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Evaluation of the Maryland All-Payer Model

Volume I: Final Report

Prepared for

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EVALUATION OF THE MARYLAND ALL-PAYER MODEL VOLUME I: FINAL REPORT

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LIST OF ABBREVIATIONS

ACO	Accountable care organization
ACSC	Ambulatory care sensitive condition
AHA	American Hospital Association
AHRF	Area Health Resources File
AMS	Applied Medical Software
APC	Ambulatory payment classification
APR	All Patient Refined
BRFFS	Behavioral Risk Factor Surveillance System
CCIP	Complex and Chronic Care Improvement Program
CCW	Chronic Condition Data Warehouse
CEO	Chief executive officer
CFO	Chief financial officer
CG	Comparison group
CI	Confidence interval
СМО	Chief medical officer
CMS	Centers for Medicare & Medicaid Services
CPT	Current Procedural Terminology
CRISP	Chesapeake Regional Information System for our Patients
CRP	Care Redesign Program
CY	Calendar year
D-in-D	Difference-in-differences
DDD	Difference-in-differences
DMAIC	Define, Measure, Analyze, Improve and Control
DRG	Diagnosis-related group
DSH	Disproportionate share hospital
ED	Emergency department
EMR	Electronic medical record
FFS	Fee-for-service
FQHC	Federally qualified health center
FY	Fiscal year
GBR	Global Budget Revenue
HAC	Hospital-acquired conditions
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Services
HCC	Hierarchical Condition Category
HCIA	Health Care Innovation Awards
HCIP	Hospital Care Improvement Program
HSA	Hospital service area
HSCRC	Health Services Cost Review Commission
IBR	Intern-to-bed ratio
ICU	Intensive care unit
IME	Indirect medical education
IPPS	Inpatient Prospective Payment System
LOS	Length of stay
MACRA	Medicare Access and CHIP Reauthorization Act of 2015
MCC	Multiple chronic conditions

MCDB	Medical Care Data Base
MHAC	Maryland Hospital Acquired Conditions
MHCC	Maryland Health Care Commission
OPPS	Outpatient Prospective Payment System
PAC	Post-acute care
PAU	Potentially avoidable utilization
PBPM	Per beneficiary per month
PCMH	Patient-centered medical home
PDMP	Prescription Drug Monitoring Program
PMPM	Per member per month
PPS	Prospective payment system
PQI	Prevention quality indicator
QBR	Quality-based reimbursement
RHC	Rural health clinic
RUCC	Rural-Urban Continuum Codes
SHIP	State Health Improvement Process
SIM	State Innovation Models
SNF	Skilled nursing facility
STAC	Short-term, acute care
TAF	T-MSIS Analytic File
TCOC	Total cost of care
TPR	Total Patient Revenue
UCC	Uncompensated care

EXECUTIVE SUMMARY

On January 1, 2014, Maryland implemented its All-Payer Model for hospitals, which shifted the state's hospital payment structure to an allpayer, annual, global hospital budget that encompassed inpatient and outpatient hospital services. Maryland's All-Payer Model was built on the state's all-payer hospital rate-setting system, which had operated since the 1970s. The All-Payer Model operated under an agreement with the Centers for Medicare & Medicaid Services (CMS) that exempted Maryland hospitals from Medicare's Inpatient Prospective Payment System (IPPS) and Outpatient Prospective Payment System (OPPS). Under the agreement with CMS, Maryland was expected to limit per capita total hospital cost growth for all payers, including Medicare, and generate \$330 million in Medicare savings over 5 years. The All-Payer Model ended in December 2018 and was succeeded in January 2019 by the Total Cost of Care (TCOC) Model, which operates under a new agreement with CMS.

This is the final report of the evaluation of the All-Payer Model, conducted by RTI International. The report covers 5 years of the implementation of the All-Payer Model, outcomes for 4.5 years for fee-forservice Medicare beneficiaries (January 2014–June 2018), and outcomes for 4 years for commercial plan members (January 2014–December 2017). In addition, we present pre-post descriptive trends for 4 years (January 2014– December 2017) for Maryland Medicaid beneficiaries.

MARYLAND ALL-PAYER MODEL SNAPSHOT

- Significant transformation occurred among Maryland hospitals over the 5 years of All-Payer Model implementation. Hospitals, clinicians, and other stakeholders demonstrated that they were willing to accept the considerable uncertainty of a major change to their payment methodology.
- Maryland's All-Payer Model reduced both total expenditures and total hospital expenditures for Medicare beneficiaries without shifting costs to other parts of the health care system outside of the global budgets. The reductions in hospital expenditures were driven by reduced expenditures for outpatient hospital services.
- Commercial plan members had slower growth in total hospital expenditures driven by inpatient facility savings; however, growth in total expenditures did not slow among commercial plan members.
- Although Medicare's expenditures for emergency department (ED) visits that did not result in an admission declined, the rate of ED visits did not change relative to the comparison group. In contrast, the rate of ED visits declined for commercial plan members, possibly reflecting Maryland hospitals' efforts to shift ED use to other settings. Inpatient admissions trended downwards for Maryland residents enrolled in Medicare, Medicaid, and commercial insurance, but the difference relative to the comparison group was statistically significant only for Medicare. The decline could be due to hospital programs that aimed to reduce utilization by improving care management and avoiding unnecessary hospitalizations.
- The effects of hospital strategies to reduce avoidable utilization were mixed. Admissions for ambulatory care sensitive conditions declined in both the Medicare and commercial populations relative to the comparison group, but declines in unplanned readmission rates were similar to the comparison group.
- Medicare payments for inpatient hospital services did not change because the change in utilization was offset by an increase in payment per inpatient admission. Though hospitals increasingly acknowledged the importance of developing partnerships with community providers, coordination of care with community providers, as measured by follow-up visits after hospital discharge, did not improve.
- Maryland hospitals were able to operate within their global budgets without adverse effects on their financial status.
- Teaching and high disproportionate share hospital (DSH) percentage hospitals generally had poorer outcomes during the All-Payer Model period than other hospitals, particularly for unplanned readmissions and follow-up visits after hospital discharge.
- Dually eligible beneficiaries and beneficiaries with multiple chronic conditions had more favorable outcomes than other Medicare beneficiaries.
- Employing physicians and providing patients with clinically specific education were associated with improvements in both hospital financial and patient care performance.



Significant transformation occurred among Maryland hospitals over the 5 years of All-Payer Model implementation.

- Hospitals' investment in and implementation of new strategies to operate under the All-Payer Model produced changes in care delivery at both the hospital and clinician levels.
- Nearly all hospitals invested in care coordination, discharge planning, social work staffing, patient care transition programs, and systematic use of patient care plans in response to the All-Payer Model. Hospital leadership also considered health data and analytics core strategies and critical tools to manage successfully under the All-Payer Model.
- A few core concerns persisted for hospital leaders throughout the duration of the All-Payer Model: the complexity and limited transparency of the payment methodologies; dissatisfaction with the market shift adjustment and the inability to retain their full global budgets; the perceived inadequacy of rate update factors; and frustration with the large relative impact of patient satisfaction ratings on hospital budget updates.



Maryland's All-Payer Model reduced both total expenditures and total hospital expenditures for Medicare beneficiaries; however, only total hospital expenditures declined for commercial plan members.

- Medicare beneficiaries had 2.8 percent slower growth in total expenditures (\$975 million in savings) during the Maryland All-Payer Model relative to the comparison group, largely driven by 4.1 percent slower growth in total hospital expenditures (\$796 million in savings) (see *Figure ES-1*).
- The additional reduction in total Medicare expenditures was due to savings on professional services in hospital settings and post-acute care (PAC). Although these services were not subject to

For further information on total expenditures, hospital expenditures, and nonhospital expenditures, see *Section 4*.

global budgets, lower spending for professional services in hospital settings is consistent with decreases both in inpatient admissions and use of some hospital outpatient department services. The reduction in expenditures for PAC was likely due to the decrease in inpatient admissions, because an inpatient stay is required to qualify for these services. It could also reflect the significant investments hospitals made in post-discharge planning and care that may have allowed patients to avoid PAC services.





• Commercial plan members had 6.1 percent slower growth in total hospital expenditures relative to a comparison group; however, growth in total expenditures did not slow among commercial plan members. The contrast with the Medicare findings is due to different utilization patterns for the commercial population, specifically increased expenditures for professional services that offset savings on inpatient facility payments (see *Figure ES-2*).





PMPM = per member per month



- Slower growth in ED expenditures (30.6%) and other hospital expenditures (17.2%) drove total Medicare hospital savings in Maryland.
- Changes in ED and other hospital outpatient department expenditures for commercial plan members in Maryland did not differ from the comparison group.
- Medicare expenditure savings for ED visits resulted from a decrease in the payment per ED visit in Maryland relative to the comparison group, not a reduction in the ED visit rate (see *Figure ES-3*). Despite reports from hospital leaders of major investments to shift non-emergent ED use to other settings, ED visits increased similarly for Medicare beneficiaries in Maryland and the comparison group during the All-Payer Model. Hospital leaders noted challenges changing ED visit rates because they have little control over a patient's decision to seek care through the ED.





• The ED visit rate declined 2.6 percent more among commercial plan members in Maryland than in the comparison group in the first 4 years of the All-Payer Model (see *Figure ES-4*). The ED visit rate also declined among Medicaid beneficiaries in Maryland. It may have been easier to convince commercial plan members and non-dual Medicaid beneficiaries to seek care in alternative settings because they are healthier on average than Medicare beneficiaries. In addition, commercial plan payments per ED visit increased 10.4 percent more for Maryland relative to the comparison group, which is consistent with diverting non-emergent patients to other settings.

Figure ES-4 Impacts of the Maryland All-Payer Model on utilization for commercial plan members





Maryland's All-Payer Model reduced inpatient admissions for Medicare beneficiaries, but not expenditures for inpatient facility services. Inpatient admissions also trended downwards for commercial plan members and Medicaid beneficiaries.

• Inpatient admissions trended downwards for Maryland residents enrolled in Medicare (*Figure ES-3*), Medicaid, and commercial insurance

(*Figure ES-3*), Medicaid, and commercial insurance (*Figure ES-4*), but the difference from the comparison group was only statistically significant for Medicare beneficiaries, who had a 7.2 percent greater decline in admissions overall. For both

For further information on inpatient hospital utilization and expenditures, see *Sections 4* and *6*.

Medicare beneficiaries and commercial plan members, the magnitude of the reduction in admissions increased over the first 4 years of the model. The growing reduction in admissions in Maryland over time could reflect the maturation of hospital programs to reduce utilization by avoiding unnecessary hospitalizations. These programs, including increased care coordinator, care manager, and social work staffing, took time for hospitals to develop, implement, and refine.

- Admission severity increased more for Maryland Medicare beneficiaries than for the comparison group (*Figure ES-3*). An increase in admission severity is expected as admission rates decline if avoided admissions are more likely to be less severe cases. However, admission severity increased less for commercial plan members in Maryland than in the comparison group (*Figure ES-4*).
- Although inpatient admissions declined for Medicare beneficiaries, inpatient facility expenditures did not decline because utilization reductions were offset by increases in the payment per admission as a result of rate adjustments that hospitals were permitted to make to meet their global budgets (*Figure ES-1*). Inpatient facility expenditures increased 9.3 percent less for commercial plan members in Maryland than in the comparison group, however, perhaps reflecting a slower growth rate in commercial payments for admissions in Maryland than in the comparison group (*Figure ES-2*).



Maryland hospital strategies to reduce avoidable utilization had mixed effects.

Maryland hospitals had mixed success in reducing avoidable utilization within both the Medicare and the commercially insured populations, depending on the measure and population examined.
 For further information on avoidable utilization, see Section 5.

- Rates of unplanned readmissions decreased similarly for Medicare beneficiaries in Maryland and the comparison group in the first 4.5 years after All-Payer Model (*Figure ES-3*). Likewise, unplanned readmission rates decreased at similar rates over the first 4 years of the All-Payer Model for commercial plan members in Maryland and the comparison group (*Figure ES-4*).
- Admissions for ambulatory care sensitive conditions (ACSCs) decreased 6.7 percent more for Medicare beneficiaries in Maryland than in the comparison group during the first 4.5 years of the All-Payer Model (*Figure ES-3*). Similarly, ACSCs decreased 6.1 percent more for commercial plan members in Maryland than in the comparison group (*Figure ES-4*). We generally did not find a statistically significant difference in trends for ED visits for avoidable conditions in the Medicare population.
- ED visits within 30 days of discharge declined 5.9 percent among commercial plan members in Maryland relative to the comparison group during the first 4 years of the All-Payer Model. However, for Medicare beneficiaries, the ED visit rate following hospital discharge increased at similar rates in Maryland and the comparison group over the first 4.5 years.
- Hospitals continued to develop strategies to reduce avoidable utilization but they varied in their progress. Some hospitals reported successfully decreasing avoidable or reducible utilization among certain groups within their overall patient populations, but changing utilization among patients with complex care needs was more challenging.



Coordination with community providers following a hospitalization has not improved.

• The post-discharge follow-up visit rate increased similarly for Medicare admissions in Maryland and the comparison group. The post-discharge follow-

For further information on coordination of care, see *Section 5*.

up rate increased more for commercial admissions in the comparison group than in Maryland.

• Hospital leaders increasingly focused on developing partnerships with community providers, but lack of provider engagement and provider shortages posed barriers to improving care coordination. Hospital leaders also expressed concern about patient compliance and responsibility, which can affect post-discharge follow-up.



- On nearly every measure of patient experience that was examined, Maryland hospitals were rated lower than comparison hospitals. However, this did not worsen after implementation of the All-Payer Model.
 For further information on patient experience, see Section 5.
- During site visits, hospitals reported a focus on improving patient experience. With a few exceptions, Maryland hospitals' patient survey scores improved during the All-Payer Model implementation period, but we found no evidence that the gap between Maryland and comparison group hospitals narrowed.



Maryland's All-Payer Model reduced expenditures for hospital services without shifting costs to other parts of the health care system outside of the global budgets, although site of care changed slightly for Medicare beneficiaries.

• The relative declines in both total expenditures and total hospital expenditures for Medicare indicate that the savings on hospital services were not due to cost shifting to sectors outside of global budgets.

For further information on spillover effects, see *Section 7*.

- Hospitals did not unbundle inpatient services for Medicare patients and shift costs to pre-admission or post-discharge periods after implementation of the All-Payer Model.
- Maryland hospitals were less likely to transfer patients to other short-term, acute care hospitals and more likely to transfer patients to PAC providers following implementation of the All-Payer Model. However, hospital length of stay prior to a PAC transfer decreased slightly less in Maryland than in the comparison group, suggesting the Maryland hospitals did not try to transfer patients out of hospital settings sooner as a result of the All-Payer Model.
- Medical exam visits provided in hospital outpatient settings shifted to nonhospital outpatient settings after All-Payer Model implementation for Medicare beneficiaries but not for commercial plan members.
- Medicare beneficiaries did not have to seek care elsewhere because of restricted access to Maryland hospitals. Trends in the share of Maryland Medicare beneficiary admissions to out-of-state hospitals and the share of Maryland hospital admissions from out-of-state Medicare beneficiaries were largely unchanged over the study period.



Maryland's All-Payer Model had differential effects for teaching, high DSH percentage, and accountable care organization (ACO)-aligned hospitals.

- Differences in the effect of the All-Payer Model between hospitals that had and had not been operating under a global budget through the predecessor TPR system were minimal.
 For further information on hospital subgroups, see
- Teaching hospitals and high DSH percentage hospitals Section 8. generally had poorer outcomes during the All-Payer Model period than other hospitals, particularly for unplanned readmissions and 14-day follow-up visit rates. This finding may be due to the greater complexity and acuity of the patients served by these hospitals. Even though we adjusted for a beneficiary's risk score, admission severity on average was higher for teaching and high DSH percentage hospitals than other hospitals. Hospital leaders noted that patient compliance was a challenge in changing patterns of care, and this may have posed a greater challenge for teaching and high DSH percentage hospitals because of their higher patient acuity or other factors.
- Contrary to expectations, hospitals aligned with an ACO performed more poorly on patient follow-up visits than non-aligned hospitals under the All-Payer Model. Given an ACO's contractual arrangements with both inpatient and outpatient providers, the ACO-participating hospitals should have better alignment with community physicians to improve the follow-up visit rate, as well as greater incentives to improve follow-up care to achieve shared savings.



Beneficiaries with multiple chronic conditions and beneficiaries dually eligible for Medicare and Medicaid had greater reductions in expenditures and utilization than their subgroup counterparts.

 Outcomes improved for beneficiaries with multiple chronic conditions and beneficiaries dually eligible for Medicare and Medicaid relative to other Medicare beneficiaries during the All-Payer Model period. These outcomes suggest that hospitals may have prioritized high-cost,

high-need patients as they changed their care delivery practices. Additionally, these beneficiaries may have had the most opportunity to improve under the reforms of the Maryland All-Payer Model.

• We did not find consistent differences in selected utilization and expenditure impacts based upon a beneficiary's original basis for Medicare entitlement, race, or rural residency.



I.S

Only a few features of hospital strategies for operating under global budgets emerged as related to hospital performance.

- Employing physicians and providing patients with clinically specific education were associated with improvements in both hospital financial and patient care performance.
 For further information on fontures related to hospital
 - features related to hospital performance, see *Section 9*.
- Maryland hospitals operating under global budgets nearly universally employed dedicated analytics staff, care coordination and care management staff, discharge planners, and social work staff; used Maryland's health information exchange and data analytics; and used patient care transition programs and patient care plans. Although their widespread adoption made it impossible to assess their relationship with hospital performance, it also suggests these strategies were foundational to hospital operations under global budgets.

Maryland hospitals were able to operate within global budgets without adverse effects on their financial status.

- Hospitals regularly monitored their volume and adjusted their rates during the year to meet budget targets.
- For further information on hospital financial performance, see *Section 3*.
- Despite constraints on hospital revenues imposed by global budgets, operating margins increased after the implementation of the All-Payer Model, although there was not a consistent upward trend in all years.

Medicare payment rates were relatively higher and commercial payment rates were relatively lower in Maryland than in the comparison group and compared to what they would have been under IPPS and OPPS because of the harmonization of payments among payers under the state's all-payer rate-setting system.

• Both before and after implementation of the All-Payer Model, Medicare inpatient payment rates were substantially higher under Maryland's all-payer ratesetting system than they would have been under the IPPS, ranging from 33 to 44 percent higher for the same mix of admissions.

For further information on the comparison of all-payer ratesetting with other payment systems, see *Section 10*.

• For the commercially insured population, the payment differential ranged from 11 to 15 percent lower in Maryland than in the comparison group for the same case mix.

- Medicare claims for hospital outpatient services were paid at a rate 58 to 66 percent higher in Maryland than they would have been under the OPPS.
- These estimates reflect differences in payment rates only and do not indicate how much Medicare would save if Maryland hospitals operated under IPPS and OPPS because they do not account for changes in utilization that might occur as a result of a change in payment system.

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SECTION 1 INTRODUCTION

1.1 Background on the All-Payer Model

On January 1, 2014, Maryland implemented its All-Payer Model for hospitals, which transitioned the state's hospital payment structure to an all-payer, annual global budget that encompassed nearly all inpatient and outpatient hospital services. The All-Payer Model continued the state's history of innovation in hospital payment that began with the introduction of an all-payer hospital rate-setting system in the 1970s. *Figure 1* highlights key points in the evolution of Maryland's hospital payment system through the end of the All-Payer Model and the transition to a new model in January 2019. Maryland operated the hospital rate-setting system that preceded the All-Payer Model under an agreement with the Centers for Medicare & Medicaid Services (CMS) that exempted the state's hospitals from Medicare's Inpatient Prospective Payment System (IPPS) and Outpatient Prospective Payment System (OPPS). Under this agreement, growth in Medicare inpatient payments per admission in Maryland had to remain below the national growth rate to maintain the state's exemption from IPPS and OPPS. As the cost per admission began increasing at a faster rate in Maryland than in the rest of the nation, concerns grew that Maryland's long-standing exemption could be in jeopardy if this cost trajectory did not change. Furthermore, the focus on cost per admission was poorly aligned with other health care delivery system reforms under way in Maryland and nationally that focused on comprehensive, coordinated care across delivery settings.



Figure 1 Evolution of hospital payment in Maryland

In response to these concerns, Maryland proposed a new hospital payment model that shifted the emphasis from controlling payments per inpatient admission to controlling total payments for hospital services. By July 2014, all 46 general acute care hospitals in the state¹ were operating under a global budget, with global budgets encompassing 95 percent of hospital revenue. Although most hospitals in the state were first introduced to global budgets with the

¹ An additional general acute care hospital, Holy Cross Germantown, opened in October 2014. A global budget was established for the hospital for the program year beginning in July 2015; however, the hospital's rates were tied to those for Holy Cross Hospital.

implementation of the All-Payer Model in 2014, 10 rural hospitals already had global budgets under an earlier program called Total Patient Revenue (TPR).²

Under the agreement with CMS for the All-Payer Model, Maryland had to do the following over 5 years:

- Limit annual all-payer per capita inpatient and outpatient hospital cost growth to the previous 10-year growth in gross state product (3.58%).
- Generate \$330 million in savings to Medicare based on the difference in the Medicare per-beneficiary total hospital cost growth rate between Maryland and that of the nation overall.
- Reduce its 30-day readmission rate to the unadjusted national Medicare average.
- Reduce the rate of potentially preventable complications by nearly 30 percent.
- Limit the annual growth rate in per-beneficiary total cost of care (TCOC) for Maryland Medicare beneficiaries to no greater than 1.0 percentage point above the annual national Medicare growth rate in that year.
- Limit the annual growth rate in per-beneficiary TCOC for Maryland Medicare beneficiaries to no greater than the national growth rate in at least 1 of any 2 consecutive years.
- Submit an annual report demonstrating its performance along various population health measures.

The Center for Medicare & Medicaid Innovation (Innovation Center) monitored Maryland's progress meeting the terms of the agreement each year and could end the agreement if the state was not in compliance, including with the limitations on the annual growth rate.³

Under the All-Payer Model, the Maryland Health Services Cost Review Commission (HSCRC) established an annual global budget, or allowed revenues, for each hospital. The

² Although TPR was an option since the early years of Maryland's original agreement with CMS for all-payer rate setting, for many years, only one hospital adopted it. A second hospital transitioned to TPR in fiscal year (FY) 2008, and eight more transitioned in FY 2011. The following hospitals operated under TPR: Meritus Medical Center, University of Maryland at Dorchester, Garrett County Memorial Hospital, Western Maryland Regional Medical Center, University of Maryland Shore Medical Center at Chestertown, Union Hospital of Cecil County, Carroll Hospital Center, University of Maryland Shore Medical Center at Easton, Calvert Memorial Hospital, and McCready Memorial Hospital.

³ The Innovation Center used actuarial analyses to assess Maryland's compliance with the agreement terms. The Lewin Group conducted these analyses under contract to CMS.

annual budget was built from allowed revenues during a base period (2013),⁴ which were adjusted for future years using a number of factors, both hospital specific and industry wide. Each year, the hospital's global budget was updated to reflect an allowed rate of hospital cost inflation; approved changes in the hospital's volume based on changes in population demographics and market share; and additional adjustments related to reductions in potentially avoidable utilization (PAU) such as readmissions, quality performance, uncompensated care (UCC), and changes in various adjustments like user fees. The First Annual Report on the evaluation of the All-Payer Model describes, in detail, the factors used to set hospital budgets.⁵

HSCRC then set rates for services that Maryland hospitals used to bill all payers so that total payments (based on expected utilization) would match the global budget. Public payers (Medicare and Medicaid) were allowed a 6 percent discount on charges, which was also in place before the implementation of the All-Payer Model. As under Maryland's previous hospital payment system, each hospital billed payers for services provided using the hospital's service-specific rates. The global budgets introduced under the All-Payer Model established a ceiling on each hospital's revenues, including services provided to both Maryland residents and nonresidents.⁶ Hospitals were, however, permitted revenues outside their global budgets for certain specified services (for example, home health, outpatient renal dialysis, and skilled nursing facility services).

Hospitals had an incentive to ensure that revenues did not fall short of or exceed their budgets. To the extent that a hospital's actual utilization deviated from projected utilization and hospital revenues varied from the global budget, a one-time adjustment to the approved budget for the following year was made to compensate the hospital for charges less than the approved budget (underages) and to recoup charges in excess of approved revenues (overages). However, hospital revenues were expected to conform closely to the global budgets, and penalties were applied to the portion of overages and underages that exceeded 0.5 percent of the hospital budget to discourage patterns of overcharging or undercharging.

HSCRC recognized that actual utilization was unlikely to perfectly match the projected utilization on which the global budget was based. To compensate for some deviation from the underlying utilization assumptions, hospitals were permitted to adjust their rates during the year to reach their global budgets. However, there were limits on the size of adjustments that were

⁴ Maryland Department of Health and Mental Hygiene: Maryland's all-payer model: Proposal to the Center for Medicare and Medicaid Innovation. <u>http://dhmh.maryland.gov/docs/Final%20Combined%20Waiver%20</u> <u>Package%20101113.pdf</u>. Last updated on October 11, 2013. As obtained on January 29, 2015.

⁵ Haber, S., Beil, H., Adamache, W., Amico, P., Beadles, C., Berzin, O. K. G., ... Wright, A. F. (2016). *Evaluation of the Maryland All-Payer Model: First annual report*. Centers for Medicare & Medicaid Services. https://downloads.cms.gov/files/cmmi/marylandallpayer-firstannualrpt.pdf

⁶ Services for Maryland nonresidents were excluded initially from some hospitals' global budgets. In FY 2014, the exclusion applied to four hospitals: University of Maryland Medical Center, Johns Hopkins Hospital, Johns Hopkins Bayview, and Johns Hopkins Suburban. The University of Maryland Medical Center Shock Trauma Center had a separate revenue cap, which also excluded services to Maryland nonresidents. Beginning in FY 2015, the University of Maryland facilities dropped their nonresident exclusion. Johns Hopkins Hospital, Johns Hopkins Bayview, and Johns Hopkins Suburban dropped the nonresident exclusion beginning in FY 2017.

permitted, and rate adjustments had to be applied uniformly to all services. Hospitals were permitted to vary their charges from the approved rates by plus or minus 5 percent without permission. Hospitals could vary charges up to 10 percent if they requested and were granted permission from HSCRC. HSCRC considered variation beyond 10 percent under special circumstances—for example, to avoid penalizing hospitals for reductions in PAU and to provide continued support for investments required to achieve these reductions. HSCRC monitored hospitals' charges and service volume through monthly reports to ensure each hospital's compliance with its global budget. Although there was no specified penalty for charge adjustments greater than the allowed percentage, HSCRC could apply a noncompliance penalty to the hospital's budget in the subsequent year if the charges in a rate center varied from the approved rate by more than the allowed percentage over the entire rate year.

Maryland adopted the All-Payer Model as the first step toward a population-based payment model that would hold hospitals responsible for use of all health care services by the populations they serve. In its agreement with CMS for the All-Payer Model, the state committed to moving from a model that had spending targets focused only on hospital services to a population-based model with a per capita TCOC spending test after 5 years. To prepare for this transition, CMS and Maryland modified their agreement for the All-Payer Model to incorporate the Care Redesign Program (CRP). The CRP, which began operating in July 2017, was intended to strengthen hospitals' ability to achieve the goals of the All-Payer Model by better aligning incentives of Maryland hospitals with hospital- and community-based providers with the aim of reducing PAU and internal hospital costs. The CRP initially included two tracks—the Hospital Care Improvement Program (HCIP) and the Complex and Chronic Care Improvement Program (CCIP). HCIP engaged hospital-based providers in the task of improving hospital-based care and care transitions. CCIP provided hospitals with a tool for engaging community-based providers to offer enhanced care management and coordination for high-cost or potentially high-cost patients.

The Innovation Center determined that Maryland met the terms of the All-Payer Model agreement⁷ and the All-Payer Model was succeeded by the TCOC Model in January 2019. The TCOC Model was implemented under a new agreement with CMS that holds the state responsible for limiting per capita growth in total expenditures for fee-for-service (FFS) Medicare beneficiaries. The TCOC Model retained hospital global budgets and the CRP but made some modifications to the All-Payer Model. These included incorporating hospital upside and downside risk for up to 1 percent of hospital Medicare revenues based on performance against a Medicare TCOC benchmark and adding a third CRP track focused on bundled payments for episodes of care. The TCOC Model added a new component, the Maryland Primary Care Program, that supports primary care practices in providing advanced primary care services and incentivizes quality and utilization improvements consistent with the goals of the TCOC Model.

⁷ Maryland's performance on the terms of the All-Payer Model agreement through 2017 is summarized here: <u>https://hscrc.state.md.us/Documents/Modernization/Updated%20APM%20results%20through%20PY4.pdf</u> ². A report on performance through the end of the All-Payer Model was not publicly available at the time this report was written.

1.2 Comparison of the Maryland All-Payer Model with Maryland's Previous Hospital Payment System and the Medicare Prospective Payment System

The All-Payer Model differed from the hospital payment system that operated in Maryland before January 2014, as well as from the Medicare Prospective Payment System (PPS), along several key dimensions that were expected to drive the model's outcomes. *Table 1* compares the design of the Maryland All-Payer Model with the state's previous hospital payment system and the Medicare PPS.⁸

Designs of Maryland's All-Payer Model, Maryland's previous hospital payment system, and the Medicare Prospective Payment System		
	Previous Maryland	Medicare Prospective

Table 1

Design feature	Maryland All-Payer Model	Previous Maryland hospital payment system	Medicare Prospective Payment System
Participating payers	All payers	All payers	Medicare
Participating providers	Hospitals	Hospitals	Hospitals
	• Voluntary participation of nonhospital providers in the CRP		
System financial performance criteria	• All-payer annual per capita total (inpatient and outpatient) hospital cost growth no more than 3.58%	Cumulative growth in Medicare inpatient payments per admission no more than cumulative growth nationally	None
	• \$330 million in Medicare savings over 5 years based on the Medicare per-beneficiary total hospital cost growth rate in Maryland compared with the national growth rate		
Limits on hospital revenues	Annual hospital global budget revenue target with penalties for overages and underages	None, except for hospitals operating under TPR system	None
Unit of payment	• Revenue center rate x volume	• Revenue center rate x volume	• Prospective case- based payment
	 Hospital-specific rates based on hospital's historical costs trended forward Rates can be adjusted within limits to meet hospital's revenue target 		
		 Hospital-specific rates based on hospital's historical costs trended forward 	National base rates

⁸ A detailed comparison of the All-Payer Model with Maryland's hospital rate-setting system and the Medicare PPS is included in the First Annual Report on the evaluation of the All-Payer Model.

Table 1 (continued)Designs of Maryland's All-Payer Model, Maryland's hospital rate-setting system, and the
Medicare Prospective Payment System

Design feature	Maryland All-Payer Model	Previous Maryland hospital payment system	Medicare Prospective Payment System
Uncompensated care adjustment basis	Average of hospital's historical actual and projected charity care and bad debt percentage	Average of hospital's historical actual and projected charity care and bad debt percentage	Disproportionate patient percentage (based on sum of Medicaid days and Medicare Supplemental Security Income days)
Pay-for-performance initiatives	 Readmissions reductions MHAC reductions Quality-based reimbursement Must meet national Medicare performance standards with flexibility to experiment with alternative designs Must meet quality targets related to readmissions and admissions for PPCs 	 Readmissions reductions MHAC reductions Quality-based reimbursement Must meet national Medicare performance standards with flexibility to experiment with alternative designs 	 Readmissions reductions HAC reductions Value-based purchasing
Population-based payment	 No, but expected to transition to population-based model with total per capita cost of care test after 5 years Must submit annual report demonstrating performance on various population health measures 	No	No

CRP = Care Redesign Program; HAC = hospital-acquired conditions; MHAC = Maryland HAC; PPC = potentially preventable complication; TPR = Total Patient Revenue.

The adoption of Maryland's All-Payer Model changed incentives from the state's previous hospital payment system in several important ways:

- The previous hospital payment system did not limit hospital revenues, except for a small number of hospitals that were operating under the TPR system. Under the All-Payer Model, hospital global budgets capped all hospitals' annual revenues.
- The previous hospital payment system set limits on costs per admission, but it only weakly limited the volume of admissions. The All-Payer Model created incentives to limit both volume and costs per admission.
- Performance criteria in the agreement with CMS for the previous hospital payment system applied only to inpatient services and did not limit outpatient hospital expenditures. The performance criteria for the All-Payer Model encompassed both inpatient and outpatient revenues, which created incentives to limit overall hospital

expenditures and provided flexibility to shift services between hospital inpatient and outpatient settings.

• Tests in the agreement with CMS for the previous hospital payment system were based only on experience in the Medicare population. The agreement for the All-Payer Model included a test that applied to the overall Maryland population, as well as tests specific to the Medicare population, which provided incentives to limit hospital expenditure growth for the overall population.

Some of the pay-for-performance aspects of the All-Payer Model, however, were components of Maryland's previous hospital payment system.

The All-Payer Model differs from the PPS in several fundamental ways, including participation by Medicaid and commercial payers, in addition to Medicare; limits on hospital revenues through the global budget; and the unit of payment for hospital services. On the other hand, although the pay-for-performance initiatives and adjustments for UCC vary somewhat between the All-Payer Model and the PPS, these are more subtle differences.

1.3 Conceptual Framework for the All-Payer Model Evaluation

Figure 2 portrays a conceptual framework for the evaluation of the Maryland All-Payer Model. The top panel shows key components of the All-Payer Model, including hospital global budget revenue; all-payer rate setting; the Readmissions Reduction Incentive Program (RRIP); the Quality-Based Reimbursement (QBR) program; the Maryland Hospital Acquired Conditions (MHAC) program; and the CRP. Maryland's strategy for achieving the goals of the agreement with CMS for the All-Payer Model incorporated a number of complementary health system reform efforts, including workforce development initiatives through innovative medical education strategies; development of local population health initiatives through the State Health Improvement Process; development of the state's health information exchange (the Chesapeake Regional Information System for our Patients [CRISP]); adoption of delivery models such as patient-centered medical homes and accountable care organizations (ACOs); and activities under the state's State Innovation Models Model Design award and a number of Health Care Innovation Awards.

