,858	$40,424

Table Appendix C-22: MedExpert Total Medicare Expenditures by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures (2012 USD)	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	26,140	26,171	25,744	25,773	8,267	7,688
Total Medicare Parts A, B, and D Expenditures						
Mean	$3,399	$3,266	$3,360	$3,125	$3,018	$3,000
Median	$824	$769	$824	$760	$798	$748
90th percentile	$8,221	$7,849	$8,161	$7,601	$7,042	$6,945
99th percentile	$40,484	$40,481	$39,208	$37,826	$35,498	$36,378
Total Medicare Parts A and B Expenditures						
Mean	$2,814	$2,731	$2,745	$2,574	$2,431	$2,470
Median	$521	$485	$530	$492	$522	$486
90th percentile	$6,517	$6,270	$6,113	$5,713	$5,191	$5,216
99th percentile	$38,718	$38,386	$37,083	$35,313	$33,833	$34,388

Table Appendix C-23: MedExpert Inpatient and Outpatient Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	48,778	48,778	48,778	48,778	45,539	44,830	26,515	26,612
Inpatient Expenditures								
Mean	$2,732	$2,718	$878	$900	$922	$905	$970	$940
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$7,427	$7,935	$0	$0	$0	$0	$0	$0
99th percentile	$47,736	$45,299	$23,528	$24,163	$24,329	$22,516	$23,435	$22,849
Outpatient ER Expenditures								
Mean	$189	$201	$50	$61	$51	$54	$44	$50
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$475	$516	$0	$0	$0	$0	$0	$0
99th percentile	$2,855	$3,033	$1,205	$1,393	$1,191	$1,287	$1,089	$1,205
Outpatient Non-ER Expenditures								
Mean	$1,107	$1,119	$290	$278	$293	$292	$298	$280
Median	$65	$89	$0	$0	$0	$0	$0	$0
90th percentile	$2,053	$2,264	$381	$424	$378	$420	$364	$358
99th percentile	$25,759	$24,781	$6,887	$6,576	$6,839	$6,649	$6,837	$6,751

Table Appendix C-24: MedExpert Inpatient and Outpatient Expenditures by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures (2012 USD)	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	26,140	26,171	25,744	25,773	8,267	7,688
Inpatient Expenditures						
Mean	$866	$835	$864	$775	$679	$770
Median	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0
99th percentile	$22,382	$21,020	$20,597	$19,623	$19,459	$20,363
Outpatient ER Expenditures						
Mean	$47	$48	$48	$46	$44	$51
Median	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0
99th percentile	$1,176	$1,239	$1,105	$1,123	$1,177	$1,148
Outpatient Non-ER Expenditures						
Mean	$287	$269	$286	$259	$273	$249
Median	$0	$0	$0	$0	$0	$0
90th percentile	$385	$348	$381	$336	$337	$345
99th percentile	$6,693	$6,572	$6,672	$6,423	$6,103	$5,771

Table Appendix C-25: MedExpert Expenditures for Other Settings in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	48,778	48,778	48,778	48,778	45,539	44,830	26,515	26,612
Carrier/PB Expenditures								
Mean	$3,297	$3,040	$896	$823	$901	$818	$945	$897
Median	$1,881	$1,667	$358	$314	$357	$303	$377	$349
90th percentile	$7,159	$6,685	$2,066	$1,987	$2,070	$1,958	$2,210	$2,121
99th percentile	$24,173	$22,435	$8,169	$7,663	$8,454	$8,006	$8,441	$8,436
Skilled Nursing Facility Expenditures								
Mean	$780	$970	$239	$286	$247	$281	$279	$315
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$26,003	$31,002	$10,425	$11,905	$10,853	$12,066	$11,578	$13,203
Durable Medical Equipment Expenditures								
Mean	$241	$246	$57	$60	$57	$56	$56	$51
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$544	$558	$110	$106	$90	$91	$70	$64
99th percentile	$3,800	$3,892	$946	$978	$987	$942	$926	$957

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Home Health Expenditures								
Mean	$893	$795	$232	$210	$234	$217	$216	$207
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$2,857	$2,596	$0	$0	$0	$0	$0	$0
99th percentile	$13,511	$13,017	$4,623	$4,622	$4,637	$4,537	$4,328	$4,317
Hospice Expenditures								
Mean	$205	$264	$87	$110	$88	$110	$98	$115
Median	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$2,261	$1,589	$3,609	$1,881	$4,007	$2,380	$4,155

Table Appendix C-26: MedExpert Expenditures for Other Settings by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q6

Measures (2012 USD)	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	26,140	26,171	25,744	25,773	8,267	7,688
Carrier/PB Expenditures						
Mean	$952	$887	$948	$879	$939	$870
Median	$383	$350	$400	$367	$401	$363
90th percentile	$2,214	$2,081	$2,242	$2,061	$2,174	$2,014
99th percentile	$8,809	$8,309	$8,452	$7,819	$7,929	$7,503
Skilled Nursing Facility Expenditures						
Mean	$279	$306	$278	$293	$218	$224
Median	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0
99th percentile	$12,053	$12,954	$12,039	$12,581	$9,921	$10,601
Durable Medical Equipment Expenditures						
Mean	$60	$52	$59	$52	$48	$49
Median	$0	$0	$0	$0	$0	$0
90th percentile	$77	$64	$60	$46	$52	$41
99th percentile	$964	$934	$967	$1,018	$881	$919
Home Health Expenditures						
Mean	$212	$216	$168	$168	$158	$158
Median	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0
99th percentile	$4,496	$4,551	$3,712	$3,756	$3,716	$3,666
Hospice Expenditures						
Mean	$108	$116	$93	$101	$72	$96
Median	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0
99th percentile	$3,877	$4,029	$3,129	$3,580	$1,217	$3,355

APPENDIX D: RESULTS FOR IHARP

The following tables provide the baseline demographic and health characteristics; mortality and readmission rates; health service utilization and medical costs; and medication adherence rates results for intervention and comparison group beneficiaries in the IHARP FFS cohort.

D.1 Demographic and Health Characteristics

Table Appendix D-1: IHARP Baseline Demographic and Health Characteristics, Medicare FFS Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	592	592		
Average Age (Years)[+]	70.49	70.55	-0.07	0.01
Age under 65[+]	21%	21%	0%	0.00
Gender				
Male[+]	37%	37%	0%	0.00
Female	63%	63%	0%	0.00
Race				
White[+]	91%	91%	0%	0.00
Black or Other	9%	9%	0%	0.00
Dual Eligible[+]	27%	27%	0%	0.00
Medicare Eligibility				
Disabled[+]	43%	43%	0%	0.00
Aged	57%	57%	0%	0.00
Evaluation and Management (E&M) Visits				
E&M Visits: 0	0%	0%	0%	0.00
E&M Visits: 1-5[+]	14%	10%	4%	0.12
E&M Visits: 6-10[+]	24%	21%	3%	0.07
E&M Visits: 11-15[+]	21%	21%	0%	0.01
E&M Visits: 16+[+]	41%	48%	-7%	0.14
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	89%	92%	-3%	0.11
1 SNF Stay (Prior Year)[+]	8%	5%	3%	0.10
2+ SNF Stays (Prior Year)[+]	4%	3%	1%	0.04
IP Stay before study enrollment	52%	52%	0%	0.00
0 IP Stays (1Q Prior)	38%	38%	0%	0.00
1 IP Stay (Prior Year)[+]	49%	49%	0%	0.00
2+ IP Stays (Prior Year)[+]	13%	13%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
0 IP Stays (Prior Year)	28%	27%	1%	0.01
1 IP Stay (Prior Year)+	40%	44%	-4%	0.08
2+ IP Stays (Prior Year)	32%	29%	3%	0.07
ER Visits (Pre-Enrollment Quarter)				
ER Visits: 0	64%	64%	1%	0.01
ER Visits: 1+	27%	27%	0%	0.00
ER Visits: 2++	8%	9%	-1%	0.02
Medical Cost per Beneficiary				
Cost (4Q Prior)+	3,075	2,922	154	0.03
Cost (3Q Prior)+	3,398	3,457	-58	0.01
Cost (2Q Prior)+	3,662	3,788	-126	0.02
Cost (1Q Prior)+	9,823	8,933	890	0.08
IP Cost (Prior Year)	9,176	8,443	734	0.06
IP Cost (1Q Prior)+	5,552	5,137	416	0.05
Frailty Measures				
Home Oxygen+	24%	26%	-2%	0.05
Charlson Score+	2.09	2.01	0.08	0.03
Area Depravation Index (ADI)	105.34	105.32	0.02	0.00
Drug History (Pre-Enrollment Year)				
Antidiabetics+	35%	35%	0%	0.00
Insulin+	26%	27%	-1%	0.03
SSRIs and SNRIs+	43%	45%	-2%	0.05
Other Antidepressants+	29%	31%	-2%	0.03
Statin+	69%	72%	-3%	0.06
Thiazide+	41%	43%	-2%	0.04
Calcium channel blockers+	47%	43%	3%	0.07
Beta blockers+	67%	71%	-4%	0.08
ACE inhibitors+	54%	56%	-2%	0.05
ARBs+	26%	30%	-4%	0.09
Antihypertensives+	20%	20%	-1%	0.02
Antineoplastics+	7%	7%	0%	0.01
Corticosteroids+	41%	41%	0%	0.00
Cardiotonics+	7%	8%	-2%	0.06
Antiarrhythmics+	8%	8%	0%	0.01
Vasopressors+	3%	3%	0%	0.01
Antiasthmatic+	43%	46%	-3%	0.07
Antianxiety Agents+	33%	33%	1%	0.02
Antipsychotics+	11%	10%	1%	0.03
Anticoagulants+	25%	29%	-4%	0.08

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Insulin[+]	27%	28%	0%	0.01
Nitrates[+]	34%	32%	2%	0.04
Loop diuretics[+]	49%	53%	-4%	0.08
Potassium sparing diuretics[+]	13%	13%	0%	0.00
Fibric acid derivatives[+]	15%	14%	1%	0.01
Platelet aggregation inhibitors[+]	23%	21%	2%	0.06
Initial Hospitalization Major Diagnosis Category				
Diseases & Disorders Of The Nervous System[+]	4%	4%	-1%	0.03
Diseases & Disorders Of The Respiratory System[+]	10%	11%	-1%	0.03
Diseases & Disorders Of The Circulatory System[+]	15%	15%	-1%	0.02
Diseases & Disorders Of The Musculoskeletal System & Conn Tissue[+]	5%	4%	1%	0.06
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP)	3%	4%	-1%	0.05
Acute cerebrovascular disease (IP, 30 days prior)	1%	2%	0%	0.01
AMI (IP)	4%	3%	1%	0.05
AMI (IP, 30 days prior)	2%	2%	0%	0.01
Cerebrovascular disease[+]	30%	29%	2%	0.04
Parkinson's disease and multiple sclerosis	2%	3%	-1%	0.05
Asthma	49%	52%	-3%	0.05
Coagulation and hemorrhagic disorders[+]	10%	9%	1%	0.03
Congestive heart failure (All Settings)[+]	41%	42%	-1%	0.02
Congestive heart failure (IP)	8%	10%	-2%	0.06
Coronary atherosclerosis[+]	54%	54%	0%	0.00
Dementia[+]	10%	8%	2%	0.06
Diabetes mellitus without complication[+]	65%	67%	-2%	0.05
Diabetes mellitus with complications[+]	42%	42%	-1%	0.01
Cardiac dysrhythmias, arrest and ventricular fibrillation[+]	67%	66%	1%	0.03
Fluid and electrolyte disorders[+]	45%	45%	1%	0.02
Gastrointestinal hemorrhage (All Settings)[+]	11%	10%	1%	0.02
Gastrointestinal hemorrhage (IP)	3%	2%	1%	0.05
Other heart disease[+]	87%	90%	-2%	0.07
Heart valve disorders[+]	45%	43%	2%	0.04
Hepatitis[+]	2%	2%	0%	0.01
Hypertension with complications[+]	31%	33%	-3%	0.06
Stomach, pancreas and lung cancer[+]	1%	1%	0%	0.02
Peri- endo- and myocarditis[+]	15%	14%	1%	0.03
Disorders of nervous system[+]	29%	30%	-1%	0.03

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Other cancers	19%	18%	1%	0.01
Paralysis+	4%	4%	0%	0.02
Pneumonia+	32%	31%	1%	0.02
Pneumonia (IP, 30 days prior)	4%	5%	-1%	0.04
Pulmonary heart disease+	17%	18%	-2%	0.04
Renal failure	35%	38%	-2%	0.05
Respiratory failure (IP) +	3%	3%	-1%	0.03
Respiratory failure (IP, 30 days prior)	1%	2%	-1%	0.06
Rheumatoid arthritis and related disease+	6%	8%	-2%	0.07
Septicemia+	10%	10%	0%	0.01
Shock+	2%	3%	0%	0.01
Tuberculosis+	0%	0%	0%	0.06
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP) +	4%	4%	0%	0.01
Heart valve procedures (IP)+	2%	1%	1%	0.05
Hemodialysis+	5%	3%	1%	0.06
Peritoneal dialysis	3%	3%	0%	0.02
Procedures on vessels of head and neck (IP)+	14%	12%	2%	0.06
Radiology and chemotherapy+	2%	3%	-1%	0.06
Respiratory intubation and mechanical ventilation+	11%	10%	1%	0.04
Blood transfusion+	11%	10%	1%	0.02
Blood transfusion (IP)	11%	10%	0%	0.01
Transportation	43%	41%	3%	0.05

+Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

D.2 Mortality and Readmissions

Table Appendix D-2: Difference in Mortality per 1,000 Beneficiaries after IHARP Enrollment, Medicare FFS Cohorts

Medicare Cohort	Cumulative [a]	Q1	Q2	Q3	Q4	Q5
Number of Participant Beneficiaries	**592**	**592**	**509**	**389**	**285**	**192**
Medicare FFS						
Difference[b]	-47.90*	-70.95*	-14.09	-1.30	0.67	8.25
95% Confidence Interval	(-66.6 | -29.2)	(-93.9 | -48.0)	(-30.5 | 2.3)	(-14.7 | 12.1)	(-21.7 | 23.1)	(-18.4 | 34.9)
P-Value	<0.001	<0.001	0.092	0.849	0.953	0.543

*Statistically significant at the 5% level.
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

Table Appendix D-3: Difference in Readmissions per 1,000 Beneficiaries after IHARP Enrollment, Medicare FFS Cohort

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5
Number of Participant Beneficiaries	**252**	**145**	**89**	**62**	**49**	**38**
30-Day Hospital Readmissions per 1,000 Beneficiaries Following:						
All Inpatient Admissions						
Difference[b]	1.48	51.54	-43.14	-14.47	63.49	-114.83
95% Confidence Interval	(-25.6 | 28.6)	(-64.8 | 167.8)	(-188.0 | 101.7)	(-188.1 | 159.1)	(-138.0 | 265.0)	(-334.1 | 104.4)
P-Value	0.914	0.385	0.559	0.870	0.537	0.305
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission						
Difference	3.25	36.48	-43.14	-37.22	137.57	-69.38
95% Confidence Interval	(-22.7 | 29.2)	(-73.8 | 146.7)	(-188.0 | 101.7)	(-202.0 | 127.6)	(-46.7 | 321.8)	(-279.4 | 140.6)
P-Value	0.806	0.517	0.559	0.658	0.143	0.517

*Statistically significant at the 5% level.
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.
[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Figure D-1: IHARP Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort

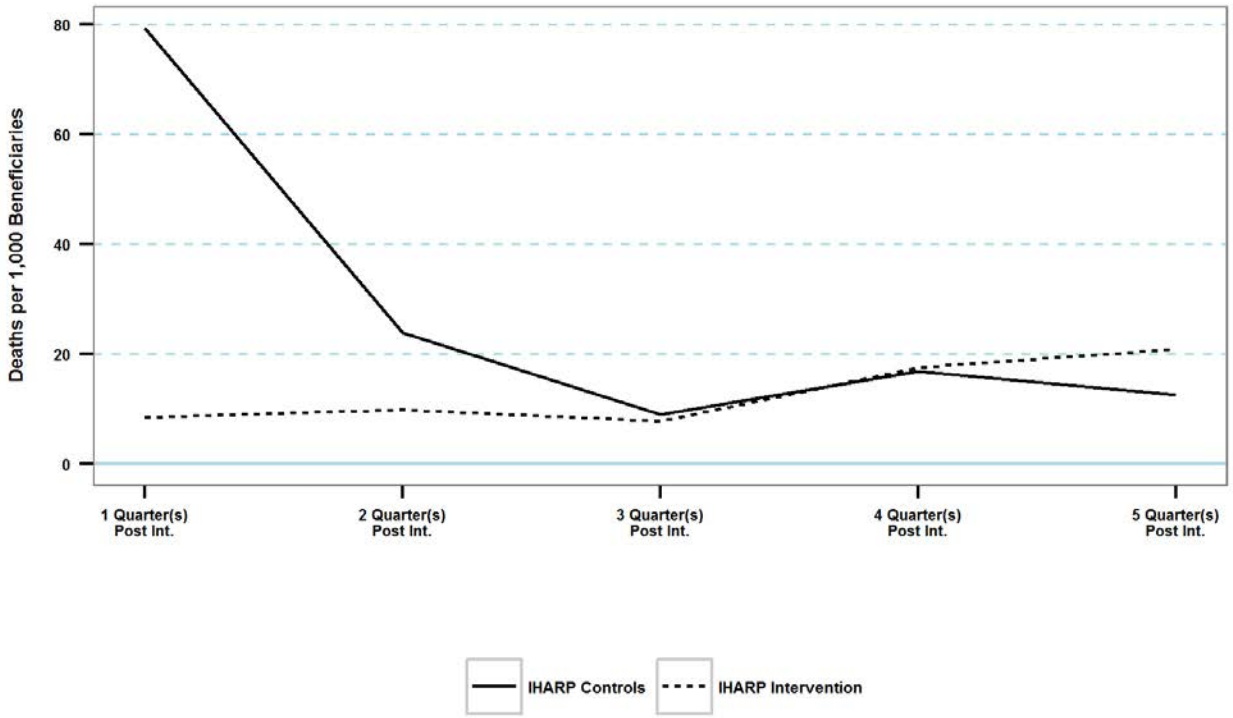


Figure D-2: IHARP Readmissions per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