The middle panel shows strategies implemented by hospitals to respond to the All-Payer Model. These include changes in rates charged by hospitals to meet their budget targets; changes in hospital staffing, development of clinical care delivery strategies, and investment in data analytic capacity and other hospital infrastructure to improve efficiency and support care coordination and care management; and participation in the CRP.

Figure 2 Conceptual framework for Maryland All-Payer Model evaluation

INTERVENTION				
MARYLAND ALL-PAYER MODEL STRATEGIES	OTHER HEALTH SYSTEM REFORM INITIATIVES			
 Hospital global budgets All-payer rate setting Readmissions Reduction Incentive Program Quality-Based Reimbursement Program Maryland Hospital Acquired Conditions Program Care Redesign Program 	 Workforce transformation Population health initiatives Health information exchange (CRISP) PCMHs ACOs SIM Model Design grant HCIA 			
V V V	✓ ▼ ▼			
OUTCOMES				
HOSPITAL STRATEGIES				
 Changes in charges to meet hospital budget target Staffing changes Development of clinical care delivery strategies 	 Investment in data analytics Investment in other hospital infrastructure Participation in Care Redesign Program 			
	✓ ▼ ▼			
MODEL IMPACTS				
Hospital Financial Performance	Health Care Utilization			
 Changes in hospitals revenues, operating expenses, and operating margins 	 Reduction in inpatient admissions Reduction in ED visits Reduction in hospital length of stay 			
Health Care Expenditures	Quality of Care			
 Reduction in total expenditures Reduction in hospital expenditures Increase in nonhospital expenditures Reduction in Medicare beneficiary cost-sharing 	 Reduction in unplanned readmissions Reduction in ED visits following hospital discharges Increase in post-discharge follow-up visits Improvement in beneficiary experience of hospital care Improvement in population health 			
Hospital Service Mix	Spillover Effects			
 Increase in hospital case-mix Reduction in case-mix adjusted payment per admissions Reduction in unplanned readmissions Reductions in patients admitted from the ED 	 Increased use of post-acute care Increased use of pre-admissions services Increased use of nonhospital services Increase use of out-of-state hospitals by Maryland residents 			

ACO = accountable care organization; CRISP = Chesapeake Regional Information System for our Patients; ED = emergency department; HCIA = Health Care Innovation Awards; PCMH = patient-centered medical home; SIM = State Innovation Models

The bottom panel describes expected outcomes of the All-Payer Model in six main domains, based on anticipated hospital responses to its incentives.

• **Hospital financial performance**: Global budgets limited growth in hospital revenues overall, and hospitals were expected to respond to this by shifting services, and therefore revenues, from inpatient to outpatient settings. Guaranteed revenues from global budgets could increase hospital operating margins if hospitals reduced operating expenses by avoiding unnecessary utilization and shifting services to less expensive settings, but operating margins could decline if hospitals did not succeed in making these changes.

- Health care utilization: The All-Payer Model was expected to reduce hospital utilization by incorporating assumptions about reductions in PAU in hospital budget updates and by rewarding or penalizing hospitals based on their readmission rates. In response to these incentives, hospitals were expected to implement strategies to reduce hospital admissions and reduce emergency department (ED) visits by diverting patients to other settings. Hospitals also were expected to improve care management for admitted patients, which could reduce length of stay (LOS) and unnecessary service use during an admission. At the same time, the rate of outpatient ED visits that did not result in a hospitalization could increase if hospitals successfully reduced admissions of patients seen in the ED. Similarly, LOS might increase if incentives to reduce hospital admissions increased case-mix severity. The CRP was expected to strengthen hospitals' abilities to reduce unnecessary hospital utilization by better aligning hospital and nonhospital provider incentives.
- Health care expenditures: Hospital revenues were capped by global budgets, which was expected to limit hospital expenditure growth. Incentives to reduce inpatient admissions and ED visits were expected to reduce expenditures for inpatient and ED services, but expenditures for other hospital outpatient department services could increase if hospitals diverted patients to these settings. Total health care expenditures, were also expected to decrease but by less than the reduction in hospital expenditures, because spending on nonhospital services could increase if they were substituted for hospital services.
- Quality of care: The All-Payer Model had several components that were expected to improve quality of care, including incorporating assumptions about savings from reductions in PAU in global budget updates and rewards and penalties for performance on certain dimensions of quality-based performance. Hospitals were expected to respond to these incentives by implementing strategies to improve care management and care coordination, which were expected to reduce unplanned readmissions and ED visits following hospital discharge and to increase follow-up visits after hospital discharge. Hospitals were also expected to implement initiatives to improve patient experience of care. Global budget limits on hospital revenues were expected to encourage hospitals to participate in community partnerships to improve population health and thereby reduce health care expenditures.
- Hospital service mix: All-Payer Model incentives to reduce admissions of less complex or less severely ill patients were expected to increase hospital case mix. Hospitals were expected to respond to incentives in the hospital budget-setting methodology to decrease PAU by implementing strategies to reduce unplanned admissions and admissions of patients seen in the ED. Finally, in response to global budget limits on revenues, hospitals were expected to encourage physicians to reduce the intensity of services provided during an admission through the HCIP and other strategies.
- Spillover to other sectors of the health care delivery system: Limits on hospital revenues under global budgets were expected to incentivize hospitals to shift services outside the time frame of an inpatient stay, for example, by increasing use of

preadmission services and post-acute care (PAC). Global budgets could also restrict the accessibility of hospital services, causing patients to seek care out of state or in nonhospital settings.

1.4 Overview of Evaluation Design

Section 3021 of the Affordable Care Act requires the Innovation Center to evaluate all its payment and service delivery models. CMS contracted with RTI International to conduct an independent evaluation of the Maryland All-Payer Model. RTI's evaluation addressed a broad set of design, implementation, and outcome issues, organized in nine domains:

- **Design and implementation of the All-Payer Model:** What were the key features of the All-Payer Model? How were global budgets and other features of the All-Payer Model operationalized? How were they modified over time? How did hospitals and hospital systems respond to the new model? To what extent did hospital market actions (consolidations, closures, acquisitions, expansions and contractions of service lines) change after implementation of the All-Payer Model? What models of workforce training and development were implemented to support the All-Payer Model? How did Maryland and the participating hospitals and their Care Partners implement the CRP?
- **Hospital financial performance:** Did trends in hospital revenue, operating expenses, and operating margins change after implementation of the All-Payer Model? Did these trends differ by type of hospital (e.g., bed size, teaching status, whether the hospital had previous global budget experience under the TPR system, whether the hospital was affiliated with a system)? To what extent did hospitals adjust their rates to remain within their annual budgets? To what extent did hospitals experience penalties as a result of revenue variation from their approved budgets?
- Service utilization and expenditures: Did trends in inpatient utilization and expenditures, ED utilization and expenditures, hospital outpatient department expenditures, professional service expenditures, PAC expenditures, and total expenditures per capita change after implementation of the All-Payer Model? Did changes in trends differ by payer (Medicare, commercial insurance, and Medicaid)? How did changes in per capita utilization and expenditure trends in Maryland compare with trends for populations in comparable hospital market areas in other states?
- **Quality of care:** How did care coordination, avoidable or reducible utilization, patient experience of hospital care, and health outcomes change after the implementation of the All-Payer Model? How did the change in Maryland compare with changes for populations in comparison hospital market areas?
- Service mix: How did hospital patient mix change after the implementation of the All-Payer Model? How did utilization of specific hospital services, particularly high-cost services, change? How did admission source and type change? Did the changes differ by payer? How did the change in Maryland compare with changes for hospitals and populations in comparison hospital market areas?
- **Spillover effects:** Did the All-Payer Model result in the avoidance of complex or costly inpatient cases, unbundling of inpatient care, shifts in ED and outpatient clinic services to nonhospital settings, or increases in border crossing by both Maryland residents and nonresidents in obtaining inpatient care? Did these consequences differ by payer? How did changes in Maryland compare with changes for hospitals and populations in comparison hospital market areas?
- **Relationship between hospital and beneficiary characteristics and outcomes:** How did Medicare impacts of the All-Payer Model differ by hospital characteristics? How did Medicare population impacts of the All-Payer Model differ by beneficiary characteristics?
- Relationship between hospital responses to the All-Payer Model and outcomes: Were hospital implementation context and strategies related to hospital-level outcomes under the All-Payer Model?
- Comparison of payment rates under all-payer rate setting with other payment systems: How did inpatient payment rates for Medicare and commercial insurers in Maryland compare with payment rates in other states? How did outpatient payment rates for Medicare compare with payment rates in other states? Were Medicare payment rates higher in Maryland than in other states as a result of all-payer rate setting? Were payment rates for commercial insurers lower in Maryland than in other states as a result of higher Medicare payment rates and explicit adjustments for UCC in Maryland?

This Final Report synthesizes findings across all nine domains. The evaluation of the Maryland All-Payer Model employed a mixed methods design, incorporating qualitative and quantitative methods and data to assess both the implementation and the outcomes of the model. Qualitative and quantitative analyses were complementary components of the evaluation, in many cases addressing the same issues from alternative perspectives. Qualitative analyses were used to provide insight into barriers and facilitators to implementing the All-Payer Model; hospital and other provider responses to the model, including efforts to improve care coordination and quality of care delivered; unintended consequences of the model and effects on the hospital market; and changes in the health care workforce.

1.4.1 Implementation

To address how the Maryland All-Payer Model was designed and implemented, we collected qualitative data through telephone interviews with key informants, hospital site visits, and focus groups with physicians and other patient care providers. We also surveyed all Maryland hospitals to collect information at a consistent point in time on the strategies they used to operate under the All-Payer Model.

1.4.1.1 Qualitative Data

RTI conducted three types of qualitative data collection—telephone interviews with key informants, in-person hospital site visits comprising individual interviews and focus groups, and focus groups of physicians participating in the CRP. Interviews were conducted with senior

hospital leaders, including chief executive, financial, medical, and nursing officers, as well as upper-level managers responsible for case management, population health, or quality of care. Hospital focus groups were conducted with physicians and with nurses and care management personnel. CRP focus groups were conducted with physicians who were participating in either HCIP or CCIP. Key informants selected for telephone interviews included payers; state officials; and representatives of physician, hospital, and PAC organizations. Additional detail on the qualitative methods is in *Appendix A*.

1.4.1.2 Hospital Survey Data

To complement the qualitative data collection, we conducted a survey to learn how hospitals responded to the All-Payer Model and the CRP. The survey had a 100 percent response rate from Maryland hospitals. We conducted descriptive analyses of the survey data, tabulating responses for Maryland hospitals overall. Information about strategies implemented by hospitals was also incorporated in the comparative case study (see *Section 1.4.3*) to identify the relationship between hospital strategies and All-Payer Model outcomes. The hospital survey data collection and analysis methods are described in *Appendix A*, and the detailed hospital survey results are presented in *Appendix B*.

1.4.2 Impacts

We used a number of secondary data sources to assess impacts of the Maryland All-Payer Model, including hospital financial data and claims data described in the following sections. All secondary data sources used for the evaluation are described in detail in *Appendix C*.

1.4.2.1 Hospital Financial Data

We analyzed several types of financial data to assess hospital financial performance under the All-Payer Model by examining trends in hospital global budgets; hospital adherence to their global budgets; rate adjustments by hospitals; and hospital financial status, including hospital revenues, operating expenses, and operating margin. These analyses used data from the HSCRC Revenue and Volumes Report, which contains inpatient and outpatient revenue and volume data by rate center for each Maryland hospital; hospital statements of revenues and expenditures; and global budget information provided by HSCRC. The financial data analysis methods are detailed in *Appendix A*.

1.4.2.2 Claims Data

We analyzed claims data for Medicare beneficiaries and commercial plan members to assess All-Payer Model impacts on health care expenditures and service utilization, quality of care, hospital service mix, spillover to nonhospital sectors of the health care delivery system, and to compare hospital payment rates in Maryland under all-payer rate setting with payment rates under other systems. We also used Medicare claims data to assess whether All-Payer Model impacts differed by beneficiary and hospital characteristics. We used Medicaid claims to assess service utilization trends for Maryland Medicaid beneficiaries. The claims-based methods are described fully in *Appendix A*.

Medicare and commercial insurance data. Most claims-based analyses used a difference-in-differences (D-in-D) design, comparing changes in trends from a 3-year baseline

period to the Maryland All-Payer Model implementation period for selected outcomes for FFS Medicare beneficiaries and commercial plan members in Maryland, with Medicare beneficiaries and commercial plan members in matched comparison hospital market areas.⁹ The analyses included 4.5 years (2014 to June 2018) of Medicare data and 4 years of commercial insurance data (2014 to 2017) after the implementation of the All-Payer Model. We estimated annual effects for each All-Payer Model year, then combined annual estimates to produce overall estimates for all years.

We drew the comparison group from outside Maryland because the All-Payer Model was implemented statewide. Identifying an appropriate comparison group was challenging because Maryland had operated under different hospital regulatory and payment policies than the rest of the country for decades. It was unlikely that a single state provided an ideal comparison. Therefore, we selected the comparison group from multiple states and hospital market areas so that any unusual trends in a single area would not have a large impact on the results. To select the comparison group, we first selected hospitals from across the country that closely resembled each Maryland hospital based on hospital and county characteristics, then we identified residents of the selected hospitals' market areas, and finally we constructed annual person-level propensity score weights to balance Maryland and comparison group residents on individual and market area characteristics. The detailed methods for constructing the comparison group and propensity score weights are included in *Appendix D*.

For each annual observation period, we restricted the Medicare sample to FFS beneficiaries who were alive at the beginning of the observation period and enrolled in both Part A and Part B for at least 1 month of the period. We included all commercial plan members in the MarketScan database identified as enrolled in a commercial insurance plan at any point during the given analysis year. However, because capitated plans may not have complete expenditure data in the MarketScan database, we restricted the sample for expenditure outcomes to commercial plan members who were enrolled in an FFS plan at any point during the year and did not have any capitated payments.

The D-in-D design assumes that the outcomes for beneficiaries in Maryland and beneficiaries in the comparison groups had parallel trends during the baseline period. We tested the assumption that Maryland and the comparison group had parallel baseline trends by estimating a model for the baseline period only. We found statistically significant differences in baseline trends for a number of key payment and utilization outcomes for Medicare beneficiaries—7 of the 12 measures we assessed had a statistically significant difference in their baseline trend at p<0.05. Although baseline trends generally appeared similar based on visual inspection, we concluded that we could not assume that Maryland and the comparison group were on the same trajectory before the implementation of the All-Payer Model for Medicare. We opted to take a conservative approach that allowed us to generate effect estimates that net out the potential baseline differences between Maryland and the comparison group for Medicare analyses. To do this, we included an interaction term between the Maryland indicator and a linear time trend in the final D-in-D model. The linear time trend controls for differences between Maryland and the comparison group over time. As such, the D-in-D interaction term measures the deviation of the difference between Maryland and the comparison group in the post period from the trend line. This model specification allows for differences in estimates in Maryland and the comparison group during the baseline period, and it allows for a straightforward interpretation of the D-in-D coefficient. We did not include the linear time trend for commercial plan members because only 1 of the 12 key measures we assessed had a statistically significant difference in their baseline trend at p < 0.05, and 4 additional measures had a difference at p < 0.10.

We estimated Maryland All-Payer Model impacts on a range of outcomes: expenditures, in total and for hospital and nonhospital services; service utilization, including inpatient admissions and ED visits; quality of care, including unplanned readmissions and follow-up visits after hospital discharge; hospital service mix, including the severity of hospital admissions and the likelihood that a patient seen in an ED was admitted to the hospital; and spillover to nonhospital services, including PAC. *Appendix E* describes all outcome measure specifications.

In addition, we conducted subgroup analyses for Medicare to assess whether the impacts of the Maryland All-Payer Model differed by both hospital and population subgroups. Specifically, we examined whether there were differences by the following hospital subgroups: (1) participated in TPR system (yes or no); (2) hospital teaching status (teaching hospital or not); (3) disproportionate share hospital (DSH) percentage (high or low/medium DSH percentage); and (4) ACO alignment (ever in an ACO or not). We also examined whether the impacts of the All-Payer Model differed by the following population subgroups: (1) dual enrollment status (dually enrolled in Medicaid or not); (2) disability status (original reason for Medicare entitlement was disability or not); (3) health status (multiple chronic conditions or not); (4) race (white or non-white); and (5) rural residence status (rural or urban). For these hospital and population subgroups, we used difference-in-difference-in-differences (D-D-D) regression models.

We also used Medicare claims to compare inpatient and outpatient payment rates under Maryland's all-payer rate-setting system with IPPS and OPPS payment rates, and we used commercial claims to compare commercial insurance inpatient payment rates for Maryland hospitals with comparison group hospitals.

Medicaid data. This report also includes results for the Medicaid population in Maryland. For the Medicaid analyses, we used Medicaid Analytic eXtract (MAX) data for 2011–2012 and T-MSIS Analytic File (TAF) data for 2014–2017. We excluded the 2013 Medicaid data from these analyses, because it was incomplete. We excluded Medicaid beneficiaries who were dually enrolled in Medicare, because Medicare is the primary payer for most services and these beneficiaries were included in the Medicare analyses. Additionally, because the Medicaid expansion occurred at the same time as the All-Payer Model implementation (2014), and because we did not have a viable Medicaid comparison group, we excluded Medicaid expansion beneficiaries from the analysis.

Due to data limitations described in *Appendix F*, we were not able to create a comparison group for the Medicaid analyses as we did for the Medicare and commercial insurance analyses or accurately calculate several outcomes using Medicaid claims data. As such, we present descriptive statistics only for Medicaid beneficiaries residing in Maryland for the three following outcomes: (1) inpatient admissions per 1,000 beneficiaries; (2) ED visits per 1,000 beneficiaries; and (3) total expenditures. Because these analyses do not have a comparison group, the Medicaid results should be interpreted with great caution.

1.4.3 Comparative Case Study

We conducted a comparative case study to examine whether hospital strategies for operating under the Maryland All-Payer Model and physician engagement with implementing

these strategies were related to hospital performance. We used the qualitative data and hospital survey data described in *Section 1.4.2* to identify a list of strategies whose adoption differed among Maryland hospitals and we used the hospital survey data to measure level of physician engagement. For the hospital-level outcomes, we examined hospital operating margin and 30-day unplanned readmission rate aggregated to the hospital level. We chose these outcome measures because they showed the most variation across hospitals. The comparative case study analysis methods is detailed in *Appendix A*.

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SECTION 2 HOW DID HOSPITALS IMPLEMENT THE MARYLAND ALL-PAYER MODEL?

Key Takeaways for Implementation of the Maryland All-Payer Model

- All-Payer Model implementation was an ongoing, gradual process that reflected both the state's progress in developing operational policies and hospital leaderships' increasing engagement in this reform.
- Hospitals' investment in and implementation of new strategies to operate under the All-Payer Model produced changes in care delivery at both the hospital and clinician levels.
- Nearly all hospitals invested in care coordination, discharge planning, social work staffing, patient care transition programs, and systematic use of patient care plans in response to the All-Payer Model. Hospital leadership also considered health data and analytics core strategies and critical tools to manage successfully under the All-Payer Model.
- Hospitals and physicians initially were slow to join the CRP, but participation accelerated once CMS announced that physician Care Partners would be eligible for MACRA's Quality Payment Program. Many participating physicians had limited knowledge of the program's purposes, how it worked, and what they were expected to do differently.
- A few core concerns persisted for hospital leaders throughout the duration of the All-Payer Model: the complexity and limited transparency of the payment methodologies; dissatisfaction with the market shift adjustment and the inability to retain their full global budgets; the perceived inadequacy of rate update factors; and frustration with the large relative impact of patient satisfaction ratings on the QBR program payments and penalties.

2.1 Research Questions

This section of the report describes the implementation of key features of the Maryland All-Payer Model through its final month of operation in December 2018, as the state was poised to launch the TCOC Model in January 2019. We discuss perspectives on the All-Payer Model's policies and their implementation, which we gathered through key informant interviews conducted between May 2018 and early February 2019, and stakeholder discussions and focus groups conducted during hospital site visits between June 2018 and February 2019. Although this section focuses on the final data collection periods, we incorporate qualitative information collected in earlier years that was presented in three prior annual reports on the All-Payer Model evaluation. This chapter also includes findings from focus groups conducted from July to October 2018 with physicians participating in the CRP. These groups asked CRP physicians about changes in their practice behaviors since the CRP was implemented. In addition, we report findings from a survey of hospital chief financial officers (CFOs) about hospital responses to the All-Payer Model, including strategies adopted, hospital leadership models, and staff engagement, as well as early perceptions of and responses to the CRP. The survey provides a picture of the strategies that hospitals implemented to operate under the All-Payer Model collected at a single point in time as the model was ending. Although we conducted site visits to all Maryland hospitals over the course of the evaluation, these occurred at different times, so qualitative data reflect perceptions at different points in the implementation process.

This section of the report aims to answer the following research questions:

- What strategies and implementation processes did hospitals and clinicians use to operate under the All-Payer Model?
- What factors either facilitated or inhibited hospitals and clinicians from implementing these strategies and processes?
- What were hospital leaders' and clinicians' perceptions of the All-Payer Model?
- How did participating hospitals implement the CRP and how did hospitals' operations and physicians' behaviors change because of the CRP?

Information presented from these varied sources—key informant interviews, site visit interviews, focus group discussions, and the CFO survey—provide context from multiple viewpoints to answer these research questions. In some cases, the contributors to these data collections may have perspectives that represent departures from, or potential misperceptions of, All-Payer Model policy and how it was implemented. These perspectives are described without correction, as they represent the understanding of hospital leadership and other key stakeholders. If needed, we note when a perspective is clearly inaccurate.

2.2 What Did Hospital Leaders and Other Stakeholders Identify as Common Themes and Topics Under the All-Payer Model?

Although hospital responses to the All-Payer Model varied, we identified common themes and topics in our interviews with stakeholders, hospital leaders, and clinical staff members. *Figure 3* shows the top 50 topics discussed during site visit interviews and focus groups in 2018 and 2019, ranked by the frequency with which they appeared in our conversations.

The five most prominent topics in 2018 and 2019 interviews and focus groups were patients, hospitals, care, doctors, and nursing. This was unchanged from the prior 2 years, indicating these were a central focus for stakeholders. Patients were a key focus for hospital leaders from a number of perspectives. First, hospital leaders and clinical staff routinely told us that they perceive their patient population to be sicker and more complex than average. This is a logical consequence of the All-Payer Model's goal of admitting only those patients with a clear need for acute care services. Hospital leaders and clinicians acknowledged the importance of this, but they also noted that their patients' need for a high level of care requires considerable hospital financial and staffing resources. Patients were also a focus as hospital leaders worked to manage and coordinate care through the inpatient stay and, increasingly, through the discharge and post-admission periods. Hospital leaders and clinicians believed this post-discharge focus was critical to improve care and reduce readmissions. However, managing patients was a challenge, as many do not comply with care plans or resist seeking care in alternative settings (such as clinics rather than EDs).

Figure 3 Top 50 topics discussed in qualitative data collection during 2018 and 2019



NOTE: Word size denotes frequency, with larger fonts indicating words that were used more often; word colors vary to make words visually distinct from one another in the graphic but do not signify any relation to frequency of use.

SOURCE: RTI analysis of site visit interview and focus group data from 2018 to 2019.

Beyond these top 5 topics, the next most common topics or phrases in 2018 and 2019 were time (6th), system (7th), GBR [global budget revenue] (8th), data (9th), and change (10th). The terms time, system, GBR, and data also ranked in the top 10 in both 2016 and 2017.

Shifts in the top 50 topics suggest hospital leaders' deeper experience operating under the All-Payer Model. The following topics included in the top 50 terms in 2018 and 2019 moved up at least 10 places in the rankings relative to 2017: challenge (+11), metric (+10), team (+11), and facility (+14). The increased prominence of these topics may signal hospital leaders' greater emphasis on finding efficiencies through many of the central strategies of the All-Payer Model— quality improvement, team-based care, and strict facility management—or it may signal their inability to take further advantage of those opportunities.

The term "safety" ranked 46th in the top 50 topics—an increase of 22 positions from 2017. This shift reflects our finding that hospital leaders increasingly focused on safety, both for patients and staff members, as they considered the appropriate placement and timing of patients' care and as they grappled with the growing needs of patients with psychiatric, substance use, and other behavioral health problems.

2.3 What Strategies Did Hospitals Adopt to Operate Under the All-Payer Model?

This section describes how hospitals responded to the All-Payer Model in its final year. This discussion is organized around strategies that hospitals implemented, rationales for pursuing these strategies, and commentary about how well these strategies worked. *Figure 4* summarizes hospital CFO survey responses regarding strategies hospitals were using at the end of the fifth year of the All-Payer Model. Complete survey responses are in *Appendix B*. Consistent with site visit findings in previous years, the most common strategy, adopted by all Maryland hospitals, was the use of care coordination and care management staff.



Figure 4 Implementation strategies employed by Maryland hospitals

CRISP = Chesapeake Regional Information System for our Patients.

2.3.1 Staffing Strategies

Based on both our site visit feedback and the CFO survey, staffing-related changes were the dominant strategy hospital leaders used to operate under global budgets. In the survey, all hospital CFOs reported investing in care coordination and care management staff; nearly all hospitals also invested in discharge planning staff. Although some hospitals were already using these types of staff, the percentage of hospitals using them increased during the All-Payer Model; in particular, the use of care coordination/care management staff and community health workers increased. For hospitals that already used these staff, there was a marked increase in the level of staffing for these roles and the availability of these staff for expanded hours (particularly during nights and weekends). Most hospital leaders described the importance of care coordination staff to assess patients and direct their care in the ED more efficiently, achieve more timely appropriate hospital discharges, coordinate patient care needs both in the hospital and in post-discharge settings, reduce readmissions, and support patient education. By 2018, many hospitals had almost continuous 24/7 coverage by care coordination/care management and discharge planning staff.

Increased social work staffing reflected hospital leaders' growing recognition that to reduce unnecessary inpatient admissions, expedite safe discharges, and avoid readmissions for some of the most complex patients, they must address non-medical social needs. Consistent with this, in the survey, 74 percent of hospital CFOs reported investments in interventions that address social determinants of health.

Many hospital leaders we spoke with in 2018 and 2019 were decreasing their dependence on community physicians and increasing their reliance on physicians employed by their organizations, either as hospitalists or through direct group contracts (most commonly for ED physician services). Consistent with this feedback, in the survey, 87 percent of hospital CFOs reported having employed physician staff. However, the motivation for this strategy differed based on hospital circumstances. During site visits, some hospital leaders in more rural or economically disadvantaged areas reported they would not be able to attract or retain enough hospitalists and certain types of specialists if they did not employ physicians (and in some cases, entire practices). Nearly all of the rural hospitals we visited in 2019 contracted with ED physician practices, generally with performance-based reimbursement. Hospitals in rural or economically disadvantaged areas that were unable to attract and retain physicians sometimes hired physicians temporarily as contract employees when there was a coverage deficit. This was a major source of financial stress for these hospitals. In suburban and urban hospitals, employing hospitalists was a strategy to more effectively align physician behavior and practice patterns with hospital goals under global budgets. Hospital leaders, and physicians themselves, also reported the increased importance of meeting quality performance metrics¹⁰ to avoid penalties under the All-Payer Model global budget-setting methodology as another reason to employ physicians, because community physicians lacked both the incentives and the time to focus on hospitalbased performance.

¹⁰ The QBR program includes penalties and incentive payments based on quality performance targets.

When things started changing and all these metrics started coming into play the rest of the doctors didn't feel like they could keep up. Where it used to be okay to say, "Well, I go to my office from 8–5 and I'll come at 6 and discharge that patient," that's not okay anymore.... Instead you have people like us, hospitalists, we're here 24 hours a day and could meet those metrics easily.

Maryland physician

Use of community health workers was another common staffing strategy that 81 percent of hospitals adopted. Some hospital leaders found this strategy effective for managing complex patients with social needs and for addressing primary care access limitations. However, some found patients were unwilling to allow community health workers into their homes either because they did not trust them or because they found the service intrusive.

2.3.2 Hospital Clinical Activities and Strategies

We also gathered information on a range of clinical activities and strategies that hospital leaders used to transform care delivery. None of these strategies is entirely new; however, their diffusion among hospitals increased and, in some cases, they were refined over time.

The most common clinical care strategy was the use of patient care plans. In our survey, 94 percent of hospital CFOs reported their organizations regularly employed patient care plans to direct efficient care delivery. In some hospitals, care management or care coordination staff developed the care plans; in others, physicians were responsible. Hospital leaders and clinicians considered care plans effective for organizing and coordinating the care teams treating patients within the hospital, leading to appropriate planned discharges. Despite their widespread use, we heard mixed reviews of their effectiveness, because patients did not adhere to care plans and health goals. Patient compliance and alignment of patient behavior with hospital goals remained a common challenge for all hospitals.

Care plans are great, but the assumption in a care plan is that the patients bought into that care plan are just going to be compliant. And that's not the case. So, they spend a lot of time putting together these care plans and then it doesn't matter because the rogue element is the patient. You can counsel patients all you want, but if they really love a Big Mac and french fries, they're just going to eat it.

- Maryland hospital leader

Other widely adopted strategies focused on managing patient care transitions after discharge from an inpatient admission. Based on our survey, 91 percent of hospitals used care transition programs, 85 percent referred patients to hospital-funded or hospital-supported

alternative care settings,¹¹ 83 percent referred patients to palliative care programs, and 77 percent developed protocols or agreements with clinical partners. These findings are consistent with hospital leaders' increased emphasis on managing patient care beyond the walls of the hospital. This greater emphasis also reflects hospital leaders' anticipation of responsibility for controlling TCOC under the successor to the All-Payer Model.

Some hospitals continued to invest in resources aimed at avoiding clinically unnecessary readmissions. Hospital CFOs reported a range of strategies, including providing patients with a supply of prescription drugs at discharge (79%) and providing patients with disease monitoring or other equipment at discharge (87%). During site visits, hospital leaders also described an increased emphasis on providing patient education prior to discharge, discussing safe discharge options and placement at the time of admission, and having discussions with family members about how patients can care for themselves at home to avoid readmissions. Even with these resources, discharging patients in a timely manner and keeping them from being readmitted remained a major challenge for hospital leaders and clinical staff. Clinical staff often reported that patients were disinterested in detailed information about their diseases, had to be repeatedly reminded to view educational videos and resources, and did not read or did not understand discharge instructions.

You can give the handout and say, "This is your med, this is your education." You can play [the hospital's educational video] and say, "We played you the video." But then they go home and they still aren't necessarily remembering it. And then we do have a form in the back of our folders that we can give them that says, "Hey, fill this out by the end of your admission. If you can't answer all these questions, then you need to ask us questions so you're not going home feeling clueless." They never fill it out.

- Maryland clinician

Hospital leadership was particularly focused on discharge strategies and protocols, as they perceived these to have major impacts on readmission rates. Hospital leaders reported a number of initiatives—improved coordination with PAC facilities, providing 30-day supplies of medications at discharge, and development and implementation of discharge clinics as alternatives to ED visits for post-discharge issues—as ways to better care for patients after a hospital stay. The primary goal of these initiatives was to lower readmission rates, but hospital leaders also believed these initiatives could improve overall clinical outcomes and potentially lower costs.

Use of telehealth and other patient connection technologies was also more widely reported in these later site visit discussions. In our survey, 74 percent of hospital CFOs reported they had implemented telehealth or connected patient technologies for clinical care. Rural

¹¹ Some hospitals directly funded alternative care settings such as targeted outpatient clinics or bridge clinics. These hospitals covered the costs of patients' transitional, follow-up, or even primary care provided in these settings. Hospital leaders believed cost-savings from reduced hospital use covered the clinic costs. Other hospitals provided space for these clinics outside the hospital campus. In these cases, patients or insurers were billed for care provided.

hospitals often used these applications to connect with tertiary care centers for complex patients. Hospitals in both rural and urban settings also used them to connect with, monitor, and follow up with post-discharge patients. One rural hospital leader told us that transformation implementation grants available from HSCRC provided the financial resources that finally made telemedicine feasible.

2.3.3 Health Data and Analysis Strategies

Reliance on data analytic tools increased as implementation of the All-Payer Model matured. By 2018 and 2019, almost all hospital CFOs reported using data and related tools from Maryland's health information exchange, CRISP (98%). During site visits, CRISP data was the most commonly reported tool for ED physicians and staff to understand presenting patients' prior health service use, diagnoses, and health status. In 2017, Maryland began using CRISP as its Prescription Drug Monitoring Program (PDMP) platform and mandated PDMP use for prescription opioids or benzodiazepines in 2018. As a result of this new law, physicians increasingly relied on CRISP as a critical tool for identifying patients with opioid or other drug dependencies, who sometimes shop multiple EDs looking for prescriptions. As one clinician told us: "I can find some serious prescription malfeasance with one click." Clinicians also reported that CRISP helped improve efficiency by giving physicians access to test results, diagnoses, and other information so appropriate care could begin more quickly without the need for repetitive orders.

We use CRISP in Maryland, which has been great. When patients come in the ED, they [clinicians] can go right into CRISP, they can tell where the patient was. We can see what they got done, what type of care, instead of re-running all those tests again. It has been wonderful. Being able to have that data, the cost savings are incredible.