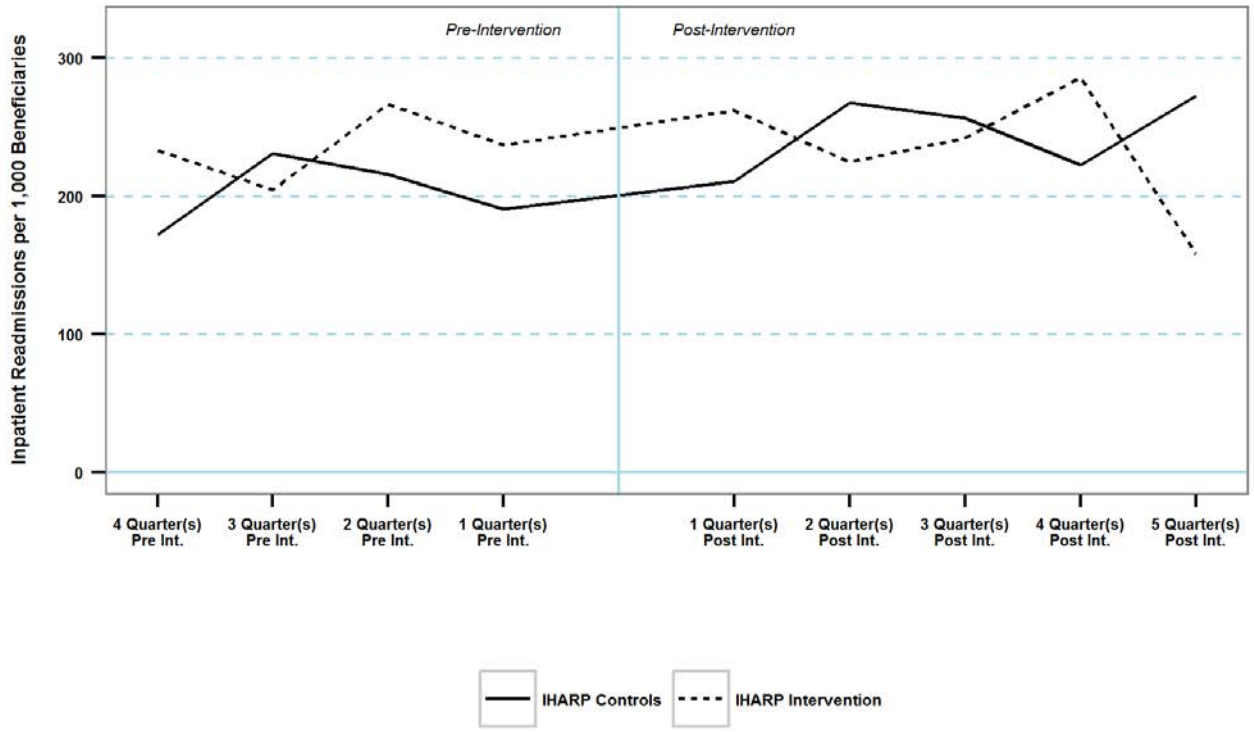


Table Appendix D-4: IHARP Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort, Q1 to Q3

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	592	592	509	460	389	333
All-Cause Mortality per 1,000 Beneficiaries	8.4	79.4	9.8	23.9	7.7	9.0
30-Day Hospital Readmission per 1,000 Beneficiaries Following any Inpatient Admissions	262.1	210.5	224.7	267.9	241.9	256.4
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	220.7	184.2	224.7	267.9	193.5	230.8

Table Appendix D-5: IHARP Mortality and Readmission per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS Cohort, Q4 to Q5

Measures	Q4		Q5	
	Intervention	Controls	Intervention	Controls
Number of Beneficiaries	285	237	192	159
All-Cause Mortality per 1,000 Beneficiaries	17.5	16.9	20.8	12.6
30-Day Hospital Readmission per 1,000 Beneficiaries Following any Inpatient Admissions	285.7	222.2	157.9	272.7
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	285.7	148.1	157.9	227.3

D.3 Health Service Resource Use

Table Appendix D-6: Difference-in-Difference Estimates of IHARP Effects on Resource Use, Medicare FFS Cohort

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5
Number of Participant Beneficiaries	592	592	509	389	285	192
ER Visits	110.64	0.84	-12.55	74.68	16.29	176.71
95% Confidence Interval	(-35.5 | 256.8)	(-111,113)	(-136,111)	(-124,273)	(-195,227)	(-90,444)
P-Value	0.138	0.988	0.842	0.461	0.880	0.194
Inpatient Admissions	168.86*	152.45*	28.5	32.43	67.73	-41.69
95% Confidence Interval	(69.0 | 268.7)	(71,234)	(-55,112)	(-68,133)	(-60,196)	(-189,105)
P-Value	<0.001	<0.001	0.505	0.526	0.299	0.578
Unplanned Inpatient Admissions	159.01*	141.47*	21.43	5.19	71.93	-7.74
95% Confidence Interval	(64.5 | 253.5)	(65,218)	(-58,101)	(-90,100)	(-52,195)	(-143,127)
P-Value	<0.001	<0.001	0.597	0.914	0.253	0.910
Hospital Days	679.00*	695.95*	93.69	146.55	-78.08	-295.94
95% Confidence Interval	(38.7 | 1,319.3)	(127,1265)	(-432,619)	(-538,831)	(-797,640)	(-1013,421)
P-Value	0.038	0.017	0.727	0.675	0.831	0.418

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Figure D-3: IHARP Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

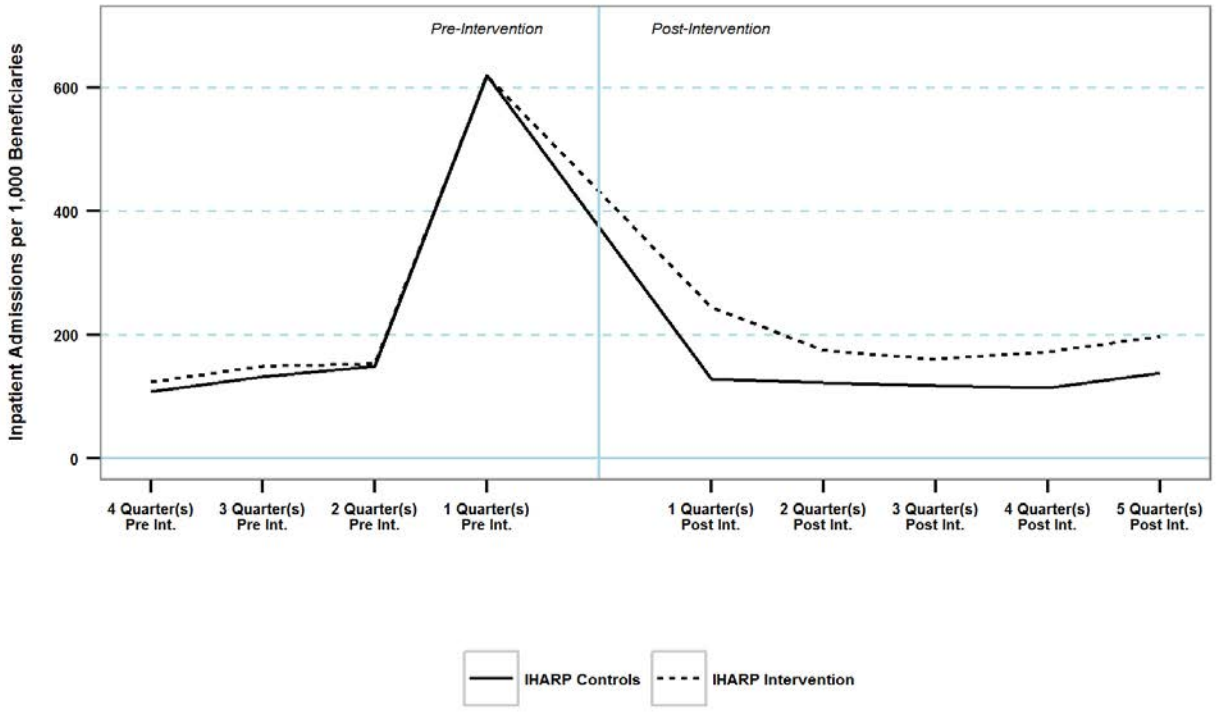


Figure D-4: IHARP Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

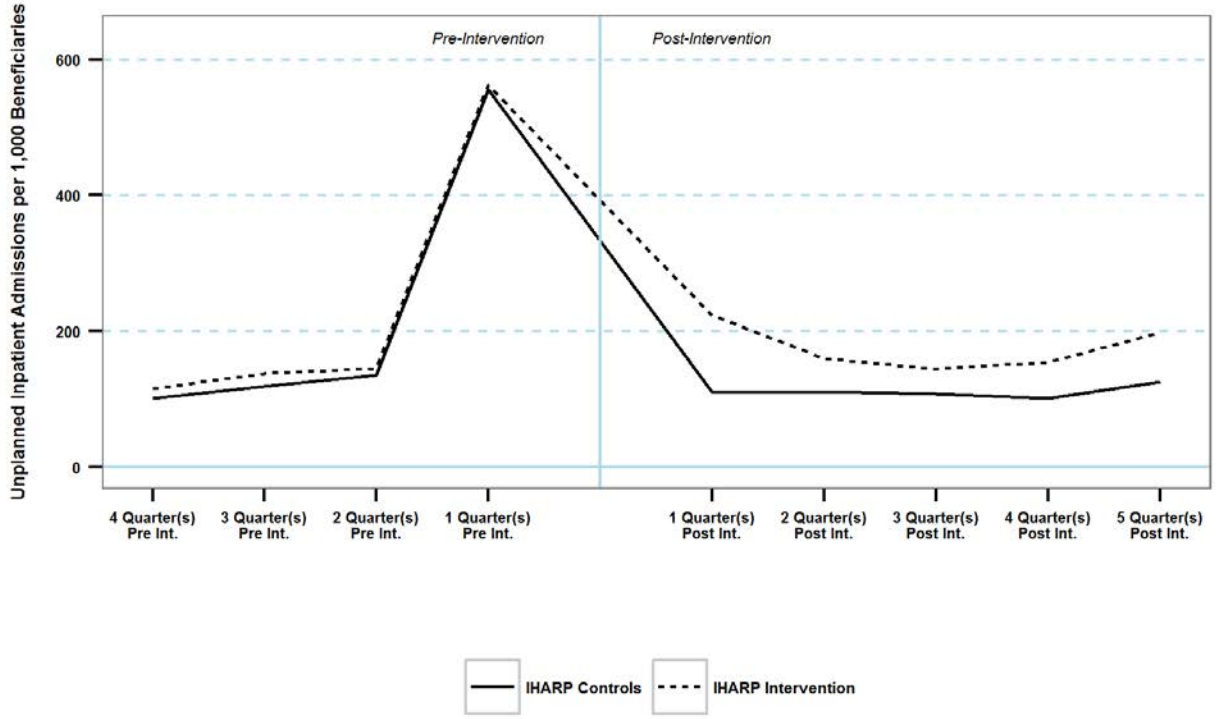


Figure D-5: IHARP ER Visits per 1,000 Beneficiaries by Quarter, Medicare FFS Cohort

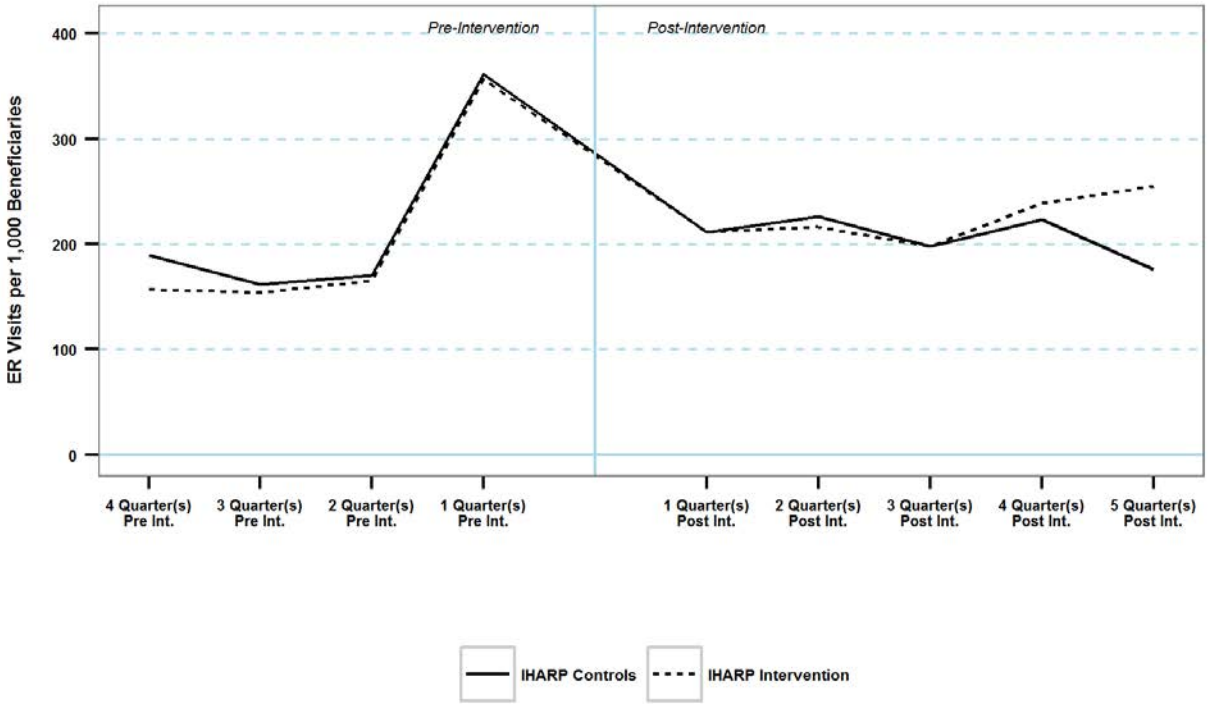


Table Appendix D-7: IHARP Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	592	592	592	592	509	460	389	333	285	237	192	159
Health Service Use Rate per 1,000 Beneficiaries												
ER Visits	527.0	554.1	211.1	211.1	216.1	226.1	197.9	198.2	238.6	223.6	255.2	176.1
All Inpatient Admissions	723.0	728.0	244.9	128.4	174.9	121.7	159.4	117.1	171.9	113.9	197.9	138.4
Unplanned Inpatient Admissions	674.0	660.5	223.0	109.8	159.1	110.9	144.0	108.1	154.4	101.3	197.9	125.8

Table Appendix D-8: IHARP Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	592	592	592	592	509	460	389	333	285	237	192	159
Mean Number of Events per 1,000 Beneficiaries												
ER Visits	1,243.2	1,239.9	315.9	314.2	316.3	321.7	406.2	279.3	403.5	337.6	484.4	245.3
All Inpatient Admissions	1,346.3	1,300.7	336.1	172.3	231.8	178.3	226.2	165.2	270.2	151.9	244.8	195.0
Unplanned Inpatient Admissions	1,211.1	1,155.4	300.7	145.3	208.3	158.7	197.9	156.2	252.6	126.6	239.6	150.9
Hospital Days	6,096.3	5,778.7	1,695.9	920.6	1,218.1	893.5	1,200.5	864.9	1,129.8	924.1	1,000.0	886.8

D.4 Medical Expenditures

Table Appendix D-9: Difference-in-Difference Estimates of IHARP's Effects on Expenditures, Medicare FFS Cohort

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5
Number of Participant Beneficiaries	592	592	509	389	285	192
Total Medicare Parts A, B, and D Expenditures[b]	2,151,961.28*	1850.98*	480.53	842.71	1065.06	48.64
95% Confidence Interval	(604,444.1 | 3,699,478.4)	(420,3282)	(-859,1821)	(-786,2471)	(-898,3028)	(-2082,2179)
P-Value	0.006	0.011	0.482	0.310	0.287	0.964
Total Medicare Parts A and B Expenditures	2,297,562.23*	1830.61*	563.24	986.28	1347.04	-47.78
95% Confidence Interval	(794,684.3 | 3,800,440.2)	(432,3229)	(-706,1832)	(-573,2546)	(-540,3234)	(-2054,1959)
P-Value	0.003	0.010	0.384	0.215	0.162	0.963
Inpatient Expenditures	1,126,630.63*	1024.65*	254.89	483.19	425.05	-509.02
95% Confidence Interval	(197,337.6 | 2,055,923.7)	(224,1825)	(-467,977)	(-457,1424)	(-600,1450)	(-1602,583)
P-Value	0.017	0.012	0.489	0.314	0.416	0.361
Outpatient ER Expenditures	-27,983.01	-37.65	-37.86	-7.81	10.4	90.29
95% Confidence Interval	(-114,046.6 | 58,080.6)	(-110,35)	(-107,31)	(-99,83)	(-100,121)	(-11,191)
P-Value	0.524	0.307	0.280	0.866	0.854	0.080
Outpatient Non-ER Expenditures	377,847.44*	-25.24	323.43*	330	403.1*	464.82
95% Confidence Interval	(48,754.8 | 706,940.1)	(-317,267)	(39,608)	(-21,681)	(21,786)	(-147,1077)
P-Value	0.024	0.865	0.026	0.065	0.039	0.137
Carrier/PB Expenditures	321,147.07*	283.75*	52.32	265.6	276.99	160.13
95% Confidence Interval	(48,803.7 | 593,490.5)	(42,526)	(-205,310)	(-53,584)	(-99,653)	(-307,628)
P-Value	0.021	0.022	0.690	0.102	0.149	0.501
Skilled Nursing Facility Expenditures	381,038.85	484.12	-104.34	-137.64	198.82	-269.86
95% Confidence Interval	(-97,836.3 | 859,914.0)	(-110,1078)	(-419,210)	(-553,278)	(-395,793)	(-797,257)
P-Value	0.119	0.110	0.515	0.516	0.511	0.315
Durable Medical Equipment Expenditures	14,684.57	12.71	32.12	-4.05	26.58	43.29
95% Confidence Interval	(-187,748.8 | 217,118.0)	(-173,198)	(-203,267)	(-213,205)	(-79,132)	(-170,256)
P-Value	0.887	0.893	0.789	0.970	0.622	0.690

Measures (2012 USD per Person)	Cumulative[a]	Q1	Q2	Q3	Q4	Q5
Home Health Expenditures	174,033.55	213.39*	108.47	6.97	-35.42	-50.1
95% Confidence Interval	(-22,111.5 | 370,178.6)	(19,408)	(-77,294)	(-186,200)	(-286,215)	(-317,217)
P-Value	0.082	0.032	0.252	0.944	0.781	0.712
Hospice Expenditures	-81,457.37	-132.2*	-68.05	44.16	36.73	15.66
95% Confidence Interval	(-173,098.6 | 10,183.8)	(-246,-19)	(-164,28)	(-76,164)	(-76,149)	(-70,101)
P-Value	0.081	0.023	0.165	0.469	0.523	0.720

Note: The difference-in-differences (DiD) estimate is the average per-person difference in expenditures occurring in the intervention as compared to control cohorts between the intervention period and the pre-intervention (baseline) period

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]Denominator is subset to beneficiaries enrolled in Medicare Part D

Figure D-6: IHARP Total Medicare Parts A, B, and D Expenditures per Beneficiary, Medicare FFS Cohort

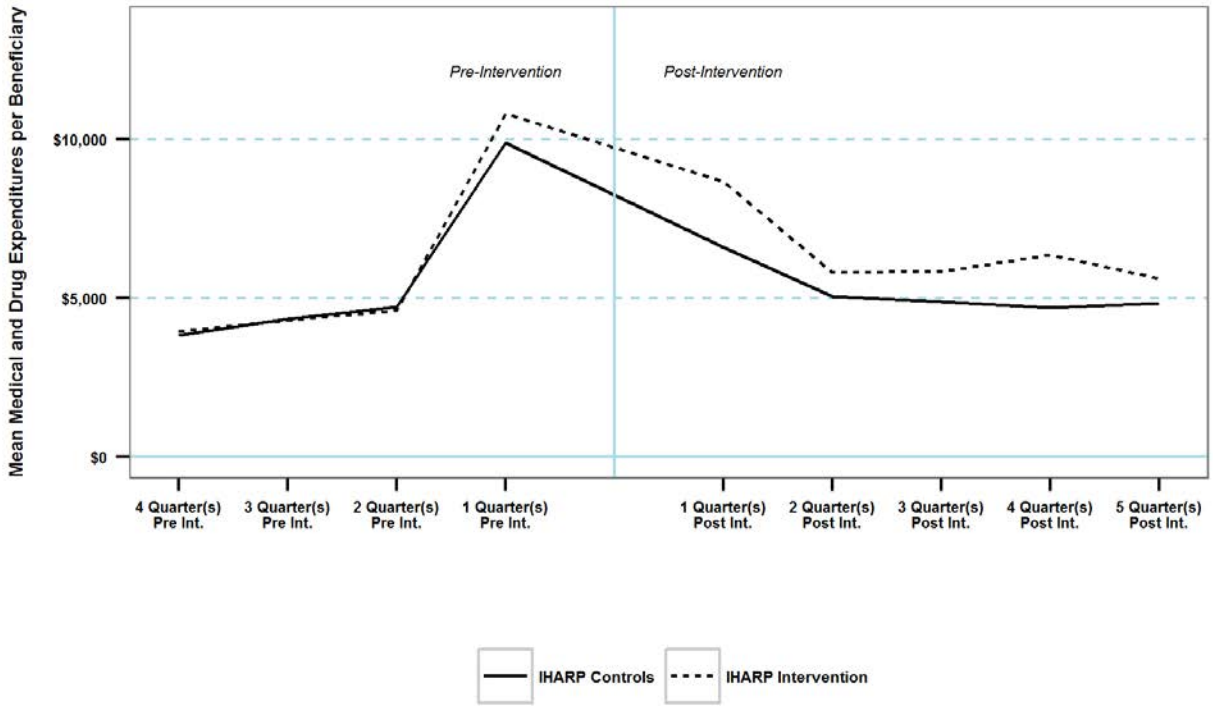


Figure D-7: IHARP Total Medicare Parts A and B Expenditures per Beneficiary, Medicare FFS Cohort

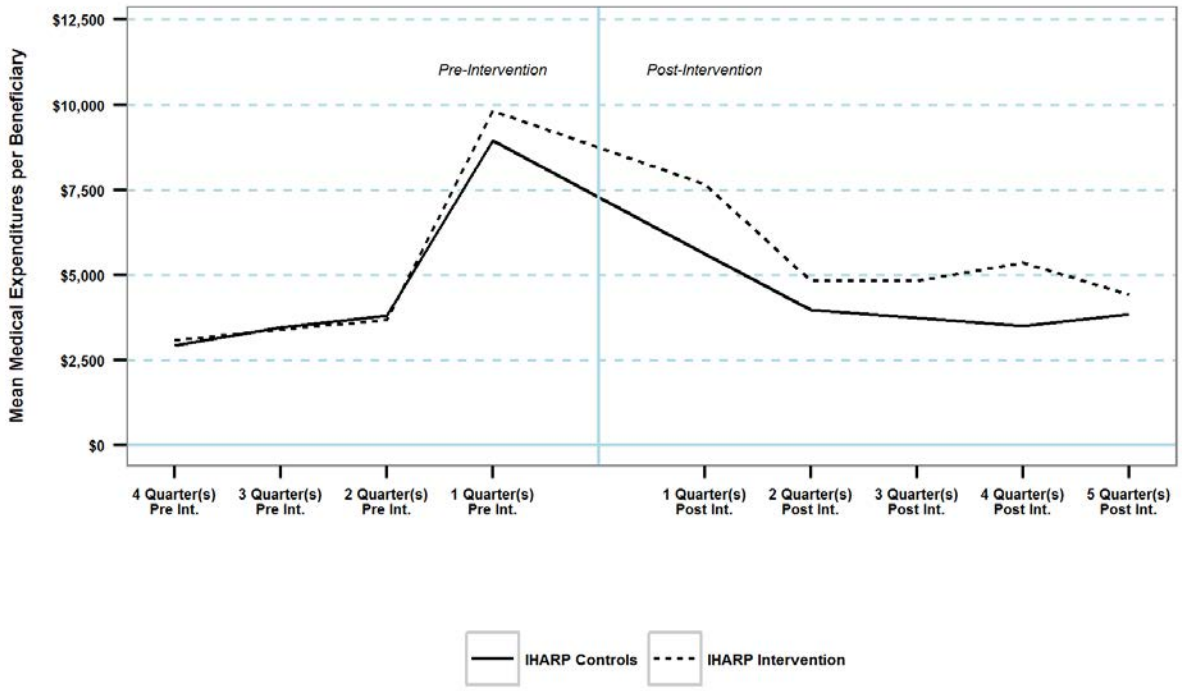


Table Appendix D-10: IHARP Total Medicare Expenditures in the Baseline Period by Quarter Following Enrollment, Medicare FFS Cohort

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	592	592	592	592	509	460	389	333	285	237	192	159
Total Medicare Parts A, B, and D Expenditures[a]												
Mean	$23,677	$22,784	$8,667	$6,593	$5,796	$5,051	$5,817	$4,879	$6,355	$4,699	$5,609	$4,844
Median	$15,722	$16,145	$3,794	$2,764	$1,917	$2,069	$1,905	$1,983	$1,838	$1,913	$1,936	$1,663
90th percentile	$54,388	$47,317	$23,284	$16,952	$15,693	$12,830	$15,469	$12,659	$17,539	$10,252	$14,645	$12,852
99th percentile	$115,855	$107,124	$64,178	$47,424	$49,069	$37,604	$47,498	$39,670	$54,043	$35,592	$41,871	$32,061
Total Medicare Parts A and B Expenditures												
Mean	$19,958	$19,100	$7,653	$5,608	$4,823	$3,961	$4,821	$3,725	$5,359	$3,491	$4,418	$3,839
Median	$11,598	$13,021	$2,146	$1,906	$1,039	$1,114	$1,083	$973	$969	$1,028	$1,416	$809
90th percentile	$48,239	$43,463	$21,639	$15,021	$14,561	$10,221	$13,345	$10,426	$15,668	$8,706	$11,463	$10,675
99th percentile	$104,275	$99,318	$64,122	$47,350	$48,854	$33,660	$46,538	$36,626	$52,363	$32,419	$35,426	$31,741

[a]Denominator is subset to beneficiaries enrolled in Medicare Part D.

Table Appendix D-11: IHARP Inpatient and Outpatient Expenditures in the Baseline Period and by Quarter Following Enrollment, Medicare FFS Cohort

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	592	592	592	592	509	460	389	333	285	237	192	159
Inpatient Expenditures												
Mean	$9,176	$8,443	$2,650	$1,442	$1,686	$1,161	$1,765	$1,097	$1,902	$1,049	$1,380	$1,371
Median	$4,701	$4,509	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$24,120	$21,225	$9,087	$4,633	$5,745	$3,947	$5,337	$3,200	$5,434	$3,323	$5,287	$3,994
99th percentile	$57,953	$53,271	$38,882	$28,039	$27,639	$19,089	$30,320	$16,056	$30,401	$20,696	$18,312	$22,751
Outpatient ER Expenditures												
Mean	$550	$565	$123	$164	$120	$160	$144	$146	$179	$185	$161	$96

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Median	$99	$160	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$1,532	$1,604	$386	$423	$344	$503	$425	$537	$449	$495	$497	$353
99th percentile	$3,714	$4,623	$1,826	$2,163	$1,662	$2,487	$2,275	$1,914	$2,713	$3,188	$1,829	$1,348
Outpatient Non-ER Expenditures												
Mean	$2,282	$2,391	$792	$845	$740	$551	$760	$553	$808	$461	$953	$542
Median	$632	$778	$129	$105	$65	$70	$66	$65	$66	$64	$69	$40
90th percentile	$4,954	$5,006	$1,893	$1,687	$1,612	$1,151	$1,819	$934	$2,027	$1,025	$1,912	$780
99th percentile	$29,929	$31,583	$11,299	$13,294	$10,058	$7,722	$11,841	$9,293	$10,889	$6,692	$11,616	$7,962

Table Appendix D-12: IHARP Expenditures for Other Settings by Quarter Following Enrollment, Medicare FFS Cohort

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	592	592	592	592	509	460	389	333	285	237	192	159
Carrier/PB Expenditures												
Mean	$4,264	$4,480	$1,403	$1,174	$1,019	$1,013	$1,119	$968	$1,082	$958	$1,009	$1,105
Median	$2,989	$3,435	$803	$700	$507	$518	$495	$489	$493	$427	$611	$501
90th percentile	$9,054	$7,874	$3,129	$2,653	$2,380	$2,270	$2,754	$2,094	$2,693	$2,091	$2,034	$2,837
99th percentile	$22,450	$18,846	$8,298	$6,302	$8,099	$8,648	$10,466	$6,261	$6,487	$7,413	$7,260	$6,698
Skilled Nursing Facility Expenditures												
Mean	$1,534	$1,056	$1,577	$973	$420	$314	$440	$331	$750	$263	$340	$215
Median	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$3,303	$0	$1,612	$0	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$27,119	$25,876	$30,590	$24,300	$12,444	$12,280	$15,181	$11,283	$22,738	$10,497	$12,171	$5,417
Durable Medical Equipment Expenditures												
Mean	$905	$980	$275	$281	$295	$288	$182	$278	$211	$187	$245	$201
Median	$179	$174	$54	$15	$15	$0	$30	$0	$57	$0	$49	$0
90th percentile	$2,079	$2,100	$593	$617	$544	$631	$507	$532	$556	$558	$514	$516

Measures (2012 USD)	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4		Q5	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
99th percentile	$5,528	$8,739	$2,362	$3,825	$2,309	$4,248	$1,056	$3,914	$1,316	$2,130	$901	$2,615
Home Health Expenditures												
Mean	$1,132	$1,056	$771	$539	$495	$360	$317	$310	$350	$351	$280	$267
Median	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$4,283	$3,548	$3,315	$2,249	$2,251	$1,981	$354	$0	$551	$0	$0	$1,625
99th percentile	$14,289	$13,603	$6,606	$5,938	$6,124	$5,216	$5,446	$5,152	$5,756	$6,092	$4,850	$4,061
Hospice Expenditures												
Mean	$0	$2	$48	$180	$31	$99	$82	$38	$68	$32	$40	$24
Median	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
90th percentile	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
99th percentile	$0	$0	$50	$7,630	$0	$2,188	$150	$0	$177	$0	$112	$0

D.5 Medication Adherence

Table Appendix D-13: Average Proportion of Days Covered (PDC) by Medication Type, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	128	132	128	132
Mean	85.38	85.59	84.84	85.31
Median	93.30	93.38	90.04	92.61
25th percentile	78.11	79.96	79.28	80.87
75th percentile	98.87	98.30	98.17	97.93
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Calcium Channel Blockers				
Number of Eligible Beneficiaries	67	74	67	74
Mean	87.94	88.09	87.74	82.05
Median	95.53	95.37	97.21	92.25
25th percentile	87.32	84.99	85.99	76.37
75th percentile	99.34	98.33	100.00	98.08
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Diabetes Medication				
Number of Eligible Beneficiaries	50	43	50	43
Mean	90.88	90.37	86.98	91.63
Median	96.46	98.03	93.57	96.04
25th percentile	88.08	83.93	76.49	92.15
75th percentile	100.00	99.17	99.59	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
RAS Antagonists				
Number of Eligible Beneficiaries	127	125	127	125
Mean	86.78	86.24	85.58	85.42
Median	94.00	92.71	93.28	93.65
25th percentile	82.84	82.17	82.32	79.04
75th percentile	99.34	98.29	98.18	98.51
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Statins				
Number of Eligible Beneficiaries	139	134	139	134
Mean	82.20	87.24	81.74	86.15
Median	91.57	93.79	89.37	93.81
25th percentile	74.69	82.64	72.84	80.06
75th percentile	97.75	98.03	96.58	97.94
90th percentile	100.00	100.00	99.32	99.71
99th percentile	100.00	100.00	100.00	100.00

Table Appendix D-14: Rate of 80% PDC by Medication Type, Medicare FSS Cohort

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	128	132	128	132
Rate	0.73	0.75	0.72	0.76
Standard Deviation	0.04	0.04	0.04	0.04
Calcium Channel Blockers				
Number of Eligible Beneficiaries	67	74	67	74
Rate	0.84	0.81	0.81	0.70
Standard Deviation	0.05	0.05	0.05	0.05
Diabetes Medication				
Number of Eligible Beneficiaries	50	43	50	43
Rate	0.86	0.81	0.72	0.88
Standard Deviation	0.05	0.06	0.06	0.05
RAS Antagonists				
Number of Eligible Beneficiaries	127	125	127	125
Rate	0.76	0.78	0.80	0.72
Standard Deviation	0.04	0.04	0.04	0.04
Statins				
Number of Eligible Beneficiaries	139	134	139	134
Rate	0.67	0.79	0.65	0.75
Standard Deviation	0.04	0.04	0.04	0.04

Table Appendix D-15: Difference in Rate of 80% PDC by Medication Type, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment)	Intervention Period (Year Post Enrollment)
Beta Blockers		
Rate Difference	-0.016	-0.039
95 % Confidence Interval	(-0.121,0.089)	(-0.142,0.064)
P-Value	0.765	0.457
Calcium Channel Blockers		
Rate Difference	0.03	0.10
95 % Confidence Interval	(-0.105,0.155)	(-0.054,0.26)
P-Value	0.707	0.198
Diabetes Medication		
Rate Difference	0.05	-0.16
95 % Confidence Interval	(-0.115,0.207)	(-0.289,-0.039)
P-Value	0.575	0.010
RAS Antagonists		
Rate Difference	-0.01	0.08
95 % Confidence Interval	(-0.115,0.091)	(-0.039,0.189)
P-Value	0.819	0.196
Statins		
Rate Difference	-0.12	-0.10
95 % Confidence Interval	(-0.215,-0.029)	(-0.198,0)
P-Value	0.010	0.050

Table Appendix D-16: Difference-in-Difference of PDC by Medication Type, Medicare FFS Cohort

Measures	Baseline Period (Year Prior to Enrollment) VS Intervention Period (Year Post Enrollment)
Beta Blockers	-0.26
95% Confidence Interval	(-7,6)
P-Value	0.935
Calcium Channel Blockers	5.84
95% Confidence Interval	(-3,15)
P-Value	0.218
Diabetes Medication	-5.16
95% Confidence Interval	(-13,3)
P-Value	0.216
RAS Antagonists	-0.39

Measures	Baseline Period (Year Prior to Enrollment) VS Intervention Period (Year Post Enrollment)
95% Confidence Interval	(-7,6)
P-Value	0.905
Statins	0.63
95% Confidence Interval	(-6,7)
P-Value	0.845

APPENDIX E: RESULTS FOR USC

The following tables provide the baseline demographic and health characteristics; mortality and readmission rates; health service utilization and medication adherences rates results for intervention and comparison group beneficiaries in the USC FFS and MA cohort.

E.1 Demographic and Health Characteristics

Table Appendix E-1: USC Baseline Demographic and Health Characteristics, FFS and MA Cohorts

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	702	702		
Average Age (Years)[+]	71.35	71.60	-0.25	0.02
Age under 65[+]	18%	18%	0%	0.00
Gender				
Male[+]	42%	41%	2%	0.03
Female	58%	59%	-2%	0.03
Race				
White[+]	44%	45%	-1%	0.01
Black or Other	56%	55%	1%	0.01
Dual Eligible[+]	84%	85%	-1%	0.02
Medicare Eligibility				
Disabled[+]	29%	29%	0%	0.00
ESRD	0%	0%	0%	0.02
Aged[+]	71%	71%	0%	0.01
Evaluation and Management (E&M) Visits				
E&M Visits: 0	1%	1%	0%	0.00
E&M Visits: 1-5[+]	10%	10%	0%	0.01
E&M Visits: 6-10	12%	14%	-2%	0.05
E&M Visits: 11-15[+]	11%	11%	0%	0.00
E&M Visits: 16+[+]	66%	64%	2%	0.04
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	98%	98%	0%	0.00
1 SNF Stay (Prior Year)[+]	2%	2%	0%	0.01
2+ SNF Stays (Prior Year)[+]	1%	0%	0%	0.02
IP Stay before study enrollment				
0 IP Stays (1Q Prior)	90%	92%	-1%	0.04
1 IP Stay (Prior Year)[+]	7%	7%	1%	0.03
2+ IP Stays (Prior Year)[+]	2%	2%	0%	0.03

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
0 IP Stays (Prior Year)	80%	80%	-1%	0.02
1 IP Stay (Prior Year)+	15%	14%	0%	0.01
2+ IP Stays (Prior Year)+	6%	5%	0%	0.01
Fraility Measures				
Charlson Score+	0.31	0.29	0.01	0.01
Area Depravation Index (ADI)	97.45	97.44	0.01	0.00
Drug History (Pre-Enrollment Year)				
Antidiabetics+	58%	59%	-1%	0.02
Insulin+	46%	47%	-1%	0.02
SSRIs and SNRIs+	36%	34%	2%	0.03
Other Antidepressants+	21%	21%	0%	0.00
Statin+	84%	84%	0%	0.00
Thiazide+	44%	46%	-1%	0.03
Calcium channel blockers+	48%	51%	-3%	0.06
Beta blockers+	57%	59%	-2%	0.04
ACE inhibitors+	70%	69%	1%	0.02
ARBs+	35%	36%	-1%	0.02
Antihypertensives+	19%	20%	-1%	0.03
Antineoplastics+	8%	8%	0%	0.01
Corticosteroids+	23%	23%	0%	0.01
Cardiotonics+	4%	3%	1%	0.06
Antiarrhythmics+	3%	3%	0%	0.00
Vasopressors	1%	1%	0%	0.00
Antiasthmatic+	37%	37%	-1%	0.01
Antianxiety Agents+	25%	24%	0%	0.01
Antipsychotics+	11%	11%	-1%	0.02
Anticoagulants+	12%	10%	2%	0.05
Insulin+	33%	33%	0%	0.01
Nitrates+	21%	21%	0%	0.01
Loop diuretics+	26%	25%	1%	0.03
Potassium sparing diuretics+	4%	4%	0%	0.02
Fibric acid derivatives+	16%	17%	-1%	0.03
Platelet aggregation inhibitors+	18%	18%	0%	0.01
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP) +	1%	1%	0%	0.01
Acute cerebrovascular disease (IP, 30 days prior)	0%	0%	0%	0.08
AMI (IP)	1%	1%	0%	0.00
AMI (IP, 30 days prior)	0%	0%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Cerebrovascular disease+	17%	18%	-1%	0.02
Parkinson's disease and multiple sclerosis	2%	2%	0%	0.01
Asthma	26%	27%	-1%	0.03
Circulatory or heart condition				
Coagulation and hemorrhagic disorders+	5%	5%	0%	0.01
Congestive heart failure (All Settings) +	21%	20%	1%	0.02
Congestive heart failure (IP)	1%	2%	-1%	0.10
Coronary atherosclerosis+	27%	27%	0%	0.01
Dementia+	16%	19%	-3%	0.07
Diabetes mellitus without complication+	62%	62%	0%	0.01
Diabetes mellitus with complications+	57%	58%	-1%	0.01
Cardiac dysrhythmias, arrest and ventricular fibrillation+	25%	25%	0%	0.00
Fluid and electrolyte disorders+	13%	14%	0%	0.01
Gastrointestinal hemorrhage (All Settings) +	7%	5%	1%	0.05
Gastrointestinal hemorrhage (IP)	0%	0%	0%	0.02
Other heart disease+	47%	47%	0%	0.00
Heart valve disorders+	11%	10%	1%	0.02
Hepatitis+	3%	2%	1%	0.05
Hypertension with complications+	14%	13%	0%	0.01
Stomach, pancreas and lung cancer+	0%	1%	0%	0.02
Peri- endo- and myocarditis+	5%	5%	0%	0.01
Disorders of nervous system+	15%	13%	1%	0.04
Other cancers	6%	10%	-4%	0.15
Paralysis+	3%	3%	0%	0.02
Pneumonia+	9%	9%	0%	0.00
Pneumonia (IP, 30 days prior)	0%	0%	0%	0.03
Pulmonary heart disease+	2%	2%	0%	0.02
Renal failure	34%	36%	-2%	0.04
Respiratory failure (IP)	0%	0%	0%	0.02
Respiratory failure (IP, 30 days prior)	0%	0%	0%	0.00
Rheumatoid arthritis and related disease+	3%	4%	0%	0.02
Septicemia+	3%	2%	1%	0.04
Shock	1%	1%	0%	0.02
Tuberculosis	0%	0%	0%	0.02
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP)	1%	1%	0%	0.04
Heart valve procedures (IP)	0%	0%	0%	0.05
Hemodialysis	1%	1%	0%	0.00
Peritoneal dialysis	1%	1%	1%	0.06