- Maryland clinician

Almost all hospital CFOs (94%) in our survey reported that their organizations used data analytics to support their operation under global budgets. During site visits, hospital leaders told us that they leverage information from their electronic medical records (EMRs) to identify highcost patients, physicians with higher-cost practice patterns, and opportunities for improved quality and cost performance. During the 2018 and 2019 site visits, more hospital leaders than in previous years appeared focused on meeting performance metrics used in setting global budgets—particularly readmissions—and were using data analytics to identify ways to improve, meet standards, and avoid penalties. More hospital leaders also reported investing in some type of customized data analytics than in previous years. Hospitals associated with larger systems often leveraged centralized professional data analytic staff with deep capabilities and access to a range of internal data and external benchmarking data. Leaders in independent hospitals and hospitals in smaller systems also reported investing in customized data analytics, but they tended to have more limited resources and, therefore, more limited capabilities.

Despite the widely held belief that data analytics was a critical strategy, we also heard that the amount of data could be overwhelming and confusing, particularly to physicians and other clinicians. Physicians often told us that they did not always trust the data they received and

found the data too old to be clinically relevant. Physicians also said they did not know what they were expected to do in response to the performance data they received.

I feel overwhelmed by the data coming in sometimes because we're getting it from so many different viewpoints.

We get data from everywhere. Which one do I present? Which one do I count as the real deal?

- Comments from Maryland physicians

Even when they succeeded in identifying the most reliable and relevant sources of data, hospital leaders found it challenging to get physicians and other clinicians to focus on the information. Clinical staff often reported that they felt overburdened with rapidly increasing demands to chart information, document activities, educate patients, comply with performance metrics, and undertake other activities that take away time spent with their patients.

Providers don't understand the data.... They don't have time to really sit and delve down into it. They have a high-level understanding. Providers are so busy and we have a limited time and audience with them, so you have to throw out the key facts they'll remember and take with them. I'm sure if they had the time that they'd love to know more, but their focus is on the patient.

- Maryland hospital leader

We also heard that data alone was not sufficient to change physician behavior. Rather, hospital leadership needed to add the "why" and the "how" to complete the message. Although data analytics was viewed as a critical tool and an effective strategy for operating under global budgets, hospital leaders acknowledged further improvement was needed to transform data into more universally usable information for clinicians.

2.4 What Factors Impacted Hospital Progress and Perceived Success in Operating Under the All-Payer Model?

In the final year of the All-Payer Model, hospital leaders and other stakeholders generally were fully committed to identifying and implementing strategies to operate in the global budget fixed revenue environment. Hospital strategies for operating under global budgets were not static. Hospital leadership often reported they iterated strategies using lessons learned from less-than-successful experiences, refined and built on successful strategies, and identified and developed new strategies to address new challenges.

Generally, hospital leaders and other stakeholders perceived they were operating successfully under the All-Payer Model. Most were achieving budget targets and avoiding significant penalties, and believed they were shifting care delivery from high volume to higher value. However, a few persistent issues remained for many hospital leaders: how to engage with and change the behavior of some high-cost patients; how to reduce costs and develop clinical strategies to address behavioral health problems; and how to fully engage with the physician community.

The negative perspectives regarding the fixed revenue aspect of the All-Payer Model that persisted among some hospital leadership in the early years of the model were absent from our discussions with hospital leaders and other stakeholders in the final model years. Hospital leaders and stakeholders appeared to accept, although they did not always embrace, global budgets as their new normal. By the final year of the All-Payer Model, hospital leaders' concerns about policy design had shifted to the move to care redesign and hospital responsibility for constraining expenditure growth for all health care services under the upcoming TCOC Model. Although hospital leaders expressed support for the state's and CMS' joint commitment to continue all-payer rate setting and even the global budget revenue component of the All-Payer Model, few were confident they understood the plans for this next generation of health care reform.

In the Third Annual Report on the All-Payer Model evaluation, we found leaders at almost three-quarters of the hospitals visited in 2017 were fully engaged and making strides toward successful operation under a global budget. At that mid-point of All-Payer Model implementation, fully engaged hospitals were using data analytics, had a systematic process to identify opportunities for improvement, had implemented strategies to control costs and utilization, and had made progress in physician engagement. About a quarter of hospitals were mostly engaged and had made progress toward many of these core elements but were missing one of the pieces. In the final year of the All-Payer Model, all hospital leadership teams had progressed further in identifying and implementing strategies to respond to global budgets, and many had refined their strategies based on longer experience with the model.

Although all hospital leaders were highly engaged in responding to the All-Payer Model, their experiences still differed based on population or health system factors that either helped structural challenges—"headwinds." Figure 5 is a graphic representation of the major factors that hospital leaders described as either facilitating or inhibiting their efforts to operate successfully in a fixed revenue environment. Facilitating tailwind factors included having a clearly articulated vision accompanied by highly engaged senior hospital leadership; a systematic culture of continuous evaluation, learning, and improvement (or continuous quality improvement); and strategies for waste reduction, including "Lean" approaches.¹² Inhibiting headwind factors included lack of patient compliance or responsibility for costs and utilization and lack of local community referral resources. The absence of tailwind-enabling factors could also contribute to headwinds. Hospital leaders described experiencing both these tailwinds and headwinds to differing degrees. Some factors, which we describe as variable winds, did not affect hospitals in a consistent direction and could be experienced either as tailwinds or headwinds depending on the circumstances in specific hospitals. Lastly, HSCRC policies define the fixed revenue environment, or the atmosphere, in which hospitals operate. These policies can

¹² "Lean" approaches refer to steps that are commonly part of the Lean Six Sigma management methodology, which relies on collaborative team activities to improve performance by removing waste and reducing inefficient variation in practices.

augment both the headwinds and tailwinds hospitals encountered under the All-Payer Model. The following sections describe each set of factors in more detail.





2.4.1 Tailwinds

Leadership and Vision. During our hospital site visits in 2018 and 2019, it became clear that senior-level leadership at the hospital (or health care system) level was critical to hospitals successfully adapting to global budgets. In earlier site visits, leadership seemed important primarily for establishing a positive atmosphere and acceptance of the major changes caused by the All-Payer Model. As hospital strategies matured, more complex explanations emerged about how effective senior leadership contributed to successful operation under global budgets.

In our survey, most CFOs reported that their hospital had clear leadership for All-Payer Model implementation. Seventy-two percent responded that they had a clearly designated leader, and nearly all reported that either the hospital chief executive officer (CEO) or CFO played this role. Senior leadership at hospitals was also reported to be more highly engaged in implementation than clinicians. Senior executives were rated an average of 9.2 (out of 10) on a global budget engagement score, compared with 6.7 for physicians and 5.4 for bedside nursing staff. This suggests that senior executives, and particularly hospital CEOs and CFOs, played a critical role in hospitals adapting to the All-Payer Model.

During site visits, we heard that leadership was critical in translating big, high-level concepts (such as, operating under fixed revenues, turning from volume to value) into operational strategies. As one hospital leader remarked: "What's critical about leadership is the translation of the larger visions and goals of [global budget revenue] into operational 'asks' for the clinical staff." Hospital leaders also viewed senior leadership as critical to creating the vision of an evidence-based, value-driven culture toward which the organization should collectively strive and their demonstrated commitment as essential for driving change. We were told that leadership was needed to re-tool how clinical staff approached care, costs, and patient experience, and that their decisions on whether and where to invest limited resources to support these changes sent critical messages to the entire hospital organization.

Particularly in 2019, site visit key informants described the importance of effective hospital senior leadership in managing difficult personnel changes. Several hospitals were undergoing significant management changes to continue to adapt to the All-Payer Model. Organizations seemed attuned to making sure they had the right staff, particularly in management roles. One hospital leader admitted that the organization had a long-standing culture problem that required significant staffing changes to resolve: in the new environment, "…some staff just needed to go." As hospital leadership continued to develop strategies, they were working on ways to be clearer about expectations, metrics, and performance.

Effective leadership was also described as valuable in engaging staff. Vertical engagement and buy-in from staff—through committees, opportunities for feedback and input, and a sense of involvement in decision making—were all described as important for making positive changes.

Conversely, hospitals that we visited that lacked effective leadership seemed to struggle more with staff engagement and commitment to hospital goals and new directions. Physicians at these hospitals seemed to harbor greater levels of frustration, and hospital leaders were less clear on necessary changes and successful strategies for operating under a global budget and the path forward as they looked toward responsibility for managing total patient care expenditures under the TCOC Model.

Normally the word "bureaucracy" has a negative connotation but in this situation, I think that bureaucracy has been instrumental in helping improve quality and providing the resources that we need to ...solve some of these problems. Because individual physicians can't really see the full picture, they can only see what they're doing, and this ...provides them a ten-thousand-foot view of what's happening.

- Maryland clinician

Culture of Improvement. Hospital leadership teams that felt they were operating successfully under global budgets tended to have implemented a specific continuous improvement construct. Hospital leaders most commonly reported using one of the variants of Lean Six Sigma, although they also described other strategies. Hospitals that adhered to a Lean or other continuous improvement program often adopted regular use of multidisciplinary rounding (reported by 89% of CFOs as an implementation strategy). All levels of staff felt leaders at hospitals implementing these programs were open to suggestions and feedback, which led to opportunities to identify better practices and solve problems. These organizations also generally had strategies to improve quality in innovative ways.

Waste Reduction. Although reducing inefficiency and waste in hospital operations and clinical care should be a core strategy for hospitals operating under fixed revenues, not all hospital leaders had specific ways to identify these cost-cutting opportunities. Hospital leadership teams that systematically looked for waste tended to have strong leadership and continuous improvement strategies. Hospital leaders most commonly identified consolidating medical supply purchasing as a waste reduction strategy. Hospital leaders found limited clinical justification for purchasing multiple versions of medical supplies (for example, surgical joints) and significant opportunities for savings when options were consolidated, which put them in a stronger negotiating position with suppliers. Some hospital leaders also found that limiting access to medical supply and pharmaceutical representatives produced significant savings by reducing duplication and unnecessary purchases. Leaders in some hospital reported they were forming collaboratives to leverage market power to reduce supply costs. Hospital leadership sometimes described these waste reduction strategies as having importance beyond the financial savings; they sent clinical staff the message that the hospital was looking at all options to reduce spending that does not return value and preserve important resources.

2.4.2 Headwinds

Patient Compliance. During site visits in 2018 and 2019, all hospital leaders identified lack of patient compliance and responsibility as their strongest and most consistent frustration. This frustration was also common in previous years. As one physician noted: "It's all on us.... We are trying to help patients, we're throwing hundreds of hours at this, and patients don't want

to do this." Hospital leaders all reported that the lack of a mechanism to account for patient compliance and responsibility was a major flaw of the All-Payer Model. Hospital CFOs most frequently cited patient noncompliance/non-engagement as a significant challenge to hospital operations under global budgets, identified by 47 percent as one of their top three organizational challenges in our survey.

Providers in hospitals that had made significant investments in care management and population health initiatives viewed some patients' continuing pattern of repeated readmission to the hospital as outside their control. Hospital leaders expressed frustration that they were penalized for patients who were readmitted or required more costly care because they did not attend their follow-up appointments or take their medications.

Patients – they have no skin in the game. The patient has the ultimate autonomy so we're being forced into becoming a paternalistic system where we're responsible for people all the time. We can't make people not smoke or return for their follow-up visits. We can incentivize them, but there are diminishing returns/unintended consequences.

- Maryland clinician

Some hospital leaders tried to prevent readmissions by using strategies such as hiring case managers to find primary care providers with open appointments, partnering with local pharmacies to deliver medication at the bedside before discharge, or establishing their own specialty outpatient clinics (for example, discharge clinics or chronic disease clinics) to increase the availability of follow-up appointments and help patients adhere to their discharge instructions. We heard multiple instances of hospital leaders and clinicians seeking to understand and address the root causes behind patients' lack of adherence to care plans.

One of our first patients in the [hospital outpatient clinic] was a 50 something year old gentleman who was a bilateral amputee from long-standing diabetes and he was constantly coming in with blood sugars in the seven hundreds. And he would just keep bouncing back and bouncing back. So my physician who leads the [hospital outpatient clinic] was after him constantly to try to get him to come in and the social worker met with him and found out where he lives. He had no electricity so he had no refrigeration, so he kept his insulin on the window because that was the coldest part of the apartment. And he wasn't taking his medication...but after she had called him like 18 times he finally said, "I get the feeling you really care about what happens to me." So there have been some successes.".

- Maryland hospital leader

Despite these efforts, some patients remained noncompliant and continued to rely on the hospital as their primary source of medical care. This was particularly true regarding use of the ED. Hospital leaders implemented a range of strategies to redirect patients to clinics, primary care, and other resources for non-emergent health issues. Still, most hospital leaders and clinicians reported that some patients persisted in coming to the ED, no matter what alternatives they offered patients, including cheaper alternatives and alternatives that would allow them to be

seen more quickly. Hospital leaders and clinicians were concerned about being held accountable for a wider range of health care services under the TCOC Model absent a systematic mechanism to account for patient noncompliance or to encourage patients to take responsibility for their own outcomes.

Limited Community Resources. Hospital leaders in both rural and traditionally disadvantaged geographic areas were more likely than their counterparts in urban and more financially prosperous communities to cite lack of community referral resources as an ongoing challenge in meeting the goals of the All-Payer Model. Hospital leaders in all areas cited the growth in behavioral health disorders as a challenge to their success operating under global budgets. Hospitals varied significantly in the extent to which this was a problem, and those in rural and economically disadvantaged markets were most heavily impacted by these factors. Hospitals in rural or disadvantaged areas also faced challenges recruiting and retaining key clinical specialists, because their volumes were insufficient to support them with patient billing alone. Hospital leaders in these situations were more likely to either purchase practices or employ physicians in needed specialties. Finally, some hospitals in rural and disadvantaged areas serve populations with higher prevalence of health-related social needs, including food, transportation, housing, and other basic needs. One hospital that served a disadvantaged neighborhood had instituted programs that identified affordable housing and job training to address the social determinants of health in their community.

2.4.3 Variable Winds

Physician Engagement. Some hospital leaders described substantial progress in engaging their physicians in global budget strategies. Physician engagement was described as a facilitator of success under the All-Payer Model. However, most hospitals were still struggling to fully engage their physicians in the move to value-based care. A number of hospital leaders noted that they were moving toward employed or contracted physician models to improve engagement and accountability. Hospitals also used reimbursement based on performance and adherence to hospital strategies and programs to increase physician engagement. But financial alignment was not always sufficient to achieve physician engagement. As one hospital leader noted: "The end goal is not to need financial incentives. The goal is to become a highly functioning care team like Cleveland Clinic or Mayo."

In theory, one goal of the CRP was to create greater financial alignment and operational engagement between hospitals and physicians. Continued lack of engagement and awareness, even among CRP participating physicians, suggests that this goal was not fully accomplished during the All-Payer Model¹³ (see *Section 2.4* for more detail on the CRP).

Clinical Accountability. A related factor was physician accountability; some hospital leaders shared metrics on performance and quality to motivate physicians and improve accountability. When this was successful, hospital leaders saw sharing metrics as a facilitator or tailwind. Other hospital leaders cited metric overload and physician mistrust of the data presented; physicians often questioned the accuracy of the data for their patients, its timeliness, or its reflection of the care they provided themselves as opposed to someone else on a patient's

¹³ The CRP is continuing under the TCOC Model with some modifications (see *Section 1*).

care team. In these cases, accountability programs could inhibit progress. Most hospital leaders were still looking for an effective strategy to increase physician accountability and viewed this factor as an inhibitor to continued progress. Some hospital leaders had begun to establish staff positions to support data and metric translation for physicians; often, these were roles filled by physicians based on the belief that physicians were the most effective communicators and persuaders of their peers.

Fixed Revenue. Fixed revenues under global budgets were a third factor that hospitals experienced in very different ways. Some hospital leaders viewed their global budget as a major benefit that guaranteed them a more predictable revenue source, especially those with decreasing patient volume. However, most hospital leaders reported that there was insufficient margin built into their rates. This was particularly a challenge for hospitals with growing market share; only a portion of the revenue for their increased patient volume was transferred to them from hospitals with declining market share, and there was a lag before their budgets reflected their higher volume.

2.4.4 HSCRC Policy Making—the Atmosphere that Comprises the Fixed Revenue Environment

Hospital stakeholders raised several issues with HSCRC policy making and the methodologies used to calculate global budgets that they perceived as complicating their ability to make progress and to operate successfully under the All-Payer Model.

Complexity and limited transparency of the global budget methodology—Hospital concerns regarding the incomplete and therefore limited transparency, complexity, and lack of predictability of HSCRC policy for setting all-payer rates and global budgets and for establishing performance targets for the QBR program became more acute as the model matured and penalties for performance were implemented. Hospital, state, and interest group leaders all acknowledged that the All-Payer Model was implemented very quickly on an aggressive policy timeline. Under these circumstances, they understood that some details of the global budget methodology would evolve over time. However, hospital leaders felt that the evolution of the global budget methodology never really settled down. As one hospital leader told us: "The thing that is frustrating with the program...is that every time you sort of make some progress in these programs new regs come, new penalties. You can never get ahead of it...because the rules change." Nine percent of hospital CFOs in our survey cited the aggressive timelines for implementing policies as a top challenge of the All-Payer Model.

HSCRC is very much the Wizard of Oz for me. It's a lot...like, someone's behind that curtain...: Can someone please just help me understand why this is happening or what happens if this happens?

- Maryland hospital leader

Hospital leaders and industry stakeholders also consistently reported that they did not understand the "rules of the game." While hospital leaders noted that they had access to HSCRC policy makers and often said they were able to discuss issues and problems freely with state staff, they were also frustrated that All-Payer Model policy overall was not more transparent and predictable. In our survey, 34 percent of hospital CFOs cited the complexity of global budgetrelated policies as one of their top operational challenges.

Market shift adjustment and retention of savings—Hospital leaders were almost universally frustrated by HSCRC polices related to the market shift adjustment. From the beginning, they described this aspect of the global budget update methodology as confusing and unpredictable. Hospital leaders seemed to understand the underlying premise that hospitals with reduced volume in a given year would lose revenue, that hospitals with increased volume would get additional revenue, and that neither the revenue reduction nor the revenue increase would be proportional to the volume shift. But beyond the basic premise, we heard widespread disagreement on how exactly this market shift was, or should be, calculated and implemented. Some hospital leaders believed they were consistently on the receiving end of additional volume from other facilities for which they were never appropriately compensated.

... in the market shift adjustment, ... revenues moved from facilities – the losing hospital still retains the higher portion of volume—more money stays with initial hospital than the receiving hospital. [I] don't think it's sustainable—money needs to follow people.

- Maryland hospital leader

From the start of All-Payer Model implementation, hospital leadership teams expected they would be permitted to retain at least a proportion of the savings they generated under their global budget. The expectation they would be able to retain savings was what appealed to hospital leaders about the model, and many counted on this to support investments consistent with the move from inpatient to outpatient care, and from volume to value. In practice, hospital leaders reported that they felt they were penalized for appropriately shifting care to alternative clinical settings outside the hospital and that they were not allowed to retain savings in the way they expected. Leaders in hospitals experiencing declining volume described the difficulties that sharp decreases in their global budgets would pose to maintaining minimum levels of care in their communities.

We knew there would be adjustments for PAUs, market shift, we didn't know about the 10 percent corridor rate rules. That was an initial problem because it was implemented 6 months into it. We didn't know about it and a lot of hospitals had gotten rid of volume and were now under their budget and couldn't get their budget back.

- Maryland hospital leader

Our discussions with hospital leaders, state officials, and industry stakeholders suggested that the state was considering some policy changes that could affect hospital market shares, but decisions on the new policies had not been made. Uncertainty regarding the specifics of these future policies made strategic decision making more difficult for hospital leaders.

Patient satisfaction—Clinicians and hospital leadership consistently expressed concern about the disproportionate impact of patient satisfaction scores on the calculation of QBR payments and penalties under the All-Payer Model. Although hospital leaders agreed on the importance of tracking and improving patients' experience during their hospital stay, they were frustrated with the large impact that Hospital Consumer Assessment of Healthcare Providers and Services (HCAHPS) scores had on budget updates given their perception hospitals had the limited control over some aspects of the scores. Clinicians also noted that high patient satisfaction scores are not necessarily indicative of good quality care.

You know, we're giving them patient satisfaction scores based on...this customer service stuff when...you're [not] going on vacation.... How satisfied were you with your room and your meal? We're not focusing on what is important, which is the outcome of your patient.

- Maryland clinician

Hospital leaders implemented a range of strategies to improve patient experience, as well as avoid the significant penalties associated with poor performance. These included hiring a dedicated staff member to oversee patient experience and implementing real-time feedback mechanisms to identify issues before discharge. Still, few hospital leaders felt that these strategies improved patient care or efficiency in a meaningful way.

Adequacy of update factors and revenues—Not surprisingly, hospital leaders frequently voiced concerns about the adequacy of global budget updates to fund hospital operations. Inadequate resources to implement strategies to respond to global budgets was cited by 47 percent of hospital CFOs as one of their top organizational implementation challenges. Forty-three percent of hospital CFOs reported that insufficient hospital rate increases was a top challenge in operating under a global budget. During site visits, hospital leaders noted that the methodology for setting global budgets did not have an explicit mechanism for funding medical education, clinical innovation, and needed capital upgrades, renovations, and updates. Hospital leaders and stakeholders acknowledged that some money was available either from grants (for example, the Regional Partnership or Infrastructure Transformation programs) or through rate adjustment applications directly to HSCRC. However, hospital leaders and some clinicians felt the All-Payer Model lacked a vision for how these elements of a high-quality health care system would be funded in the long term.

Hospital leaders recognized that these investments were expected to be funded using savings from increased operational efficiency; some hospital leaders described instances when they were able to turn savings into appropriate investments. But other hospitals, particularly smaller independent hospitals with smaller total budgets, pointed out the limitation of relying only on efficiency to make critically needed investments or care for complex patients.

[Providers at my hospital] were so efficient in the way in which care was delivered that we became really very lean, but very lean doesn't support the complexity of [some ICU] patients.

- Maryland clinician

Over the course of All-Payer Model implementation, two traditional inpatient hospitals transformed into different types of facilities, and several more were in the process of transforming when the All-Payer Model ended. Pressures for operational efficiency drove some of these facilities to close or focus their services on an ambulatory care model. Staff in these hospitals felt they bore most of the burden of negotiating with and notifying their communities, who were unhappy with losing their community hospital and having to travel farther for care, and were not persuaded by evidence that low patient volume can adversely affect quality of care. As one frustrated clinician told us: "[Patients] are willing to travel the extra 12 miles to go to Chick-fil-A, but [they aren't] willing to go 12 miles to have a screening colonoscopy. [Patients] want it in [their] backyard." Hospital staff found it difficult to navigate these issues, which impacted morale.

Particularly in the final year of the All-Payer Model, hospital leaders seemed more concerned about ensuring that their revenues were not reduced by performance-based penalties: "It's getting harder and harder to earn the [global budget revenue] money and easier and easier to lose the money through penalties." Several hospitals had increased their attention to key performance metrics like readmissions and patient satisfaction, in some cases debriefing and examining every readmission for lessons learned.

Finally, hospital leaders frequently questioned why the burden of generating efficiencies and savings in the health care system seemed to fall on them alone. They viewed other participants in the system—patients and private insurers particularly—as having no responsibility or risk under the All-Payer Model, despite their role in driving health care expenditures. Insurers that we interviewed, on the other hand, expressed some frustration that hospital rates continued to increase, driving up costs.

2.5 What Were Hospitals' Experiences with the CRP?

During the fourth year of the All-Payer Model, CMS amended its agreement with Maryland to include the CRP. The CRP sought to better align incentives of Maryland hospitals with hospital- and community-based providers, with the aim of reducing potentially avoidable hospital utilization and internal hospital costs. Under the CRP, participating hospitals would provide participating physicians, known as Care Partners, with a share of financial savings generated from specific interventions. The CRP included two tracks—HCIP and CCIP. Under HCIP, Maryland hospitals engaged hospital-based providers to improve hospital care and care transitions. Under CCIP, hospital leaders engaged community-based providers and offered them care managers and coordinators to assist patients that met specific high cost and use criteria. Hospitals could choose to participate in neither, one, or both tracks.

2.5.1 Hospital Participation

Figure 6 shows the number of hospitals enrolled in the CRP over time. Initially, 16 hospitals joined the CRP with 10 hospitals agreeing to participate in HCIP and 6 in CCIP in July 2017. In January 2018, the University of Maryland hospital system and its affiliate hospitals agreed to participate in the CRP, which nearly doubled the total number of participating hospitals. Five hospitals that originally joined the CRP in July 2017 as an HCIP or CCIP hospital decided to participate in both tracks in January 2018. In mid-2018, CMS announced that physicians participating in the CRP could qualify for payments as part of the Quality Payment

Program under the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). Based on our discussions with hospital leaders and physicians, this policy guidance dramatically changed hospitals' interest in the CRP and their ability to recruit physicians to participate. In our survey, 36 percent of hospital CFOs cited the ability to satisfy other regulatory requirements, including MACRA, as a key factor in their decision to participate in the CRP. Following this announcement, 13 additional hospitals joined the CRP, and all 3 major hospital systems in Maryland—Johns Hopkins, University of Maryland, and MedStar—participated. By the end of the All-Payer Model (December 2018), 43 Maryland hospitals (91%) were participating in the CRP.



Figure 6 Hospital participation in the Care Redesign Program

Since the beginning of the All-Payer Model, hospital leaders and clinicians identified the misalignment of physicians' financial incentives with the goals of hospital cost and volume reduction under global budgets as a challenge to hospitals' successful response to the All-Payer Model. According to one hospital leader: "[The] school of medicine says [physicians] need to be more productive, but [the] hospital is telling them not to bring in more volume. We have contrary strategies." Although the CRP was developed to better align hospitals' and physicians' financial incentives, one-third of CFOs participating in our survey did not identify achieving better financial alignment with physicians as a factor in their decision to join the program.

Figure 7 shows the hospital CFO survey responses regarding reasons for their hospital's decision to participate in the CRP. Hospital leaders most frequently identified getting access to

Medicare data (82%) as a factor in their decision.¹⁴ Seventy-two percent of hospitals joined the CRP to develop relationships with physician partners in anticipation of the TCOC Model, 69 percent joined the CRP to fully participate in CMS and HSCRC initiatives, 67 percent joined to achieve better financial alignment with physicians, and 49 percent joined to improve financial alignment with other clinicians. As noted earlier, 36 percent of all hospital CFOs and 44 percent of participating hospital CFOs cited satisfying other regulatory requirements as a motivation for joining.





Initially, only one-third of hospitals agreed to participate in the CRP. During the early implementation of the CRP hospital leaders described concerns about participation that ranged from the onerous administrative requirements to having other gainsharing initiatives in place at the hospital. CRP participation required hospitals to complete a 55-page participation agreement that outlined the rules and requirements of the program, which hospital leaders described as both arduous and complicated. Also, although the CRP was launched in July 2017, the paperwork was not available and could not be completed until the fall of 2017. One hospital leader commented, "The pace [at] which [the CRP] was pushed out without finalizing the rules, regulations, and

¹⁴ Hospitals participating in the HCIP track received annual reports from Applied Medical Software (AMS) with outcomes and other metrics for Medicare patients receiving care at the hospital.

documents was very challenging." Eighty percent of CFOs at hospitals that were not participating in the CRP at the time of our survey felt the HCIP and CCIP participation requirements were not feasible for their hospital.

Three of the five CFOs who reported that their hospital did not participate in the CRP¹⁵ indicated that they would not be able to achieve the necessary physician engagement to implement the program. Leaders at hospitals that used contract physicians found it challenging to engage physicians in the CRP and, in some cases, not a worthwhile investment.

We use a significant component of locums on our behavior health unit. Our hospitalists are outsourced, our ED coverage is outsourced, our ICU is outsourced. So, I think that part of the reason that we've shied away from [the CRP]...was financial, and part of it was the physician engagement component.

- Maryland hospital leader

The CFO at one non-participating hospital reported the hospital had implemented its own financial alignment initiatives (such as gainsharing, or a bonus system). Among hospitals participating in the CRP, nearly half (46%) implemented an additional initiative to better align their physicians and the hospital's financial incentives. As one hospital leader highlighted, "Those hospitals with a majority of employed physicians are not excited about gainsharing [HCIP]; they already have a bonus plan for physicians built on quality metrics."

2.5.2 Physician Recruitment

Hospitals were required to actively engage physicians in the CRP by having them sign a Care Partner Agreement. During site visits, most hospital leaders identified enrolling physicians in the program as an ongoing burden, which they addressed in varying ways. Some hospital leaders slowly rolled out the CRP to physicians by unit. CRP administrators or physician leaders engaged physicians within a unit and over time expanded the number and type of physicians engaged. This approach allowed hospitals to adjust their engagement message, begin implementation on a small scale, and focus on a single issue such as sepsis or cardiac care. Hospitals that used this roll-out approach had smaller numbers of Care Partners initially. However, these hospitals often applied protocols or care changes adopted for the CRP to a broader group of physicians than just the Care Partners. Thus, physicians at these hospitals were impacted by the CRP even before enrolling as Care Partners. Many hospitals relied on their chief medical officer (CMO) or other physicians to enroll Care Partners. One hospital leader shared: "Our CMO [and] I interviewed every doctor and had them...sign the physician agreements." These hospital leaders and physicians felt that having a physician peer or "champion" explain the CRP enhanced physicians' understanding of the program and their desire to participate.

¹⁵ Five hospital survey respondents reported not participating in the CRP but documentation from CMS on hospital participation showed that four hospitals were not participating in the CRP as of July 2018.

Despite these efforts, nearly all hospital leaders and physicians considered communication and messaging about the CRP to be an area that needed improvement. During focus groups, numerous Care Partners expressed confusion and an overall lack of awareness about the CRP, despite having signed a Participation Agreement.

The communication has been challenging because this is one of the first times we've had to fully involve [physicians] and [get physicians to] understand that they are part of the waiver. The physicians didn't feel the waiver as much as the hospitals do. That's a complicated message to give.

- Maryland hospital leader

Another hospital leader explained, "[Physicians are] doing the work. They just don't know that [the work they are doing is] part of the HCIP." Some hospital leaders used large group meetings to recruit physicians, rather than individual contacts. Physicians who enrolled without an individual conversation were less aware of the CRP and their participation in the program than were their counterparts at hospitals where leadership individually enrolled or engaged physicians. One physician at a hospital that engaged staff in large group settings shared, "I've heard HCIP over and over and over again but couldn't have given you that salient of a description and couldn't actually tell you if I thought that was right or not."

For nearly all hospitals, physician participation in the CRP increased following CMS' decision to tie it to eligibility for MACRA's quality payment program.

We've been [participating in the CRP] for a year, going on two...and the docs are getting 25 cents back [as a result of the shared savings]. I mean, they've got to be incentivized better than that. Again, using the colloquial term we have coined here, the 'MACRA-tization,' getting them approved for MACRA, getting them approved for an alternative payer model, if that works, that is worth it to them.

- Maryland hospital leader

2.5.3 Implementation

Hospital leaders' approaches to implementing the CRP differed in whether they built on an existing program or initiative that provided similar services or financial incentives, such as ACO initiatives. Sixty-four percent of hospitals participating in the CRP built their HCIP or CCIP initiative on an existing hospital program or initiative. In most cases, these existing hospital programs were performance-based reimbursement mechanisms that paid contract or hospital employed staff based on quality, financial, or other specific metrics. As one hospital leader explained, "One of the reasons we got into CCIP was to formalize what we were already doing. We've been doing care management for 5–6 years." Most programs that the CRP built upon were relatively new—implemented in the past 6 months to 2 years—and could easily incorporate changes by leveraging already established partnerships or relationships with physicians or other community organizations and existing infrastructure. For example, one hospital built its CCIP initiative on its ACO program and engaged the ACO community physicians to provide enhanced care coordination to the subset of ACO patients that met CCIP eligibility criteria. Hospitals that built on existing programs were able to start up their CRP programs more quickly and with fewer barriers than those that established a new financial incentive program.

For hospitals creating initiatives from scratch, implementation was much slower. One physician shared: "I think this CCIP program just doesn't feel like it's quite gotten off the ground yet." Hospitals participating in HCIP often used AMS data to identify areas with potential for cost savings and improved care outcomes around which they could develop their CRP initiative. These hospitals often targeted multiple areas.

When we looked at AMS simulation data, it drove us to several areas, DRGs, where we have opportunity to reduce our costs.... One of the top areas we felt we could focus on since it was our greatest opportunity financially was length of stay.

- Maryland hospital leader

CRP implementation generally involved identifying staff to run the program, determining the areas of focus, engaging physicians, and developing models of care that would change physician behaviors and care practices. CRP implementation protocols documented hospitals' areas of focus along with outcome measures and criteria for shared savings calculations. Most hospital leaders selected one to three areas as the initial focus for CRP implementation and outlined plans to expand to additional areas in their implementation protocols. Hospital leaders most commonly selected to focus on care coordination, patient safety, patient and caregiver experience, and clinical care.

Many hospital leaders viewed the CRP as a complex initiative to implement, particularly CCIP, which involved multiple types of clinical staff and large-scale changes within the hospital and by community-based practitioners. Under CCIP, hospitals provided care management to patients seen by community physicians. Some hospitals paid for care managers who were embedded into community physicians' practices. Other hospitals used hospital-based care managers to provide case management to CCIP-eligible patients receiving care in the physicians' office. Physicians participating in CCIP were required to develop care plans for their patients; however, in focus groups, most physicians participating in the CRP were uncertain about how these care plans were being used or why they were being created.

What was not made clear was really what's the advantage? If we've got a whole lot of paperwork to do on an individual patient and we already feel like we're doing a good bit for [the patient], why do we want to involve ourselves in a cumbersome process of paperwork?

- Maryland physician

HCIP initiatives often used the hospitals' EMRs to support practice changes. For example, a few hospitals targeted sepsis as part of their HCIP and focused on physicians' sepsis

bundle compliance and sepsis prevention activities. Hospitals reprogrammed their EMR to include a sepsis warning that used an algorithm and patients' vital signs to determine when a patient was at risk of developing sepsis. When a patient's vital signs triggered the warning, physicians were required to document how they addressed the risk in the EMR. Other HCIP initiatives used data dashboards or additional clinical staff, such as discharge planners, to address target areas like length of stay or readmissions. Despite these efforts, hospital leaders and participating physicians highlighted that changing physicians' behavior to affect the targeted metrics was often challenging.

To actually change behavior, you have to have good data that shows exactly what's going on and what other people are doing. And for a physician to take the time out of their already busy schedule to be doing that kind of analytic stuff is—it's hard. It's hard to find time to do much else as a doctor, let alone become a data analyst.

- Maryland hospital leader

Hospital leaders remained uncertain about how to guide physicians through the behavior change necessary to affect patient outcomes. Even at hospitals where physicians received shared savings, neither physicians nor hospital leaders were entirely sure what processes or changes generated these savings. Moreover, there was no consensus among hospital leaders about the size of incentives needed to motivate physician behavior change.

Well, I mean, while the best motivator for doctors is probably using money to affect their behavior, it seems as though that's not ideal. It should be what's best for the patient or the society, or something other than what's best for their pocket.

- Maryland hospital leader

Another hospital leader shared: "Opioids and sepsis are important quality measures for our community, and that's what physicians are going off of."

As noted earlier, many physicians participating in CRP focus group discussions were unaware of the program, regardless of whether the hospital where the physician was a Care Partner implemented the CRP in July 2018 or later in the year, although all of them had signed a Participation Agreement for either HCIP or CCIP. Some Care Partners could describe hospitalwide quality or care initiatives and changes made within the hospital and its EMR that seemed to align with the hospitals' CRP implementation plans, even though they did not connect these initiatives or changes to the CRP. Also, hospital leaders consistently emphasized the challenge of introducing the CRP to physicians, staff, and the hospital overall amid global budget implementation and other health delivery reforms. I don't think [hospitals have] collectively done a very good job at messaging what [the CRP] is and why it is important. I think there are always a lot of initiatives and a lot of competing priorities. So, trying to message what's really most salient at the time I think is kind of a challenge.

- Maryland hospital leader

Among physicians that were aware of the CRP, some noted that physicians might receive shared savings under the CRP without changing their behaviors or how they provide care because CRP initiatives sometimes targeted areas, such as length of stay or readmissions, that were already a hospital priority.

Most of the things that have been discussed [as hospital changes], they have been happening from the hospital administration prior to [the CRP]—[these initiatives] about length of stay and readmission.

- Maryland physician

Some physicians questioned whether the focus areas selected by the hospital were appropriate or promoted the best patient care, and some questioned whether their practice changes had a significant impact on patient outcomes and the targeted metrics. Some expressed concern that the changes were compromising quality to save costs. Still other physicians aware of the CRP questioned whether the hospital initiatives were well thought out.

The sepsis score, this opiate initiative is certainly well intentioned, but we don't have any sense of what the intent is and how to improve it and what the rationale for that improvement is.

- Maryland physician comments on a HCIP initiative

2.6 Discussion

Significant transformation occurred among Maryland hospitals over the 5 years of All-Payer Model implementation. Hospital leaders, clinicians, and other stakeholders demonstrated that, despite ongoing concerns and challenges, they ultimately were willing to accept the considerable uncertainty of a major change to their payment methodology. Hospital leaders' continued concerns about some policies—most notably related to the market shift adjustment and the relatively large potential impact of the patient experience score on hospitals' quality-based reimbursement—did not derail progress and we noted a strong sense of collaboration between hospital leaders and HSCRC in working through complex issues. In the course of our site visits, focus groups, and stakeholder interviews, respondents raised several recurring challenges related to implementation of the All-Payer Model that may be important to consider as Maryland moves forward with the TCOC Model and assumes responsibility for limiting growth in total Medicare expenditures: lack of physician alignment; patient noncompliance; how to support medical innovation and teaching; and limited transparency and predictability of HSCRC policies. While

some specifics of the themes evolved, these issues were identified early and persisted throughout All-Payer Model implementation.

Lack of physician alignment—Hospital fixed revenue budgets lie at the heart of the All-Payer Model. Hospital leaders adopted strategies to control expenses and utilization that allowed them to operate within their fixed revenue budgets. Unlike hospitals, physicians continued to be paid on a FFS basis and often had productivity targets that incentivized higher volume. Lack of alignment between hospital and physician incentives also related to non-financial aspects of the model. The All-Payer Model drove hospitals toward different clinical models (including a deliberate shift from inpatient to outpatient care), a focus on efficiency and value that clinicians sometimes perceived to be a move away from innovation, and a reliance on performance and metrics in place of less formalized clinical judgment. Physicians told us they sometimes struggled with these changes and felt a lack of "alignment" with hospitals beyond finances and payment.

Over the 5 years of the All-Payer Model evaluation, hospital leaders and physicians alike shared concerns about aligning and engaging physicians in the All-Payer Model. In the first three years of the model, hospital leaders focused on informing physicians about the All-Payer Model and engaging them in select aspects of the model, such as quality improvement. Physicians seemed knowledgeable about the metrics and quality incentive payments tied to the All-Payer Model through the QBR program and they were aware of key aspects of the QBR program, such as the inclusion of patient satisfaction as a performance metric. Despite widespread knowledge about the QBR program and the All-Payer Model's value and performance focus, physicians who received FFS reimbursement had financial incentives that were misaligned with those of hospitals operating under fixed revenue budgets.

Late in the implementation of the All-Payer Model, hospital leaders were more engaged in trying to identify ways to align physician incentives with the fixed revenues of hospital global budgets. The CRP, which was introduced around this time, offered physicians opportunities to share savings with the hospitals. The CRP's gainsharing approach was designed to align physicians' payments with the hospitals' focus on cost savings and specific quality improvements. However, hospital leadership teams implementing the CRP at this early stage found it difficult to message this new program to physicians, much less convey the physician care changes necessary to generate impactful and lasting cost savings. Hospitals leaders were working on ways to educate and engage participating physicians, but some saw this as a longterm challenge. Hospital participation in the CRP grew considerably over time and, by the final year of the All-Payer Model, nearly all Maryland hospitals were participating. Despite the growth in participation, it is too early to draw conclusions about whether the CRP can align physicians' payments and ultimately their behaviors with the interests of hospitals operating under fixed revenue budgets. Also, the CRP was overshadowed by hospitals' growing efforts to put in place other mechanisms for incentivizing and sharing hospital cost savings with physicians, such as performance-based physician contracts that included quality metric targets and ACOs. At the same time, even physicians with performance-based contracts were subject to productivity targets that incentivized generating volume and ran counter to hospital incentives under the model to reduce unnecessary volume and costs.

The CRP changed with the state's transition to the TCOC Model in January 2019. Under the TCOC Model, the CRP expanded to include a third track that focuses on episode-based care or bundled payments. The state also introduced the Maryland Primary Care Program and planned to discontinue CCIP at the end of 2019. It is unknown how hospital leaders will implement these multiple initiatives and, more importantly, if they will more meaningfully engage physicians in them.

As Maryland moves forward with implementation of the TCOC Model, the importance of physician alignment grows. Under the new model, hospitals will need to expand physician alignment beyond their four walls and engage community-based physicians in reducing costs and unnecessary care. Identifying mechanisms and strategies for engaging these physicians will be important. Also, changing the medical community's approach to physician contracts so that they no longer include productivity targets may be important for facilitating physician alignment with the TCOC Model goals. One clinical leader suggested physician behavior and practice patterns, such as the pace at which physicians work, can be difficult to change even with better aligned financial incentives.

But if you build a system ... and everyone's aligned on a common goal... It's not gonna turn a slow doc into a fast doc. It's not gonna take a fast doc and put him in even to a faster doc.

- Maryland clinical leader

Patient noncompliance—Throughout the All-Payer Model, hospital leaders and clinicians consistently highlighted the challenge they faced getting patients to comply with medical advice and manage their health appropriately. Moreover, the All-Payer Model did not incorporate any mechanism to align patient behavior with the model's goals. For example, despite the efforts and initiatives of hospitals, patients continued to rely on the ED as their site of care even when other, better options are available. Hospital leaders raised persistent concerns that responsibility for and the consequences of unnecessary utilization lie solely with hospitals, whereas the patients have been subject to neither. By the end of the All-Payer Model, no Maryland hospital had made much progress in mitigating this challenge.

Hospitals were also held accountable for ensuring patient satisfaction with their inpatient care experience. Some clinicians felt hospitals focused on factors—like hospital food, appearance of hospital rooms, and expectations of personal attention—that maintained patient satisfaction and helped the hospital meet its patient experience targets, but did not necessarily translate into better care. Throughout the All-Payer Model, clinicians and hospital leaders expressed a view that the emphasis on patient experience in the QBR program was unfair and counterproductive to improving quality of care. This sense of "unfairness" was compounded by patient noncompliance with clinical education, discharge instructions, and other direction intended to improve outcomes. Over the course of the All-Payer Model, hospitals increased the number of staff that provide discharge planning and care transition services. They also increased their care management, community health worker, and social work services so they could focus more closely on noncompliant patients. Yet, substantial challenges with patient compliance remained.

The potential consequences of patient noncompliance will grow considerably as hospitals assume responsibility for patients' TCOC. It will no longer be sufficient for hospitals to ensure that patients do not receive unnecessary care in a hospital setting. Hospitals will need to make sure that patients with chronic conditions or issues that require follow-up care are receiving the lowest cost and most effective community-based care. Maryland hospitals' approach to this challenge may help other states and payers better engage patients with their care and better understand their behavior.

Supporting medical innovation—Throughout the All-Payer Model, hospital leaders and clinicians raised questions about how the model could—and should—explicitly support medical innovation. To them, medical innovation, driven most often by teaching and tertiary care facilities, felt at odds with the All-Payer Model. They observed an uneasy fit between a payment model focused on efficiency and value and the high costs and uncertain clinical impacts associated with developing and testing medical innovations. Moreover, hospital leaders indicated that their global budgets barely covered patient care costs, let alone costs associated with updating their infrastructure or implementing medical innovations. With limited funds to support new technologies or innovations, clinicians and some hospital leaders worried that patients might seek care at hospitals in other states, and physicians would leave Maryland. Our analysis, however, did not find trends in Maryland residents' admissions to out-of-state hospitals changed under the All-Payer Model (see *Section 7*). Concerns about supporting medical innovation were greatest among academic institutions that aim to recruit the top physicians and expand the medical field.

Some hospitals, particularly academic hospitals, started looking for other funding sources to support investments in medical innovations. Other hospitals used return on investment calculations to determine which medical innovations they could continue to support within the hospital and which they could not. Hospital leaders were also thinking about which innovations they could shift to their affiliated hospitals outside Maryland (particularly in Virginia or the District of Columbia) or could support in an outpatient setting that is less highly regulated. They did not see either approach as a long-term solution for supporting medical innovation. Hospital leaders and clinicians advocated for more up-front payment for medical innovation. The balance between reducing costs and unnecessary care while fostering and paying for medical innovation remained a challenge as hospitals moved to a TCOC environment.

Policy transparency and predictability—HSCRC's communication of the All-Payer Model and the relatively short timeframe over which it evolved were challenging even for the most sophisticated hospital leadership teams. The large-scale changes inherent in the All-Payer Model required considerable time to formulate, communicate, and implement. As the All-Payer Model evolved, communication between hospital leadership and HSCRC, hospital leadership and physicians, and hospital leadership and communities generally improved. However, there was still room for improvement. We heard throughout the model duration that hospital leaders did not always "know the rules of the game," which in turn made it difficult for them to plan and adapt. Hospital leaders called for more transparency, predictability, and communication with a wider array of stakeholders around policy changes made by HSCRC throughout the All-Payer Model. Given the complexity of the TCOC Model, this feedback is an important lesson for the state as it moves forward with this new model. All-Payer Model implementation was an ongoing process reflecting both the state's progress in developing policies that governed the model and hospitals' engagement in this reform. Despite the challenges posed by relatively rapid evolution and imperfect communication of policy, the willingness of hospital leaders, their staff, and HSCRC to collaborate during All-Payer Model implementation has continued into the development of the new chapter of Maryland's all-payer policy. Both stakeholders and hospital leadership conveyed that the details of the TCOC Model were still being developed and communicated. Hospital leaders expressed uncertainty regarding how to engage physicians and whether they will be able to contain costs for services, patients, and health care providers that are not under their control. Still, hospital leaders were generally optimistic that all parties will be able to work together to address challenges and develop new rules that allow hospitals to effectively operate under the TCOC Model.
SECTION 3 HOSPITAL FINANCIAL PERFORMANCE

Key Takeaways for Hospital Financial Performance

- Hospital global budgets grew slightly more rapidly from fiscal year (FY) 2017 to FY 2018 than from FY 2016 to FY 2017. Increasingly, Maryland hospitals better managed their revenues in compliance with their global budget targets in the final 2 years of the model.
- Hospitals used rate adjustments to remain within their budgets. Hospitals regularly monitored their volume and adjusted their rates during the year to meet budget targets.
- Maryland hospitals successfully operated within global budgets without adverse effects on their financial status. Despite constraints on hospital revenues imposed by global budgets, operating margins increased over the course of the All-Payer Model, although there was not a consistent upward trend in all years.

3.1 Research Questions

This section describes trends in hospital global budgets and compliance with approved rates, as well as trends in hospital revenue, costs, and operating margins before and after the implementation of the All-Payer Model. Specifically, our analyses addressed the following questions:

- What were trends in Maryland hospitals' global budgets?
- Did hospitals adjust their rates to remain within their global budgets?
- How did financial performance change after implementation of the All-Payer Model?

Controlling growth in hospital service expenditures and utilization in both inpatient and outpatient settings was a central goal of the Maryland All-Payer Model. Hospitals faced penalties if their total revenues varied from their allowed annual revenue (or global budget) beyond a narrow 0.5 percent corridor, which created strong incentives to manage volume and revenue to meet the target budget. HSCRC, which set the rates each hospital could charge for its services (defined by rate center), recognized that the utilization assumptions underlying hospital budgets were unlikely to be met exactly, so they permitted hospitals to vary their charges from their set rates during the year within prescribed corridors (up to 5% without permission and up to 10% with permission from HSCRC). Any rate changes had to be applied uniformly to all rate centers.

HSCRC controlled hospital revenues directly through the budget-setting process. Depending on how HSCRC set budget updates, trends in hospital revenues could change over time. The mix of hospital revenue sources could also change. Incentives to reduce readmissions and preventable hospital complications could reduce inpatient revenues. The effect on outpatient service revenues is less clear. Incentives to shift services from inpatient to outpatient settings could increase outpatient revenues, whereas incentives to reduce unnecessary ED use could decrease outpatient revenues. Because global budgets strictly controlled hospital revenues and penalized hospitals for certain types of avoidable utilization, hospital operating margins could increase or decrease under the All-Payer Model depending on the amount budgets increased over time and how hospitals managed their volume and operating expenses.

3.2 Results

3.2.1 How Did Global Budgets for Maryland Hospitals Change Over Time?

• Overall, hospital global budgets grew by 14.1 percent throughout the model. Hospital global budgets grew by 2.6 percent from FY 2017 to FY 2018, which was slightly higher than from FY 2016 to FY 2017. Some types of hospitals (e.g., hospitals without global budget experience under TPR, large hospitals, and high and low DSH percentage hospitals) consistently had larger budget increases than others.

• In FY 2018, 85 percent of Maryland hospitals were budget compliant, representing a slight increase since the start of the All-Payer Model. Some types of hospitals (e.g., hospitals with global budget experience under TPR, small hospitals, teaching hospitals, medium DSH percentage hospitals, and hospitals not affiliated with a system) were less likely than their counterparts to remain within the budget corridor, although patterns changed over the course of the model.

Overall, Maryland hospital global budgets increased by 14.1 percent from FY¹⁶ 2014 to FY 2018, from \$14.7 billion to \$16.8 billion.¹⁷ In total, hospital budgets grew by 2.6 percent from FY 2017 to FY 2018, compared to 2.7 percent from FY 2014 to FY 2015, 2.0 percent from FY 2015 to FY 2016, and 6.3 percent from FY 2016 to FY 2017. The transition from excluding to including patients who resided outside of Maryland in the hospital global budget revenues caused the higher growth in some years.¹⁸ After taking into account whether revenues for out-of-state patients were included, growth from FY 2017 to FY 2018 was still slightly higher than previous years. Of the 46 hospital budgets, 32 increased in all four time periods. Seven hospitals had a smaller budget in FY 2018 than in FY 2014, with reductions ranging from 5.4 percent to 15.9 percent. Several hospitals whose global budgets declined over the All-Payer Model reported receiving market shift adjustments as a result of decreased volumes.

¹⁶ Maryland's state fiscal year runs from July 1 through June 30.

¹⁷ Holy Cross Germantown Hospital, which opened in FY 2015, began operating under a global budget in FY 2016. It is excluded from the analyses reported in this chapter because it was not fully operating under the global budget model until late in the evaluation period. Holy Cross Germantown Hospital's global budget was less than \$100,000 in each year.

¹⁸ The University of Maryland Medical Center's global budget included revenues from nonresidents beginning in FY 2015. Excluding the University of Maryland Medical Center, the budget growth from FY 2014 to FY 2015 for Maryland hospitals overall was just below 2 percent. Global budgets for Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center, and Suburban Hospital included revenues from nonresidents beginning in FY 2017. Excluding these hospitals, hospital budgets grew by 1.7 percent from FY 2016 to FY 2017.

Changes in hospital budgets from year to year varied substantially among hospitals. *Figure 8* shows the number of hospitals by the change in their budget over the four periods. The number of hospitals with a greater than 5 percent increase in their budget grew over time, and the number of hospitals with budget reductions decreased over time.



Figure 8 Annual changes in hospital global budgets during the Maryland All-Payer Model

NOTE: Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

Figure 9 shows the percent change in hospital budgets over time by hospital characteristics.¹⁹ In all four time periods, budgets increased more for hospitals that did not have prior global budget experience under the TPR system, large hospitals, and high and low DSH percentage hospitals than their counterparts. The much larger growth from FY 2016 to FY 2017 for hospitals without prior global budget experience under TPR, large hospitals, teaching hospitals, hospitals with a high DSH percentage, and hospitals affiliated with a hospital system is an artifact of the large increase in the budget for Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center described above. After excluding these hospitals, the growth of budgets for those categories of hospitals was similar to the growth in previous years. Since the start of the All-Payer Model, only two categories have seen a decrease in hospital budgets—hospitals with prior global budget experience under the TPR system from FY 2016 to FY 2017 and small hospitals from FY 2015 to FY 2016.

¹⁹ Hospital characteristics are defined in *Appendix Table A-4*.

14 12 10 8 Percent 6 4 2 0 20–30 <150 <20 >30 ٩ Yes 150-359 350+ > 5% 5% Nonaffiliated Affiliated -2 VI BR IBR All Participated in TPR Number of DSH percentage[†] Affiliation Teaching inpatient beds status† Hospital characteristic FY 2014-2015 ---- FY 2015-2016 FY 2016-2017 FY 2017-2018

Figure 9 Annual changes in hospital global budgets during the Maryland All-Payer Model by hospital characteristic

DSH = disproportionate share hospital; IBR = intern-to-bed ratio; TPR = Total Patient Revenue.

NOTE: Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

† IBR and DSH percentages were based on data from the 2014 Inpatient Prospective Payment System (IPPS) Impact File. Data for the University of Maryland Medical Center at Dorchester are reported under the University of Maryland Shore Medical Center at Easton in the IPPS Impact File. Therefore, teaching status and DSH percentage for these hospitals were based on their combined information in the IPPS Impact File.

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Maryland hospitals whose revenues varied from their global budget targets by more than 0.5 percent were subject to penalties that depended on the percent variation and on whether revenues exceeded or fell short of their budget targets. *Figure 10* displays the number of hospitals by the categories of revenue variation used to determine penalties. Hospitals' ability to stay within the 0.5 percent budget corridor improved over time. Among the 15 percent of Maryland hospitals whose revenues were outside the 0.5 percent budget corridor in FY 2018, hospitals were slightly more likely to underrun their budgets. No hospital missed its global budget target by more than 2 percent in FY 2017. This is likely because a large number of hospitals were permitted to make rate adjustments greater than 5 percent in the fourth quarter of FY 2017 to compensate for lower-than-anticipated volume during the first half of the year (see *Section 3.2.2*).



Figure 10 Trends in variation of hospital revenues from global budget targets during the Maryland All-Payer Model

NOTE: Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

Compliance with the 0.5 percent budget corridor varied by hospital characteristics. *Figure 11* shows the percentage of hospitals whose revenues were not budget compliant in FY 2018 for all Maryland hospitals and by hospital characteristic. Overall, 15 percent of hospitals were not budget compliant in FY 2018, a slight increase from 13 percent in FY 2017. Hospital leaders increasingly reported adopting sophisticated strategies to manage their revenues within their global budget targets during site visits over the course of the model. In FY 2018, hospitals that previously operated under the TPR system, small hospitals not affiliated with a hospital system were less likely to be budget compliant than were their counterparts. Small hospitals and non-teaching hospitals were consistently less likely to comply with their budget over the course of the All-Payer Model. Hospitals that previously operated under the TPR system were likely to be budget compliant during the first 3 years of the model, but this pattern reversed in FY 2017 and FY 2018. *Appendix Table G-1* shows more detailed information on the number of hospitals by the magnitude of revenue variation by hospital characteristic for FYs 2014–2018.

Figure 11 Percentage of hospitals that were not global budget compliant in FY 2018, all Maryland hospitals and by hospital characteristic



DSH = disproportionate share hospital;; IBR = intern-to-bed ratio; TPR = Total Patient Revenue.

NOTE: Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

† IBR and DSH percentages were based on data from the 2014 Inpatient Prospective Payment System (IPPS) Impact File. Data for the University of Maryland Medical Center at Dorchester are reported under the University of Maryland Shore Medical Center at Easton in the IPPS Impact File. Therefore, teaching status and DSH percentage for these hospitals were based on their combined information in the IPPS Impact File.

HSCRC reduced 14 hospitals' FY 2019 global budgets because their revenues in the previous year exceeded their global budget; 3 of these hospitals received additional penalties for charging rates outside the 5 percent rate corridor without permission but none of these hospitals were also penalized because their revenues exceeded the 0.5 percent budget corridor. HSCRC increased the remaining 32 hospitals' FY 2019 global budgets to compensate for undercharges in FY 2018, but they reduced the increases for 2 hospitals for exceeding the 0.5 percent budget corridor and 11 hospitals for exceeding the 5 percent rate corridor without permission. In comparison, HSCRC reduced 23 hospitals' FY 2018 global budgets based on FY 2017 performance and increased 23 hospitals' budgets. The number of hospitals subject to a penalty for exceeding the 5 percent rate corridor was 7 in 2015, 10 in FY 2016, 26 in FY 2017, and 14 in FY 2018.²⁰ This variation partly reflects HSCRC's increasing stringency in granting exceptions for greater than 10 percent rate variances.

3.2.2 Did Hospitals Adjust Their Rates to Remain within Their Global Budgets?

- Depending on the quarter, between 40 percent and 60 percent of Maryland hospitals exceeded the 5 percent rate corridor in FY 2018.
- In all years except FY 2017, hospitals' average charges over the course of the year were closer to the rate amounts set by HSCRC than charges in individual quarters. This suggests hospitals made rate adjustments in response to short-term volume fluctuations, but the volume assumptions underlying budget targets were reasonably accurate.

Figure 12 reports by quarter and by FY the number of hospitals that had a difference between charged rates for medical/surgical acute services and the rates set for them by HSCRC (called rate orders) of less than 5 percent, between 5 to 10 percent, and more than 10 percent. In addition, for every year except FY 2014 we show the number of hospitals that formally requested and received permission from HSCRC to exceed the 5 percent rate corridor in each quarter. The number of hospitals with 5 percent or greater rate variation can be compared with the number of hospitals approved to make these adjustments.²¹ For example, 27 hospitals exceeded the 5 percent rate corridor in the fourth quarter of FY 2018, but only 20 had permission to do so. Hospitals that received permission to exceed the 5 percent rate corridor could charge rates above or below the approved rate order.

²⁰ HSCRC did not apply penalties during the first year of the model in FY 2014.

²¹ The number of hospitals with permission to exceed the 5 percent rate corridor is not shown for FY 2014 because hospitals were not required to request permission during that year. HSCRC approved all hospitals requests for this rate variation in FY 2015. In FY 2016, HSCRC denied two hospitals' requests to exceed the 5 percent rate corridor. In both cases, HSCRC adjusted the hospital's global budget, which eliminated their need to exceed the 5 percent corridor. In FY 2017, HSCRC denied one hospital's request for rate variation. In FY 2018, HSCRC denied two hospitals' requests for permission to vary rates up to 10 percent from their rate order.

Figure 12 Trends in percent difference between hospitals' charged rates and their rate orders for inpatient medical/surgical acute services during the Maryland All-Payer Model by quarter and annual aggregate



NOTES: In fiscal years (FYs), Q1 = July-September, Q2 = October-December, Q3 = January-March, and Q4 = April-June. The circles indicate the number of hospitals with permission to vary rates by more than 5 percent in each quarter. Hospitals were not required to request this permission in Q3 and Q4 of FY 2014. Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

Hospitals' charged rates commonly differed from their established rate orders by more than 5 percent. Depending on the quarter, 18 to 27 of the 46 hospitals charged rates outside the 5 percent rate corridor in FY 2018, and at least half of the hospitals did so in 10 of the 18 quarters since the start of the All-Payer Model. In all years except FY 2016, the number of hospitals with rate adjustments above 5 percent was largest in the last quarter. This pattern is expected if hospitals adjusted their revenues at the end of the year to meet their budget targets.

In all years, hospitals' average charges over the course of the year were closer to their established rates than charges in individual quarters, suggesting that the volume assumptions underlying the budgets were reasonably accurate despite short-term fluctuations. On average in FY 2018, 4 hospitals charged rates for medical/surgical acute services that differed from their rate order by more than 10 percent; in previous years, the number varied from 2 to 6 hospitals. Similar to previous years, significantly more hospitals charged rates for medical/surgical acute services that differed from their rate orders by more than 10 percent in individual quarters—4 to 15 hospitals in 2018. This suggests that hospitals made offsetting rate increases and rate decreases over the course of the year. In FY 2017, hospitals' average charges during the year were less likely to be within 5 percent of established rates and more likely to differ by more than 10 percent than in other years, reflecting HSCRC's permission for large rate increases in the latter portion of the year to allow hospitals to reach their revenue targets.²² In all years, hospitals whose average charges over the course of the year exceeded the 5 percent corridor almost always exceeded the rate order amount.

In all years, some hospitals exceeded the 5 percent rate corridor without having permission to do so. The numbers were particularly large in the first quarters of FY 2015, when only a few hospitals requested permission to exceed the 5 percent corridor, and in the last quarter of FY 2017, when the greatest number of hospitals exceeded the 5 percent corridor. Furthermore, although many hospitals' charges exceeded their rate orders by more than 10 percent, HSCRC rarely granted hospitals permission to do so. In some cases, HSCRC gave hospitals permission to exceed the rate corridor without formal requests and these permissions are not reflected in *Figure 12*.

Appendix Table G-2 shows the number of hospitals with charged rates that exceeded the 5 percent rate corridor for clinic services and outpatient emergency services, as well as inpatient medical/surgical acute services. Although rate adjustments were supposed to be applied uniformly to all rate centers, hospitals did not do so in all 4 years. Some hospitals received permission to exceed the 5 percent rate corridor for specific rate centers in FY 2018. Among the three rate centers, hospitals were least likely to exceed the 5 percent rate corridor for outpatient clinic services and most likely to exceed it for inpatient medical/surgical acute services.

Figure 13 shows the percentage of hospitals with rate variations of less than 5 percent, 5 to 10 percent, and greater than 10 percent for inpatient medical/surgical acute services on

²² In FY 2017, hospitals were more conservative about making rate adjustments in response to volume fluctuations in the early part of the year, possibly because they were adapting to HSCRC's mid-year budget targets introduced in FY 2017. However, hospitals experienced lower-than-anticipated volume during the first half of the year (likely due to a mild flu season in 2016/2017), so a large number of hospitals had to make adjustments greater than 5 percent in the fourth quarter of FY 2017 in order to reach their global budget revenue targets.

average during FY 2018 by hospital characteristic. *Appendix Table G-3* shows this information by quarter for FY 2014 through FY 2018. Thirty-three percent of all Maryland hospitals exceeded the 5 percent rate corridor on average over the course of FY 2018, which is comparable to FY 2016 and a decrease from 46 percent in FY 2017. This percentage varied by hospital characteristic, but the differences were modest, generally within a range of 10 percentage points. However, for hospital bed size, 50 percent of small hospitals exceeded the 5 percent rate corridor, whereas only 26 percent of medium-sized hospitals and 22 percent of large hospitals did so. There were also larger differences between low and medium DSH percentage hospitals, 22 percent and 44 percent, respectively.





DSH = disproportionate share hospital; IBR = intern-to-bed ratio; TPR = Total Patient Revenue.

NOTE: Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

† IBR and DSH percentages were based on data from the 2014 Inpatient Prospective Payment System (IPPS) Impact File. Data for the University of Maryland Medical Center at Dorchester are reported under the University of Maryland Shore Medical Center at Easton in the IPPS Impact File. Therefore, teaching status and DSH percentage for these hospitals were based on their combined information in the IPPS Impact File.

3.2.3 How Did Hospital Financial Performance Change after Implementation of the All-Payer Model?



This section examines trends in the financial performance of Maryland hospitals from FY 2012 through FY 2018. The analyses examined hospital operating revenue, operating expenses, and operating margins.

Figure 14 presents the trend for all Maryland hospitals in gross revenue for patient services, in total and for inpatient and outpatient services, before and after implementation of the All-Payer Model. Total gross revenue for patient services increased by 16 percent, from \$16.2 billion in FY 2012 to \$18.8 billion in FY 2018. Total revenue has increased steadily, but at varying rates since the start of the All-Payer Model. Total revenue growth was generally faster before implementation of the All-Payer Model than after, but the fastest growth was from FY 2017 to FY 2018. Total revenues increased from FY 2012 to FY 2018 for all types of hospitals (*Appendix Table H-1*), but large hospitals and hospitals with a high DSH percentage had the greatest growth.

As shown in *Figure 14*, trends for inpatient and outpatient revenues differed. Outpatient services accounted for a growing share of hospital revenues after implementation of the All-Payer Model. Inpatient services showed a declining or flat trend following All-Payer Model implementation through FY 2016 but increased from FY 2016 to FY 2018. Although inpatient services accounted for the bulk of hospital revenues before the start of the All-Payer Model, inpatient and outpatient services approached equal shares afterward. This shift from inpatient to outpatient services is consistent with hospital efforts to move unneeded care out of the inpatient setting to lower-cost, outpatient settings. These changes, however, may reflect broader market trends rather than a direct response to the All-Payer Model. Inpatient revenues increased by 3.5 percent from FY 2012 to FY 2018, while outpatient revenues increased by 34.3 percent. Inpatient revenues increased from FY 2012 to FY 2018 for all types of hospitals except small hospitals (6.4% decrease) and medium DSH percentage hospitals (5.0% decrease). *Appendix Table H-3* show trends inpatient and outpatient revenue trends, respectively, by hospital characteristics.

Figure 14 Trends in Maryland hospitals' gross revenue for patient services



NOTES: MDAPM = Maryland All-Payer Model. Includes regulated and unregulated services. Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

Total operating expenses for all Maryland hospitals grew more rapidly than revenue for patient services, increasing 19.8 percent from \$13.0 billion in FY 2012 to \$15.6 billion in FY 2018 (*Figure 15*). Operating expenses increased steadily over this time. There was minimal growth of 1.0 percent from FY 2013 to FY 2014, while all other years showed a 2.8 to 3.9 percent increase. *Appendix Table H-4* shows trends in operating expenses by hospital characteristics.

The All-Payer Model does not appear to have undermined the financial condition of Maryland hospitals. The operating margin for all Maryland hospitals combined increased after the implementation of the All-Payer Model (*Figure 16*), from 2.5 percent in FY 2012 to 3.4 percent in FY 2018. Even though total operating expenses grew more rapidly than gross patient revenue, net patient revenues increased because uncompensated care costs declined. This accounts for the overall increase in hospital operating margins for Maryland hospitals. However, operating margins varied during the All-Payer Model period. After increasing in the first 2 years, reaching 3.7 percent in FY 2015, the operating margin declined in each of the 2 following years, falling to 2.7 percent in FY 2017, before increasing to 3.4 percent in FY 2018. Although there was considerable variability in operating margin by hospital characteristics, the operating margin grew from FY 2012 to FY 2018 for all types of hospitals except large hospitals, teaching hospitals, and high DSH percentage hospitals (*Appendix Table H-5*). From FY 2015 to FY 2018, the operating margin for all types of hospitals decreased. From FY 2017 to FY 2018, the operating margin increased for all types of hospitals except those with prior global budget experience under the TPR system and hospitals not affiliated with a hospital system.

Figure 15 Trends in Maryland hospitals' total operating expenses



NOTES: MDAPM = Maryland All-Payer Model. Includes regulated and unregulated services. Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.





NOTES: MDAPM = Maryland All-Payer Model. Includes regulated and unregulated services. Holy Cross Germantown Hospital opened in FY 2015, but it is excluded from these analyses because the hospital did not have a global budget until FY 2016.

3.3 Discussion

During the All-Payer Model, hospital budgets increased about 2 percent per year, although the 2.5 percent increase from FY 2017 to FY 2018 was slightly higher than previous years. Most hospitals succeeded in keeping their revenues within 0.5 percent of their global budget and avoided penalties for exceeding this budget corridor. During site visits all hospital financial leaders reported they focused on budget compliance and regularly monitored their volumes and revenues to make rate adjustments to meet their budget targets by the end of the year.