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Procedures on vessels of head and neck (IP)	2%	2%	0%	0.03
Radiology and chemotherapy	1%	1%	0%	0.01
Respiratory intubation and mechanical ventilation	1%	1%	0%	0.04
Blood transfusion	3%	3%	0%	0.03
Blood transfusion (IP)	2%	3%	0%	0.02
Transportation	11%	11%	0%	0.01
Comorbidity Categories (Pre-Enrollment Quarter)				
Depression[+]	20%	18%	2%	0.05
AIDS HIV	0%	0%	0%	0.00
Alcohol Abuse[+]	2%	1%	0%	0.02
Cardiac Arrhythmias	16%	11%	5%	0.14
Congestive heart failure	15%	12%	3%	0.09
Chronic pulmonary disease[+]	14%	16%	-2%	0.04
Coagulopathy	2%	3%	-1%	0.05
Deficiency Anemia[+]	4%	4%	0%	0.02
Diabetes complicated	66%	61%	5%	0.10
Diabetes uncomplicated	0%	1%	-1%	0.09
Dementia	7%	8%	-1%	0.04
Drug Abuse	1%	1%	0%	0.03
Fluid and Electrolyte Disorders[+]	7%	4%	2%	0.10
Hypothyroidism	10%	10%	0%	0.00
Hypertension complicated[+]	3%	3%	0%	0.01
Hypertension uncomplicated	75%	62%	13%	0.29
Liver Disease	4%	3%	1%	0.05
Lymphoma	0%	0%	0%	0.03
Metastatic Cancer	0%	0%	0%	0.00
Myocardial infraction	3%	3%	0%	0.00
Obesity[+]	72%	74%	-1%	0.03
Other neurological disorders	6%	3%	2%	0.12
Paralysis	2%	1%	1%	0.06
Peptic Ulcer Disease excluding bleeding	1%	0%	0%	0.05
Peripheral vascular disorders	17%	15%	2%	0.05
Psychosis[+]	2%	2%	0%	0.02
Pulmonary Circulation Disorders	1%	0%	0%	0.04
Renal Failure	24%	20%	3%	0.08
Rheumatoid arthritis collagen vascular disease	3%	2%	1%	0.07
Solid Tumor without metastasis	4%	5%	-1%	0.06
Valvular Disease[+]	3%	3%	0%	0.01
Weight loss[+]	3%	4%	-1%	0.06

[+]Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

E.2 Mortality and Readmissions

Table Appendix E-2: Difference in Mortality per 1,000 Beneficiaries after USC Enrollment, FFS and MA Cohorts

Medicare Cohort	Cumulative [a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	**702**	**702**	**637**	**530**	**380**	**236**	**164**
Medicare FFS							
Difference[b]	-0.15	1.42	-1.62	1.79	-0.14	4.31	-12.35
95% Confidence Interval	(-12.2 | 11.9)	(-5.9 | 8.8)	(-8.5 | 5.3)	(-9.3 | 12.9)	(-16.4 | 16.1)	(-14.1 | 22.7)	(-29.3 | 4.7)
P-Value	0.981	0.705	0.646	0.753	0.987	0.646	0.155

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

Table Appendix E-3: Difference in Readmissions per 1,000 Beneficiaries after USC Enrollment, FFS and MA Cohorts

Measures	Cumulative[a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	**702**	**702**	**637**	**530**	**380**	**236**	**164**
30-Day Hospital Readmissions per 1,000 Beneficiaries Following Any Inpatient Admission							
Difference[b]	-4.11	-67.67	-84.15	-47.62	67.34	-16.67	230.77*
95% Confidence Interval	(-18.6 | 10.4)	(-235.0 | 99.7)	(-259.6 | 91.3)	(-242.3 | 147.1)	(-197.4 | 332.0)	(-175.0 | 141.6)	(1.7 | 459.8)
P-Value	0.579	0.428	0.347	0.632	0.618	0.837	0.048
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission							
Difference	-5.82	-88.97	-57.13	-75.40	21.89	-16.67	230.77*
95% Confidence Interval	(-19.8 | 8.2)	(-240.9 | 62.9)	(-228.2 | 114.0)	(-264.8 | 114.0)	(-238.0 | 281.8)	(-175.0 | 141.6)	(1.7 | 459.8)
P-Value	0.415	0.251	0.513	0.435	0.869	0.837	0.048

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Figure E-1: USC Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, FFS and MA Cohorts

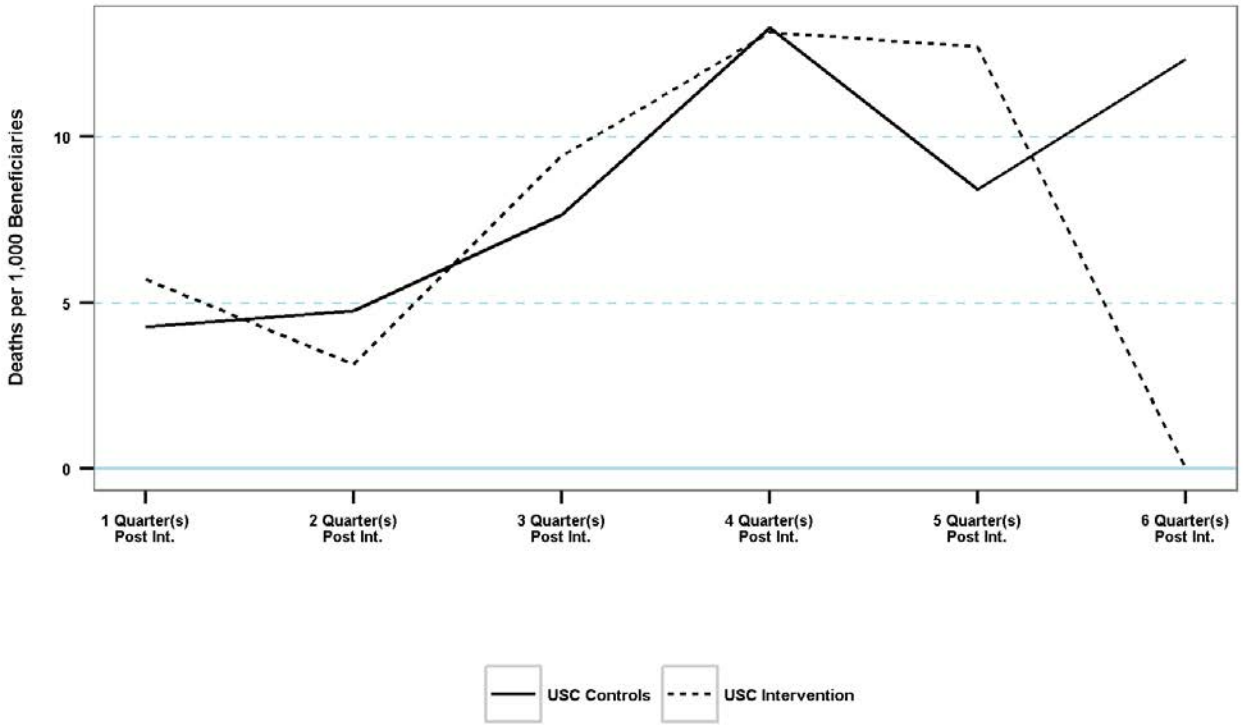


Figure E-2: USC Readmissions per 1,000 Beneficiaries by Quarter, FFS and MA Cohorts

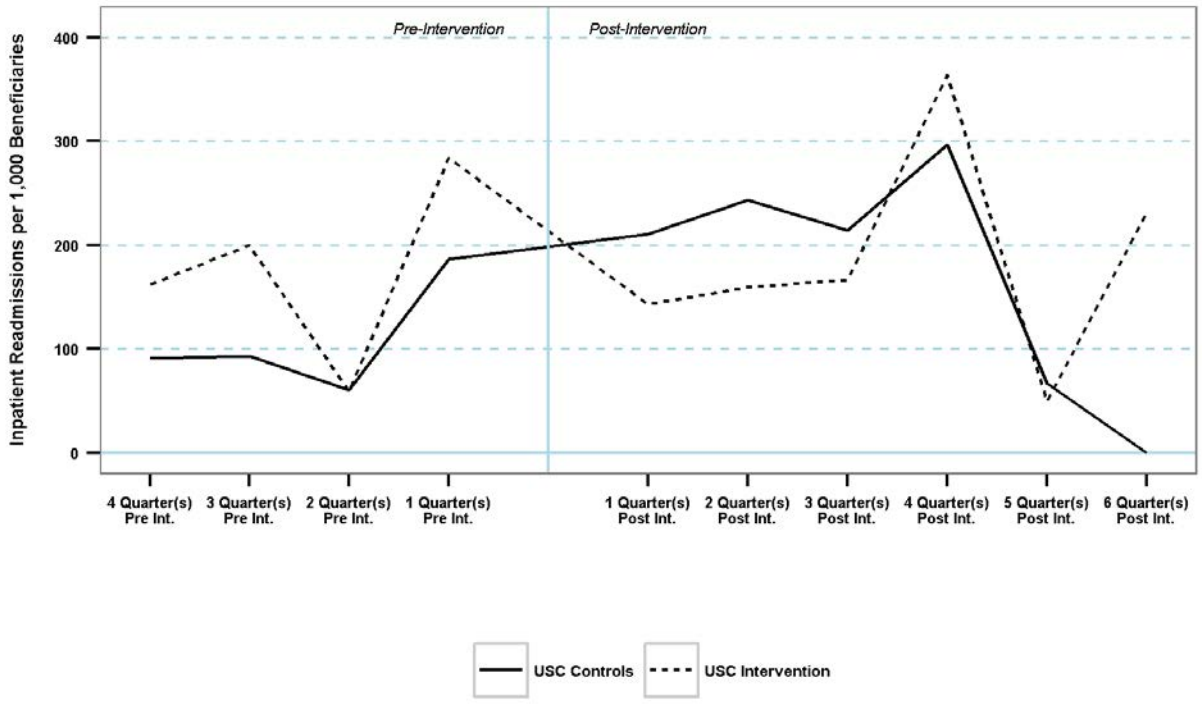


Table Appendix E-4: USC Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, FFS and MA Cohorts, Q1 to Q3

Measures	Q1		Q2		Q3	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	702	702	637	630	530	523
All-Cause Mortality per 1,000 Beneficiaries	5.7	4.3	3.1	4.8	9.4	7.6
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	142.9	210.5	159.1	243.2	166.7	214.3
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	95.2	184.2	159.1	216.2	138.9	214.3

Table Appendix E-5: USC Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, FFS and MA Cohorts, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervention	Controls	Intervention	Controls	Intervention	Controls
Number of Participant Beneficiaries	380	376	236	238	164	162
All-Cause Mortality per 1,000 Beneficiaries	13.2	13.3	12.7	8.4	0.0	12.3
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	363.6	296.3	50.0	66.7	230.8	0.0
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	318.2	296.3	50	66.7	230.8	0

E.3 Health Service Resource Use

Table Appendix E-6: Difference-in-Difference Estimates of USC's Effects on Resource Use, FFS and MA Cohorts

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative [a]	Q1	Q2	Q3	Q4	Q5	Q6
Number of Participant Beneficiaries	702	702	637	530	380	236	164
Inpatient Admissions	15.93	-3.21	2.25	3.32	-26.64	5.52	45.94
95% Confidence Interval	(-50.2 | 82.1)	(-41,35)	(-43,47)	(-43,49)	(-87,34)	(-66,77)	(-19,111)
P-Value	0.637	0.868	0.922	0.887	0.386	0.880	0.168
Unplanned Inpatient Admissions	10.97	-4.27	13.68	-4.81	-33.22	6.61	30.6
95% Confidence Interval	(-50.8 | 72.7)	(-39,31)	(-29,57)	(-49,39)	(-90,23)	(-63,76)	(-30,91)
P-Value	0.728	0.812	0.533	0.83	0.25	0.853	0.321
Hospital Days	-345.54	-129.63	-188.71	-161.33	-365.92	-421.64	-7.36
95% Confidence Interval	(-1,164.6 | 473.5)	(-485,226)	(-570,192)	(-613,290)	(-1108,376)	(-1234,390)	(-363,348)
P-Value	0.408	0.475	0.331	0.484	0.333	0.308	0.968

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level
[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Figure E-3: USC Inpatient Admissions per 1,000 Beneficiaries by Quarter, FFS and MA Cohorts

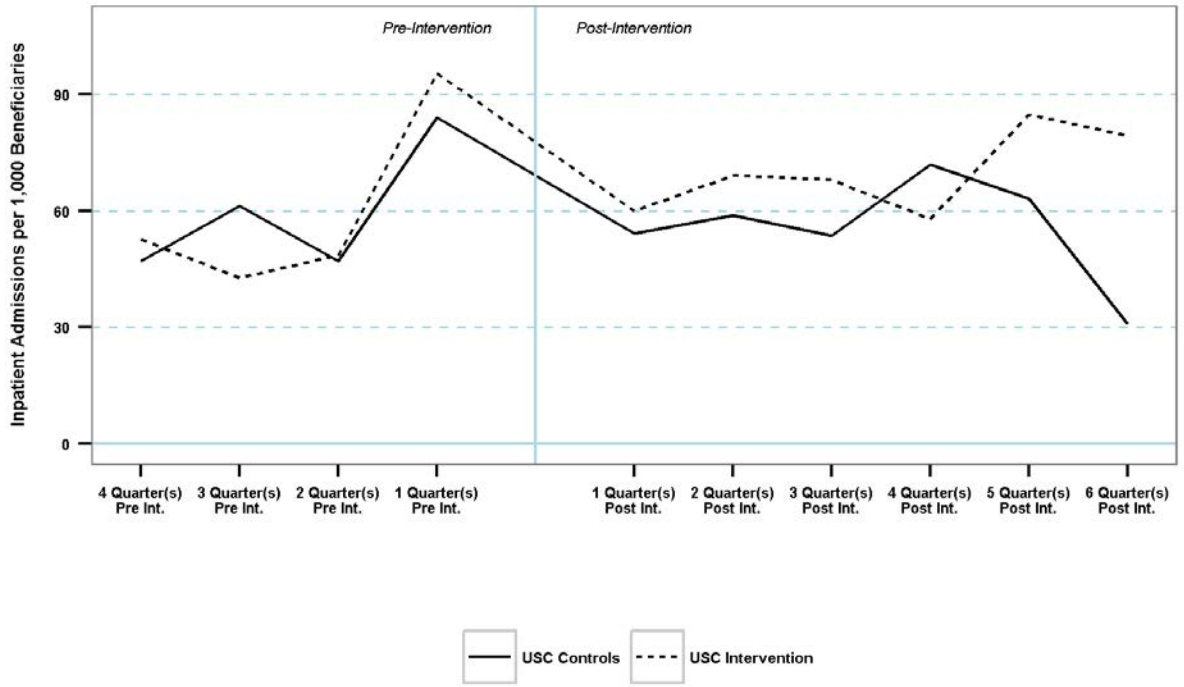


Figure E-4: USC Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, FFS and MA Cohorts

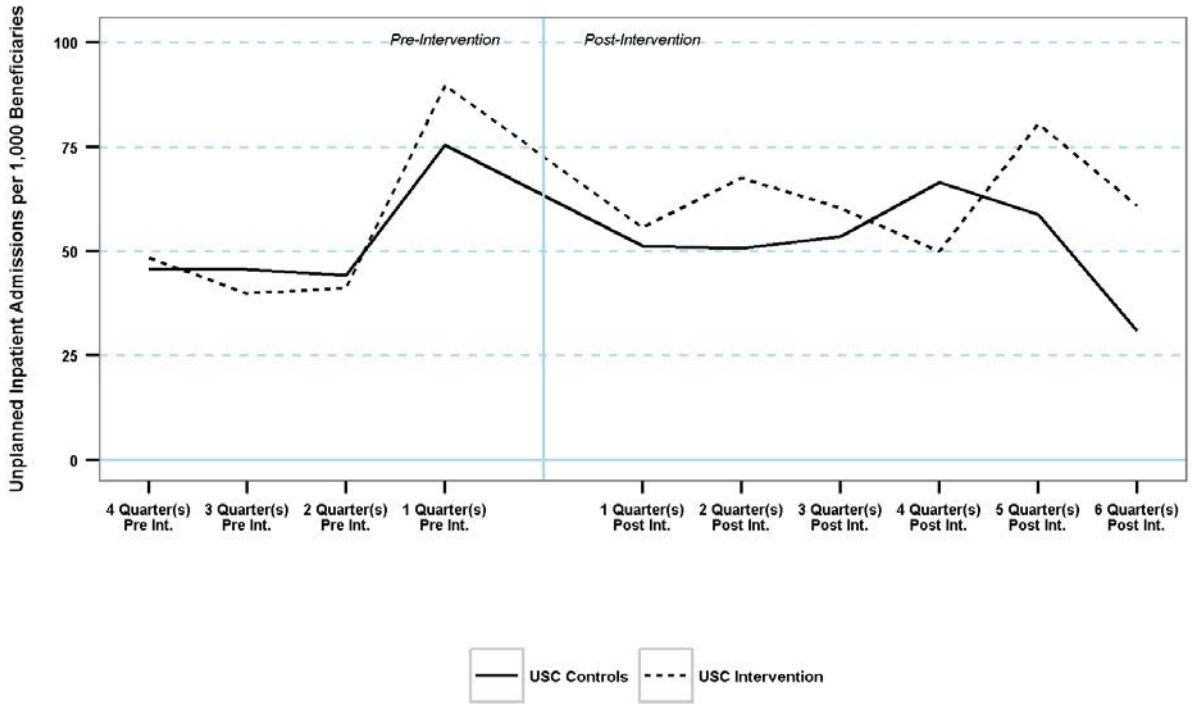


Table Appendix E-7: USC Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, FFS and MA Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	702	702	702	702	637	630	530	523
Health Service Use Rate per 1,000 Beneficiaries								
All Inpatient Admissions	203.7	196.6	59.8	54.1	69.1	58.7	67.9	53.5
Unplanned Inpatient Admissions	189.5	173.8	55.6	51.3	67.5	50.8	60.4	53.5