Some types of hospitals were less likely than others to stay within the budget corridor, and patterns changed over time. During the first 3 years of the All-Payer Model, hospitals without prior experience operating under global budgets were less likely to remain within the 0.5 percent budget corridor than hospitals that had prior global budget experience through the TPR system. However, hospitals without prior global budget experience became better at managing their revenues, and their budget compliance improved over time. Starting in FY 2017, hospitals with prior global budget experience were less likely to be budget compliant. System affiliation showed a similar trend. Compliance for affiliated hospitals, which started lower than nonaffiliated hospitals, increased and exceeded the compliance rate for nonaffiliated hospitals in FY 2017 and FY 2018. Although hospitals with global budget experience under the TPR system initially had more success remaining within the budget corridor than hospitals that were new to global budgets, information collected during site visits suggested that all hospitals adopted more sophisticated strategies to adapt to global budgets over the 5 years of the model, which may have contributed to their equalized performance. Finance leaders of affiliated hospitals reported that a major benefit of system affiliation was the expertise provided and coordination of financial strategies at a system level versus an individual hospital level. Hospitals affiliated with systems often reported that they received support from system-level financial staff to monitor volumes and revenues so they could make rate adjustments throughout the year.

Throughout the All-Payer Model, Maryland hospitals adjusted the rates charged frequently during the year to keep revenues within their budget targets. During site visits at the end of the All-Payer Model, some hospitals that had observed consistent increases or decreases in volume reported they had requested rate reconsideration from HSCRC in addition to modifying their rates during the year. Hospitals were often most likely to exceed the 5 rate percent corridor during the fourth quarter of the year, either in response to large, unplanned volume fluctuations or to adjust their revenues to remain budget compliant. Hospitals also adapted to the requirement to request permission to exceed the 5 percent rate corridor, with the largest number of hospitals requesting rate corridor expansions in FY 2018. Hospital financial leaders consistently reported that frequent rate adjustments were an essential tool while operating in a global budget environment. In earlier years of the All-Payer Model, however, hospital leaders also noted that frequent rate adjustments could negatively affect uninsured patients who pay for their services out-of-pocket. Although patients with insurance had limited cost-sharing liability, individual patients who were uninsured might face different out-of-pocket costs depending on when they received services.

Although total revenue for patient services in Maryland hospitals grew after the implementation of the All-Payer Model, inpatient services accounted for a declining share of

revenue as outpatient services accounted for an increasing share. During site visits, hospital leaders and staff commonly described a new focus within their hospitals to strategically shift services into outpatient settings to respond to global budgets. However, national trends during this time also show that outpatient revenues were an increasing share of total revenue and were approaching equal shares as inpatient revenues.²³ As discussed in *Section 4*, growth in inpatient expenditures for Medicare beneficiaries and commercial plan members did not differ between Maryland and the comparison group, although admission rates decreased more in Maryland for both populations.

Despite constraints on hospital revenues imposed by global budgets, hospital operating margins increased after implementation of the All-Payer Model for most types of hospitals, as well as for all Maryland hospitals combined. Even with this growth, Maryland hospital operating margins remained below the average for community hospitals nationwide.²⁴ During site visits, hospitals consistently described efforts to improve their operational efficiency through strategies that included standardization of clinical practices and supplies in order to control utilization and costs. Other common strategies involved workforce changes such as the reconfiguration of staffing ratios, enhanced use of physician assistants, and cross-training staff. Hospitals were also consolidating service lines across hospitals within a system. While hospitals did not report significant changes in their operating margins under the All-Payer Model, many hospitals reported concerns that they would not be able to fund capital improvements, medical innovations, and population health initiatives for their communities if operating margins deteriorated. Hospitals also reported challenges from rising pharmaceutical costs and costs associated with offering competitive salaries to maintain their workforce.

²³ American Hospital Association. (2018.) Trendwatch Chartbook 2018: Trends affecting hospitals and health systems. Retrieved from <u>https://www.aha.org/system/files/2018-07/2018-aha-chartbook.pdf</u>

²⁴ American Hospital Association. (2018.) Trendwatch Chartbook 2018: Trends affecting hospitals and health systems. Retrieved from <u>https://www.aha.org/system/files/2018-07/2018-aha-chartbook.pdf</u>

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SECTION 4 WHAT WAS THE IMPACT OF THE MARYLAND ALL-PAYER MODEL ON SERVICE UTILIZATION AND EXPENDITURES?

Key Takeaways for Service Utilization and Expenditures

- Medicare beneficiaries had 2.8 percent slower growth in total expenditures (\$975 million in savings) during the Maryland All-Payer Model relative to the comparison group, largely driven by 4.1 percent slower growth in total hospital expenditures (\$796 million in savings). These findings indicate that the model reduced hospital costs without shifting costs to other parts of the Maryland health care system outside the global budgets.
- Commercial plan members had 6.1 percent slower growth in total hospital expenditures; however, growth in total expenditures did not slow among commercial plan members due to an increase in expenditures for professional services.
- Inpatient admissions trended downwards for Maryland residents enrolled in Medicare, Medicaid, and commercial insurance, but the difference from the comparison group was only statistically significant for Medicare. The 7.2 percent relative decrease in Medicare admissions in Maryland and downward trends for the other payers could be due to hospital programs that aimed to reduce utilization by improving care management and avoiding unnecessary hospitalizations.
- Slower growth in total hospital expenditures for commercial plan members was driven by 9.3 percent slower growth in inpatient facility expenditures.
- Inpatient facility expenditures grew at a similar rate for Maryland and comparison group Medicare beneficiaries because utilization reductions in Maryland were offset by increases in the payment per admission as a result of rate adjustments that hospitals were permitted to make to meet their global budgets as utilization declined.
- The ED visit rate increased similarly for Medicare beneficiaries in Maryland and the comparison group. In contrast, the ED visit rate declined 3.4 percent more for the commercially insured population and declined among Medicaid beneficiaries in Maryland. These findings suggest hospital efforts to divert non-emergent cases to other settings (such as mobile health clinics, discharge clinics, or other outpatient settings) were successful for some populations, although it may have been more difficult to change utilization patterns among Medicare beneficiaries who have more complex health issues on average than commercially insured members.

4.1 Research Questions

To assess the impact of the All-Payer Model on utilization and expenditures, we addressed the following research questions:

- How did utilization of and expenditures for hospital inpatient and ED services,²⁵ as well as total expenditures for hospital and nonhospital services, change in Maryland after the implementation of the All-Payer Model relative to the comparison group?
- How did Medicare beneficiary cost-sharing liability for hospital inpatient, ED, hospital outpatient department, and professional services,²⁶ as well as the total cost-sharing liability for all hospital and nonhospital services, change in Maryland after the implementation of the All-Payer Model relative to the comparison group?

As hospitals responded to global budgets and other features of the Maryland All-Payer Model, utilization and expenditures for hospital services were expected to change in response. In particular, inpatient admissions and ED visits, which were the basis for PAU adjustments, were expected to decline. In addition to reducing the number of hospital admissions, length of stay (LOS) for hospital admissions was also expected to decline in response to incentives to reduce expenditures. On the other hand, LOS might increase if incentives to reduce hospital admissions increased case-mix severity.

Reductions in inpatient admissions and ED services were expected to lead to overall reductions in hospital spending. Because hospital services are so expensive, reductions in hospital expenditures should cause total expenditures to also decrease. However, to the extent that nonhospital services were substituted for hospital services, the effect on total expenditures will be less than the savings from reduced hospital expenditures. Medicare beneficiaries could also benefit from lower out-of-pocket costs if there are Medicare savings, because their cost-sharing liability is closely associated with Medicare expenditures.

Although the All-Payer Model included incentives to limit per capita hospital spending, these incentives were dampened in several ways. Perhaps most fundamentally, physician services were outside of the All-Payer Model. Unlike hospitals, physicians were compensated based on an FFS system and continued to have incentives to increase their patient volume, including admitting patients to the hospital. The lack of alignment between physician and hospital incentives may have limited hospitals' ability to control utilization, because physicians are drivers of hospital admissions. However, the All-Payer Model may have encouraged other health system reform initiatives that better aligned physician and hospital incentives, such as ACOs, other gainsharing arrangements between hospitals and physicians, and meaningful health information exchange. Such reforms were expected to reduce utilization. Anticipation of the transition to the TCOC Model in January 2019 could have further encouraged broader health system reforms even while the All-Payer Model was still operating.

Furthermore, hospital budgets were derived using base period revenues (and, hence, utilization), adjusted for several factors. Hospitals had to bill for services to receive their budgeted revenue. If utilization decreased, hospitals could increase rates within a prescribed range to recover some of the lost revenue. The incentives to reduce utilization to retain savings were relatively

²⁵ ED visits include both visits to the ED and observation stays.

²⁶ Professional services include physician and all other professional claims submitted on a CMS-1500 claim form in the carrier file (i.e., the physician/supplier Part B claims file).

limited, and hospitals had an incentive to provide enough services to receive their full budget and maintain the market share on which future budgets would be set. However, penalties associated with PAU and QBR were intended to ensure that the "right" services were provided. Although incentives to reduce utilization below the levels on which the budget was based were limited, penalties for billing more than the hospital's budget created a disincentive to increase utilization.

4.2 Results

4.2.1 What Was the Impact of the Maryland All-Payer Model on Total Expenditures and Total Hospital Expenditures?

S Total PBPM	•	Total expenditures for Medicare beneficiaries increased both in Maryland and in the comparison group, but the increase was 2.8 percent smaller in Maryland (\$26.10 per beneficiary per month [PBPM]) after 4.5 years of the Maryland All-Payer Model. This was largely driven by the 4.1 percent relative decrease in total hospital PBPM expenditures.
	•	The larger relative decline in total expenditures than in hospital expenditures for the Medicare population indicates that the model reduced hospital costs without shifting costs to other parts of the Maryland health care system outside the global budgets.
	•	Commercial plan members had a 6.1 percent slower growth rate in total hospital expenditures; however, there were no total savings for the commercially insured.

We expected the All-Payer Model to reduce both total expenditure and hospital expenditure growth. Results for both outcomes were consistent with these hypotheses for Medicare beneficiaries, but for commercial plan members only hospital expenditures was consistent.

4.2.1.1 Medicare

Table 2 presents the results of the difference-in-differences (D-in-D) regression analyses for total PBPM expenditures and total hospital PBPM expenditures. The yearly D-in-D regression estimates for each outcome are presented in **Appendix I**. Total hospital expenditures include payments for inpatient facility services, ED visits, and other hospital outpatient department services (e.g., hospital outpatient visits, labs, and x-rays). The plots in **Figures 17** and **18** include 90 percent and 95 percent confidence intervals (CIs) around the estimated annual effects for the change in total PBPM and total hospital PBPM expenditures. Unadjusted yearly averages are shown in **Appendix I**. We also convert the D-in-D results into probabilities of savings that are shown in **Appendix I**.

Table 2Impacts on total expenditures and total hospital expenditures for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

		Change in outcome from baseline to implementation period				
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Total PBPM (\$)	ॐ	\$	8	-26.10 (-37.34, -14.85)	-2.8	<0.001
Total hospital PBPM (\$)*	ॐ		8	-21.31 (-29.83, -12.79)	-4.1	<0.001
Increase	Solution Decrease		On change	Coul	d move in either direct	ion
Change in expected direction	n Change in unexp	pected direction Change, could mo		e in either direction		

CI = confidence interval; D-in-D = difference-in-differences; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for all PBPM models is 10,281,981.

* Total hospital expenditures PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Figure 17 Impacts on total expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



NOTES: PBPM = per beneficiary per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure 18 Impacts on total hospital expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



NOTES: PBPM = per beneficiary per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

- Total expenditures increased for Medicare beneficiaries in both Maryland and the comparison group from the baseline to the All-Payer Model period, but the growth in total expenditures was 2.8 percent slower for Maryland Medicare beneficiaries during the first 4.5 years of the model (D-in-D estimate: -\$26.10 PBPM). The magnitude of the difference grew over the implementation period, but the difference was not statistically significant in the fourth or fifth year. Since Year 5 is comprised of only the first 6 months of 2018, the sample size was smaller than the other years, which may explain why the difference was not statistically significant.
- The decrease in total expenditures was driven by relative reductions in total hospital expenditures. During the first 4.5 years of the All-Payer Model, total hospital expenditures increased by 4.1 percent less in Maryland than in the comparison group (D-in-D estimate: -\$21.31 PBPM). The magnitude of the difference grew over time, but the difference was not statistically significant in the fifth year. The smaller sample size in Year 5 may explain the lack of statistical significance.

4.2.1.2 Commercial Insurance

Table 3 presents the results of the D-in-D regression analyses for total per member per month (PMPM) and total hospital PMPM expenditures for the commercially insured population. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. The plots in *Figures 19* and *20* include 90 percent and 95 percent CIs around the estimated annual effects for the change in total and total hospital expenditures. Unadjusted yearly averages are shown in *Appendix I*.

- Changes in total expenditures in Maryland did not differ from the comparison group during the first 4 years overall. However, total expenditures increased 6.8 percent less in Maryland than in the comparison group in Year 4 of the model (D-in-D estimate: -14.95 PMPM).
- During the first 4 years of the All-Payer Model, total hospital expenditures increased by 6.1 percent less in Maryland than in the comparison group (D-in-D estimate: -\$6.93 PMPM). The magnitude of the difference grew over time and was statistically significant in the third and fourth years only.

Table 3Impacts on total expenditures and total hospital expenditures for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

		Change in outcome from baseline to implementation period				
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Total PMPM (\$)	ॐ	8	8	-4.65 (-9.46, 0.16)	-2.1	0.11
Total hospital PMPM (\$)*	ॐ	⊗	⊗	-6.93 (-10.73, -3.14)	-6.1	0.003
Increase	Solution Decrease		😑 No change	Coul	ld move in either direct	ion
Change in expected direction	h Change in unexp	pected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; PMPM = per member per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for individual-level variables (gender, age category, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse, or child], and commercial insurance plan type) and the urban/rural status of the county.

How to interpret the findings: A negative value for the regression-adjusted D-in-D corresponds to a greater decrease or a smaller increase in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A positive value corresponds to a greater increase or a smaller decrease in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for all PMPM models is 3,824,639.

* Total hospital PMPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

Figure 19 Impacts on total expenditures for commercial plan members, first 4 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure 20 Impacts on total hospital expenditures for commercial plan members, first 4 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

4.2.1.3 Medicaid

Figure 21 shows, for Medicaid beneficiaries in Maryland, the unadjusted yearly averages for total expenditures. Because these are unadjusted averages with no comparison group, we cannot conclude what the impact of the Maryland All-Payer Model was for the Medicaid population.²⁷ Total PBPM expenditures declined slightly from 2011 through 2014, then increased through 2016. We excluded 2013 Medicaid data from these analyses because they were incomplete. We did not include total expenditures in 2017 due to a data anomaly in the capitated payment amounts. The issues we identified with the available Medicaid data are detailed in *Appendix F*.





²⁷ We were not able to conduct a D-in-D analysis with Medicaid data due to missing data elements, which prohibited selecting a comparison group and constructing key outcomes. Moreover, uniform Medicaid data were not available across all states and years at the time of our analysis.

4.2.2 What Was the Impact of the Maryland All-Payer Model on Hospital Inpatient Utilization and Expenditures?

H	• Inpatient admissions declined by 7.2 percent more among Medicare beneficiaries in Maryland than in the comparison group after 4.5 years of the Maryland All-Payer Model.
Admissions	• Likewise, inpatient admissions trended downward for the Medicaid and commercially insured populations in Maryland. The decline in the commercially insured population, however, did not differ from the comparison group.
	• Payment per admission increased by 6.8 percent more for Maryland Medicare admissions than for the comparison group in the first 4.5 years after All-Payer Model implementation. However, payment per admission increased by 7.7 percent less for Maryland commercial admissions than for the comparison group after 4 years of the All-Payer Model.
	• The change in inpatient facility expenditures for Medicare beneficiaries did not differ between Maryland and the comparison group. Inpatient facility expenditures increased by 9.3 percent less for commercial plan members in Maryland than in the comparison group, however.
	• Despite efforts by hospitals to reduce LOS through proactive discharge planning, the change in LOS did not differ between Maryland and the comparison group among Medicare beneficiaries or commercial plan members.

We expected the All-Payer Model to reduce inpatient admissions and inpatient facility expenditures. For Medicare beneficiaries, only the results for inpatient admissions were consistent with this hypothesis, whereas, for commercial plan members, only the results for inpatient expenditures were consistent. The effects of the All-Payer Model on LOS and payment per admission could not be predicted because patient severity could increase if hospitals avoided unnecessary admissions, which could offset incentives to reduce the cost of an inpatient stay.

4.2.2.1 Medicare

Table 4 shows the results of the D-in-D regression analyses for the rate of inpatient use per 1,000 Medicare beneficiaries, inpatient LOS, inpatient expenditures, and payment per inpatient admission for Maryland relative to the comparison group after 4.5 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. The plots in *Figures 22* and *23* include 90 percent and 95 percent CIs around the estimated annual effects for the change in the inpatient admission rate and the change in inpatient facility expenditures, respectively. Unadjusted yearly averages for the inpatient admission rate and inpatient facility expenditures are shown in *Appendix I*.

	Expected direction of outcome	Change in outcome from baseline to implementation period				
Outcome		Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
All-cause acute inpatient admissions per 1,000 population	*	*	≫	-23.2 (-28.5, -17.8)	-7.2	<0.001
Acute inpatient LOS	\diamond	~	\bigcirc	0.1 (-0.03, 0.2)	0.9	0.26
Inpatient facility PBPM (\$)	*		8	4.30 (-4.02, 12.61)	1.1	0.40
Payment per inpatient admission (\$)	\diamond	⊗		967.49 (705.46, 1,229.52)	6.8	<0.001
Increase	Solution Decrease		On change	🗘 Coul	d move in either direct	ion
Change in expected direction Change in unexpected direction		Change, could move in either direction				

Table 4Impacts on inpatient utilization and expenditures for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; LOS = length of stay; PBPM = per beneficiary per month.

<u>Methods</u>: A negative binomial regression model was used to obtain estimates of the differences in the number of acute inpatient admissions and the number of days in LOS. The number of admissions estimate was multiplied by 1,000 to obtain a rate per 1,000 beneficiaries. A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

(continued)

Table 4 (continued)Impacts on inpatient utilization and expenditures for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for the inpatient admission rate and PBPM models is 10,281,981. The total weighted N for the acute inpatient LOS and payment per admission models is 3,143,370.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Figure 22 Impacts on all-cause acute inpatient admissions per 1,000 Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



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

Figure 23 Impacts on inpatient facility PBPM expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

- Inpatient admissions decreased in both Maryland and the comparison group during the first 4.5 years of the Maryland All-Payer Model, but they decreased 7.2 percent more in Maryland (D-in-D estimate: -23.2 admissions per 1,000 Medicare beneficiaries). The magnitude of the difference grew in each year of All-Payer Model implementation, although it was not statistically significant in Year 1 of the model.
- Hospital leaders reported that they made significant investments in post-discharge planning, in part, to reduce inpatient LOS. Nonetheless, the increase in average inpatient LOS in Maryland was not statistically significantly different from the increase in the comparison group in any of the first 4.5 years of the All-Payer Model implementation or overall.
- The change in Maryland inpatient facility PBPM expenditures did not differ from the comparison group in any year or overall.
- During the first 4.5 years overall, the average payment for an inpatient admission in Maryland increased by 6.8 percent more than the comparison group (D-in-D estimate: \$967 per admission). The magnitude of the difference increased substantially in Year 4 and Year 5 of the All-Payer Model.

4.2.2.2 Commercial Insurance

Table 5 shows the results of the D-in-D regression analyses for the rate of inpatient admissions per 1,000 commercial plan members, inpatient LOS, inpatient expenditures, and payment per inpatient admission for Maryland relative to the comparison group after 4 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. The plots in *Figures 24* and *25* include 90 percent and 95 percent CIs around the estimated annual effects for the change in the inpatient admission rate and the change in the inpatient facility expenditures, respectively. Unadjusted yearly averages for the inpatient admission rate and inpatient facility expenditures are shown in *Appendix I*.

- The inpatient admission rate decreased for both Maryland commercial plan members and the comparison group, but the decline did not differ between both groups.
- The change in average inpatient LOS was not statistically significantly different for Maryland and the comparison group in any of the first 4 years of All-Payer Model implementation or overall.
- Inpatient facility expenditures increased 9.3 percent less for commercial plan members in Maryland than in the comparison group (D-in-D estimate: -\$5.74 PMPM). The magnitude of the difference increased each year and was statistically significant in the third and fourth year.
- The increase from the baseline period in the payment per inpatient admission was 7.7 percent smaller in Maryland than in the comparison group for the first 4 years overall (D-in-D estimate: -\$1,018 per admission). However, the change in payment per admission did not differ in Year 2 or Year 4 of the All-Payer Model.

Table 5
Impacts on inpatient utilization and expenditures for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

	Expected direction of outcome	Change in outcome from baseline to implementation period				
Outcome		Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
All-cause acute inpatient admissions per 1,000 population	*	*	*	-0.6 (-1.3, 0.05)	-1.5	0.13
Acute inpatient LOS	\diamond	≶	\$	0.03 (-0.1, 0.1)	0.7	0.51
Inpatient facility PMPM (\$)	*	⊗		-5.74 (-8.48, -3.00)	-9.3	< 0.001
Payment per inpatient admission (\$)	\diamond	\$	\$	-1,017.96 (-1,467.54, -568.39)	-7.7	< 0.001
Increase	Solution Decrease		ON change	Coul	d move in either direct	ion
Change in expected direction	Change in unex	pected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; LOS = length of stay; PMPM = per member per month.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the differences in probability of an acute inpatient admission. The probability of any admission estimate was multiplied by 1,000 to obtain an approximate rate per 1,000 members. A negative binomial regression model was used to obtain estimates of the differences in the number of days in LOS. A weighted least squares model was used to obtain estimates of the difference expenditures. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

(continued)

Table 5 (continued)Impacts on inpatient utilization and expenditures for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

The total weighted N for the inpatient admission rate model is 4,045,874. The total weighted Ns for the acute inpatient LOS is 212,870 and for payment per admission models is 200,870. The total weighted N for the PMPM model is 3,824,639. The expenditure outcomes exclude commercial plan members with capitated payments.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

Figure 24 Impacts on all-cause acute inpatient admissions per 1,000 commercial plan members, first 4 years of Maryland All-Payer Model implementation



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

Figure 25 Impacts on inpatient facility PMPM expenditures for commercial plan members, first 4 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

4.2.2.3 Medicaid

Figure 26 shows the unadjusted inpatient admission rate per 1,000 beneficiaries for Medicaid beneficiaries in Maryland. Inpatient admissions per 1,000 beneficiaries declined steadily for Maryland Medicaid beneficiaries from the baseline period through the All-Payer Model period. We excluded 2013 Medicaid data from these analyses because they were incomplete. Because these are unadjusted averages with no comparison group, we cannot conclude what the impact of the Maryland All-Payer Model was for the Medicaid population.

Figure 26 Unadjusted inpatient admissions per 1,000 Medicaid beneficiaries in Maryland, 2011 through 2017



4.2.3 What Was the Impact of the Maryland All-Payer Model on Outpatient Hospital Utilization and Expenditures?



The All-Payer Model was expected to reduce ED visits and ED expenditures per beneficiary. Despite incentives to avoid unnecessary services during ED visits, the effect on payment per ED visit could not be predicted if hospitals were able to divert less costly nonemergent cases to other settings. Likewise, fixed revenues under global budgets could incentivize hospitals to reduce expenditures for other hospital outpatient department services, but expenditures for these services could increase if hospitals shifted inpatient and ED services to these settings. Although the ED visit rate for Medicare beneficiaries did not decline under the All-Payer Model, ED expenditures grew more slowly. For commercial plan members, however, the ED visit rate declined but the All-Payer Model had no effect on ED expenditures.

4.2.3.1 Medicare

Table 6 shows the results of the D-in-D regression analyses for ED visits per 1,000 Medicare beneficiaries; expenditures for ED visits and for other hospital outpatient department services; and payment per ED visit, for Maryland relative to the comparison group after 4.5 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. The plots in *Figures 27* through *29* include 90 percent and 95 percent CIs around the estimated annual effects for the change in the ED visit rate, ED visit expenditures, and other hospital outpatient department expenditures, respectively. Unadjusted yearly averages for ED visits, ED visit expenditures, and other hospital outpatient department expenditures are shown in *Appendix I*. For all ED outcomes reported in this chapter, ED visits include both visits to the ED and observation stays.

- ED visits increased similarly for Medicare beneficiaries in Maryland and the comparison group after 4.5 years of All-Payer Model implementation, indicating that the All-Payer Model did not have an impact on this outcome. Although we expected ED visits to decline because hospitals described making major investments to shift non-emergent ED use to other settings, hospital leaders reported problems in convincing people to not use the ED. Patient compliance may have been harder to achieve for Medicare beneficiaries due to a higher prevalence of more complex health issues in the Medicare population.
- The relative reduction in total hospital expenditures noted in *Section 4.2.1.1* was due to relative declines in expenditures for outpatient hospital services, including ED visits and other hospital outpatient department services. ED visit expenditures declined 30.6 percent in Maryland relative to the comparison group during the first 4.5 years of the All-Payer Model (D-in-D estimate: -\$7.47 PBPM). Expenditures for ED visits declined slightly in Maryland over the 4.5 years of All-Payer Model implementation but increased steadily in the comparison group in each year. The magnitude of the relative reduction increased substantially from the first to the fifth year of the All-Payer Model.
- Other hospital outpatient department PBPM expenditures increased 17.2 percent less in Maryland than in the comparison group in the 4.5 years of All-Payer Model implementation overall (D-in-D estimate: -\$18.14 PBPM) and in each year individually. The magnitude of the relative reduction increased over time.
- Payment per ED visit declined by 32.6 percent in Maryland relative to the comparison group (D-in-D estimate: -\$223 per visit). The average payment per ED visit declined in Maryland, but it increased in the comparison group in each year of the All-Payer Model implementation period. The magnitude of the relative reduction increased substantially from the first to the fifth year of the model. In subsequent analyses, we found that the payment per ED visit savings were due in part to large increases in OPPS payments in 2014 and 2015.
| | Fynected | Change in out
to impleme | come from baseline
entation period | | | |
|--|-------------------------|-----------------------------|---------------------------------------|-------------------------------|--------------------------|---------|
| Outcome | direction of
outcome | Maryland | Comparison
group | D-in-D estimate
(90% CI) | Relative
difference % | p-value |
| ED visits per 1,000 population | * | 8 | 8 | 7.0
(-0.6, 14.7) | 1.5 | 0.13 |
| ED visits PBPM (\$) | ॐ | * | 8 | -7.47
(-8.86, -6.08) | -30.6 | < 0.001 |
| Other hospital outpatient department PBPM (\$) | \diamond | ~ | ⊗ | -18.14
(-20.57, -15.70) | -17.2 | < 0.001 |
| Payment per ED visit (\$) | \diamond | * | ⊗ | -222.88
(-264.65, -181.11) | -32.6 | < 0.001 |
| Increase | Solution Decrease | | On change | Coul | d move in either direct | ion |
| Change in expected direction | Change in unex | spected direction | Change, could mov | e in either direction | | |

Table 6Impacts on outpatient hospital utilization and expenditures for Medicare beneficiaries,first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A negative binomial regression model was used to obtain estimates of the differences in the number of ED visits. The number of ED visits estimate was multiplied by 1,000 to obtain a rate per 1,000 beneficiaries. A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

(continued)

Table 6 (continued) Impacts on outpatient hospital utilization and expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for all PBPM models and the ED visit model is 10,281,981. The total weighted N for payment per ED visit is 4,760,964.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Figure 27 Impacts on ED visits per 1,000 Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



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

Figure 28 Impacts on ED visit PBPM expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



NOTES: PBPM = per beneficiary per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure 29 Impacts on other hospital outpatient department PBPM expenditures for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



NOTES: PBPM = per beneficiary per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

4.2.3.2 Commercial Insurance

Table 7 shows the results of the D-in-D regression analyses for the rate of ED visits per 1,000 commercial plan members, ED visit expenditures, other hospital outpatient department expenditures, and payment per ED visit for Maryland relative to the comparison group after 4 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. The plots in *Figures 30* through *32* include 90 percent and 95 percent CIs around the estimated yearly effects for the change in the ED visit rate, ED visit expenditures, and other hospital outpatient department expenditures, respectively. Unadjusted yearly averages for the ED visit rate, ED visit expenditures, and other hospital outpatient department expenditures.

- The ED visit rate decreased by 2.6 percent more in Maryland than in the comparison group after the first 4 years of All-Payer Model implementation overall (D-in-D estimate: -3.4 visits per 1,000 commercial plan members). The magnitude of the difference fluctuated by year and was only statistically significant in Year 2 of the model. The overall decline is consistent with hospital reports of major investments to divert ED visits to other settings.
- The changes in ED visit and other hospital outpatient department expenditures were not statistically significantly different for Maryland relative to the comparison group during the first 4 years of the All-Payer Model implementation.

Table 7
Impacts on outpatient hospital utilization and expenditures for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

	Exposted	Change in out to implem	come from baseline entation period			
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
ED visits per 1,000 population	*	*	*	-3.4 (-5.8, -1.0)	-2.6	0.02
ED visits PMPM (\$)	≫	8		0.36 (-0.14, 0.86)	3.9	0.24
Other hospital outpatient department PMPM (\$)	\diamond	~	\$	-1.51 (-3.93, 0.90)	-3.5	0.30
Payment per ED visit (\$)	\diamond	~	\$	59.25 (30.91, 87.59)	10.4	< 0.001
S Increase	Solution Decrease		On change	Cou	ld move in either direct	ion
Change in expected direction	Change in une	expected direction	Change, could mov	ve in either direction		

CI = confidence interval; ED = emergency department; PMPM = per member per month.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the differences in probability of an ED visit. The probability of any ED visit estimate was multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the difference-in-differences (D-in-D) estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

(continued)

Table 7 (continued)Impacts on outpatient hospital utilization and expenditures for commercial plan members,first 4 years of Maryland All-Payer Model implementation

The total weighted N for the ED visit rate model is 4,045,874. The total weighted N for all PMPM models is 3,824,639. The total weighted N for payment per ED visit is 723,071. The expenditure outcomes exclude commercial plan members with capitated payments.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

Figure 30 Impacts on ED visits per 1,000 commercial plan members, first 4 years of Maryland All-Payer Model implementation



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

Figure 31 Impacts on ED visit PMPM expenditures for commercial plan members, first 4 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

Figure 32 Impacts on other hospital outpatient department PMPM expenditures for commercial plan members, first 4 years of Maryland All-Payer Model implementation



NOTES: PMPM = per member per month. Bars indicate 90 percent confidence intervals (CIs), and lines that extend beyond the bars indicate 95 percent CIs. CIs that do not cross the origin on the x-axis indicate statistically significant effect estimates; CIs that cross the origin denote statistically insignificant effects.

• Maryland had a 10.4 percent larger increase in the payment per ED visit than the comparison group during the first 4 years of the All-Payer Model overall (D-in-D estimate: \$59 per visit). The magnitude of the relative difference fluctuated over the 4 years of the model and was not statistically significant in Year 4. The greater increase in payment per ED visit is consistent with diverting non-emergent patients to other settings, as higher acuity, and thus more costly, visits would remain.

4.2.3.3 Medicaid

Figure 33 shows the unadjusted ED visit rate per 1,000 beneficiaries for Medicaid beneficiaries in Maryland. ED visits per 1,000 beneficiaries declined in Maryland from 2012 through 2017. We excluded 2013 Medicaid data from these analyses because they were incomplete. Because these are unadjusted averages with no comparison group, we cannot conclude what the impact of the Maryland All-Payer Model was for the Medicaid population.

Figure 33 Unadjusted ED visits per 1,000 Medicaid beneficiaries in Maryland, 2011 through 2017



ED = emergency department

4.2.4 What Was the Impact of the Maryland All-Payer Model on Nonhospital Expenditures?

S Nonhospital	After 4.5 years of All-Payer Model implementation, total spending for professional services increased nearly 2 percent less among Maryland Medicare beneficiaries than in the comparison group. Professional spending in hospital settings declined 4.4 percent for Maryland Medicare beneficiaries relative to the comparison group, but the model had no impact on spending for professional services outside the hospital.
•	In contrast, spending for professional services increased 2.9 percent more for Maryland commercial plan members than for the comparison group.
•	PAC service expenditures for Medicare beneficiaries declined by 5.9 percent relative to the comparison group during the first 4.5 years of the All-Payer Model. This finding could be the result of the decline in inpatient admissions, because an inpatient stay is required to qualify for PAC services, but it could also reflect the significant investments hospitals made in post-discharge planning and care that may have allowed patients to avoid PAC services.
•	Medicare expenditures for other nonhospital services increased by 8.6 percent in Maryland relative to the comparison group during the first 4.5 years of the All-Payer Model.
•	In contrast, there was no impact on other nonhospital service expenditures among the commercially insured population.

The effect of the All-Payer Model on professional services overall could not be predicted because expenditures for professional services delivered outside the hospital were expected to increase if services were shifted out of hospital settings, but expenditures for professional services provided in hospital settings were expected to decline. For Medicare, we found the expected reduction in expenditures for professional services provided in the hospital. We could not predict how PAC spending would change because efforts to move patients out of the hospital could increase PAC spending, but it could decline if fewer patients were eligible for these services because of decreases in hospital admission rates. We expected spending for other nonhospital services to increase and Medicare findings were consistent with this hypothesis, but there was no impact for the commercially insured population.

4.2.4.1 Medicare

Table 8 presents the results of the D-in-D regression analyses for the nonhospital expenditure measures for Medicare beneficiaries in Maryland and the comparison group after 4.5 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*.

- Professional expenditures increased 1.8 percent less in Maryland than the comparison group during the first 4.5 years of the All-Payer Model overall (D-in-D estimate: -\$4.45 PBPM). However, the difference was statistically significant only in the first year of the All-Payer Model.
- The smaller increase was mainly driven by spending for professional services in hospital (i.e., regulated) settings. In the hospital setting, expenditures for professional services declined in Maryland and increased in the comparison group, resulting in a 4.4 percent decrease in Maryland relative to the comparison group during the first 4.5 years overall (D-in-D estimate: -\$2.71 PBPM). This decline is consistent with decreases in both inpatient admissions and some hospital outpatient department services.
- In the nonhospital (unregulated) setting, expenditures for professional services increased for both Maryland and the comparison group. Although they increased more slowly in Maryland, the difference only reached statistical significance in Year 1 of the All-Payer Model.
- PAC expenditures²⁸ declined 5.9 percent more in Maryland than the comparison group during the first 4.5 years of the All-Payer Model overall (D-in-D estimate: -\$6.32 PBPM). Because an inpatient admission is required to qualify for PAC services, this relative reduction could reflect the decline in inpatient admissions. It could also reflect the significant investments hospitals made in post-discharge planning and care that may have allowed patients to avoid PAC services.

²⁸ PAC expenditures include expenditures for skilled nursing facilities, long-term care hospitals, rehabilitation hospitals, and home health.

	Exposted	Change in outcome from baseline to implementation period				
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Professional PBPM—total (\$)	\diamond	*	*	-4.45 (-6.98, -1.92)	-1.8	0.004
Professional PBPM—regulated settings (\$)	ॐ	*	⊗	-2.71 (-3.57, -1.84)	-4.4	<0.001
Professional PBPM—unregulated settings (\$)		\$	⊗	-1.74 (-4.14, 0.65)	-1.0	0.23
Post-acute care PBPM—total (\$)	\diamond	*	*	-6.32 (-9.08, -3.57)	-5.9	< 0.001
Post-acute care PBPM—skilled nursing facilities (\$)	\diamond	*	*	-4.15 (-6.32, -1.99)	-5.8	0.002
Post-acute care PBPM—long-term care hospitals (\$)	\diamond	*	*	-0.77 (-1.64, 0.11)	-20.0	0.15
Post-acute care PBPM—rehabilitation hospitals (\$)	\diamond		~	-0.07 (-1.05, 0.91)	-1.2	0.91
Post-acute care PBPM—home health (\$)	\diamond	*	*	-1.33 (-2.29, -0.38)	-4.9	0.02
Other PBPM $(\$)^*$		≶	*	5.99 (3.46, 8.52)	8.6	<0.001
✤ Increase	Decrease	(No change	Coul	d move in either direct	ion
Change in expected direction	Change in unexpe	cted direction	Change, could move	e in either direction		

Table 8
Impacts on nonhospital expenditures for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

(continued)

Table 8 (continued)Impacts on nonhospital expenditures for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for all PBPM models is 10,281,981.

* Other PBPM includes payments for noninpatient and other services, along with durable medical equipment payments.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

- The greater decline in PAC expenditures was primarily driven by greater declines in spending for post-acute care services in skilled nursing facilities (SNFs). SNF PAC expenditures declined by 5.8 percent more in Maryland than the comparison group after 4.5 years of implementation (D-in-D estimate: -\$4.15 PBPM). The magnitude of the difference increased over time, but only reached statistical significance in the first and fifth years of the All-Payer Model.
- Home health PAC expenditures also declined by 4.9 percent more in Maryland than the comparison group (D-in-D estimate: -\$1.33 PBPM) over the first 4.5 years of implementation, but the difference was not statistically significant in any individual year.
- The change in expenditures for PAC services in long-term care or rehabilitation facilities was not statistically significantly different for Maryland and the comparison group over the first 4.5 years of the All-Payer Model.
- Expenditures for other nonhospital services (including hospice and other outpatient services, as well as durable medical equipment) increased 8.6 percent in Maryland relative to the comparison group (D-in-D estimate: \$5.99 PBPM).

4.2.4.2 Commercial Insurance

Table 9 presents the results of the D-in-D regression analyses for the nonhospital expenditure measures for commercial plan members in Maryland and the comparison group after 4 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*.

- During the first 4 years of the All-Payer Model overall, professional expenditures increased 2.9 percent more for Maryland commercial plan members than the comparison group (D-in-D estimate: \$2.80 PMPM). The magnitude of the difference increased over time, but it was not statistically significant in any individual year of the model.
- The change in expenditures for other nonhospital services in Maryland was not statistically significantly different from the comparison group for the first 4 years of the All-Payer Model overall. However, expenditures for other nonhospital services in Maryland declined by 15.6 percent relative to the comparison group during the fourth year of the model (D-in-D estimate: -\$1.80 PMPM).

Table 9Impacts on nonhospital expenditures for commercial plan members,first 4 years of Maryland All-Payer Model implementation

		Change in outco impleme	ome from baseline to ntation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Professional PMPM (\$)	\$	\$	*	2.80 (0.63, 4.98)	2.9	0.03
Other PMPM (\$)*		*		-0.53 (-1.28, 0.23)	-4.6	0.25
♠ Increase	Decrease Decrease		On change	🗘 Coul	d move in either direct	ion
Change in expected direction	on Change in unexp	pected direction	Change, could move	e in either direction		

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CI = confidence interval; D-in-D = difference-in-differences; PMPM = per member per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditures. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A negative value for the regression-adjusted D-in-D corresponds to a greater decrease or a smaller increase in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A positive value corresponds to a greater increase or a smaller decrease in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for all PBPM models is 3,824,639.

* Other PMPM includes payments for noninpatient and other services, including those made for other outpatient services.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

4.2.5 What Was the Impact of the Maryland All-Payer Model on Medicare Beneficiary Cost-Sharing Liability?

Beneficiary Cost Sharing	 The decline in total beneficiary cost sharing for Maryland Medicare beneficiaries relative to the comparison group was sustained and increased in size through the first 4.5 years of the All-Payer Model implementation period. Because beneficiary cost sharing is closely linked with Medicare expenditures, out-of-pocket costs for ED visits, other hospital outpatient department services, and professional services likewise declined for Maryland beneficiaries relative to those in the comparison group during the first 4.5 years of the implementation period. Beneficiary cost sharing for inpatient facility services also declined relative to the comparison group, despite the absence of an impact on Medicare expenditures for these services. The decline in beneficiary cost sharing for inpatient stay rather than a copayment, reflects the reduction in the admission rate.
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Medicare beneficiary cost-sharing liability is closely associated with Medicare expenditures. Therefore, any reductions (or increases) in Medicare expenditures because of the All-Payer Model would also affect beneficiaries' out-of-pocket costs. As such, beneficiaries could benefit from the model if it was successful in reducing Medicare spending. Although these effects are driven by changes in Medicare expenditures, to measure beneficiary benefits directly, we estimated All-Payer Model effects on total beneficiary cost-sharing liability and separately for inpatient facility, ED visits, other hospital outpatient department services, and professional services. As with Medicare expenditures, we included all Medicare beneficiaries in these analyses.

Table 10 presents the results of the D-in-D regression analyses for the beneficiary costsharing measures after 4.5 years of the Maryland All-Payer Model. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*.

- During the first 4.5 years of All-Payer Model implementation, total beneficiary cost sharing increased 4.2 percent less in Maryland than in the comparison group (D-in-D estimate: -\$6.37 PBPM). The magnitude of the relative reduction grew over time and was statistically significant in each year of the model.
- Despite the absence of any impact on inpatient facility expenditures, beneficiary cost sharing for inpatient facility services declined 6.5 percent in Maryland relative to the comparison group during the 4.5-year implementation period (D-in-D estimate: -\$1.54 PBPM). Beneficiary cost sharing for inpatient services declined slightly in Maryland while increasing in the comparison group. The magnitude of the relative reduction grew over time and was statistically significant in each year of the model. This decline reflects the reduction in the admission rate because, unlike other services, beneficiary cost sharing for inpatient services is not a copayment, rather it is a deductible for the first 60 days of an inpatient stay.

Table 10	
Impacts on beneficiary cost sharing for Medicare beneficiaries,	
first 4.5 years of Maryland All-Payer Model implementation	

		Change in out to implem	come from baseline entation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Total PBPM (\$)	≫	≈		-6.37 (-7.69, -5.05)	-4.2	< 0.001
Inpatient facility PBPM (\$)	≫	*		-1.54 (-1.99, -1.09)	-6.5	< 0.001
ED visits PBPM (\$)	*			-1.54 (-1.85, -1.23)	-26.2	< 0.001
Other hospital outpatient department PBPM (\$)	\diamond	≈		-3.04 (-3.62, -2.46)	-12.1	< 0.001
Professional PBPM (\$)	\diamond	~		-0.98 (-1.60, -0.35)	-1.5	0.01
Sincrease	∛ Decrease		On the other that the other ot	Coul	d move in either direct	ion
Change in expected direction	on Change in unexp	pected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of beneficiary cost sharing. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A negative value for the regression-adjusted D-in-D corresponds to a greater decrease or a smaller increase in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A positive value corresponds to a greater increase or a smaller decrease in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

(continued)

Table 10 (continued)Impacts on beneficiary cost sharing for Medicare beneficiaries,first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for all models is 10,281,981.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

- Beneficiary cost sharing for ED visits increased in Maryland and in the comparison group in the first 4.5 years after the implementation of the All-Payer Model overall, but it increased 26.2 percent less in Maryland (D-in-D estimate: -\$1.54 PBPM). The growth was statistically significantly less in Maryland than in the comparison group in each year.
- Beneficiary cost sharing for other hospital outpatient department services increased 12.1 percent less in Maryland than in the comparison group in the first 4.5 years of All-Payer Model implementation overall (D-in-D estimate: -\$3.04 PBPM). The relative decline in beneficiary cost sharing for other hospital outpatient department services in Maryland was statistically significant in each year individually.
- Beneficiary cost sharing for professional services in Maryland increased 1.5 percent less than in the comparison group in the first 4.5 years of implementation overall (D-in-D estimate: -\$0.98 PBPM), but Year 1 was the only individual year where the relative decline was statistically significant.

4.3 Discussion

In response to the All-Payer Model, expenditures and utilization for hospital services, especially inpatient admissions and ED visits, should decrease. Four and a half years into the implementation of the All-Payer Model, we found overall reductions in total expenditures and total hospital expenditures for Medicare beneficiaries in Maryland relative to the comparison group. In addition, we found reductions in total hospital expenditures for commercial plan members in Maryland relative to the comparison group; however, we did not find statistically significant reductions in total expenditures for the commercially insured population. This is due to different utilization patterns for the commercial population, specifically increased expenditures for professional services that offset savings on inpatient facility payments. In addition, PAC was a substantial contributor to the reduction in nonhospital expenditures for the Medicare population, but utilization of PAC services is negligible for commercial plan members.

As expected, we found reductions in inpatient admissions for Medicare beneficiaries in Maryland relative to the comparison group. Although inpatient admissions also declined for Maryland commercial plan members, the difference in the decline did not reach statistical significance. For both Medicare beneficiaries and commercial plan members, the magnitude of the reduction in admissions increased over the first 4 years of the model. Similarly, inpatient admissions trended downwards from the baseline period through the implementation period for Maryland Medicaid beneficiaries. The growing reduction in admissions in Maryland over time could reflect the maturation of hospital programs to reduce utilization by avoiding unnecessary hospitalizations. These programs, including increased care coordinator, care manager, and social work staffing, took time for hospitals to develop, implement, and refine. Hospital leadership reported coordinating with both ED and SNF staff to avoid unnecessary admissions. For example, hospitals coordinated with SNFs, including locating staff within SNFs in some cases, so that the SNF staff would consult hospital staff instead of calling an ambulance to determine whether a patient needed to return to the hospital or not. Hospital leadership also reported significant investments in post-discharge planning to prevent repeat admissions, which may have driven down the overall inpatient admission rate.

Despite the reduction in admissions, there were no statistically significant savings on inpatient facility expenditures for Medicare beneficiaries because utilization reductions were offset by increases in the payment per admission. The increased payment per admission in Maryland relative to the comparison group is due in part to more rapid growth in payment rates in Maryland as a result of rate adjustments that hospitals are permitted to make within prescribed limits to regain lost revenue from decreased utilization to meet their global budgets. In particular, payment per admission increased substantially in 2017 for Medicare beneficiaries due in part to the large rate increases in the first two quarters of the year to compensate for the lower than expected volume in the first half of FY 2017 as reported in *Section 3*. A greater increase in casemix severity might also contribute to the faster growth in the payment per admission, which could occur if avoided admissions were lower cost cases. We found a small increase in severity of Medicare admissions in Maryland relative to the comparison group (see *Section 6*).

Among commercial plan members, payment per inpatient admission grew more slowly in Maryland relative to the comparison group. This could be due to more rapid growth in commercial payment rates in the comparison group relative to Maryland. We also found a smaller increase in case-mix severity for commercial admissions in Maryland relative to the comparison group (see *Section 6*), which could also contribute to the slower growth in payment per admission.

For the Medicare population, savings on total hospital expenditures were driven by expenditure reductions for outpatient hospital services. During the first 4.5 years of the All-Payer Model, PBPM expenditures for ED visits and for other hospital outpatient department services grew more slowly among Medicare beneficiaries in Maryland relative to the comparison group. In contrast, expenditures for ED visits and for other outpatient hospital services did not change for the commercially insured population in Maryland relative to the comparison group.

Changes in the rate of ED visits differ for Medicare and the commercially insured population. The ED visit rate increased similarly for Medicare beneficiaries in Maryland and the comparison group. However, the ED visit rate decreased for the Maryland commercially insured population. The ED visit rate also declined among Medicaid beneficiaries in Maryland. Hospital leaders reported major investments to shift non-emergent ED use to other settings, which may explain the commercially insured and Medicaid findings. Although unexpected, the ED visit rate may not have changed in the Medicare population because hospitals were successful in reducing admissions of people who visited the ED. We found that admissions among people who visited the ED declined more among Maryland Medicare beneficiaries than in the comparison group, although the difference did not reach statistical significance (see *Section 6*).

Hospital leaders noted that they have little control over a patient's decision to seek care through the ED, although some hospitals tried to provide alternatives such as mobile health clinics and discharge clinics. It may have been more difficult to change utilization patterns among Medicare beneficiaries who have more complex health issues relative to the commercially insured and non-dual Medicaid populations, which are healthier on average than Medicare. Nearly all non-dual Maryland Medicaid beneficiaries are enrolled in managed care, which also may contribute to the reduction in avoidable ED use observed in the Medicaid population. Because managed care organizations are paid a capitation rate regardless of how many services Medicaid beneficiaries use, they have an incentive to curb overuse of expensive services such as ED visits.

We report ED visits and observation stays together due to the low frequency of observation stays in Maryland relative to the comparison group. We conducted a sensitivity analysis to assess how the results for ED visits and observation stays may vary by running the models for each outcome separately. Among Medicare beneficiaries, ED visits increased more in Maryland than in the comparison group but observation stays declined relative to the comparison group. As was the case for ED visits and observation stays combined, the increase in the ED visit rate was driven by a greater increase during the first 2 years of the model, and there were no differences in the last 3 years of the All-Payer Model. Among commercial plan members, we found an increase in the rate of observation stays for Maryland relative to the comparison group. The outpatient ED visit rate excluding observation stays for Maryland commercial plan members declined relative to the comparison group, however. As such, the decline in the overall ED visit rate we observed for commercial plan members was driven by a relative decline in ED visit state excluding observation stays are lative decline in ED visit rate we observed for commercial plan members was driven by a relative decline in ED visit state excluding observation stays for Maryland commercial plan members declined relative to the comparison group.

The payment per ED visit declined for Medicare beneficiaries in Maryland but increased for the comparison group, leading to a reduction in Maryland relative to the comparison group. The reduction for the Medicare population indicates either that the resource intensity of ED visits decreased relative to the comparison group during the implementation period or that payment rates increased more slowly in Maryland than under the OPPS. In subsequent analyses, we found that the ED savings were due in part to large increases in OPPS payments in 2014 and 2015. For commercial plan members, the payment per ED visit increased more in Maryland than in the comparison group, indicating that the services became more resource intensive relative to the comparison group or that commercial insurance payment rates grew more rapidly in Maryland. This finding, coupled with the relative decline in ED visits, could indicate that hospitals had some success in diverting non-emergent cases from the ED to other settings for the commercial population.

For Medicare, more than 80 percent of the total savings was due to the relative decrease in total hospital PBPM expenditures. Total Medicare savings exceeded hospital savings because expenditures for nonhospital services (professional services and PAC) also increased less or declined slightly more for Maryland Medicare beneficiaries than the comparison group. We found a relative reduction in expenditures for professional services provided in regulated settings only, which is consistent with decreases in inpatient admissions and use of some hospital outpatient department services. The decline in PAC spending was driven primarily by relative declines in PAC spending in SNFs. Home health spending also declined in Maryland relative to the comparison group after 4.5 years of the model. The greater reduction in expenditures for PAC is likely due in part to the relative reduction in inpatient admissions because an inpatient stay is required to qualify for PAC services. The relative reduction could also reflect the significant investments hospitals made in post-discharge planning and care that may have allowed patients to avoid PAC services, although it had no impact on hospital LOS. Analyses reported in *Section* 7 show an increase in the rate of discharges to PAC in Maryland relative to the comparison group following implementation of the All-Payer Model, however. Overall, the relative decline in total Medicare expenditures and decreases in nonhospital Medicare

expenditures indicate that the model is reducing Medicare hospital spending without shifting costs to other parts of the Maryland health care system outside the global budgets.

In contrast, we found increased spending relative to the comparison group for professional services among the commercially insured population and the increase in professional spending offset savings in hospital spending. We were not able to differentiate professional services in regulated and nonregulated settings in the commercial data and, therefore, could not determine whether hospital savings were due to shifting costs to other parts of the health care system in the commercially insured population.

We found reductions in cost sharing for Medicare beneficiaries in Maryland relative to the comparison group after the implementation of the All-Payer Model. These findings indicate that that the Maryland All-Payer Model benefited Medicare beneficiaries by lowering their outof-pocket costs. Because beneficiary cost sharing is closely linked with Medicare expenditures, out-of-pocket costs in total, for ED visits, for other hospital outpatient department services, and for professional services likewise declined for Maryland beneficiaries relative to those in the comparison group during the All-Payer Model implementation period. Beneficiary cost sharing for inpatient facility services also decreased relative to the comparison group, despite the absence of a difference in Medicare expenditures for these services. Beneficiary cost sharing for inpatient services declined because the cost sharing for Part A inpatient services is a deductible for the first 60 days of an inpatient stay rather than a copayment. Even though we found that Medicare inpatient facility payments did not decline because the cost per admission increased, an increase in cost per admission would not raise the beneficiary deductible. However, the decrease in the admission rate translated into fewer people having to pay the deductible and a reduction in inpatient cost sharing.

As detailed in *Appendix D*, identifying a comparison group for Maryland is difficult due to long-standing differences in hospital payment policies between Maryland and the rest of the country. We addressed this challenge with matching and propensity score weights to make the observed characteristics of Maryland and the comparison group as similar as possible. For the Medicare population, we also included a linear time trend to account for differing baseline trends. The model with the linear time trend assumes Maryland would have continued the same path it did during the baseline period if the All-Payer Model had not been introduced and the comparison group would have followed the same path throughout the study period. To assess whether inclusion of the linear time trend affected our findings, we conducted sensitivity analyses using a model that assumed Maryland and the comparison group were following parallel trends during the baseline period for the Medicare population (see *Appendix J*).

It is important to note that results from the model used for the sensitivity analysis are not accurate if the assumption that Maryland and the comparison group were following parallel trends is not accurate. Although the baseline trends for Maryland and the comparison group were not parallel for Medicare beneficiaries for most of the outcomes included in this section, some expenditure and utilization outcomes did show parallel trends. These included total expenditures; total hospital expenditures; professional expenditures that were incurred in a hospital setting; PAC expenditures incurred in a SNF, long-term care hospital, and rehabilitation hospital; and LOS.

Although total expenditures still grew more slowly in Maryland than in the comparison group in the sensitivity analysis, the difference did not reach statistical significance. Nonetheless, we found savings in total hospital expenditures for Maryland Medicare beneficiaries with either approach we used. We also found savings on expenditures for professional services provided in a hospital setting with both approaches. LOS increased for Maryland admissions relative to the comparison group with both approaches, but the difference only reached statistical significance in the sensitivity analysis. Likewise, we find savings in PAC expenditures in SNFs in both analyses, but the difference was not statistically significant in the sensitivity analysis. In contrast, we found savings in PAC spending in rehabilitation hospitals in both analyses, but it was only statistically significant in the sensitivity analysis. In summary, although the statistical significance of the findings varied by statistical approach for some outcomes, we found that the findings for all of the outcomes that were on parallel trajectories in the baseline period trended in the same direction regardless of the statistical approach we used. Most importantly, both approaches provided evidence that the Maryland All-Payer Model reduced total hospital expenditures.

In contrast to the Medicare population, we found that Maryland and comparison group commercial plan members were on parallel trajectories for most outcomes included in this section. As such, our main model assumed Maryland and the comparison group were following parallel trends during the baseline period and we used the model that included a linear time trend—that is, the model that assumed differential baseline trends—as the sensitivity analysis for commercial plan members. Because the model that assumes parallel trends may produce incorrect results when the baseline trends are not parallel, we looked at whether the sensitivity analysis produced different results for these outcomes that did not have parallel trends during the baseline period: inpatient expenditures, payment per inpatient admission, LOS, number of ED visits, and ED expenditures. We found greater declines in ED visits for commercial plan members in Maryland than in the comparison group and no differences in the change in LOS with both approaches. However, inpatient facility expenditures increased more in Maryland than in the comparison group in the sensitivity analysis (although the difference was not statistically significant), but it increased less in Maryland than in the comparison group in the main analysis. Likewise, in the sensitivity analysis, payment per admission increased more in Maryland than in the comparison group, whereas it increased less in Maryland in the main analysis. Although ED spending increased at similar rates in Maryland and the comparison group in the main analysis, ED spending increased less in Maryland than in the comparison group in the sensitivity analysis. Regardless of the statistical approach used, our analyses found ED visits declined for the commercially insured in Maryland while LOS were unchanged; however, findings for inpatient and ED spending differed so we should interpret the relative declines in inpatient spending found in the main analysis with caution.

As detailed in *Appendix K*, to ensure comparability between groups for the commercially insured population, we used MarketScan data for both Maryland and the comparison group. MarketScan data is a convenience sample that is not representative of the entire commercially insured population. As such, the results from the MarketScan analyses may not be generalizable to all commercially insured populations in Maryland. We also calculated outcomes for the Maryland commercially insured population included in the Maryland Medical Care Data Base (MCDB) and compared them to outcomes from MarketScan data by examining descriptive trends. We found that the trends for most spending and utilization outcomes generally went in

the same direction for the commercially insured populations included in MarketScan and the MCDB. However, there were differences in the trends for the ED visit rate and ED PMPM expenditures for the commercial population included in the MCDB relative to the population included in MarketScan. These findings suggest that the findings for the ED outcomes for the MarketScan population may not be generalizable to the entire commercially insured population in Maryland.

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SECTION 5 WHAT WAS THE IMPACT OF THE MARYLAND ALL-PAYER MODEL ON QUALITY OF CARE?

Key Takeaways for Quality of Care

- Maryland hospitals had mixed success in reducing avoidable utilization within the Medicare and commercially insured populations. Evidence differed depending on the measure examined, and findings differed across the two populations.
 - Rates of unplanned readmissions did not change for either population relative to the comparison group, but they did decrease in absolute terms. Although unplanned readmissions declined in Maryland, this was also a target for hospitals nationwide.
 - Admissions for ambulatory care sensitive conditions (ACSCs) decreased 6.7 percent for Maryland Medicare beneficiaries and 6.1 percent for commercial plan members relative to the comparison groups. These declines could be due to hospital programs aimed at reducing utilization by improving care management and avoiding unnecessary hospitalizations.
 - Visits to the ED within 30 days of discharge declined 5.9 percent more for commercial plan members in Maryland than in the comparison group. The All-Payer Model did not have a statistically significant impact for Medicare beneficiaries.
 - The All-Payer Model did not have a statistically significant impact on ED visits for avoidable conditions in the Medicare population except for ED visits for heart failure, which increased by 11.2 percent in Maryland relative to the comparison group.
 - Hospitals developed a variety of staffing and care delivery strategies to reduce avoidable utilization, but their impacts were limited. Hospitals found it difficult to convince patients to use alternatives to the ED.
- The All-Payer Model did not have an impact on the percentage of discharges with a follow-up visit within 14 days for Medicare beneficiaries, and the percentage increased less for commercial plan members. Hospitals acknowledged the importance of developing partnerships with community providers to improve care coordination, but lack of provider engagement and supply in some areas made progress difficult.
- Although self-reported patient experience with Maryland hospitals was lower than with comparison hospitals for nearly every measure examined, patient experience did not decline under the All-Payer Model. Hospitals focused on improving patient experience, but saw little evidence of their efforts in patient survey ratings.
- The All-Payer Model was not associated with population health improvement. Although most hospitals reported investing in initiatives to improve population health, they found it difficult to engage patients and change their behavior.

5.1 Research Questions

In this section, we address the following research questions related to quality of care:

- How did trends in avoidable or reducible utilization change in Maryland relative to the comparison group after implementation of the All-Payer Model?
- How did trends in care coordination activities change in Maryland relative to the comparison group after implementation of the All-Payer Model?
- How did patient experience of care change in Maryland relative to the comparison group after implementation of the All-Payer Model?
- How did patient behaviors change in Maryland relative to the comparison group after implementation of the All-Payer Model?

The Maryland All-Payer Model aimed to promote better care, better health, and lower cost for all Maryland patients. Nonetheless, an ongoing concern about cost-containment initiatives such as Maryland's All-Payer Model is that they may create incentives to limit care, resulting in poorer quality of care and worse patient outcomes. The All-Payer Model incorporated features to offset such incentives. Unlike the IPPS, hospitals were paid based on individual units of service provided. Because hospitals could increase rates only within a prescribed range to recover some of the lost revenue from decreased utilization, incentives to reduce utilization to retain savings were relatively limited. In fact, the All-Payer Model incentivized hospitals to provide enough services to receive their full budget and maintain the market share on which future budgets would be set. Furthermore, the QBR program, one of the factors that determined hospitals' budget updates, created incentives for hospitals to improve performance on measures such as patient experience, patient safety indicators and complications, and mortality. Similarly, the adjustment to hospital budgets for PAU provided incentives to improve quality of care and reduce certain types of inappropriate utilization, including readmissions.

The All-Payer Model included several goals related to improving population health, and global budgets provided an incentive for hospitals to engage in population health management. Population health management can involve (1) a focus on subpopulations of patients (e.g., those with a specific chronic disease or at risk for certain conditions); (2) coordination of care, with primary care providers as leaders of the health care team; and (3) patient engagement and community integration. The All-Payer Model encouraged hospitals to develop community partnerships (e.g., with tobacco cessation centers) and the CCIP track within the CRP encouraged collaboration between hospitals and community-based providers to better manage and coordinate care for patients at risk of incurring high costs. Concurrent health system reform activities and anticipation of the follow-on TCOC Model may have further encouraged hospitals to improve population health. However, hospitals had limited incentives to invest in activities to improve population health, as the benefits might not accrue directly to the hospital. Also, hospitals alone had limited ability to change patient behaviors, such as obesity and smoking, that affect population health and are underlying drivers of morbidity and mortality.

5.2 Results

5.2.1 What Were the Impacts of the Maryland All-Payer Model on Avoidable and Reducible Utilization?

H	• Evidence that avoidable or reducible inpatient utilization decreased among Medicare beneficiaries in Maryland during the first 4.5 years of the All-Payer Model was mixed.
Readmissions	 Although the rate of hospital admissions for ACSCs fell by 6.7 percent more in Maryland than in the comparison group, the difference in the reduction in unplanned readmissions was not statistically significant.
ACSC ADMISSIONS	 The All-Payer Model did not have an impact on the likelihood of having an ED visit within 30 days of discharge or on the rates of avoidable ED visits for most conditions examined. The rate of ED visits for heart failure,
	however, increased by 11.2 percent relative to the comparison group.
	• Evidence of effects on avoidable or reducible utilization for the commercially insured population in the first 4 years of the All-Payer Model was also mixed.
	 While hospital admissions for ACSCs declined 6.1 percent more in Maryland than in the comparison group, the difference in the reduction in unplanned readmissions was not statistically significant.
	 The percentage of discharges with an ED visit within 30 days declined 5.9 percent in Maryland relative to the comparison group.

We expected the All-Payer Model to decrease avoidable or reducible inpatient and ED utilization. For inpatient utilization, results for ACSC admissions were consistent with this hypothesis for both the Medicare and commercially insured populations, but results for unplanned readmissions were not. Findings for ED utilization were not consistent with this hypothesis for the Medicare population, but they were consistent for the commercially insured population.

5.2.1.1 Medicare

Table 11 presents the results of the D-in-D regression analyses for measures of avoidable or reducible hospital utilization in inpatient and ED settings. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. For inpatient care, we examined the rates of unplanned readmissions and ACSC admissions. The ED measures were the percentage of hospital discharges with an ED visit within 30 days and ED visits for selected avoidable conditions (bacterial pneumonia, heart failure, and chronic obstructive pulmonary disease or asthma). Adjusted means are lower in Year 5 for ACSC admissions and rates of ED visits for selected conditions because they represent 6 months, rather than 12 months, of data. The plots in *Figures 34* and *35* include 90 percent and 95 percent CIs around the estimated annual effects for the change in the rate of unplanned readmissions and the change in the rate of ACSC admissions, respectively. We present unadjusted yearly averages for unplanned readmissions and ACSC admissions and ACSC admissions in *Appendix I*.

- The All-Payer Model did not have a statistically significant impact on unplanned readmissions within 30 days of discharge over the first 4.5 years of the All-Payer Model or in any individual year. Although unplanned readmissions declined in Maryland, this was a focus for hospitals nationwide, and they also declined in the comparison group.
- The reduction in the ACSC admission rate was 6.7 percent larger among Medicare beneficiaries in Maryland than in the comparison group during the 4.5 years of the All-Payer Model (D-in-D estimate: -2.8 admissions per 1,000 Medicare beneficiaries). The reduction in the ACSC admission rate was larger in Maryland than in the comparison group in all years except Year 1, and the magnitude of the relative reduction increased between Years 1 and 4.
- The All-Payer Model did not have an impact on the percentage of Medicare beneficiary hospital discharges that had an ED visit within 30 days during the 4.5 years of the All-Payer Model overall or in any year. The percentage increased in both groups at similar rates.
- ED visits for selected avoidable conditions did not follow a consistent pattern between Medicare beneficiaries in Maryland and the comparison group. The rate of ED visits for heart failure increased in Maryland, whereas the rate decreased slightly in the comparison group during the All-Payer Model implementation period, resulting in an overall relative increase of 11.2 percent in Maryland (D-in-D estimate: 1.3 ED visits for heart failure per 1,000 Medicare beneficiaries). However, there were no statistically significant impacts on the rate of ED visits for bacterial pneumonia or chronic obstructive pulmonary disease/asthma during the All-Payer Model period overall.

Table 11
Impacts on rates of avoidable or reducible utilization for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

	Expected direction of outcome	Change in outcome from baseline to implementation period		D–in–D estimate	Relative	
Outcome		Maryland	Comparison group	(90% CI)	difference %	p-value
Unplanned readmissions within 30 days of discharge per 1,000 discharges	≫	≫	*	-0.5 (-4.5, 3.6)	-0.3	0.85
Hospital admissions for ACSCs per 1,000 population	ॐ	*	*	-2.8 (-3.7, -1.9)	-6.7	< 0.001
Percentage of discharges with an ED visit within 30 days of discharge	ॐ	8	8	0.1 (-0.3, 0.4)	0.6	0.79
ED visits for bacterial pneumonia per 1,000 population	ॐ	8	8	0.2 (-0.2, 0.5)	4.3	0.43
ED visits for heart failure per 1,000 population	ॐ	8	ॐ	1.3 (0.3, 2.2)	11.2	0.03
ED visits for COPD and asthma per 1,000 population	ॐ	*	ॐ	0.9 (-0.4, 2.1)	3.4	0.26
✤ Increase ♦ Decre	ase	\bigcirc No	change	Could move in a	either direction	
Change in expected direction Change	ge in unexpected di	rection Cha	nge, could move in either dir	ection		

ACSC = ambulatory care sensitive condition; CI = confidence interval; COPD = chronic obstructive pulmonary disease; D-in-D = difference-in-differences; ED = emergency department.

<u>Methods</u>: A logistic regression model was used to obtain estimates for all outcomes. All models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). Admission-level models (unplanned readmissions and ED visit within 30 days of discharge) also adjusted for the hospital's resident-to-bed ratio, number of short-term, acute care hospital beds, and disproportionate share hospital percentage.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

(continued)

Table 11 (continued)Impacts on rates of avoidable or reducible utilization for Medicare beneficiaries,first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for probability of an unplanned readmission is 1,980,821. The total weighted N for the number of ACSC admissions and ED visits by condition is 10,281,981. The total weighted N for probability of an ED visit within 30 days of discharge is 1,994,678.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Figure 34 Impacts on unplanned readmissions within 30 days of discharge per 1,000 discharges for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



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

Figure 35 Impacts on hospital admissions for ambulatory care sensitive conditions per 1,000 Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation



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

5.2.1.2 Commercial Insurance

Table 12 presents the results of the D-in-D regression analyses for the rates of unplanned readmissions and ACSC admissions, and the percentage of hospital discharges with an ED visit within 30 days. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*. We did not calculate rates of ED visits for selected avoidable conditions for commercial plan members because they occurred infrequently. The plots in *Figures 36* and *37* include 90 percent and 95 percent CIs around the estimated annual effects for the change in the rate of unplanned readmissions and the change in the rate of ACSC admissions, respectively. We present unadjusted yearly averages for unplanned readmissions and ACSC admissions in *Appendix I*.