Table Appendix E-8: USC Resource Use Rate by Quarter Following Enrollment, FFS and MA Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	380	376	236	238	164	162
Health Service Use Rate per 1,000 Beneficiaries						
All Inpatient Admissions	57.9	71.8	84.7	63.0	79.3	30.9
Unplanned Inpatient Admissions	50.0	66.5	80.5	58.8	61.0	30.9

Table Appendix E-9: USC Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, FFS and MA Cohort, Q1 to Q3

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	702	702	702	702	637	630	530	523
Mean Number of Events per 1,000 Beneficiaries								
All Inpatient Admissions	297.7	290.6	69.8	71.2	86.3	81.0	81.1	70.7
Unplanned Inpatient Admissions	260.7	255.0	62.7	65.5	84.8	68.3	71.7	70.7
Hospital Days	1,723.6	1,102.6	314.8	289.2	345.4	363.5	401.9	334.6

Table Appendix E-10: USC Mean Resource Use by Quarter Following Enrollment, FFS and MA Cohort, Q4 to Q6

Measures	Q4		Q5		Q6	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	380	376	236	238	164	162
Mean Number of Events per 1,000 Beneficiaries						
All Inpatient Admissions	84.2	95.7	105.9	75.6	91.5	30.9
Unplanned Inpatient Admissions	68.4	90.4	101.7	71.4	73.2	30.9
Hospital Days	552.6	595.7	364.4	268.9	353.7	246.9

E.4 Medication Adherence

Table Appendix E-11: Average Proportion of Days Covered (PDC) by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	148	149	148	149
Mean	87.04	85.70	88.09	87.30
Median	96.29	93.77	97.32	94.89
25th percentile	79.14	80.60	82.46	80.56
75th percentile	99.40	100.00	100.00	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Calcium Channel Blockers				
Number of Eligible Beneficiaries	104	114	104	114
Mean	84.01	88.17	85.10	86.66
Median	96.30	95.67	95.24	96.25
25th percentile	73.13	87.50	77.45	83.43
75th percentile	100.00	100.00	100.00	99.72
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Diabetes Medication				
Number of Eligible Beneficiaries	97	103	97	103
Mean	86.87	86.01	91.33	89.83
Median	96.32	97.44	100.00	97.29
25th percentile	79.44	81.66	89.20	88.22
75th percentile	100.00	100.00	100.00	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
RAS Antagonists				
Number of Eligible Beneficiaries	269	285	269	285
Mean	85.93	87.28	87.76	86.98
Median	95.53	95.83	97.29	96.21
25th percentile	80.12	83.10	82.78	84.16
75th percentile	100.00	100.00	100.00	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Statins				
Number of Eligible Beneficiaries	247	247	247	247
Mean	83.89	81.43	86.05	85.10

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Median	93.24	89.26	94.51	94.19
25th percentile	75.95	67.93	77.27	77.23
75th percentile	99.31	98.59	100.00	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00

Table Appendix E-12: Rate of 80% PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	148	149	148	149
Rate	0.73	0.75	0.78	0.76
Standard Deviation	0.04	0.04	0.03	0.04
Calcium Channel Blockers				
Number of Eligible Beneficiaries	104	114	104	114
Rate	0.70	0.82	0.72	0.76
Standard Deviation	0.04	0.04	0.04	0.04
Diabetes Medication				
Number of Eligible Beneficiaries	97	103	97	103
Rate	0.74	0.76	0.80	0.80
Standard Deviation	0.04	0.04	0.04	0.04
RAS Antagonists				
Number of Eligible Beneficiaries	269	285	269	285
Rate	0.75	0.76	0.77	0.78
Standard Deviation	0.03	0.03	0.03	0.02
Statins				
Number of Eligible Beneficiaries	247	247	247	247
Rate	0.70	0.66	0.72	0.73
Standard Deviation	0.03	0.03	0.03	0.03

Table Appendix E-13: Difference in Rate of 80% PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)	Intervention Period (Year Post Enrollment)
Beta Blockers		
Rate Difference	-0.022	0.019
95 % Confidence Interval	(-0.12,0.076)	(-0.079,0.117)
P-Value	0.658	0.704
Calcium Channel Blockers		
Rate Difference	-0.12	-0.04
95 % Confidence Interval	(-0.22,-0.026)	(-0.153,0.069)
P-Value	0.013	0.460
Diabetes Medication		
Rate Difference	-0.02	0.01
95 % Confidence Interval	(-0.133,0.103)	(-0.104,0.12)
P-Value	0.804	0.889
RAS Antagonists		
Rate Difference	-0.01	-0.01
95 % Confidence Interval	(-0.084,0.056)	(-0.078,0.06)
P-Value	0.696	0.797
Statins		
Rate Difference	0.04	-0.01
95 % Confidence Interval	(-0.048,0.12)	(-0.086,0.07)
P-Value	0.403	0.840

Table Appendix E-14: Difference-in-Difference of Average PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment) VS Intervention Period (Year Post Enrollment)
Beta Blockers	-0.55
95% Confidence Interval	(-6,5)
P-Value	0.852
Calcium Channel Blockers	2.61
95% Confidence Interval	(-5,10)
P-Value	0.502
Diabetes Medication	0.64
95% Confidence Interval	(-6,8)
P-Value	0.859
RAS Antagonists	2.13
95% Confidence Interval	(-2,7)
P-Value	0.359
Statins	-1.5
95% Confidence Interval	(-7,4)
P-Value	0.558

Note: The difference-in-differences (DiD) estimate is the average difference in percent days covered per beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level

APPENDIX F: RESULTS FOR PHARM2PHARM

The following tables provide the baseline demographic and health characteristics; mortality and readmission rates; health service utilization; and medication adherence rates results for the intervention group and comparison group beneficiaries in the Pharm2Pharm cohort who were enrolled in Medicare Parts A, B, and D (Medicare FFS) or Medicare Advantage and Part D (MA).

F.1 Demographic and Health Characteristics

Table Appendix F-1: Pharm2Pharm Baseline Demographic and Health Characteristics, Medicare FFS Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	209	209		
Average Age (Years) [+]	74.30	74.37	-0.07	0.01
Age under 65[+]	11%	11%	0%	0.00
Gender				
Male[+]	44%	44%	0%	0.00
Female	56%	56%	0%	0.00
Race				
White[+]	37%	34%	2%	0.05
Black or Other	63%	66%	-2%	0.05
Dual Eligible[+]	16%	17%	-1%	0.03
Medicare Eligibility				
Disabled[+]	22%	20%	2%	0.05
ESRD	3%	4%	0%	0.03
Aged[+]	75%	76%	-1%	0.03
Evaluation and Management (E&M) Visits				
E&M Visits: 0	2%	3%	-1%	0.06
E&M Visits: 1-5[+]	14%	15%	0%	0.01
E&M Visits: 6-10	19%	23%	-4%	0.11
E&M Visits: 11-15[+]	28%	27%	1%	0.03
E&M Visits: 16+[+]	37%	33%	4%	0.09
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 SNF Stays (Prior Year)	87%	88%	0%	0.01
1 SNF Stay (Prior Year) [+]	11%	9%	1%	0.05
2+ SNF Stays (Prior Year)[+]	2%	3%	-1%	0.06
0 IP Stays (1Q Prior)	0%	0%	0%	0.00
1 IP Stay (Prior Year)[+]	78%	78%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
2+ IP Stays (Prior Year)+	22%	22%	0%	0.00
0 IP Stays (Prior Year)	0%	0%	0%	0.00
1 IP Stay (Prior Year)+	56%	57%	-2%	0.04
2+ IP Stays (Prior Year)+	44%	43%	2%	0.04
ER Visits (Pre-Enrollment Quarter)				
ER Visits: 0	70%	67%	2%	0.05
ER Visits: 1+	20%	22%	-2%	0.05
ER Visits: 2++	10%	11%	0%	0.02
Medical Cost per Beneficiary				
Cost (4Q Prior)+	3,642	3,349	293	0.04
Cost (3Q Prior)+	4,401	3,416	985	0.13
Cost (2Q Prior)+	4,485	3,608	877	0.11
Cost (1Q Prior)+	14,562	13,936	626	0.04
IP Cost (Prior Year)	13,974	11,919	2,054	0.13
IP Cost (1Q Prior) +	9,754	8,949	805	0.06
Fraility Measures				
Home Oxygen+	12%	9%	3%	0.09
Urinary Catheter	4%	4%	0%	0.00
Charlson Score	3.14	3.17	-0.03	0.01
Area Depravation Index (ADI)	102.33	102.32	0.01	0.00
Drug History (Pre-Enrollment Year)				
Antidiabetics+	29%	28%	0%	0.01
Insulin+	23%	24%	-1%	0.02
SSRIs and SNRIs+	25%	24%	1%	0.02
Other Antidepressants+	14%	12%	2%	0.06
Statin+	81%	87%	-5%	0.14
Thiazide+	26%	25%	0%	0.01
Calcium channel blockers+	52%	51%	0%	0.01
Beta blockers+	73%	71%	2%	0.04
ACE inhibitors+	46%	50%	-4%	0.08
ARBs+	45%	45%	0%	0.01
Antihypertensives+	19%	17%	2%	0.05
Antineoplastics+	10%	10%	0%	0.00
Corticosteroids+	46%	51%	-5%	0.10
Cardiotonics+	11%	11%	1%	0.03
Antiarrhythmics+	11%	12%	-1%	0.03
Vasopressors+	2%	2%	0%	0.00
Antiasthmatic+	48%	50%	-2%	0.05
Antianxiety Agents+	19%	16%	3%	0.09

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Antipsychotics+	6%	9%	-3%	0.11
Anticoagulants+	29%	29%	0%	0.01
Insulin+	24%	20%	4%	0.10
Nitrates+	24%	21%	3%	0.07
Loop diuretics+	43%	43%	0%	0.00
Potassium sparing diuretics+	7%	6%	0%	0.02
Fibric acid derivatives+	7%	7%	0%	0.00
Platelet aggregation inhibitors+	23%	22%	0%	0.01
Healthcare Cost and Utilization Project (HCUP) Diagnosis Categories (Pre-Enrollment Year)				
Acute cerebrovascular disease (IP)	6%	7%	-1%	0.04
Acute cerebrovascular disease (IP, 30 days prior)	4%	3%	0%	0.03
AMI (IP)	10%	8%	2%	0.07
AMI (IP, 30 days prior)	7%	6%	1%	0.04
Cerebrovascular disease+	38%	40%	-2%	0.05
Parkinson's disease and multiple sclerosis	1%	1%	0%	0.04
Asthma	53%	54%	-1%	0.02
Coagulation and hemorrhagic disorders+	18%	15%	3%	0.09
Congestive heart failure (All Settings) +	43%	44%	-1%	0.02
Congestive heart failure (IP)	11%	11%	0%	0.00
Coronary atherosclerosis+	61%	54%	7%	0.15
Dementia+	12%	11%	0%	0.01
Diabetes mellitus without complication+	77%	75%	2%	0.04
Diabetes mellitus with complications+	50%	50%	0%	0.01
Cardiac dysrhythmias, arrest and ventricular fibrillation+	75%	75%	0%	0.00
Fluid and electrolyte disorders+	59%	61%	-2%	0.05
Gastrointestinal hemorrhage (All Settings)+	17%	20%	-2%	0.06
Gastrointestinal hemorrhage (IP)	3%	4%	0%	0.03
Other heart disease+	92%	93%	-1%	0.05
Heart valve disorder+ s	44%	44%	0%	0.01
Hepatitis+	6%	4%	2%	0.09
Hypertension with complications+	61%	61%	0%	0.00
Stomach, pancreas and lung cancer+	1%	1%	0%	0.04
Peri- endo- and myocarditis+	27%	27%	0%	0.01
Disorders of nervous system+	26%	25%	1%	0.03
Other cancers+	20%	19%	0%	0.01
Paralysis+	7%	7%	0%	0.00
Pneumonia+	51%	54%	-3%	0.06
Pneumonia (IP, 30 days prior)	7%	5%	1%	0.06

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Pulmonary heart disease	22%	20%	2%	0.05
Renal failure	56%	56%	1%	0.02
Respiratory failure (IP)+	1%	2%	-1%	0.07
Respiratory failure (IP, 30 days prior)	1%	2%	-1%	0.07
Rheumatoid arthritis and related disease+	4%	3%	0%	0.03
Septicemia+	17%	20%	-2%	0.06
Shock+	4%	5%	-1%	0.05
Tuberculosis+	0%	0%	0%	0.00
Procedures (Pre-Enrollment Year)				
Bypass and PTCA (IP)+	7%	4%	3%	0.12
Heart valve procedures (IP)+	2%	2%	0%	0.03
Hemodialysis+	15%	12%	2%	0.07
Peritoneal dialysis+	15%	12%	2%	0.07
Procedures on vessels of head and neck (IP)	18%	12%	6%	0.16
Radiology and chemotherapy	2%	3%	-1%	0.09
Respiratory intubation and mechanical ventilation+	11%	12%	-1%	0.05
Blood transfusion+	9%	7%	2%	0.07
Blood transfusion (IP)+	8%	6%	2%	0.08
Transportation+	50%	48%	2%	0.04

+Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

Table Appendix F-2: Pharm2Pharm Baseline Demographic and Health Characteristics, MA Cohort

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Number of Beneficiaries	368	368		
Average Age (Years)+	73.51	73.55	-0.04	0.00
Age under 65+	14%	14%	0%	0.00
Gender				
Male+	41%	41%	0%	0.00
Female	59%	59%	0%	0.00
Race				
White+	38%	39%	-1%	0.02

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Black or Other	62%	61%	1%	0.02
Dual Eligible	35%	36%	-1%	0.03
Medicare Eligibility				
Disabled+	30%	28%	2%	0.05
ESRD	1%	1%	0%	0.00
Aged+	69%	71%	-2%	0.05
Resource Use per Beneficiary (Pre-Enrollment Year)				
0 IP Stays (1Q Prior)	0%	0%	0%	0.07
1 IP Stay (Prior Year)	77%	77%	1%	0.01
2+ IP Stays (Prior Year)+	23%	23%	0%	0.01
0 IP Stays (Prior Year)	0%	0%	0%	0.00
1 IP Stay (Prior Year)	55%	55%	0%	0.00
2+ IP Stays (Prior Year)+	45%	45%	0%	0.00
Frailty Measures				
Area Depravation Index (ADI)	101.49	101.04	0.45	0.04
Drug History (Pre-Enrollment Year)				
Antidiabetics	30%	30%	0%	0.00
Insulin+	31%	34%	-3%	0.06
SSRIs and SNRIs+	18%	21%	-3%	0.07
Other Antidepressants+	18%	17%	0%	0.01
Statin+	74%	74%	-1%	0.02
Thiazide+	35%	35%	-1%	0.02
Calcium channel blockers+	50%	52%	-2%	0.03
Beta blockers+	73%	75%	-2%	0.04
ACE inhibitors+	54%	53%	1%	0.02
ARBs+	35%	33%	2%	0.04
Antihypertensives+	22%	20%	2%	0.04
Antineoplastics+	7%	6%	2%	0.07
Corticosteroids+	47%	52%	-5%	0.10
Cardiotonics+	17%	16%	1%	0.03
Antiarrhythmics+	13%	13%	0%	0.00
Vasopressors+	1%	1%	0%	0.03
Antiasthmatic	50%	55%	-5%	0.10
Antianxiety Agents+	20%	21%	-1%	0.02
Antipsychotics+	5%	4%	1%	0.05
Anticoagulants+	35%	36%	-1%	0.03
Insulin+	26%	27%	-2%	0.04
Nitrates+	33%	29%	4%	0.09
Loop diuretics+	55%	52%	3%	0.07
Potassium sparing diuretics+	11%	8%	3%	0.10
Fibric acid derivatives+	5%	7%	-2%	0.09
Platelet aggregation inhibitors+	29%	24%	5%	0.12

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
Risk Adjustment Processing System (RAPS) V21 Hierarchical Condition Categories				
HCC1 HIV/AIDS	0%	0%	0%	0.00
HCC2 SEPTICEMIA, SEPSIS, SYSTEMIC INFLAM RESPONSE SYNDROME/SHOCK+	5%	6%	-1%	0.05
HCC6 OPPORTUNISTIC INFECTIONS	1%	1%	0%	0.03
HCC8 METASTATIC CANCER AND ACUTE LEUKEMIA+	1%	1%	0%	0.03
HCC9 LUNG AND OTHER SEVERE CANCERS+	1%	1%	0%	0.02
HCC10 LYMPHOMA AND OTHER CANCERS	1%	1%	0%	0.03
HCC11 COLORECTAL, BLADDER, AND OTHER CANCERS+	1%	0%	1%	0.15
HCC12 BREAST, PROSTATE, AND OTHER CANCERS AND TUMORS+	3%	3%	0%	0.02
HCC17 DIABETES WITH ACUTE COMPLICATIONS+	2%	2%	0%	0.00
HCC18 DIABETES WITH CHRONIC COMPLICATIONS+	33%	34%	-1%	0.02
HCC19 DIABETES WITHOUT COMPLICATION+	24%	26%	-2%	0.05
HCC21 PROTEIN-CALORIE MALNUTRITION+	1%	1%	0%	0.03
HCC22 MORBID OBESITY+	9%	9%	0%	0.00
HCC23 OTHER SIGNIFICANT ENDOCRINE AND METABOLIC DISORDERS	5%	7%	-2%	0.09
HCC27 END-STAGE LIVER DISEASE	1%	1%	0%	0.03
HCC28 CIRRHOSIS OF LIVER	0%	1%	-1%	0.12
HCC29 CHRONIC HEPATITIS+	1%	1%	1%	0.08
HCC33 INTESTINAL OBSTRUCTION/PERFORATION	1%	2%	-1%	0.04
HCC34 CHRONIC PANCREATITIS	1%	1%	0%	0.00
HCC35 INFLAMMATORY BOWEL DISEASE	1%	0%	1%	0.07
HCC39 BONE/JOINT/MUSCLE INFECTIONS/NECROSIS	1%	1%	0%	0.00
HCC40 RHEUMATOID ARTHRITIS AND INFLAM CONNECTIVE TISSUE DISEASE	7%	6%	0%	0.01
HCC46 SEVERE HEMATOLOGICAL DISORDERS	1%	1%	0%	0.00
HCC47 DISORDERS OF IMMUNITY	2%	2%	1%	0.04
HCC48 COAGULATION DEFECTS & OTH SPECIFIED HEMATOLOGICAL DISORDRS+	7%	8%	-1%	0.03
HCC51 DEMENTIA WITH COMPLICATIONS+	0%	0%	0%	0.07
HCC52 DEMENTIA WITHOUT COMPLICATION+	3%	5%	-2%	0.10
HCC54 DRUG/ALCOHOL PSYCHOSIS	0%	1%	0%	0.04