- The All-Payer Model did not have a statistically significant impact on the rate of unplanned readmissions within 30 days of discharge among the commercially insured population in the first 4 years of implementation overall or in any individual year.
- The reduction in the ACSC admission rate was 6.1 percent larger in Maryland than in the comparison group for the commercially insured population during the first 4 years of All-Payer Model implementation overall (D-in-D estimate: -0.2 admissions per 1,000 commercial plan members). However, Year 3 was the only individual year where the difference was statistically significant.
- In the first 4 years of the All-Payer Model overall, the percentage of commercially insured hospital discharges that had an ED visit within 30 days did not change in Maryland and increased in the comparison group, resulting in a relative decrease of 5.9 percent (D-in-D estimate: -0.4 percentage points). The difference was statistically significant in Years 1 and 2 of the All-Payer Model but not Years 3 and 4.

Table 12 Impacts on rates of avoidable or reducible utilization for commercial plan members, first 4 years of Maryland All-Payer Model implementation

	Fynactad	Change in outcome from baseline to implementation period				
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Unplanned readmissions within 30 day of discharge per 1,000 discharges	's 😻	*	*	-1.4 (-4.6, 1.7)	-2.2	0.46
Hospital admissions for ACSCs per 1,000 population	*	*	*	-0.2 (-0.3, -0.1)	-6.1	0.02
Percentage of discharges with an ED visit within 30 days of discharge	ॐ	\bigcirc	8	-0.4 (-0.8 , -0.04)	-5.9	0.07
Sincrease	Solution Decrease		On change	Coul	d move in either direct	ion
Change in expected direction	Change in unex	pected direction	Change, could mov	ve in either direction		

ACSC = ambulatory care sensitive condition; CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department.

<u>Methods</u>: A logistic regression model was used to obtain estimates. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse, or child], and commercial plan type) and the urban/rural status of the county. The estimate of the probability of any admission for an ACSC was multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries.

How to interpret the findings: A negative value for the regression-adjusted D-in-D corresponds to a greater decrease or a smaller increase in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A positive value corresponds to a greater increase or a smaller decrease in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for probability of an unplanned readmission is 179,194. The total weighted N for probability of an ACSC admission is 3,122,712. The total weighted N for probability of an ED visit within 30 days of discharge is 166,076.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

Figure 36 Impacts on unplanned readmissions within 30 days of discharge per 1,000 discharges for commercial plan members, first 4 years of Maryland All-Payer Model implementation



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

Figure 37

Impacts on hospital admissions for ambulatory care sensitive conditions per 1,000 commercial plan members, first 4 years of Maryland All-Payer Model implementation



ACSC = ambulatory care sensitive condition.

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

5.2.2 What Were the Impacts of the Maryland All-Payer Model on Care Coordination?



We expected the All-Payer Model would improve care coordination with nonhospital providers. Findings for both Medicare beneficiaries and commercial plan members were not consistent with this hypothesis based on the rate of follow-up visits within 14 days after hospital discharge.

5.2.2.1 Medicare

We present the results of the D-in-D regression analyses for the percentage of hospital discharges with a follow-up visit within 14 days after discharge in *Table 13*. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

- The rate of follow-up visits within 14 days of discharge among Medicare beneficiaries increased in Maryland in the first 4.5 years of the All-Payer Model overall, but the increase was not statistically significantly different from the comparison group. While there was no significant impact in Years 2 through 5, in Year 1 the rate of follow-up visits declined in Maryland relative to the comparison group.
- Hospitals focused on developing partnerships with community providers, but lack of provider engagement and provider shortages posed barriers to improving care coordination. Hospitals also expressed concern about the lack of patient compliance and responsibility, which can affect post-discharge follow-up.

5.2.2.2 Commercial Insurance

We present the results of the D-in-D regression analyses for the percentage of hospital discharges with a follow-up visit within 14 days after discharge among the commercially insured population in *Table 14*. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

• The rate of follow-up visits within 14 days of discharge among commercial plan members increased modestly in both Maryland and the comparison group during the first 4 years of the All-Payer Model, but it increased less in Maryland resulting in a 2.2 percent decrease relative to the comparison group (D-in-D estimate: -0.9 percentage points). However, Year 1 was the only individual year in which the relative reduction was statistically significant.

Table 13Impact on the rate of follow-up visits within 14 days of discharge for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

	Fynostad	Change in outcome from baseline to implementation period				
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Percentage of discharges with a follow-u visit within 14 days of discharge	° ጵ		*	-0.4 (-1.3, 0.4)	-0.6	0.40
✤ Increase	Decrease		O No change	Could	move in either direction	on
Change in expected direction	Change in unexpe	Change in unexpected direction Change, could move		in either direction		

CI = confidence interval; D-in-D = difference-in-differences.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the difference in probability of a follow-up visit within 14 days of discharge. Models adjusted for personlevel variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), and hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, area wage index, and disproportionate share hospital percentage).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N is 2,195,401.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.
Table 14Impact on the rate of follow-up visits within 14 days of discharge for commercial plan members,first 4 years of Maryland All-Payer Model implementation



CI = confidence interval; D-in-D = difference-in-differences.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the difference in probability of a follow-up visit within 14 days of discharge. Models adjusted for individuallevel variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse, or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N is 181,141.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

5.2.3 What Were the Impacts of the Maryland All-Payer Model on Patient Experience of Care?

SURVEY	•	Maryland hospitals were rated lower than comparison group hospitals in all years on nearly every measure of patient experience examined.
	•	The gap between Maryland and comparison group hospitals did not consistently narrow or widen after All-Payer Model implementation.
	•	Hospital leaders reported they focused on improving patient experience, but their efforts were not reflected in patient survey ratings.

We expected patient experience of hospital care would improve under the All-Payer Model, but we did not find evidence to support this. We present the rates of "top box" scores for 10 HCAHPS questions in *Figures 38–47*. HCAHPS is a survey that asks hospital patients about provider communication and responsiveness, pain management, patient education, hospital environment, and whether the patient would recommend the hospital. Patients are also asked to rate the hospital on a scale of 0 (lowest) to 10 (highest). Top box scores represent the percentage of survey respondents selecting the most positive response to a question, such as a hospital rating of 9 or 10 or patients indicating their pain was always well controlled. We report the average percent of patients selecting the top box score across hospitals for the first 3 years after the implementation of the All-Payer Model, along with the 3 baseline years. Data for Years 4 and 5 were not available at the time this report was prepared.

- The percentage of patients responding with the top box score was lower in Maryland than in the comparison group for all questions and nearly all years. The exception was the question asking patients about the quietness of their room at night; for each of the 3 baseline years and Year 3 of the All-Payer Model, Maryland hospitals slightly outperformed the comparison group.
- The largest differences were for "Percentage of patients who reported that they 'Always' received help as soon as they wanted" and "Percentage of patients who reported that their room and bathroom were 'Always' clean." Depending on the year, Maryland hospital scores were 7 to 9 percent lower than comparison group hospital scores.
- The percentage of patients in Maryland responding with the top box score increased from the first baseline year to Year 3 of the All-Payer Model for all items except "Percentage of patients who reported that their doctors 'Always' communicated well" and "Percentage of patients who reported YES they would definitely recommend the hospital." Maryland hospitals improved by more than 5 percentage points from the first baseline year to Year 3 of the All-Payer Model for "Percentage of patients who reported that the area around their room was 'Always' quiet at night" and "Percentage of patients who reported that YES they were given information about what to do during recovery." The increases were very small for some outcomes.

• The gap between Maryland and comparison group hospitals did not consistently narrow or widen after All-Payer Model implementation despite hospitals' reported focus on improving HCAHPS scores.



Figure 38 Percentage of patients who reported that their nurses "Always" communicated well

Figure 39 Percentage of patients who reported that their doctors "Always" communicated well



Figure 40 Percentage of patients who reported that they "Always" received help as soon as they wanted



Figure 41 Percentage of patients who reported that their pain was "Always" well controlled



Figure 42 Percentage of patients who reported that staff "Always" explained about medicines before giving it to them



Figure 43 Percentage of patients who reported that their room and bathroom were "Always" clean



was "Always" quiet at night 90 I 75 I 60 Percent 45 L 30 I 15 L 0 2011 2012 2013 2014 2015 2016 Baseline All-Payer Model -Maryland --- Comparison group

Figure 44 Percentage of patients who reported that the area around their room was "Always" quiet at night

Figure 45 Percentage of patients who reported that YES they were given information about what to do during recovery



Figure 46 Percentage of patients who gave their hospital a rating of 9 or 10 on a scale from 0 (lowest) to 10 (highest)



Figure 47 Percentage of patients who reported YES they would definitely recommend the hospital



5.2.4 What Were the Impacts of the Maryland All-Payer Model on Patient Behavior?

)	• Maryland had between 18 and 26 percent fewer adults who reported being smokers than the comparison group states. Smoking rates generally declined in both groups at similar rates during the All-Payer Model, suggesting that the model did not have any impact on this behavior.
D	• Maryland had slightly more adults who were overweight or obese. Obesity increased at similar rates in Maryland and the comparison group states both before and after All-Payer Model implementation, suggesting that the model did not have any impact on obesity.
	• Most Maryland providers had difficulty engaging patients and shifting their behavior, which may explain the lack of evidence that the All-Payer Model produced population health improvement.

The Maryland All-Payer Model included a focus on population health as part of its strategy to reduce hospital expenditure growth. Engaging patients in changing behaviors that can lead to secondary diseases is a key component of improving population health. Although we expected improvement in population health under the All-Payer Model, we did not find evidence of this. We used Behavioral Risk Factor Surveillance System (BRFFS) data to analyze the percentage of adults who reported being current smokers and the percentage of adults who have a body mass index greater than 25 (overweight or obese) to assess changes in patient behavior following implementation of the All-Payer Model. Smoking is associated with cardiovascular disease and cancer, whereas obesity is associated with type 2 diabetes, heart disease, and high blood pressure. We report the rate for Maryland and the comparison group states for the first 3 years since the implementation of the All-Payer Model, along with the 3 baseline years in *Figures 48* and *49*. Data for Years 4 and 5 of the All-Payer Model were not available at the time this report was prepared.

- The percentage of patients who reported being current smokers was lower in Maryland than in the comparison group states in all years before and after implementation of the All-Payer Model. Depending on the year, Maryland was between 18 percent (Baseline Year 1) and 26 percent (Year 1) lower than the comparison group. The smoking rate generally declined in both Maryland and the comparison group, except for an increase in Maryland in Year 3. The difference between the groups increased in the first year of All-Payer Model implementation but then narrowed in Years 2 and 3.
- Maryland consistently had slightly higher rates of obesity than the comparison group states, about 1 percent higher both before and after All-Payer Model implementation. The obesity rate increased in all years in both groups.

Figure 48 Percentage of adults who are current smokers



Figure 49 Percentage of adults who have a body mass index greater than 25 (overweight or obese)



5.3 Discussion

During the first 4.5 years of the All-Payer Model, there was only limited evidence of improvements in quality of care but also little evidence that global budget constraints had negative impacts. Maryland hospitals had mixed success in reducing avoidable utilization. Within the Medicare and commercially insured populations, evidence differs depending on the measure examined, and findings sometimes differ across the two populations. Unplanned readmission rates fell for both Medicare and commercially insured patients in Maryland. Hospital staff described working more actively with PAC providers to reduce readmissions, including strengthening alliances and sending hospital staff to PAC facilities in some cases. Still,

the downward trends in Maryland were not different from the comparison group. Given that reducing readmissions has been a target nationwide for several years, the reduction observed for both Maryland and the comparison group is not unexpected. Even so, as reported in *Section 8*, there were some notable improvements in Maryland relative to the comparison group, such as a 6 percent reduction in unplanned readmissions for Medicare beneficiaries with disabilities relative to their comparison group counterparts. Medicare beneficiary and commercial plan member hospital admissions for ACSCs also declined more in Maryland than in the comparison group during the All-Payer Model period. The reduction in admissions for ACSCs suggests hospital efforts to reduce inpatient utilization successfully targeted unnecessary admissions.

Hospitals found it difficult to convince patients to use alternatives to the ED. Despite a range of hospital-initiated strategies aimed at redirecting patients to other resources for nonemergent health care, patients continued to present at the ED. Hospitals noted patients had little incentive to change their behavior. Some hospital leaders also cited lack of 24/7 access to primary care as a contributor to the failure to reduce ED visit rates. ED visits among Maryland Medicare beneficiaries for the potentially avoidable conditions examined either increased relative to the comparison group or increased at a comparable rate. The rate of ED visits after hospital discharge also did not change relative to the comparison group for the Medicare population, but our analyses showed a reduction relative to the comparison group for the commercially insured population. This is consistent with the relative reduction in the overall outpatient ED visit rate for the commercially insured population described in *Section 4*. The absolute increase in ED visits within 30 days after hospital discharge and for potentially avoidable conditions is also consistent with the increase in the overall outpatient ED visit rate for the described in *Section 6*, this may reflect hospitals' success in reducing admissions of Medicare patients seen in the ED.

Discussions during site visits indicated that hospitals had developed strategies to reduce avoidable utilization, including hiring care managers and discharge planners, creating clinics to see patients post-discharge, opening clinics as alternatives to the ED, and developing data analytic capabilities to identify high-risk patients. Over time, hospital initiatives to address avoidable utilization became more common and increasingly sophisticated. The hospital survey conducted in the final months of the All-Payer Model showed that nearly all Maryland hospitals used care management and discharge planning staff, and more than 80 percent had programs to direct patients from the ED to other care settings. Many hospitals also adopted clinical strategies to reduce readmissions, for example by providing a supply of prescription medications at discharge. However, most hospital leaders noted that while they could initiate changes, they could not force patients to shift their utilization away from the hospital. Although they reported success with some populations, hospital leaders generally found it more challenging to influence utilization by patients with complex needs or who lack transportation to access alternative clinic settings. This may explain the success in reducing ED visits after hospital discharge in the commercially insured population, who are younger and have a less complex case mix than Medicare beneficiaries.

We did not find evidence of improvement in coordination of care with community providers, as measured by follow-up visits within 14 days after hospital discharge. Effecting change in outcomes that are dependent on the behavior of providers outside the hospital was challenging for hospitals. Over the course of the All-Payer Model, hospitals increasingly

acknowledged the importance of developing partnerships with community providers to increase follow-up visits or care coordination more generally, but they found it difficult to engage providers in these relationships. Primary care provider shortages posed a barrier to care coordination, especially in rural and traditionally disadvantaged geographic areas. Some hospitals used community health workers to address primary care access limitations, but they sometimes encountered patient resistance to these care providers. Hospitals also expressed concern about patient compliance and responsibility, which hospital leaders felt they were not equipped to address. For example, a hospital could hire care coordinators to partner with physicians and other providers in the community, but they could not ensure that a patient would attend a follow-up visit or adhere to discharge medication instructions. The CCIP track within the CRP was intended to promote collaboration with community-based providers to better manage and coordinate care for patients. Although nearly all hospitals had joined the CRP by the end of the All-Payer Model, only nine were in the CCIP track, and participating physicians often were unaware of their involvement or uncertain about what they were expected to do.

Patient experience in Maryland hospitals was below that of comparison hospitals for nearly every measure examined. While the differential did not worsen following implementation of the All-Payer Model, it also did not improve. During site visits, hospitals reported a continued focus on HCAHPS performance and improving patient experience because of its large impact on QBR program payments and penalties. Hospitals also noted that their efforts were not reflected in their ratings, and patients did not internalize the care provided by hospital staff. For example, hospital clinical staff reported although discharge instructions were provided, some patients who were readmitted to the hospital indicated they received no such education during their previous hospital stay.

Population health in Maryland varied by outcome measure. Maryland had lower rates of adult smokers than the comparison group states both before and after All-Payer Model implementation, and the differential increased during the first 2 years of the All-Payer Model period but then narrowed in the third year. The comparison group states had slightly lower rates of adult obesity in each year, but the difference did not consistently increase or decrease over time. Although nearly 75 percent of hospitals reported investing in initiatives to address social determinants of health and almost 90 percent said they offered patient education, coaching, or self-management programs, hospital leaders felt these efforts were often stymied by lack of patient compliance.

The HCAHPS and BRFFS data available for these analyses covered the first 3 years of the All-Payer Model only, which preceded more concerted efforts by hospitals to improve patient experience and population health. These efforts would likely have a delayed effect, and any impact from these efforts might be observed in future years.

As detailed in *Section 4*, we conducted analyses to assess whether our findings were sensitive to whether we assumed parallel or differential trends in the baseline period (see *Appendix J*). For the Medicare analysis, we used a model that assumed differential baseline trends. However, we found that Maryland and comparison group Medicare beneficiaries had parallel trends during the baseline period for most of the quality of care outcomes, including unplanned readmissions. In the sensitivity analysis using a model that assumed that Maryland and the comparison group were following parallel trends during the baseline period, we found unplanned readmissions within 30 days of discharge declined more among Maryland Medicare

admissions than for the comparison group. This finding suggests that hospital efforts to improve discharge planning and programs to reduce readmissions were effective in reducing the 30-day readmission rate. The sensitivity analysis findings for the other outcomes that were on parallel paths in the baseline period were the same as the main findings.

For the commercially insured population, we assumed parallel baseline trends for the main analysis and differential baseline trends for the sensitivity analysis. Maryland and the comparison group were on parallel trajectories during the baseline period for all outcomes except having an ED visit within 30 days after hospital discharge. The finding for this outcome was the same in the sensitivity analysis that assumed Maryland and the comparison group had different baseline trends and in the main analysis.

During the first 4.5 years of the All-Payer Model, there was limited evidence that quality of care improved in Maryland relative to the comparison group, but there was also little evidence that it deteriorated. This may reflect features of the All-Payer Model that counterbalanced global budget incentives for hospitals to reduce costs in ways that could undermine quality of care, including incorporating quality-based performance and assumptions about reductions in PAU in global budget updates.

Maryland hospitals increased their efforts to reduce avoidable utilization and there is some evidence that these initiatives had the desired impact on inpatient utilization, although they did not outperform comparison hospitals in reducing readmissions, perhaps because the Medicare IPPS included strong incentives for all hospitals to do so. However, Maryland hospitals struggled with changing ED utilization, which required changing patient care-seeking behavior. The relative improvement in ED visits within 30 days of discharge among commercial plan members was driven more by increases in the comparison group than by decreases in Maryland. Difficulty changing patient behavior, as well as lack of community provider involvement in the All-Payer Model, also limited the impact of hospital efforts to increase care coordination outside the hospital. Likewise, population health behaviors did not improve under the All-Payer Model. Hospitals will need to address these challenges to succeed under the TCOC Model.

SECTION 6 WHAT WAS THE IMPACT OF THE MARYLAND ALL-PAYER MODEL ON HOSPITAL SERVICE MIX?

Key Takeaways for Service Mix

- Admission severity increased 2.4 percent more for Maryland Medicare admissions relative to the comparison group during the first 4.5 years following All-Payer Model implementation, suggesting that hospitals had some success limiting hospital admissions to higher acuity Medicare beneficiaries. However, the increase in admission severity for commercial plan members in Maryland was 2.5 percent smaller than the comparison group.
- For Medicare, the decrease in inpatient admissions in Maryland was not achieved by reducing avoidable admissions through the ED or unplanned admissions. In contrast, unplanned admissions declined 2.3 percent more for commercial plan members in Maryland relative to the comparison group, which may be due to hospital programs that sought to avoid unnecessary admissions.
- Hospital costs within a DRG grew 7.9 percent faster in Maryland relative to the comparison group for Medicare beneficiaries. This increase is likely due to more rapid growth in hospital payment rates in Maryland as a result of rate adjustments hospitals made to meet their global budgets, rather than increases in service intensity. Hospital costs within a DRG grew 5.6 percent less for commercial admissions in Maryland, however.
- Maryland Medicare admissions with major or extreme severity of illness declined by 13.2 percent relative to the comparison group. This decline suggests hospitals may have responded to global budgets by controlling the intensity of resource use during an admission for the sickest beneficiaries. This may not have been the case for commercial plan members as the percentage of commercial admissions with an intensive care unit (ICU) stay declined 6.8 percent less in Maryland than in the comparison group.

6.1 Research Questions

To assess the impact of the All-Payer Model on hospital service mix, we addressed the following research questions:

- How did trends in hospital case-mix severity change in Maryland after the implementation of the All-Payer Model relative to the comparison group?
- How did trends in the type of hospital admissions change in Maryland after the implementation of the All-Payer Model relative to the comparison group?
- How did trends in the intensity of hospital services change in Maryland after implementation of the All-Payer Model relative to the comparison group?

The rate and volume controls integrated into the Maryland All-Payer Model limited the influence that charge and volume changes could have on a hospital's total revenue. Hospitals billed for services provided, which reduced incentives for patient skimming and dumping. However, hospitals may have had incentives to change their service mix in several ways. In

some cases, the All-Payer Model created conflicting incentives for hospital behavior so that the effects on hospital service mix may be difficult to predict.

First, the All-Payer Model incentivized hospitals to reduce admissions of less complex or less severely ill patients who could be treated outside the hospital. To the extent that these incentives were successful, we expect hospital case-mix severity to increase over time. At the same time, restrictions on overall revenues created incentives for hospitals to reduce the intensity of services used during an admission and limit billing for high-cost services. Although hospital budgets were adjusted for case mix, and hospitals received revenues only for services provided, some patients within a case-mix category will be costlier. To the extent that these patients could be identified in advance, hospitals may have tried to avoid patients they expected would be relatively more expensive to serve. For example, hospitals may have tried to limit admissions of patients classified as major or extreme based on severity of illness or risk of mortality (as classified by the 3M All Patient Refined [APR] DRG Grouper). Incentives to reduce service intensity could also have contributed to a decrease in the likelihood an admission was classified as having major or extreme severity or risk of mortality because the categorization is based on procedure codes that reflect services provided, not only diagnoses.

Second, the hospital budget-setting methodology in the All-Payer Model included incentives to decrease PAU, which could have caused the mix of hospital services by hospital admission type to change over time. Reductions in unplanned admissions, admissions originating through an ED encounter, and the percentage of ED visits resulting in an admission are often targets of initiatives to reduce PAU and thus were expected to decline under the All-Payer Model.

Third, global budgets created hospital incentives to reduce the intensity of services used during an admission. These incentives could lead to decreases in the case-mix-adjusted payment per discharge, which measures hospital costs within a DRG. Despite this, a change in case-mix-adjusted payments cannot be interpreted directly as a change in service intensity during an admission because hospitals were permitted to adjust their payment rates to recoup lost revenue from utilization reductions to meet their global budgets. Put another way, the payment per discharge could change even if service intensity remained the same. A second measure of service intensity is the percentage of admissions that include an ICU stay. Hospitals might have wanted to limit use of high-cost services such as ICUs in response to global budget pressures. However, the likelihood of having an ICU stay during an admission could also be affected by changes in case-mix intensity.

6.2 Results

6.2.1 What Were the Impacts of the Maryland All-Payer Model on Hospital Case-Mix Severity?

	Admission severity increased 2.4 percent more in Maryland than in the comparison group following the All-Payer Model implementation for Medicare admissions, but admission severity increased 2.5 percent less
	among commercial plan memoers in Maryland relative to the comparison
	group.
•	The percentage of Medicare inpatient admissions classified as major or extreme severity of illness or risk of mortality increased 8.8 percent less in
	Maryland than in the comparison group during the first 4.5 years after
	implementation.

In response to All-Payer Model incentives to reduce admissions, we expected hospitals would avoid admitting patients who could be treated outside the hospital and, as a result, admission severity would increase. At the same time, within an admission severity category, we expected hospitals would avoid admitting patients classified as major or extreme severity of illness or risk of mortality because of global budgets incentives to reduce the intensity of services during an admission. Results for both outcomes were consistent with these hypotheses for Medicare beneficiaries, but admission severity for commercial plan members was not.

6.2.1.1 Medicare

Table 15 displays D-in-D regression analysis findings for the Medicare population for two outcomes that measure changes in hospital case-mix severity after the implementation of the All-Payer Model: DRG weight per admission and percentage of admissions classified as major or extreme severity of illness or risk of mortality. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

- Admission severity, as measured by DRG weight, increased in both Maryland and the comparison group during the first 4.5 years of the All-Payer Model implementation, but the increase was 2.4 percent larger for Maryland Medicare admissions (D-in-D estimate: 0.038). The relative increase in admission severity grew larger each year, but it only reached statistical significance in the fifth year.
- The percentage of admissions classified as major/extreme severity during the first 4.5 years of the All-Payer Model overall increased 8.8 percent less in Maryland hospitals than in comparison hospitals (D-in-D estimate: -1.4 percentage points). The relative reduction increased over time, but it was not statistically significant in any individual year.

Table 15Impacts on severity of admissions for Medicare beneficiaries,first 4.5 years of Maryland All-Payer Model implementation

	Change in outcom to implementa		come from baseline entation period			
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
DRG weight per admission	\$	\$	8	0.038 (0.013, 0.062)	2.4	0.01
Percentage of acute admissions with a 3M APR DRG major/extreme severity or risk of mortality	*		⊗	-1.4 (-2.3, -0.5)	-8.8	0.01
✤ Increase	Decrease		No change	Coul	d move in either direct	ion
Change in expected direction	Change in unexp	ected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group; APR = All Patient Refined.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in DRG weight. A logistic regression model was used to obtain estimates of the difference in percentage of major/extreme severity of illness or risk of mortality for inpatient admissions. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), and hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, and disproportionate share hospital percentage).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for the DRG weight per admission model is 3,062,734. The total weighted N for the percent of admissions with a 3M APR DRG major/extreme severity or risk of mortality model is 3,042,207.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

6.2.1.2 Commercial Insurance

D-in-D regression analysis results for changes in hospital case-mix severity for the commercially insured population after the implementation of the All-Payer Model, as measured by DRG weight per admission, are shown in *Table 16*. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

• Admission severity increased in both Maryland and the comparison group during the first 4 years of All-Payer Model implementation, but the increase was 2.5 percent smaller for Maryland admissions (D-in-D estimate: -0.035). The relative decrease in admission severity grew larger during the first 3 years of the model before declining in Year 4, but it was not statistically significant in the second year.

6.2.2 What Were the Impacts of the Maryland All-Payer Model on the Type of Hospital Admissions?

•	Among Medicare beneficiaries, the All-Payer Model did not have an impact on the percentage of admissions that occurred through an ED, the percentage of ED visits that resulted in an admission, and the rate of unplanned admissions in the 4.5 years following All-Payer Model implementation.
•	Likewise, among commercial plan members, the All-Payer Model did not have an impact on the percentage of admissions that occurred through the ED and the percentage of ED visits that resulted in an admission after 4 years of the All-Payer Model. However, unplanned admissions decreased 2.3 percent more among Maryland commercial plan members than the comparison group.

We expected that hospitals would respond to the incentives to reduce PAU that were built into their global budgets by decreasing admissions originating through an ED encounter, ED visits resulting in an admission, and unplanned admissions. The All-Payer Model did not have an impact on any of these outcomes for Medicare beneficiaries. Unplanned admissions decline for commercial plan members, but the All-Payer Model did not have an impact on the ED-related admission outcomes.

Table 16Impacts on severity of admissions for commercial plan members,first 4 years of Maryland All-Payer Model implementation

		Change in outco to implement	ome from baseline ntation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
DRG weight per admission	\$	\$		-0.035 (-0.050, -0.019)	-2.5	<0.001
♠ Increase	Solution Decrease		On change	🗘 Coul	d move in either direct	ion
Change in expected directio	n Change in unexp	ected direction	Change, could mov	e in either direction		

CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in DRG weight. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N for the regression model is 212,432.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

6.2.2.1 Medicare

Table 17 displays D-in-D analysis findings for the Medicare population for outcomes related to type of hospital admissions: percentage of admissions that occurred through an ED, percentage of ED visits that resulted in an admission, and the rate of unplanned admissions per 1,000 discharges. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

- The percentage of admissions through the ED declined similarly in Maryland hospitals and comparison group hospitals in the first 4.5 years following implementation of the All-Payer Model, indicating that the All-Payer Model did not have an impact on this outcome.
- The All-Payer Model did not have an impact on the percentage of ED visits that resulted in an admission, which declined at similar rates for Maryland and the comparison group in the first 4.5 years following All-Payer Model implementation.
- The rate of unplanned admissions per 1,000 discharges also declined similarly in Maryland and comparison group hospitals during the first 4.5 years of All-Payer Model implementation, indicating that the All-Payer Model did not have an impact on this outcome.

6.2.2.2 Commercial Insurance

Table 18 presents findings from D-in-D analyses for the commercially insured population for percentage of admissions that occurred through an ED, the percentage of ED visits that resulted in an admission, and the rate of unplanned admissions per 1,000 discharges. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

- The percentage of commercial admissions through the ED declined similarly in Maryland hospitals and comparison hospitals in the 4 years following implementation of the All-Payer Model, indicating that the All-Payer Model did not have an impact on this outcome.
- The All-Payer Model also had no impact on the percentage of ED visits for commercial plan members that resulted in an admission; the small decline in the percentage was similar for Maryland and the comparison group.
- The rate of unplanned admissions per 1,000 discharges declined among both Maryland and comparison group commercial plan members after 4 years of All-Payer Model implementation, but the decline was 2.3 percent larger in Maryland (D-in-D estimate: 14.2 unplanned admissions per 1,000 discharges).

Table 17Impacts on type of hospital admissions for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

	Francisco d	Change in outcome from baseline to implementation period				
Outcome	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Percentage of admissions through the ED	*	*	*	0.8 (-1.0, 2.5)	1.1	0.47
Percentage of ED visits that resulted in an admission		*	*	-0.9 (-2.3, 0.5)	-2.4	0.29
Rate of unplanned admissions per 1,000 discharges	≫	*	*	0.4 (-5.7, 6.6)	0.1	0.91
Solution Increase	Solution Decrease		On change	Coul	ld move in either direct	ion
Change in expected direction	Change in une	xpected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department.

<u>Methods</u>: A logistic regression model was used to obtain estimates for all outcomes. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), and hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, and disproportionate share hospital percentage). The percentage of acute admissions through the ED also included admission-level variables for DRG weight and whether the admission came from a skilled nursing facility.

<u>How to interpret the findings</u>: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for the percentage of acute admissions through the ED is 3,062,721. The total weighted N for the percentage of ED visits that resulted in an admission is 7,152,438. The total weighted N for the rate of unplanned admissions per 1,000 discharges model is 3,062,734.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Table 18Impacts on type of hospital admissions for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

		Change in outc to impleme	ome from baseline ntation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Percentage of admissions through the ED	*	*	*	-0.3 (-1.1, 0.4)	-0.7	0.46
Percentage of ED visits that resulted in an admission	ॐ	*	*	0.1 (-0.1, 0.4)	1.1	0.37
Rate of unplanned admissions per 1,000 discharges	*	*	*	-14.2 (-20.0, -8.3)	-2.3	<0.001
Increase	Solution Decrease		No change	Could	move in either directi	on
Change in expected direction	Change in unexpec	eted direction	Change, could move in	n either direction		

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department.

<u>Methods</u>: A logistic regression model was used to obtain estimates for all outcomes. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A negative value for the regression-adjusted D-in-D corresponds to a greater decrease or a smaller increase in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A positive value corresponds to a greater increase or a smaller decrease in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for the percentage of acute admissions through the ED model and unplanned admissions model is 212,870. The total weighted N for the percentage of ED visits resulting in an admission model is 869,217.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

6.2.3 What Was the Impact of the Maryland All-Payer Model on Intensity of Hospital Services?

• Hospital costs within a DRG increased 7.9 percent more for Medicare beneficiaries in Maryland than in the comparison group following implementation of the All-Payer Model. This was likely due to faster growth in hospital payment rates in Maryland, rather than increasing intensity of
services within a diagnosis category.
• Hospital costs within a DRG increased 5.6 percent less for commercial admissions in Maryland, however.
• The All-Payer Model did not have an impact on the likelihood of having an ICU stay during a hospital admission for Medicare beneficiaries, but the percentage of commercial plan member admissions with an ICU stay declined 6.8 percent less in Maryland than in the comparison group.

We could not predict the effect of the All-Payer Model on hospital costs within a DRG and the likelihood of having an ICU stay. Hospital incentives under global budgets to reduce the intensity of services during an admission should lead to reductions in both measures. At the same time, costs within a DRG could increase if hospitals adjusted their payment rates to compensate for lost revenue from utilization reductions and the likelihood of having an ICU stay could increase if admission severity was higher.

6.2.3.1 Medicare

Table 19 presents D-in-D regression findings for the Medicare population for two outcomes that assess whether the intensity of services during an inpatient stay changed during the All-Payer Model implementation period: hospital costs within a DRG, measured by the case-mix adjusted payment per discharge, and the percentage of admissions that included an ICU stay. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in **Appendix I**.

- Hospital costs within a DRG increased 7.9 percent more in Maryland than in the comparison group during the first 4.5 years of the All-Payer Model implementation period (D-in-D estimate: \$809 per discharge), indicating that the payment for admissions with similar case-mix severity grew at a faster rate in Maryland. The increase was statistically significantly larger in Maryland in all years, and the magnitude of the difference increased in each year. This was likely due to faster growth in hospital payment rates in Maryland, rather than increasing intensity of services within a diagnosis category.
- The All-Payer Model had no impact on the percentage of admissions that included an ICU stay in any of the first 4.5 years or overall. The likelihood of having an ICU stay increased slightly for Maryland and was essentially unchanged for comparison hospitals, but it was substantially lower in Maryland hospitals (26–28%) than in comparison hospitals (44–46%).