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC55 DRUG/ALCOHOL DEPENDENCE	3%	4%	0%	0.01
HCC57 SCHIZOPHRENIA	2%	1%	1%	0.07
HCC58 MAJOR DEPRESSIVE, BIPOLAR, AND PARANOID DISORDERS+	4%	5%	-1%	0.05
HCC70 QUADRIPLEGIA	0%	0%	0%	0.07
HCC71 PARAPLEGIA	0%	0%	0%	0.00
HCC72 SPINAL CORD DISORDERS/INJURIES	0%	1%	-1%	0.10
HCC73 AMYOTROPHIC LATERAL SCLEROSIS & OTH MOTOR NEURON DISEASE	0%	0%	0%	0.07
HCC74 CEREBRAL PALSY	0%	0%	0%	0.00
HCC75 POLYNEUROPATHY	11%	14%	-3%	0.09
HCC76 MUSCULAR DYSTROPHY	0%	0%	0%	0.00
HCC77 MULTIPLE SCLEROSIS+	1%	0%	1%	0.10
HCC78 PARKINSONS AND HUNTINGTONS DISEASES+	1%	1%	0%	0.03
HCC79 SEIZURE DISORDERS AND CONVULSIONS+	4%	4%	-1%	0.04
HCC80 COMA, BRAIN COMPRESSION/ANOXIC DAMAGE	0%	0%	0%	0.00
HCC82 RESPIRATOR DEPENDENCE/TRACHEOSTOMY STATUS	0%	0%	0%	0.07
HCC83 RESPIRATORY ARREST	0%	0%	0%	0.00
HCC84 CARDIO-RESPIRATORY FAILURE AND SHOCK+	7%	8%	-1%	0.04
HCC85 CONGESTIVE HEART FAILURE+	38%	40%	-2%	0.04
HCC86 ACUTE MYOCARDIAL INFARCTION	7%	5%	2%	0.08
HCC87 UNSTABLE ANGINA & OTH ACUTE ISCHEMIC HEART DISEASE+	3%	3%	0%	0.02
HCC88 ANGINA PECTORIS+	5%	5%	1%	0.02
HCC96 SPECIFIED HEART ARRHYTHMIAS+	34%	37%	-3%	0.06
HCC99 CEREBRAL HEMORRHAGE+	1%	1%	0%	0.03
HCC100 ISCHEMIC OR UNSPECIFIED STROKE	8%	9%	-2%	0.06
HCC103 HEMIPLEGIA/HEMIPARESIS	4%	4%	-1%	0.03
HCC104 MONOPLEGIA, OTHER PARALYTIC SYNDROMES	0%	1%	-1%	0.10
HCC106 ATHEROSCLEROSIS OF EXTREMITIES W/ULCERATION OR GANGRENE	1%	1%	0%	0.03
HCC107 VASCULAR DISEASE WITH COMPLICATIONS	3%	5%	-2%	0.09
HCC108 VASCULAR DISEASE	18%	20%	-2%	0.05
HCC110 CYSTIC FIBROSIS	0%	0%	0%	0.00

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC111 CHRONIC OBSTRUCTIVE PULMONARY DISEASE+	27%	29%	-1%	0.03
HCC112 FIBROSIS OF LUNG AND OTHER CHRONIC LUNG DISORDERS	2%	2%	-1%	0.06
HCC114 ASPIRATION AND SPECIFIED BACTERIAL PNEUMONIAS+	2%	3%	-1%	0.07
HCC115 PNEUMOCOCCAL PNEUMONIA, EMPYEMA, LUNG ABSCESS+	1%	1%	0%	0.03
HCC122 PROLIFERATIVE DIABTIC RETINOPATHY & VITREOUS HEMORR	2%	4%	-1%	0.08
HCC124 EXUDATIVE MACULAR DEGENERATION	2%	1%	1%	0.07
HCC134 DIALYSIS STATUS+	3%	6%	-3%	0.13
HCC135 ACUTE RENAL FAILURE+	10%	9%	1%	0.02
HCC136 CHRONIC KIDNEY DISEASE, STAGE 5+	2%	1%	1%	0.07
HCC137 CHRONIC KIDNEY DISEASE, SEVERE (STAGE 4)+	4%	4%	0%	0.01
HCC138 CHRONIC KIDNEY DISEASE, MODERATE (STAGE 3)+	14%	14%	1%	0.02
HCC139 CHRONIC KIDNEY DIS, MILD OR UNSPEC (STG 1-2 OR UNSPEC)	7%	6%	1%	0.06
HCC140 UNSPECIFIED RENAL FAILURE	0%	0%	0%	0.07
HCC141 NEPHRITIS	0%	1%	0%	0.04
HCC157 PRESS ULCER OF SKN W/NECROSIS THR TO MUSCLE,TENDON, BONE	0%	0%	0%	0.00
HCC158 PRESSURE ULCER OF SKIN WITH FULL THICKNESS SKIN LOSS	0%	0%	0%	0.00
HCC159 PRESSURE ULCER OF SKIN WITH PARTIAL THICKNESS SKIN LOSS	0%	0%	0%	0.07
HCC160 PRESSURE PRE-ULCER SKIN CHANGES OR UNSPECIFIED STAGE	0%	1%	0%	0.04
HCC161 CHRONIC ULCER OF SKIN, EXCEPT PRESSURE	3%	6%	-2%	0.12
HCC162 SEVERE SKIN BURN OR CONDITION	0%	0%	0%	0.00
HCC166 SEVERE HEAD INJURY	0%	0%	0%	0.07
HCC167 MAJOR HEAD INJURY	1%	1%	-1%	0.06
HCC169 VERTEBRAL FRACTURES WITHOUT SPINAL CORD INJURY	2%	3%	-1%	0.09
HCC170 HIP FRACTURE/DISLOCATION	1%	2%	-1%	0.05
HCC173 TRAUMATIC AMPUTATIONS AND COMPLICATIONS	1%	1%	0%	0.02
HCC176 COMPLICATIONS OF SPECIFIED IMPLANTED DEVICE OR GRAFT	2%	4%	-2%	0.10

Characteristics	Intervention Group	Control Group	Percent Difference	Standardized Mean Difference[a]
HCC186 MAJOR ORGAN TRANSPLANT OR REPLACEMENT STATUS	0%	0%	0%	0.00
HCC188 ARTIFICIAL OPENINGS FOR FEEDING OR ELIMINATION	1%	1%	0%	0.00
HCC189 AMPUTATION STATUS, LOWER LIMB/AMPUTATION COMPLICATIONS	2%	1%	1%	0.09

[+]Denotes characteristic used for matching.

[a] Standardized mean difference is an effect size measure used in the above table to identify substantial differences between the intervention and control groups; a standardized mean difference of 0.1 or greater is treated as an indicator of a substantial difference between the two groups.

F.2 Mortality and Readmissions

Table Appendix F-3: Difference in Mortality per 1,000 Beneficiaries after Pharm2Pharm Enrollment, Medicare FFS and MA Cohorts

Medicare Cohort	Cumulative[a]	Q1	Q2	Q3	Q4
Number of Participant Beneficiaries	**577**	**577**	**440**	**338**	**220**
Medicare FFS					
Difference[b]	-3.25	-39.86*	17.87	21.06	21.68
95% Confidence Interval	(-26.3 | 19.8)	(-69.6 | -10.1)	(-5.4 | 41.1)	(-6.1 | 48.2)	(-9.4 | 52.7)
P-Value	0.782	0.009	0.132	0.129	0.171

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]The "difference" estimate represents the difference in the number of deaths per 1,000 beneficiaries between the intervention group and control group in the relevant quarter of the intervention period. There were no deaths in the intervention or control groups prior to program enrollment as beneficiaries were required to be alive on program start date to be included in the study.

Table Appendix F-4: Difference in Readmissions per 1,000 Beneficiaries after Pharm2Pharm Enrollment, Medicare FFS and MA Cohorts

Measures	Cumulative[a]	Q1	Q2	Q3	Q4
Number of Participant Beneficiaries	**251**	**157**	**78**	**71**	**31**
30-Day Hospital Readmissions per 1,000 Beneficiaries Following Any Inpatient Admissions					
Difference[b]	-6.32	-12.51	-54.78	-12.02	24.93
95% Confidence Interval	(-30.4 | 17.8)	(-117.9 | 92.9)	(-215.1 | 105.6)	(-163.0 | 139.0)	(-168.3 | 218.1)
P-Value	0.608	0.816	0.503	0.876	0.800
30-Day Hospital Unplanned Readmissions per 1,000 Beneficiaries Following any Inpatient Admission					

Measures	Cumulative[a]	Q1	Q2	Q3	Q4
Difference	-1.88	17.49	-80.42	12.37	24.93
95% Confidence Interval	(-25.3 | 21.6)	(-84.3 | 119.3)	(-238.4 | 77.6)	(-133.8 | 158.5)	(-168.3 | 218.1)
P-Value	0.875	0.736	0.319	0.868	0.800

*Statistically significant at the 5% level.

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

[b]The "difference" estimate represents the average difference in the number of beneficiaries with at least one readmission for every 1,000 beneficiaries who have at least one inpatient admission, as compared between the intervention and control groups during the relevant quarter in the intervention period.

Figure F-1: Pharm2Pharm Mortality per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS and MA Cohorts

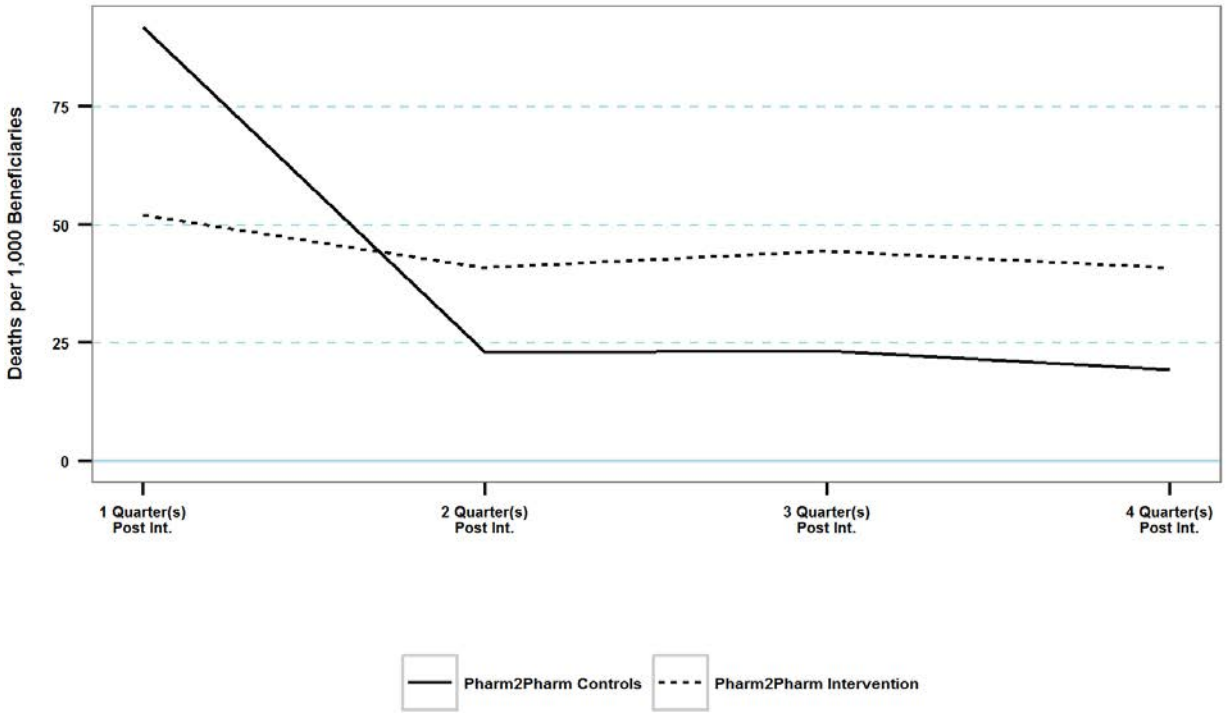


Figure F-2: Pharm2Pharm Readmissions per 1,000 Beneficiaries by Quarter, FFS and MA Cohorts

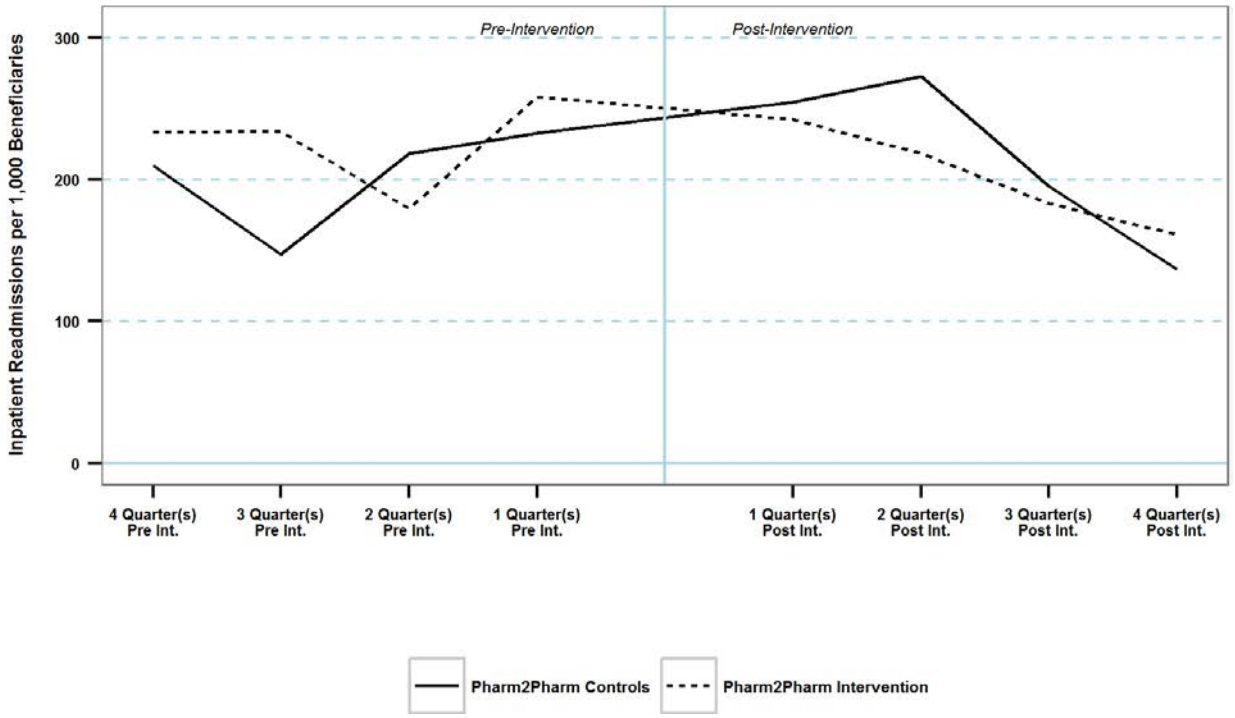


Table Appendix F-5: Pharm2Pharm Mortality and Readmissions per 1,000 Beneficiaries by Quarter Following Enrollment, Medicare FFS and MA Cohorts

Measures	Q1		Q2		Q3		Q4	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Participant Beneficiaries	577	577	440	434	338	343	220	260
All-Cause Mortality per 1,000 Beneficiaries	52.0	91.9	40.9	23.0	44.4	23.3	40.9	19.2
30-Day Hospital Readmission per 1,000 Beneficiaries Following Any Inpatient Admissions	242.0	254.5	217.9	272.7	183.1	195.1	161.3	136.4
30-day Hospital Unplanned Readmission per 1,000 Beneficiaries, Following any Inpatient Admission	235.7	218.2	192.3	272.7	183.1	170.7	161.3	136.4

F.3 Health Service Resource Use

Table Appendix F-6: Difference-in-Difference Estimates of Pharm2Pharm's Effects on Resource Use, Medicare FFS and MA Cohorts

Measures (Number of Events or Days per 1,000 Beneficiaries)	Cumulative[a]	Q1	Q2	Q3	Q4
Number of Participant Beneficiaries	577	577	440	338	220
Inpatient Admissions	127.07*	83.19	91.33*	130.54*	72.29
95% Confidence Interval	(49.4 | 204.8)	(-1,168)	(8,175)	(39,222)	(-15,160)
P-Value	0.001	0.054	0.033	0.005	0.106
Unplanned Inpatient Admissions	74.63	42.89	47.99	104.52*	36.98
95% Confidence Interval	(-1.2 | 150.5)	(-40,126)	(-33,129)	(15,194)	(-50,124)
P-Value	0.054	0.309	0.247	0.022	0.406
Hospital Days	639.97	350.09	470.33	851.02*	40.03
95% Confidence Interval	(-96.1 | 1,376.0)	(-419,1119)	(-175,1116)	(60,1642)	(-759,840)
P-Value	0.088	0.372	0.153	0.035	0.922

Note: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.

*Statistically significant at the 5% level

[a] Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Figure F-3: Pharm2Pharm Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS and MA Cohorts

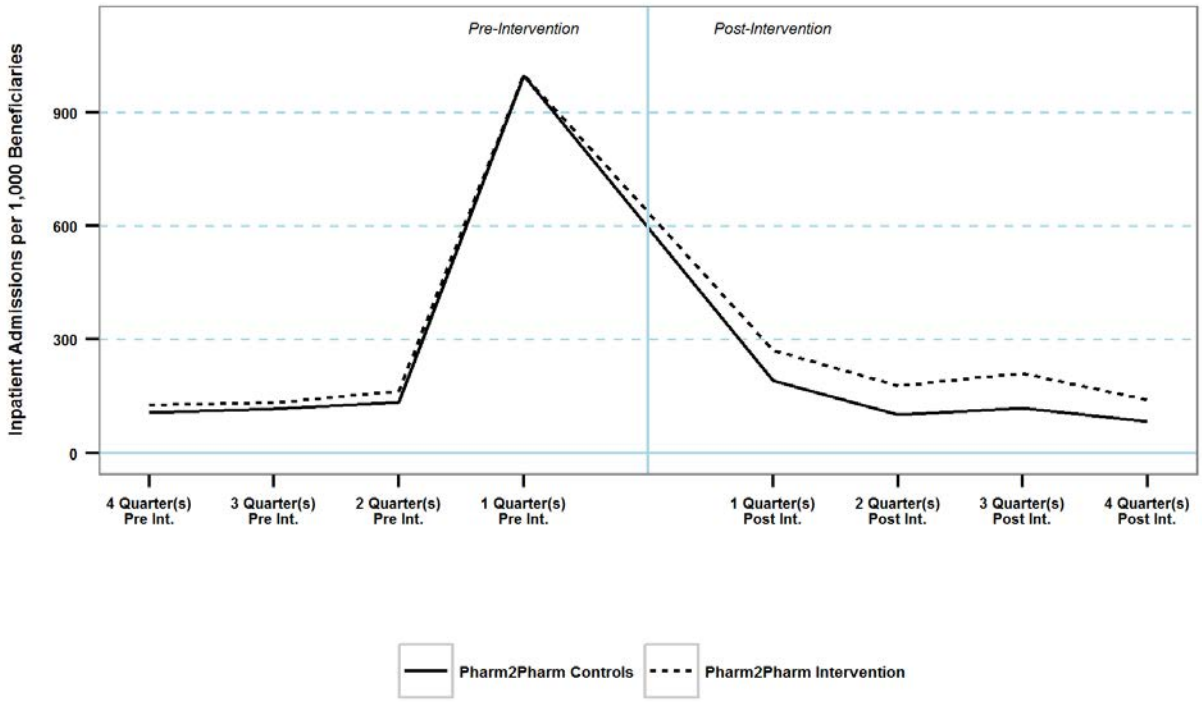


Figure F-4: Pharm2Pharm Unplanned Inpatient Admissions per 1,000 Beneficiaries by Quarter, Medicare FFS and MA Cohorts

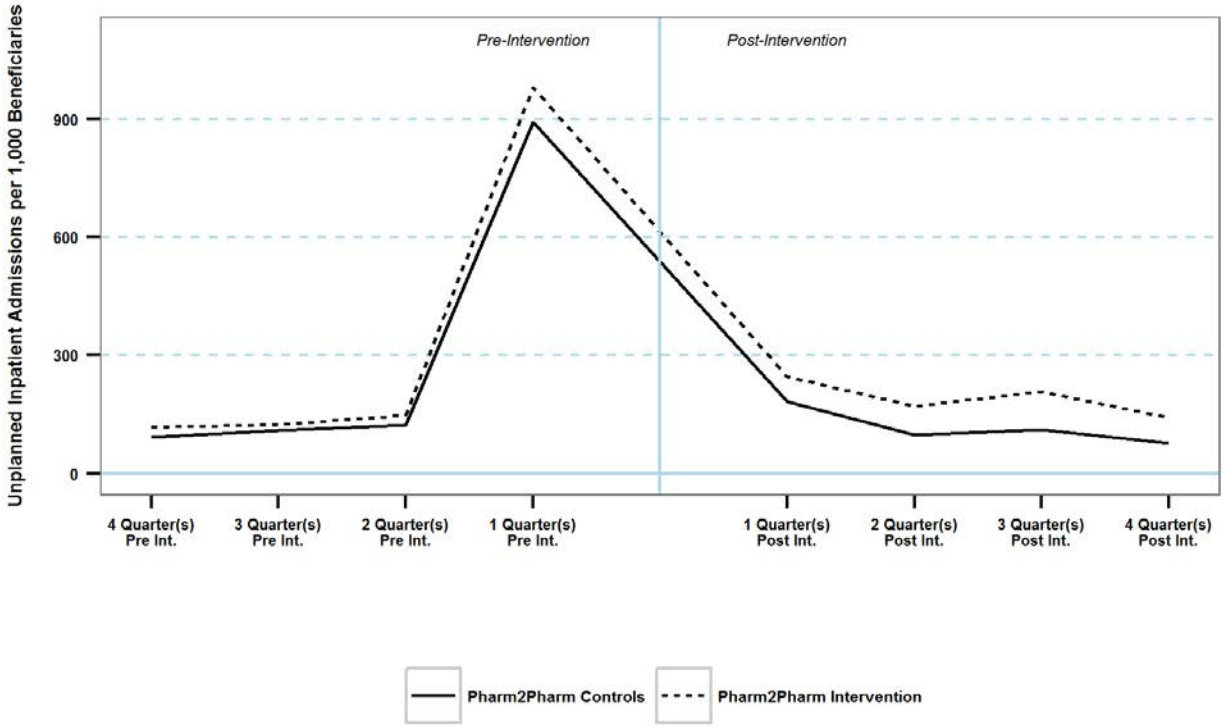


Table Appendix F-7: Pharm2Pharm Resource Use Rate in the Baseline Period and by Quarter Following Enrollment, Medicare FFS and MA Cohorts

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	577	577	577	577	440	434	338	343	220	260
Health Service Use Rate per 1,000 Beneficiaries										
All Inpatient Admissions	1,000.0	1,000.0	272.1	190.6	177.3	101.4	210.1	119.5	140.9	84.6
Unplanned Inpatient Admissions	982.7	906.4	246.1	182.0	170.5	96.8	207.1	110.8	140.9	76.9

Table Appendix F-8: Pharm2Pharm Mean Resource Use in the Baseline Period and by Quarter Following Enrollment, Medicare FFS and MA Cohorts

Measures	Baseline Period (Year Prior to Enrollment)		Q1		Q2		Q3		Q4	
	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls	Intervent.	Controls
Number of Beneficiaries	577	577	577	577	440	434	338	343	220	260
Mean Number of Events per 1,000 Beneficiaries										
All Inpatient Admissions	1,845.8	1,741.8	369.2	260.0	247.7	145.2	281.1	145.8	168.2	103.8
Unplanned Inpatient Admissions	1,748.7	1,525.1	341.4	242.6	234.1	140.6	275.1	131.2	168.2	96.2
Hospital Days	10,549.4	10,334.5	2,324.1	1,920.3	1,368.2	834.1	1,680.5	857.1	759.1	857.7

F.4 Medication Adherence

Table Appendix F-9: Average Proportion of Days Covered (PDC) by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	112	123	112	123
Mean	80.78	82.32	82.28	83.00
Median	88.98	89.91	90.51	92.20
25th percentile	68.42	71.55	74.38	74.11
75th percentile	97.15	96.94	97.31	98.45
90th percentile	99.72	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Calcium Channel Blockers				
Number of Eligible Beneficiaries	68	73	68	73
Mean	85.87	85.73	77.95	82.80
Median	94.82	94.56	84.23	89.97
25th percentile	83.86	79.65	64.24	75.31
75th percentile	99.37	99.13	95.83	99.37
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Diabetes Medication				
Number of Eligible Beneficiaries	39	43	39	43
Mean	88.85	87.76	86.75	84.87
Median	96.15	94.44	96.59	90.54
25th percentile	84.64	85.42	82.54	74.84
75th percentile	99.72	98.52	99.68	100.00
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
RAS Antagonists				
Number of Eligible Beneficiaries	109	126	109	126
Mean	85.78	84.87	81.17	85.78
Median	95.09	92.41	90.60	93.66
25th percentile	82.64	76.90	72.29	79.78
75th percentile	98.13	98.52	98.50	98.86
90th percentile	100.00	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00
Statins				
Number of Eligible Beneficiaries	136	146	136	146
Mean	84.21	82.83	83.76	85.76
Median	91.72	88.82	91.04	93.36
25th percentile	76.64	72.73	74.09	80.06

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
75th percentile	97.15	97.13	97.98	98.29
90th percentile	99.62	100.00	100.00	100.00
99th percentile	100.00	100.00	100.00	100.00

Table Appendix F-10: Rate of 80% PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)		Intervention Period (Year Post Enrollment)	
	Intervention	Controls	Intervention	Controls
Beta Blockers				
Number of Eligible Beneficiaries	112	123	112	123
Rate	0.66	0.64	0.69	0.70
Standard Deviation	0.04	0.04	0.04	0.04
Calcium Channel Blockers				
Number of Eligible Beneficiaries	68	73	68	73
Rate	0.76	0.74	0.54	0.66
Standard Deviation	0.05	0.05	0.06	0.06
Diabetes Medication				
Number of Eligible Beneficiaries	39	43	39	43
Rate	0.77	0.79	0.77	0.70
Standard Deviation	0.07	0.06	0.07	0.07
RAS Antagonists				
Number of Eligible Beneficiaries	109	126	109	126
Rate	0.77	0.72	0.63	0.75
Standard Deviation	0.04	0.04	0.05	0.04
Statins				
Number of Eligible Beneficiaries	136	146	136	146
Rate	0.71	0.67	0.70	0.75
Standard Deviation	0.04	0.04	0.04	0.04

Table Appendix F-11: Difference in Rate of 80% PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment)	Intervention Period (Year Post Enrollment)
Beta Blockers		
Rate Difference	0.018	-0.012
95 % Confidence Interval	(-0.106,0.142)	(-0.129,0.105)
P-Value	0.775	0.841
Calcium Channel Blockers		
Rate Difference	0.03	-0.11
95 % Confidence Interval	(-0.121,0.171)	(-0.263,0.037)
P-Value	0.738	0.139

Measures	Baseline Period (Year Prior to Enrollment)	Intervention Period (Year Post Enrollment)
Diabetes Medication		
Rate Difference	-0.02	0.07
95 % Confidence Interval	(-0.196,0.154)	(-0.132,0.276)
P-Value	0.814	0.490
RAS Antagonists		
Rate Difference	0.05	-0.11
95 % Confidence Interval	(-0.069,0.165)	(-0.22,-0.006)
P-Value	0.421	0.038
Statins		
Rate Difference	0.04	-0.06
95 % Confidence Interval	(-0.069,0.153)	(-0.154,0.044)
P-Value	0.460	0.275

Table Appendix F-12: Difference-in-Difference of Average PDC by Medication Type

Measures	Baseline Period (Year Prior to Enrollment) VS Intervention Period (Year Post Enrollment)
Beta Blockers	0.82
95% Confidence Interval	(-6,8)
P-Value	0.823
Calcium Channel Blockers	-5
95% Confidence Interval	(-14,5)
P-Value	0.301
Diabetes Medication	0.79
95% Confidence Interval	(-10,11)
P-Value	0.882
RAS Antagonists	-5.52
95% Confidence Interval	(-13,2)
P-Value	0.127
Statins	-3.39
95% Confidence Interval	(-10,3)
P-Value	0.277

Note: The difference-in-differences (DiD) estimate is the average difference in percent days covered per beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period.
*Statistically significant at the 5% level

APPENDIX G: QUARTERLY TRENDS IN META-EVALUATION MEASURES

The following tables report baseline and intervention period trends by quarter for the meta-evaluation measures of health care spending, admissions, readmissions, and ER visits recommended by CMS for Welvie, MedExpert, IHARP, USC, and Pharm2Pharm. The meta-evaluation measure tables presented in this section are for individual quarters consistent with CMS recommendations on reporting meta-evaluation measures.

G.1 Meta-Evaluation Measures

Table Appendix G-1: Baseline and Intervention Meta-Evaluation Measure Trends: Total Medicare Expenditures per Patient for Medicare FFS Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
IHARP (1C1CMS331010)											
Spending Rate[a]	$3,945	$4,306	$4,612	$10,814	$8,667	$5,796	$5,817	$6,355	$5,609		
Standard Deviation	$6,796	$7,937	$8,530	$12,680	$12,623	$9,782	$10,383	$11,114	$8,326		
Unique Patients	592	592	592	592	592	509	389	285	192		
MedExpert (1C1CMS331038)											
Spending Rate	$2,178	$2,281	$2,391	$2,601	$2,732	$2,796	$2,907	$2,814	$2,745	$2,431	
Standard Deviation	$6,219	$6,866	$7,369	$7,786	$8,252	$8,243	$9,027	$8,125	$9,255	$6,886	
Unique Patients	48,778	48,778	48,778	48,778	48,778	45,539	26,515	26,140	25,744	8,267	
Welvie Ohio (1C1CMS330984)											
Spending Rate	$1,917	$1,936	$2,123	$2,217	$2,343	$2,316	$2,404	$2,340	$2,459	$2,342	$2,306
Standard Deviation	$5,902	$6,075	$6,610	$7,418	$7,104	$7,397	$7,163	$7,625	$7,601	$7,197	$6,753
Unique Patients	62531	62531	62531	62531	62531	61660	60800	59929	58990	58121	57285
Control Group											

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
IHARP (1C1CMS331010)											
Spending Rate	$3,822	$4,354	$4,720	$9,889	$6,593	$5,051	$4,879	$4,699	$4,844		
Standard Deviation	$5,822	$6,725	$8,279	$10,202	$9,489	$7,963	$8,140	$7,500	$7,776		
Unique Patients	592	592	592	592	592	460	333	237	159		
MedExpert (1C1CMS331038)											
Spending Rate	$2,209	$2,291	$2,348	$2,516	$2,732	$2,736	$2,857	$2,731	$2,574	$2,470	
Standard Deviation	$6,672	$6,889	$7,139	$7,268	$8,095	$8,242	$8,731	$7,958	$7,237	$7,663	
Unique Patients	48,778	48,778	48,778	48,778	48,778	44,830	26,612	26,171	25,773	7,688	
Welvie Ohio (1C1CMS330984)											
Spending Rate	$2,061	$1,999	$2,177	$2,334	$2,545	$2,436	$2,550	$2,397	$2,499	$2,399	$2,391
Standard Deviation	$6,370	$6,208	$6,710	$7,527	$7,836	$7,513	$7,764	$7,521	$7,408	$7,215	$7,053
Unique Patients	52559	52559	52559	52559	52559	51617	50832	50018	49108	48257	47547

[a]Spending Rate: Total payments/Number of unique patients.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix G-2: Baseline and Intervention Meta-Evaluation Measure Trends: Total Medicare Expenditures per Patient for MA Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
Welvie Ohio (1C1CMS330984)											
Spending Rate	$1,264	$1,326	$1,435	$1,572	$2,099	$1,911	$1,540	$1,539	$1,753	$1,610	$1,353
Standard Deviation	$5,296	$5,014	$5,366	$6,390	$8,647	$7,614	$6,173	$6,277	$7,412	$6,698	$5,403
Unique Patients	92341	92341	92341	92341	92341	91223	90224	83927	83130	80812	79594

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Control Group											
Welvie Ohio (1C1CMS330984)											
Spending Rate	$1,281	$1,363	$1,499	$1,595	$2,144	$1,976	$1,639	$1,617	$1,848	$1,644	$1,390
Standard Deviation	$4,942	$5,180	$6,733	$5,897	$8,675	$8,225	$6,658	$6,656	$7,483	$6,957	$5,324
Unique Patients	90162	90162	90162	90162	90162	88831	87836	81744	80947	78630	77342

[a]Spending Rate: Total payments/Number of unique patients.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix G-3: Baseline & Intervention Meta-Evaluation Measure Trends: Inpatient Admissions per 1,000 Medicare FFS Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
IHARP (1C1CMS331010)											
Admit Rate[a]	123.3	148.6	152.0	619.9	244.9	174.9	159.4	171.9	197.9		
Standard Deviation	13.5	14.6	14.8	19.9	17.7	16.8	18.6	22.4	28.8		
Unique Patients	592	592	592	592	592	509	389	285	192		
MedExpert (1C1CMS331038)											
Admit Rate	54.6	59.2	60.6	65.2	68.1	72.2	74.0	71.2	71.3	62.3	
Standard Deviation	1.0	1.1	1.1	1.1	1.1	1.2	1.6	1.6	1.6	2.7	
Unique Patients	48,778	48,778	48,778	48,778	48,778	45,539	26,515	26,140	25,744	8,267	
Welvie Ohio (1C1CMS330984)											
Admit Rate	60.1	58.4	63.8	70.1	71.7	68.6	69.9	70.7	72.8	66.6	70.0
Standard Deviation	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.1

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Unique Patients	62531	62531	62531	62531	62531	61660	60800	59929	58990	58121	57285
Control Group											
IHARP (1C1CMS331010)											
Admit Rate	108.1	131.8	148.6	619.9	128.4	121.7	117.1	113.9	138.4		
Standard Deviation	12.8	13.9	14.6	19.9	13.7	15.2	17.6	20.6	27.4		
Unique Patients	592	592	592	592	592	460	333	237	159		
MedExpert (1C1CMS331038)											
Admit Rate	57.2	61.6	62.3	65.2	72.0	73.1	74.4	71.0	70.5	66.2	
Standard Deviation	1.1	1.1	1.1	1.1	1.2	1.2	1.6	1.6	1.6	2.8	
Unique Patients	48,778	48,778	48,778	48,778	48,778	44,830	26,612	26,171	25,773	7,688	
Welvie Ohio (1C1CMS330984)											
Admit Rate	62.9	59.5	63.5	73.2	77.4	72.2	71.2	71.8	72.7	68.2	72.5
Standard Deviation	1.1	1.0	1.1	1.1	1.2	1.1	1.1	1.2	1.2	1.1	1.2
Unique Patients	52559	52559	52559	52559	52559	51617	50832	50018	49108	48257	47547

[a]Admit Rate: (Total admissions/Number of unique patients)*1,000.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix G-4: Baseline & Intervention Meta-Evaluation Measure Trends: Inpatient Admissions per 1,000 MA Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
MedExpert (1C1CMS331038)											
Admit Rate	35.4	36.6	39.1	38.6	42.9	44.1	50.0	47.6	45.8	44.3	

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Standard Deviation	0.5	0.5	0.5	0.5	0.5	0.7	1.1	1.1	1.1	1.9	
Unique Patients	165,017	165,017	165,017	165,017	165,017	91,041	37,108	36,607	36,158	11,734	
Pharm2Pharm (1C1CMS331061)											
Admit Rate	126.5	133.4	164.6	1000.0	272.1	177.3	210.1	140.9			
Standard Deviation	13.8	14.2	15.4	0.0	18.5	18.2	22.2	23.5			
Unique Patients	577	577	577	577	577	440	338	220			
USC (1C1CMS331040)											
Admit Rate	52.7	42.7	48.4	95.4	59.8	69.1	67.9	57.9	84.7	79.3	
Standard Deviation	8.4	7.6	8.1	11.1	9.0	10.0	10.9	12.0	18.1	21.1	
Unique Patients	702	702	702	702	702	637	530	380	236	164	
Welvie Ohio (1C1CMS330984)											
Admit Rate	41.6	45.8	46.4	49.2	57.2	56.5	50.5	46.2	46.3	44.3	42.9
Standard Deviation	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7
Unique Patients	92341	92341	92341	92341	92341	91223	90224	83927	83130	80812	79594
Control Group											
MedExpert (1C1CMS331038)											
Admit Rate	37.9	39.6	41.8	38.6	45.8	47.4	50.3	47.3	48.5	46.2	
Standard Deviation	0.5	0.5	0.5	0.5	0.5	0.7	1.1	1.1	1.1	1.9	
Unique Patients	165,017	165,017	165,017	165,017	165,017	92,710	38,431	37,889	37,392	11,892	
USC (1C1CMS331040)											
Admit Rate	47.0	61.3	47.0	84.0	54.1	58.7	53.5	71.8	63.0	30.9	
Standard Deviation	8.0	9.1	8.0	10.5	8.5	9.4	9.8	13.3	15.8	13.6	
Unique Patients	702	702	702	702	702	630	523	376	238	162	

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Welvie Ohio (1C1CMS330984)											
Admit Rate	42.0	46.9	49.0	49.3	57.8	57.8	52.5	47.5	47.7	45.4	45.2
Standard Deviation	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7
Unique Patients	90162	90162	90162	90162	90162	88831	87836	81744	80947	78630	77342

[a]Admit Rate: (Total admissions/Number of unique patients)*1,000.
Notes: Measures with 10 or fewer beneficiaries in the numerator are suppressed. USC and Pharm2Pharm include both Medicare Advantage and Medicare FFS beneficiaries.

Table Appendix G-5: Baseline & Intervention Meta-Evaluation Measure Trends: 30-Day Hospital Readmissions per 1,000 Admissions for Medicare FFS Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
IHARP (1C1CMS331010)											
Readmit Rate[a]	232.9	204.5	266.7	237.1	262.1	224.7	241.9	285.7	157.9		
Standard Deviation	49.5	43.0	46.6	22.2	36.5	44.2	54.4	64.5	59.2		
Total Admissions	73	88	90	367	145	89	62	49	38		
MedExpert (1C1CMS331038)											
Readmit Rate	200.9	191.8	221.2	229.6	243.2	243.2	232.0	221.5	242.4	209.7	
Standard Deviation	7.8	7.3	7.6	7.5	7.4	7.5	9.5	9.6	10.0	17.9	
Total Admissions	2,663	2,889	2,956	3,180	3,322	3,289	1,961	1,860	1,836	515	
Welvie Ohio (1C1CMS330984)											
Readmit Rate	179.1	196.2	184.7	203.7	215.8	231.8	209.6	229.0	234.2	211.2	199.7
Standard Deviation	6.3	6.6	6.1	6.1	6.1	6.5	6.2	6.5	6.5	6.6	6.3

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Total Admissions	3758	3650	3990	4384	4485	4232	4250	4236	4292	3869	4012
Control Group											
IHARP (1C1CMS331010)											
Readmit Rate	171.9	230.8	215.9	190.7	210.5	267.9	256.4	222.2	272.7		
Standard Deviation	47.2	47.7	43.9	20.5	46.8	59.2	69.9	80.0	95.0		
Total Admissions	64	78	88	367	76	56	39	27	22		
MedExpert (1C1CMS331038)											
Readmit Rate	209.8	200.7	206.9	224.5	242.2	234.8	231.7	234.7	219.7	222.0	
Standard Deviation	7.7	7.3	7.3	7.4	7.2	7.4	9.5	9.8	9.7	18.4	
Total Admissions	2,788	3,005	3,040	3,180	3,514	3,275	1,981	1,858	1,816	509	
Welvie Ohio (1C1CMS330984)											
Readmit Rate	195.3	182.3	182.6	219.1	220.9	225.2	234.0	236.6	215.2	210.7	218.1
Standard Deviation	6.9	6.9	6.7	6.7	6.5	6.8	7.0	7.1	6.9	7.1	7.0
Total Admissions	3308	3126	3340	3848	4070	3726	3620	3593	3568	3289	3448

[a]Admit Rate: (Total admissions/Number of unique patients)*1,000.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix G-6: Baseline & Intervention Meta-Evaluation Measure Trends: 30-Day Hospital Readmissions per 1,000 Admissions for MA Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
MedExpert (1C1CMS331038)											
Readmit Rate	138.0	138.6	145.6	157.9	157.9	166.1	168.0	158.0	182.5	186.5	

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Standard Deviation	4.5	4.4	4.4	4.6	4.3	5.9	8.7	8.7	9.5	17.1	
Total Admissions	5,834	6,041	6,457	6,376	7,086	4,016	1,857	1,741	1,655	520	
Pharm2Pharm (1C1CMS331061)											
Admit Rate	232.9	233.8	178.9	258.2	242.0	217.9	183.1	161.3			
Standard Deviation	49.5	48.2	39.3	18.2	34.2	46.7	45.9	66.1			
Unique Patients	73	77	95	577	157	78	71	31			
USC (1C1CMS331040)											
Readmit Rate	162.2	200.0	58.8	283.6	142.9	159.1	166.7	363.6	50.0	230.8	
Standard Deviation	60.6	73.0	40.4	55.1	54.0	55.1	62.1	102.6	48.7	116.9	
Total Admissions	37	30	34	67	42	44	36	22	20	13	
Welvie Ohio (1C1CMS330984)											
Readmit Rate	168.6	178.7	170.9	207.2	208.8	210.6	201.2	198.8	207.8	214.6	206.6
Standard Deviation	6.0	5.9	5.8	6.0	5.6	5.7	5.9	6.4	6.5	6.9	6.9
Total Admissions	3843	4231	4282	4542	5282	5156	4553	3878	3850	3578	3417
Control Group											
MedExpert (1C1CMS331038)											
Readmit Rate	137.1	145.4	149.6	158.2	167.0	172.9	190.5	180.2	177.2	171.2	
Standard Deviation	4.3	4.4	4.3	4.6	4.3	5.7	8.9	9.1	9.0	16.1	
Total Admissions	6,256	6,539	6,893	6,376	7,561	4,395	1,932	1,792	1,812	549	
USC (1C1CMS331040)											
Readmit Rate	90.9	93.0	60.6	186.4	210.5	243.2	214.3	296.3	66.7	0.0	
Standard Deviation	50.0	44.3	41.5	50.7	66.1	70.5	77.5	87.9	64.4	0.0	
Total Admissions	33	43	33	59	38	37	28	27	15	5	

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Welvie Ohio (1C1CMS330984)											
Readmit Rate	173.3	174.4	184.9	205.4	209.5	210.2	214.7	203.7	210.7	202.7	210.1
Standard Deviation	6.1	5.8	5.8	6.1	5.6	5.7	6.0	6.5	6.6	6.7	6.9
Total Admissions	3791	4232	4418	4441	5207	5137	4607	3883	3859	3567	3499

[a]Admit Rate: (Total admissions/Number of unique patients)*1,000.

Notes: Measures with 10 or fewer beneficiaries in the numerator are suppressed. USC and Pharm2Pharm include both Medicare Advantage and Medicare FFS beneficiaries.

Table Appendix G-7: Baseline & Intervention Meta-Evaluation Measure Trends: ER Visits per 1,000 Medicare FFS Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
IHARP (1C1CMS331010)											
ER Rate[a]	157.1	153.7	165.5	356.4	211.1	216.1	197.9	238.6	255.2		
Standard Deviation	15.0	14.8	15.3	19.7	16.8	18.2	20.2	25.2	31.5		
Unique Patients	592	592	592	592	592	509	389	285	192		
MedExpert (1C1CMS331038)											
ER Rate	68.5	68.6	71.8	73.6	72.0	74.9	72.0	74.3	72.6	65.9	
Standard Deviation	1.1	1.1	1.2	1.2	1.2	1.2	1.6	1.6	1.6	2.7	
Unique Patients	48,778	48,778	48,778	48,778	48,778	45,539	26,515	26,140	25,744	8,267	
Welvie Ohio (1C1CMS330984)											
ER Rate	79.9	82.2	79.4	84.3	86.5	88.9	84.6	83.7	92.0	93.3	88.1
Standard Deviation	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Unique Patients	62531	62531	62531	62531	62531	61660	60800	59929	58990	58121	57285
Control Group											
IHARP (1C1CMS331010)											
ER Rate	189.2	162.2	170.6	361.5	211.1	226.1	198.2	223.6	176.1		
Standard Deviation	16.1	15.1	15.5	19.7	16.8	19.5	21.8	27.1	30.2		
Unique Patients	592	592	592	592	592	460	333	237	159		
MedExpert (1C1CMS331038)											
ER Rate	73.2	76.4	79.1	77.8	87.2	81.3	74.8	73.5	73.6	71.0	
Standard Deviation	1.2	1.2	1.2	1.2	1.3	1.3	1.6	1.6	1.6	2.9	
Unique Patients	48,778	48,778	48,778	48,778	48,778	44,830	26,612	26,171	25,773	7,688	
Welvie Ohio (1C1CMS330984)											
ER Rate	80.5	84.2	78.4	85.9	86.9	92.9	89.6	85.0	94.5	94.1	89.1
Standard Deviation	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.3	1.3	1.3
Unique Patients	52559	52559	52559	52559	52559	51617	50832	50018	49108	48257	47547

[a]ER Visit Rate: (Total ER visits and observation stays/Number of unique patients)*1,000.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

Table Appendix G-8: Baseline & Intervention Meta-Evaluation Measure Trends: ER Visits per 1,000 MA Beneficiaries

Description	Baseline Period (Year Prior to Enrollment)				Intervention Period						
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group											
MedExpert (1C1CMS331038)											
ER Rate	5.6	4.4	2.9	2.5	2.4	3.9	7.1	6.3	4.7	6.2	
Standard Deviation	0.2	0.2	0.1	0.1	0.1	0.2	0.4	0.4	0.4	0.7	
Unique Patients	165,017	165,017	165,017	165,017	165,017	91,041	37,108	36,607	36,158	11,734	
Welvie Ohio (1C1CMS330984)											
ER Rate	54.1	59.9	64.6	67.2	68.5	68.3	67.3	67.3	64.4	60.3	62.5
Standard Deviation	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.9
Unique Patients	92341	92341	92341	92341	92341	91223	90224	83927	83130	80812	79594
Control Group											
MedExpert (1C1CMS331038)											
ER Rate	12.9	11.5	9.7	8.7	7.9	7.3	7.8	6.3	5.6	5.1	
Standard Deviation	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.7	
Unique Patients	165,017	165,017	165,017	165,017	165,017	92,710	38,431	37,889	37,392	11,892	
Welvie Ohio (1C1CMS330984)											
ER Rate	55.7	58.8	63.9	71.1	68.8	68.4	68.4	68.7	66.0	61.5	66.1
Standard Deviation	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9
Unique Patients	90162	90162	90162	90162	90162	88831	87836	81744	80947	78630	77342

[a]ER Visit Rate: (Total ER visits and observation stays/Number of unique patients)*1,000.
Note: Measures with 10 or fewer beneficiaries in the numerator are suppressed.

G.2 Difference-in-Difference Meta-Evaluation Measures

Table Appendix G-9: Difference-in-Difference Meta-Evaluation Measure Estimates: Effects on Total Medicare Expenditures, Medicare FFS Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
IHARP (1C1CMS331010)	2,151,961.28*	1830.61*	563.24	986.28	1347.04	-47.78		
95% Confidence Interval	(604,444.1 | 3,699,478.4)	(432,3229)	(-706,1832)	(-573,2546)	(-540,3234)	(-2054,1959)		
P-Value	0.006	0.010	0.384	0.215	0.162	0.963		
MedExpert (1C1CMS331038)	6,265,753.68	-22.12	23.62	15.98	29.97	131.24		
95% Confidence Interval	(-6,271,337.2 | 18,802,844.5)	(-141,97)	(-99,147)	(-154,186)	(-128,188)	(-31,293)		
P-Value	0.327	0.716	0.707	0.854	0.709	0.112		
Welvie Ohio (1C1CMS330984)	-3,181,052.67	-106.97*	-50.26	-73.49	13.85	28.17	10.66	-21.32
95% Confidence Interval	(-25,002,682.6 | 18,640,577.3)	(-207,-7)	(-150,50)	(-173,26)	(-87,115)	(-73,129)	(-87,109)	(-116,73)
P-Value	0.775	0.037	0.323	0.149	0.789	0.584	0.831	0.659

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-10: Difference-in-Difference Meta-Evaluation Measure Estimates: Effects on Total Medicare Expenditures, MA Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
Welvie Ohio (1C1CMS330984)	-18,072,213.30	-10.58	-27.6	-61.61	-41.53	-57.85	4.9	-3.18

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-41,209,839.1 | 5,065,412.5)	(-97,76)	(-107,52)	(-129,6)	(-112,29)	(-137,21)	(-69,79)	(-64,58)
P-Value	0.126	0.81	0.498	0.072	0.245	0.15	0.897	0.919

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-11: Difference-in-Difference Meta-Evaluation Measure Estimates: Inpatient Admissions per 1,000 Medicare FFS Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
IHARP (1C1CMS331010)	168.86*	152.45*	28.5	32.43	67.73	-41.69		
95% Confidence Interval	(69.0 | 268.7)	(71,234)	(-55,112)	(-68,133)	(-60,196)	(-189,105)		
P-Value	<0.001	<0.001	0.505	0.526	0.299	0.578		
MedExpert (1C1CMS331038)	33.67	-4.17	1.3	1.94	1.26	5.29	4.49	
95% Confidence Interval	(-564.8 | 632.2)	(-10,1)	(-4,7)	(-5,9)	(-6,9)	(-2,13)	(-8,17)	
P-Value	0.912	0.146	0.657	0.605	0.737	0.156	0.473	
Welvie Ohio (1C1CMS330984)	-235.61	-4.89	-2.81	-2.01	0.67	3.68	0.57	-3.29
95% Confidence Interval	(-1,363.9 | 892.7)	(-10,0)	(-8,2)	(-7,3)	(-4,6)	(-1,9)	(-4,6)	(-8,2)
P-Value	0.682	0.061	0.275	0.43	0.795	0.16	0.821	0.204

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-12: Difference-in-Difference Meta-Evaluation Measure Estimates: Inpatient Admissions per 1,000 MA Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
MedExpert (1C1CMS331038)	-419.34	-1.92	-3.19*	-1.37	-1.02	-3.97	-3.69	
95% Confidence Interval	(-978.1 | 139.4)	(-4,0)	(-6,0)	(-6,3)	(-6,4)	(-9,1)	(-12,4)	
P-Value	0.141	0.079	0.03	0.571	0.665	0.091	0.373	
Pharm2Pharm (1C1CMS331061)	127.07*	83.19	91.33*	130.54*	72.29			
95% Confidence Interval	(49.4 | 204.8)	(-1,168)	(8,175)	(39,222)	(-15,160)			
P-Value	0.001	0.054	0.033	0.005	0.106			
Welvie Ohio (1C1CMS330984)	-234.04	-0.09	-0.01	-1.56	-0.71	-0.51	0.63	-1.72
95% Confidence Interval	(-1,300.9 | 832.8)	(-4,3)	(-3,3)	(-5,2)	(-4,3)	(-4,3)	(-3,4)	(-5,2)
P-Value	0.667	0.961	0.994	0.357	0.672	0.762	0.706	0.299
USC (1C1CMS331040)	15.93	-3.21	2.25	3.32	-26.64	5.52	45.94	
95% Confidence Interval	(-50.2 | 82.1)	(-41,35)	(-43,47)	(-43,49)	(-87,34)	(-66,77)	(-19,111)	
P-Value	0.637	0.868	0.922	0.887	0.386	0.880	0.168	

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. USC and Pharm2Pharm include both Medicare Advantage and Medicare FFS beneficiaries. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-13: Difference in Meta-Evaluation Measure Estimates: 30-Day Hospital Readmissions per 1,000 Admissions Medicare FFS Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
IHARP (1C1CMS331010)	1.48	51.54	-43.14	-14.47	63.49	-114.83		
95% Confidence Interval	(-25.6 | 28.6)	(-64.8 | 167.8)	(-188.0 | 101.7)	(-188.1 | 159.1)	(-138.0 | 265.0)	(-334.1 | 104.4)		
P-Value	0.914	0.385	0.559	0.870	0.537	0.305		
MedExpert (1C1CMS331038)	42.65	1.05	8.43	0.32	-13.16	22.66	-12.30	
95% Confidence Interval	(-89.8 | 175.1)	(-19.3 | 21.4)	(-12.2 | 29.1)	(-26.0 | 26.7)	(-40.1 | 13.8)	(-4.7 | 50.0)	(-62.7 | 38.1)	
P-Value	0.528	0.919	0.423	0.981	0.339	0.104	0.633	
Welvie Ohio (1C1CMS330984)	-121.18	-5.05	6.63	-24.33*	-7.58	18.91*	0.46	-18.45
95% Confidence Interval	(-326.1 | 83.7)	(-22.6 | 12.5)	(-11.8 | 25.1)	(-42.8 | -5.9)	(-26.4 | 11.2)	(0.4 | 37.4)	(-18.5 | 19.4)	(-37.0 | 0.1)
P-Value	0.246	0.572	0.482	0.010	0.429	0.045	0.962	0.051

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-14: Difference in Meta-Evaluation Measure Estimates: 30-Day Hospital Readmissions per 1,000 Admissions MA Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
MedExpert (1C1CMS331038)	-155.86*	-9.12	-6.84	-22.46	-22.29	5.33	15.32	
95% Confidence Interval	(-288.5 | -23.2)	(-21.1 | 2.8)	(-22.9 | 9.2)	(-46.9 | 1.9)	(-47.0 | 2.4)	(-20.3 | 30.9)	(-30.7 | 61.3)	
P-Value	0.021	0.134	0.404	0.071	0.077	0.683	0.514	
Pharm2Pharm (1C1CMS331061)	-6.32	-12.51	-54.78	-12.02	24.93			
95% Confidence Interval	(-30.4 | 17.8)	(-117.9 | 92.9)	(-215.1 | 105.6)	(-163.0 | 139.0)	(-168.3 | 218.1)			

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P-Value	0.608	0.816	0.503	0.876	0.800			
Welvie Ohio (1C1CMS330984)	-62.21	-0.70	0.39	-13.49	-4.89	-2.88	11.95	-3.45
95% Confidence Interval	(-256.1 | 131.6)	(-16.3 | 14.9)	(-15.4 | 16.1)	(-30.1 | 3.1)	(-22.7 | 12.9)	(-21.0 | 15.3)	(-6.9 | 30.8)	(-22.6 | 15.7)
P-Value	0.529	0.929	0.961	0.112	0.591	0.756	0.214	0.724
USC (1C1CMS331040)	-4.11	-67.67	-84.15	-47.62	67.34	-16.67	230.77*	
95% Confidence Interval	(-18.6 | 10.4)	(-235.0 | 99.7)	(-259.6 | 91.3)	(-242.3 | 147.1)	(-197.4 | 332.0)	(-175.0 | 141.6)	(1.7 | 459.8)	
P-Value	0.579	0.428	0.347	0.632	0.618	0.837	0.048	

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. USC and Pharm2Pharm include both Medicare Advantage and Medicare FFS beneficiaries. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-15: Difference-in-Difference Meta-Evaluation Measure Estimates: Inpatient: ER Visits per 1,000 Medicare FFS Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
IHARP (1C1CMS331010)	110.64	0.84	-12.55	74.68	16.29	176.71		
95% Confidence Interval	(-35.5 | 256.8)	(-111,113)	(-136,111)	(-124,273)	(-195,227)	(-90,444)		
P-Value	0.138	0.988	0.842	0.461	0.880	0.194		
MedExpert (1C1CMS331038)	60.73	-10.8*	-0.66	0.33	4.67	3.92	4.93	
95% Confidence Interval	(-577.3 | 698.7)	(-17,-5)	(-7,5)	(-7,8)	(-3,12)	(-4,11)	(-8,18)	
P-Value	0.852	<0.001	0.831	0.932	0.235	0.308	0.462	
Welvie Ohio (1C1CMS330984)	-1,103.69	0.21	-4.04	-6.08*	-1	-3.46	-1.56	-2.41

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
95% Confidence Interval	(-2,331.5 | 124.1)	(-5,6)	(-10,2)	(-12,-1)	(-6,4)	(-9,2)	(-7,4)	(-8,3)
P-Value	0.078	0.941	0.165	0.028	0.719	0.233	0.602	0.405

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.

Table Appendix G-16: Difference-in-Difference Meta-Evaluation Measure Estimates: Inpatient: ER Visits per 1,000 MA Beneficiaries

Description	Cumulative	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Intervention Group								
Welvie Ohio (1C1CMS330984)	-13.55	0.76	1.73	-0.53	0.8	0.31	-0.81	-2.61
95% Confidence Interval	(-1,172.8 | 1,145.7)	(-3,4)	(-2,5)	(-4,3)	(-3,5)	(-3,4)	(-4,3)	(-6,1)
P-Value	0.982	0.676	0.341	0.774	0.686	0.87	0.658	0.182

Notes: The difference-in-differences (DiD) estimate is the average difference in the number of outcome events per 1,000 beneficiaries, in the intervention as compared to controls between the post-intervention period and the pre-intervention (baseline) period. Cumulative effect measures the outcome relative to the entire intervention cohort rather than per 1,000 beneficiaries.