Table 19 Impacts on hospital costs within a DRG and percentage of admissions with an ICU stay for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation

		Change in out to impleme	come from baseline entation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Case-mix-adjusted payment per discharge (\$)	\$	«		808.63 (606.10, 1,011.16)	7.9	<0.001
Percentage of acute admissions with an ICU stay	\diamond	\$	\bigcirc	0.7 (-1.8, 3.3)	2.7	0.64
✤ Increase	Solution Decrease		On change	Coul	ld move in either direct	ion
Change in expected direction	Change in unexp	ected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; ICU = intensive care unit.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjusted payment per discharge. A logistic regression model was used to obtain estimates of the difference in the percentage of acute admission with an ICU stay. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), and hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, and disproportionate share hospital percentage). The case-mix adjusted payment per discharge model also adjusted for the area wage index.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights across these figures. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. See *Appendix A* for additional detail.

The total weighted N for both models is 3,062,734.

SOURCE Chronic Conditions Data Warehouse Medicare fee-for-service claims.

6.2.3.2 Commercial Insurance

<u>Table 20</u> shows results for the commercially insured population for changes in hospital costs within a DRG and the percentage of admissions that included an ICU stay. We report the D-in-D estimate for each year since the implementation of the All-Payer Model in *Appendix I*.

- Hospital costs within a DRG increased 5.6 percent less in Maryland than in the comparison group in the first 4 years of the All-Payer Model implementation period overall (D-in-D estimate: \$532 per discharge), indicating that payment for admissions with similar case-mix severity grew at a slower rate in Maryland. The overall relative decrease in payment was driven by slower growth in Maryland in Years 1 and 3; there was no significant difference in growth in Years 2 or 4.
- The decline in the percentage of admissions including an ICU stay was 6.8 percent smaller for Maryland hospitals than comparison group hospitals after 4 years of All-Payer Model implementation (D-in-D estimate: 1.0 percentage point). The overall relative increase was driven by relative increases in Maryland in the first 3 years of the model; there was no significant difference in Year 4 of the model.

6.3 Discussion

The analyses in this section examined changes in hospital case mix, the type of hospital admissions, and intensity of services provided during an inpatient stay. Global budget incentives may have affected hospital service mix in several ways, both by changing the types of cases admitted to the hospital and the types of service provided during an inpatient stay. Overall, these analyses indicate that hospitals may have admitted higher acuity Medicare beneficiaries and avoided unplanned admissions for the commercially insured. There are also some suggestions that hospitals controlled resource use for the sickest patients requiring high intensity care.

Evidence is mixed on how the All-Payer Model affected admission severity. We found that admission severity for Medicare beneficiaries increased more in Maryland than in the comparison group, but it increased less for the commercially insured population. The Medicare finding is consistent with hospital leadership reports of having made significant investments in avoiding unnecessary admissions and perceptions that they had been able to limit hospital admissions to higher acuity cases.

At the same time, the percentage of Medicare admissions classified as having major or extreme severity or risk of mortality in Maryland hospitals increased less than in the comparison group. This finding could suggest that Maryland hospitals avoided admitting the most severe and presumably most costly Medicare beneficiaries. However, even if individual hospitals avoided admitting these beneficiaries, admissions of these beneficiaries would have declined for Maryland hospitals overall only if they were denied care entirely or they were shifted to hospitals outside the state. As shown in <u>Section 7</u>, we do not find evidence that the All-Payer Model caused admissions to shift to out-of-state hospitals. Instead, the reduction in admissions classified as having major or extreme severity or risk of mortality may reflect a decrease in the intensity of services provided to the sickest hospital patients. APR DRG categories take into account both a patient's diagnoses and the services provided, as reflected in the procedure codes

Table 20Impacts on hospital costs within a DRG and percentage of admissions with an ICU stay for commercial plan members,first 4 years of Maryland All-Payer Model implementation

		Change in out to implem	come from baseline entation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Case-mix-adjusted payment per discharge (\$)	\$	~	*	-531.68 (-874.57, -188.80)	-5.6	0.01
Percentage of acute admissions with an ICU stay	\diamond	*	≫	1.0 (0.5, 1.5)	6.8	<0.001
S Increase	Solution Decrease		No change	Coul	d move in either direct	ion
Change in expected direction	Change in unex	pected direction	Change, could mov	ve in either direction		

CI = confidence interval; D-in-D = difference-in-differences; ICU = intensive care unit.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjusted payment per discharge. A logistic regression model was used to obtain estimates of the difference in the percentage of acute admission with an ICU stay. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse, or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights across these figures. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As a result, the regression-adjusted D-in-D and the D-in-D calculated from the adjusted means will differ. See *Appendix A* for additional detail.

The total weighted N for the case-mix-adjusted payment per discharge model is 200,425. The total weighted N for the percentage of acute admissions with an ICU stay model is 212,870.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

on a claim. Therefore, the likelihood that a patient was classified as having major or extreme severity or risk of mortality could fall if service intensity decreased.

We hypothesized that the probability an inpatient admission was unplanned or occurred through an ED and the probability an ED visit resulted in an admission would decrease in Maryland relative to the comparison group if hospitals reduced unnecessary admissions of people who could be treated in outpatient settings. We found little evidence to support this hypothesis. For the Medicare and commercially insured populations, the percentage of admissions through the ED and the percentage of ED visits that resulted in an admission both declined over time in Maryland, but reductions in the comparison group were similar. The rate of unplanned admissions for Maryland Medicare beneficiaries also declined at the same rate as the comparison group. The rate of unplanned admissions decreased more for commercial plan members in Maryland than for the comparison group, however.

We also found mixed evidence on changes in service intensity within a hospital stay. Hospital costs within a DRG for Medicare beneficiaries admitted to Maryland hospitals increased significantly relative to comparison hospitals. This measure controls for admission severity as a driver of increases in cost per discharge, so increases in hospital costs within a DRG could be due to increased intensity of services utilized. However, relative increases also could be due to faster growth in Maryland hospital payment rates than in IPPS payments in comparison hospitals. Under global budgets, hospitals had no incentive to increase service intensity, and there is some evidence to support faster payment growth as a result of rate adjustments that hospitals were permitted to make to regain lost revenue from decreased utilization to meet their global budgets. We found a widening differential in inpatient payment rates for Medicare admissions between Maryland and comparison group hospitals following implementation of the All-Payer Model (see *Section 10*). In addition, hospitals that made rate adjustments that were greater than the 5 percent rate corridor were far more likely to increase their rates above the rate order amount than to reduce them (see Section 3). At the same time, under the All-Payer Model, the percentage of admissions that included an ICU stay did not change relative to the comparison group for the Medicare population, suggesting service intensity did not increase. We also found a reduction in the percentage of Medicare admissions within a DRG category categorized as having major or extreme severity or risk of mortality. This finding suggests Maryland hospitals may have responded to global budget incentives by controlling the intensity of resource use for admissions requiring the highest-intensity care, and the increasing payment per discharge was due to faster growth in payment rates. Moreover, hospital costs within a DRG increased less for commercial admissions, suggesting decreased intensity of services utilized within a DRG or slower growth in payment rates for the commercially insured. However, the percentage of commercial admissions with an ICU stay declined less in Maryland than in the comparison group, which suggests that the slower increase in hospital costs was not due to decreased intensity of services but rather it was more likely due to slower growth in payment rates.

As detailed in <u>Section 4</u>, we conducted analyses to assess whether our findings were sensitive to whether we assumed parallel or differential trends in the baseline period (see **Appendix J**). For the Medicare analysis, we used a model that assumed differential baseline trends. However, we found that four service mix outcomes did have parallel trends for Medicare beneficiaries in Maryland and the comparison group during the baseline period, including the percentage of ED visits that resulted in an admission. In the sensitivity analysis using a model that assumed that Maryland and the comparison group were following parallel trends during the baseline period, we found that the percentage of ED visits that resulted in an admission declined more for Maryland Medicare beneficiaries than for the comparison group. This finding is consistent with our conjecture that the outpatient ED visit rate did not decline because fewer people who visited the ED were subsequently admitted to the hospital (see <u>Section 4</u>). The sensitivity analysis findings for the other outcomes that were on parallel paths in the baseline period were the same as the main findings.

Among the commercially insured population, we assumed parallel baseline trends for the main analysis and differential baseline trends for the sensitivity analysis. We found that commercial plan members in Maryland and the comparison group were on different trajectories in the baseline period for four of the six service mix outcomes-rate of unplanned admissions, percentage of admissions through the ED, percentage of ED visits that resulted in an admission, and percentage of admissions with an ICU stay. In contrast to our main findings and contrary to expectations, we found that the rate of unplanned admissions increased in the sensitivity analysis. Also in contrast to our main findings, we found that the percentage of admissions through the ED and the percentage of ED visits that resulted in an admission declined more among commercial admissions in Maryland than in the comparison group. The decline in the percentage of ED visits resulting in an admission among commercial plan members indicated hospital programs that sought to avoid unnecessary admissions and divert people who came to the ED to observation stays or other alternatives may have had some success. In addition, the percentage of commercial admissions with an ICU stay declined in Maryland relative to the comparison group in the sensitivity analysis. This finding further supports the conclusion that Maryland hospitals may have responded to global budget incentives by controlling the intensity of resource use for people requiring the highest-intensity care.

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SECTION 7 WERE THERE SPILLOVER EFFECTS FROM THE MARYLAND ALL-PAYER MODEL TO OTHER PARTS OF THE HEALTH CARE SYSTEM?

Key Takeaways for Spillover Effects

- Maryland hospitals were slightly less likely to transfer patients to other short-term, acute care hospitals and more likely to transfer patients to PAC providers following All-Payer Model implementation. However, hospital LOS prior to a PAC transfer decreased less in Maryland than in the comparison group, suggesting Maryland hospitals did not try to transfer patients to PAC sooner because of the All-Payer Model.
- For Medicare beneficiaries, medical exam visits provided in hospital outpatient settings shifted to nonhospital outpatient settings after All-Payer Model implementation.
- Trends in Medicare beneficiary admissions to out-of-state hospitals did not change after All-Payer Model implementation, indicating that beneficiaries did not face restricted access to inpatient care in Maryland hospitals.
- Hospitals did not unbundle inpatient services for Medicare patients and shift costs to preadmission or post-discharge periods after implementation of the All-Payer Model.

7.1 Research Questions

To understand whether the All-Payer Model had spillover effects on the parts of Maryland's health system not subject to global budgets, we addressed the following questions:

- Were Maryland hospitals more likely to avoid costly inpatient cases after the implementation of the All-Payer Model?
- Were services provided in hospital outpatient settings shifted to nonregulated settings outside of hospitals after the implementation of the All-Payer Model?
- Did out-of-state hospital admissions by both Maryland residents and nonresidents change after the implementation of the All-Payer Model?
- Did the All-Payer Model shift costs associated with inpatient hospitalizations to the periods before hospital admission and after discharge?

The incentives in Maryland's All-Payer Model were intended to reduce unnecessary hospital use and encourage delivery of services in appropriate lower-cost settings. However, incentives to reduce expenditures for hospital services might have led to underprovision of care, avoidance of costly cases, and shifting patients to either other hospitals or nonregulated (i.e., nonhospital) providers. Hospitals might have had a greater incentive to transfer costly, hard-tomanage cases to other short-term, acute care (STAC) hospitals or to PAC settings. Transferring patients to PAC settings is desirable if it resulted in patients receiving treatment at more appropriate levels of care and reduced unnecessarily long hospital stays, but it is undesirable if it resulted in poorer patient outcomes or increased readmissions because patients were discharged too soon. Because of the potential for undesirable changes in discharge behavior, HSCRC's budget-setting methodology contained adjustments for hospitals whose case-mix severity index fell during the prior year, adjustments for transfers of complex cases to academic medical centers, and penalties and rewards that encouraged reductions in readmissions. These policies might have limited incentives for hospitals to change their discharge behavior.

Because global budgets incentivized reductions in hospital services use, Maryland hospitals could have restricted access to hospital outpatient services, causing patients to seek care in nonhospital settings, such as physician offices, federally qualified health centers (FQHCs) or rural health clinics (RHCs). On the other hand, global budgets could have increased the use of hospital outpatient services to redirect patients from using the ED. Overall, total outpatient visits across all sites of care could have increased in response to incentives to constrain inpatient hospital service use.

In addition, if there were constraints on use of Maryland hospitals, Maryland residents might have increased their use of out-of-state hospitals and nonresidents might have encountered barriers to receiving care at Maryland hospitals. Finally, hospitals might have shifted the provision of services to either before or after an inpatient stay to provide them in a less costly setting or move them out of the hospital entirely. For example, hospitals might have encouraged patients to receive laboratory tests prior to hospital admission rather than during a hospital stay.

7.2 Results

7.2.1 Were Maryland Hospitals More Likely to Avoid Costly Inpatient Cases After the Implementation of the All-Payer Model?



Because we hypothesized that hospitals might try to avoid complex, costly patients, we expected the All-Payer Model to increase rates of transfers to other STAC hospitals or to PAC both for all admissions and especially for admissions of major or extreme severity. We also expected LOS for admissions resulting in a transfer to PAC to decline. Only the results for the percentage of admissions resulting in a transfer to PAC were consistent with our hypotheses.

Table 21 shows the results of D-in-D regression analyses for the percentage of Medicare admissions resulting in a STAC transfer, the percentage of STAC transfers classified as major or extreme severity, the percentage of admissions resulting in a PAC transfer, LOS for admissions resulting in a PAC transfer, and the percentage of PAC transfers classified as major or extreme severity. The yearly D-in-D regression estimates for each outcome are presented in *Appendix I*.

- The percentage of admissions that resulted in a STAC transfer decreased by 25.2 percent more in Maryland than in the comparison group during the first 4.5 years of the All-Payer Model (D-in-D estimate: -0.3 percentage points). The large relative difference reflects low baseline STAC transfer rate in Maryland (1.3%).
- The All-Payer Model did not have an impact on the percentage of STAC transfers classified as major or extreme severity across all 4.5 years or in any single implementation year.
- The percentage of admissions that resulted in a PAC transfer increased by 11.2 percent more in Maryland than in the comparison group throughout the first 4.5 years of All-Payer Model implementation (D-in-D estimate: 0.2 percentage points). During the same period, LOS for admissions resulting in a PAC transfer decreased by 2.0 percent less in Maryland than in the comparison group (D-in-D estimate: 0.1 days). The difference between Maryland and the comparison group for LOS prior to PAC transfer was statistically significant in the first 4.5 years overall but not in any individual year because of the larger number of observations for the overall period.
- The All-Payer Model did not have an impact on the percentage of PAC transfers classified as major or extreme severity through the first 4.5 years of the implementation period overall or in any single year.

Table 21
Impacts on outcomes related to avoidance of costly admissions for Medicare beneficiaries,
first 4.5 years of Maryland All-Payer Model implementation

	Expected	Change in outcome from baseline to implementation period						
Outcome	direction of outcome	Maryland	Comparison group	D–in–D estimate (90% CI)	Relative difference %	p-value		
Percentage of admissions resulting in STAC transfer	«	*	\bigcirc	-0.3 (-0.5, -0.2)	-25.2	< 0.001		
Percentage of STAC transfers classified as major or extreme severity	≶			0.7 (-2.7, 4.0)	1.0	0.74		
Percentage of admissions resulting in PAC transfer	≶	⊗	\bigcirc	0.2 (0.1, 0.4)	11.2	0.001		
Length of stay for admissions resulting in a PAC transfer	≫	*	*	0.1 (0.008, 0.2)	2.0	0.07		
Percentage of PAC transfers classified as major or extreme severity			\$	2.1 (-0.9, 5.1)	3.1	0.25		
✤ Increase	Decrease		On the other of the other othe	Could move in either direction				
Change in expected direction	Change in unexp	pected direction	tion Change, could move in either direction					

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PAC = post-acute care; STAC = short-term, acute care.

<u>Methods</u>: A logistic regression model was used to obtain estimates for all binary outcomes. A Poisson model was used for length of stay for admissions resulting in a PAC transfer. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/nonmetropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, and disproportionate share hospital percentage), and admission-level variables (DRG weight, whether an admission came from a skilled nursing facility, and whether an admission came from the ED).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

(continued)

Table 21 (continued)Impacts on outcomes related to avoidance of costly admissions for Medicare beneficiaries,first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for the percentage of admissions resulting in a STAC transfer and the percentage of admissions resulting in a PAC transfer is 3,062,721. The total weighted N for the percentage of STAC transfers classified as major or extreme severity is 26,256. The total weighted N for length of stay for admissions resulting in a PAC transfer is 60,296. The total weighted N for the percentage of PAC transfers classified as major or extreme severity is 60,045.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

7.2.2 Were Services Provided in Hospital Outpatient Settings Shifted to Nonregulated Settings Outside of the Hospital After All-Payer Model Implementation?

- The percentage of Medicare beneficiaries in Maryland with medical exam visits to physician offices increased relative to the comparison group, whereas the percentage of beneficiaries with visits to hospital outpatient settings did not change. These findings, coupled with the 2.1 percent greater increase in the total number of outpatient medical exam visits across all sites of care in Maryland than in the comparison group, suggest that some Medicare hospital outpatient services shifted to nonhospital settings after All-Payer Model implementation.
- For commercial plan members, there is no evidence that hospital outpatient services shifted to nonhospital settings after All-Payer Model implementation. The percentage of commercial plan members with medical exam visits to hospital outpatient departments increased 32.6 percent more in Maryland than in the comparison group, whereas the percentage with visits to physician offices declined 2.8 percent more in Maryland. At the same time, the total number of outpatient medical exam visits increased 2.8 percent less in Maryland than in the comparison group after All-Payer Model implementation.

We hypothesized that the All-Payer Model would increase the percentage of Medicare beneficiaries and commercial plan members with outpatient medical exam visits²⁹ in nonhospital settings, including physician offices³⁰ and FQHCs or RHCs, because Maryland hospitals could seek to constrain access to hospital outpatient department services. At the same time, Maryland hospitals might direct patients to their outpatient departments to reduce ED use so the overall impact on medical exam visits in hospital outpatient departments cannot be predicted. We also hypothesized that efforts to reduce the need for hospital services under the All-Payer Model would increase the total number of outpatient medical exam visits provided to Medicare beneficiaries and commercial plan members. Examining the total number of outpatient medical exam visits in hospital and nonhospital settings provided insight into whether visits were shifted from hospital settings.

As expected, Medicare beneficiaries in Maryland experienced relative increases in the total number of outpatient medical exam visits and in the percentages of beneficiaries with medical exams at physician offices, but there was no impact on hospital outpatient or FQHC and RHC visits. For commercial plan members, contrary to expectations, the total number of outpatient medical exam visits and percentage of plan members with physician office medical exam visits both declined relative to the comparison group under the All-Payer Model.

²⁹ Outpatient medical exam visits are outpatient evaluation and management visits. Outpatient medical exam visits include visits to primary care physicians and specialists.

³⁰ Because of issues in identifying urgent care center visits, visits with an urgent care place of service as well as those from a Method II critical access hospital are combined with physician office visits.

7.2.2.1 Medicare

Table 22 shows the results of the D-in-D regression analyses for the percentage of Medicare beneficiaries with medical exam visits to hospital outpatient departments, the percentage of Medicare beneficiaries with medical exam visits to physician offices, the percentage of Medicare beneficiaries with medical exam visits at FQHCs and RHCs, and the total number of outpatient medical exam visits per beneficiary. The yearly D-in-D estimates for each outcome are presented in *Appendix I*. Adjusted means are lower in Year 5 for all outcomes except total number of outpatient medical exam visits because they represent 6 months, rather than 12 months, of data. The total number of outpatient medical exam visits was adjusted to an annual rate, but the other outcomes are the percentage of beneficiaries using these services and could not be adjusted.

- The All-Payer Model did not have a statistically significant impact on hospital outpatient department medical exam visits. The percentage of Medicare beneficiaries with medical exam visits at hospital outpatient departments increased at similar rates among Maryland residents and comparison group residents during the first 4.5 years of the All-Payer Model.
- The percentage of Medicare beneficiaries with medical exam visits at physician offices in Maryland decreased by 0.6 percent less than in the comparison group over the 4.5-year All-Payer Model period (D-in-D estimate: 0.5 percentage points).³¹
- The All-Payer Model did not have a statistically significant impact on the percentage of Medicare beneficiaries with medical exam visits at FQHCs and RHCs during the first 4.5 years of implementation overall or during any individual year. The percentage of Medicare beneficiaries who visited FQHCs or RHCs was low (between 3% and 4%) in both the Maryland and comparison groups in all periods.
- The total number of outpatient medical exam visits per beneficiary per year at all sites of care increased by 2.1 percent more in Maryland than in the comparison group from the baseline period to the 4.5-year All-Payer Model period overall (D-in-D estimate: 0.2 visits). The increases in the total number of outpatient medical exam visits were larger in Maryland than in the comparison group in Years 3 through 5.

³¹ Table 23 shows the percentage of Medicare beneficiaries with an evaluation and management visit at a physician office declined less in Maryland than in the comparison group during the All-Payer Model period overall and in Year 5. The decline in the adjusted means for Maryland and the comparison group during these periods is driven by the fact that Year 5 in the Medicare analysis only covers 6 months of 2018, not a full year.³² Out-of-state patient revenues were initially excluded from four hospitals' global budgets. During this time, these hospitals did not have an incentive to limit nonresident admissions. Beginning July 2014 (FY 2015), only three hospitals retained the exclusion. No hospitals had the exclusion beginning July 2016 (FY 2017). If these hospitals began restricting admissions of nonresidents after these revenues were included in their global budgets, we would expect any downward trend in admissions of nonresidents to accelerate at these points, but we did not observe this.

Outcome	Expected direction of outcome	Change in outcome from baseline to implementation period					
		Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	
Hospital outpatient departments (%)	\$	8	8	0.02 (-1.1, 1.1)	0.1	0.98	
Physician offices ^a (%)	≶	*	≫	0.5 (0.3, 0.8)	0.6	< 0.001	
FQHCs and RHCs (%)	≶	\$		-0.2 (-0.4, 0.03)	-6.5	0.15	
All sites of care combined (# of visits)	≶	≶	♦	0.2 (0.1, 0.2)	2.1	<0.001	
♠ Increase	✤ Decrease		No change	🗘 Coul	d move in either direct	ion	
Change in expected direction	Change in unex	pected direction Change, could move in either direction					

 Table 22

 Impacts on outpatient medical exam visits by place of service for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval: D-in-D = difference-in-differences: FOHC = federally qualified health center: RHC = rural health clinic.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the difference in the percentage of beneficiaries with an outpatient medical exam visit by place of service. A negative binomial regression model was used to obtain estimates of the number of visits for all sites of care combined. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians).

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for all models is 10,281,981.

^a Physician offices includes visits to urgent care centers and Method II critical access hospitals.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.
7.2.2.2 Commercial Insurance

Table 23 shows the results of the D-in-D regression analyses for the percentage of commercial plan members with medical exam visits to hospital outpatient departments, the percentage of commercial plan members with medical exam visits to physician offices, and the total number of outpatient medical exam visits per plan member. We did not analyze visits to FQHCs and RHCs for commercial plan members because the rates were very low. The yearly D-in-D estimates for each outcome are presented in *Appendix I*.

- The percentage of commercial plan members with medical exam visits at hospital outpatient departments increased by 32.6 percent more for Maryland residents than comparison group residents during the first 4 years of All-Payer Model implementation (D-in-D estimate: 1.4 percentage points). This relative difference is high because the percentage of commercial plan members in Maryland with visits to hospital outpatient departments was low during the baseline period (4.5%).
- The percentage of commercial plan members who had medical exam visits at physician offices decreased by 2.8 percent more in Maryland relative to the comparison group during the first 4 years of the All-Payer Model overall (D-in-D estimate: -2.0 percentage points).
- The number of outpatient medical exam visits at any site of care increased by 2.8 percent less for commercial plan members in Maryland than for the comparison group during the 4 years of the All-Payer Model overall (D-in-D estimate: -0.1 visits).

7.2.3 Did Out-of-State Hospital Admissions by Both Maryland Residents and Nonresidents Change after the Implementation of the All-Payer Model?

- The nonresident share of Medicare admissions to Maryland hospitals remained relatively constant throughout the baseline and All-Payer Model periods.
 - The upward trend in the share of admissions for Maryland's Medicare beneficiaries at hospitals outside of Maryland did not change after All-Payer Model implementation, suggesting that the All-Payer Model did not increase the extent to which Maryland residents sought care at out-of-state hospitals.

Examining out-of-state admissions for Medicare beneficiaries could provide insight into whether the All-Payer Model constrained Maryland hospital utilization. We expected that if the All-Payer Model constrained Maryland hospital utilization and Maryland residents faced challenges in accessing inpatient care in Maryland, an increasing percentage of Maryland resident admissions would occur at out-of-state hospitals after All-Payer Model implementation. Likewise, nonresidents would account for a smaller share of admissions to Maryland hospitals if

Table 23Impacts on outpatient medical exam visits for commercial plan members,
first 4 years of Maryland All-Payer Model implementation

		Change in outo to impleme	come from baseline entation period			
Outcome	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value
Hospital outpatient departments (%)	\$	\$	8	1.4 (0.8, 2.1)	32.6	<0.001
Physician offices ^a (%)		*	≶	-2.0 (-2.6, -1.4)	-2.8	< 0.001
All sites of care combined (# of visits)	\$	≶	≶	-0.1 (-0.1, -0.06)	-2.8	< 0.001
S Increase	Solution Decrease		On change	🗘 Coul	d move in either direct	ion
Change in expected direction	n Change in unex	pected direction				

CI = confidence interval; D-in-D = difference-in-differences.

<u>Methods</u>: A logistic regression model was used to obtain estimates of the difference in the percentage of commercial plan members with an outpatient medical exam visit by place of service. A negative binomial regression model was used to obtain estimates of the number of visits for all sites of care combined. Models adjusted for individual-level variables (gender, age, drug coverage, mental health coverage, relationship to the policyholder [employee, spouse or child], and commercial plan type) and the urban/rural status of the county.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

The total weighted N for all models is 4,045,874.

^a Physician offices includes visits to urgent care centers.

SOURCE: MarketScan Data, MarketScan is ©2016 Truven Health Analytics Inc., an IBM Company.

the All-Payer Model constrained access to Maryland hospitals.³² The share of nonresident admissions at Maryland was generally stable before and after implementation of the All-Payer Model. Although the percentage of Maryland residents admitted to out-of-state hospitals increased over time, there was no change in trend after All-Payer Model implementation.

Figure 50 shows the share of nonresident Medicare admissions, inpatient days, and Medicare inpatient payments at Maryland hospitals.

- The nonresident share of admissions ranged between 7.9 and 8.3 percent throughout the baseline and All-Payer Model periods. Similarly, nonresidents accounted for 8.3 to 8.8 percent of Medicare inpatient days at Maryland hospitals.
- The nonresident share of Medicare inpatient payments increased from 9.5 percent to 10.2 percent from 2011 through 2013 and declined slightly during the All-Payer Model period—from 9.8 percent in 2014 to 9.4 percent in 2018.

Figure 50 Share of nonresident Medicare admissions, inpatient days, and inpatient payments at Maryland hospitals for 2011 through 2018



We also explored the share of Medicare admissions, inpatient days, and inpatient payments for nonresidents residing in a border state because we expected constraints on the

³² Out-of-state patient revenues were initially excluded from four hospitals' global budgets. During this time, these hospitals did not have an incentive to limit nonresident admissions. Beginning July 2014 (FY 2015), only three hospitals retained the exclusion. No hospitals had the exclusion beginning July 2016 (FY 2017). If these hospitals began restricting admissions of nonresidents after these revenues were included in their global budgets, we would expect any downward trend in admissions of nonresidents to accelerate at these points, but we did not observe this.

availability of Maryland hospital services to have a greater effect on these beneficiaries than those traveling longer distances who were more likely to be seeking specialized care. Admissions of residents in border states to Maryland hospitals did not change after implementation of the All-Payer Model; they made up approximately 6 percent of Medicare admissions and inpatient days, and between 7 and 8 percent of Medicare inpatient payments, for Maryland hospitals from 2011 through 2018 (data not shown).

Figure 51 shows the share of admissions for Maryland Medicare beneficiaries at out-ofstate hospitals. The share of admissions to out-of-state hospitals is presented by whether the hospital is in a border state or not. Patients may be admitted to non-border state hospitals either because the hospitals offer specialized services that are not available in local hospitals or the patient is out-of-state at the time of admission, neither of which is affected directly by implementation of the All-Payer Model. Thus, if the All-Payer Model reduced Maryland residents' access to Maryland hospital services, we expect increases in Maryland resident admissions to hospitals in states bordering Maryland, but admissions to non-border state hospitals would not change.

- The share of admissions for Maryland's Medicare beneficiaries at hospitals outside of Maryland trended upward, beginning during the baseline period and continuing after implementation of the All-Payer Model. The share of Maryland resident admissions to out-of-state hospitals increased every year from 2011 through 2017 and then decreased slightly from 11.8 percent in 2017 to 11.7 percent in 2018.
- Trends in shares of Maryland resident admissions to border hospitals and to nonborder hospitals were similar. Admissions to border hospitals represented between 78 and 80 percent of these out-of-state admissions from 2011 through 2018.

Figure 51 Share of Maryland Medicare beneficiaries' admissions at hospitals outside of Maryland for 2011 through 2018



7.2.4 Did the All-Payer Model Shift Costs Associated with Inpatient Hospitalizations to the Periods Before Hospital Admission and After Discharge?

During the first 4.5 years of All-Payer Model implementation overall, total Medicare payments for an episode of care increased 3.8 percent more in Maryland than in the comparison group. This faster growth was due to increased payments during the initial hospitalization for an episode.
 Changes in total payments before admission and after discharge did not differ between Maryland and the comparison group, indicating that hospitals did not

Payer Model implementation.

shift inpatient costs into the pre-admission or post-discharge periods after All-

We constructed payments for inpatient episodes of care by identifying all payments in a 14-day period prior to admission to a hospital, all payments associated with an "index" hospital admission, and all payments in the 30 days after hospital discharge. We expected that the All-Payer Model might lead hospitals to shift the provision of services from the index hospitalization period to the periods prior to the admission or after hospital discharge. Contrary to expectations, we did not find evidence that care was shifted outside of the index admission period during inpatient episodes of care.

Table 24 shows the results of the D-in-D regression analyses for total episode payments and total payments during the 14-day pre-admission and 30-day post-discharge windows only. The yearly D-in-D regression output for these outcomes is presented in *Appendix I*. Descriptive statistics on components of unadjusted inpatient episode payments for the 14-day pre-admission, index hospitalization, and 30-day post-discharge windows for Medicare beneficiaries are also shown in *Appendix I*.

- During the first 4.5 years of the All-Payer Model, total episode payments increased in both Maryland and the comparison group, but they increased 3.8 percent more in Maryland than in the comparison group (D-in-D estimate: \$884). The increase was statistically significantly larger in Maryland in three of the model years, and the magnitude of the difference increased in each year.
- Changes to payments during the pre-admission and post-discharge windows did not differ between Maryland and the comparison group during 4.5 years of the All-Payer Model period. This indicates faster growth in spending during the index admission drove the faster growth in total episode payments in Maryland.

Table 24 Impacts on Medicare payments for inpatient episodes of care for Medicare beneficiaries, first 4.5 years of Maryland All-Payer Model implementation

	Functed	Change in outco to implemen	me from baseline tation period				
Window	direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	
Total episode, all payment windows a payment components	und	«	~	883.69 (549.89, 1,217.49)	3.8	<0.001	
Total pre-admission and post-discharg window payments, all payment comp	ge			27.58 (-127.89, 183.05)	0.3	0.77	
Increase	Solution Decrease	$igodoldsymbol{ ho}$ No c	hange	Could move	in either direction		
Change in expected direction Change in unexpected direction Change, could move in either direction							

CI = confidence interval; D-in-D = difference-in-differences.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the differences in Medicare payments for inpatient episodes of care. Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, and number of chronic conditions in the previous year), county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians), hospital-level variables (resident-to-bed ratio, number of short-term, acute care hospital beds, area wage index, and disproportionate share hospital percentage), and case-mix severity (DRG weight) for the admission.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. See *Appendix A* for additional detail.

The total weighted N is 2,237,756.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

7.3 Discussion

Hospital revenue constraints under the All-Payer Model have the potential to produce unintended spillover effects on other parts of the health care delivery system if they create incentives for hospitals to avoid or shift patients—especially those with complex, costly conditions—either to other hospitals or to providers outside the model (i.e., nonhospital providers or out-of-state hospitals). Throughout the first 4.5 years of the All-Payer Model implementation, we found little evidence of these types of spillover effects on health care services furnished to Medicare or commercial plan members.

Maryland hospitals did not avoid complex, costly cases after All-Payer Model implementation by transferring Medicare patients to other hospitals or to PAC settings. Although the percentage of admissions resulting in a PAC transfer increased more in Maryland than in the comparison group, the percentage of admissions resulting in a STAC transfer declined more in Maryland. Increases in PAC transfer rates might have reflected hospital efforts to reduce readmissions by assuring appropriate care transitions for discharged patients. Hospital LOS prior to a PAC transfer decreased less in Maryland than in the comparison group, suggesting the Maryland hospitals were not transferring patients to PAC sooner as a result of the All-Payer Model. Furthermore, changes in the percentage of transfers to PAC or other STAC hospitals for admissions of major or extreme severity did not differ between Maryland and the comparison group, indicating that hospitals in Maryland were not avoiding potentially complex, costly cases after All-Payer Model implementation.

Likewise, there was no evidence that the All-Payer Model led to unbundling of inpatient services for Medicare patients by shifting costs to pre-admission or post-discharge periods. Increased payments for index hospital admissions, not pre-admission or post-discharge payments, drove larger increases in total episode payments for Medicare admissions in Maryland hospitals than in comparison hospitals. This finding is consistent with the relative increase in the average payment per admission for Medicare beneficiaries reported in *Section 4*. Similar to the payment per admission for Medicare beneficiaries, growth in total episode payments accelerated in Maryland relative to the comparison group in Years 4 and 5. These analyses controlled for case mix so, as discussed in *Section 6*, the faster growth in hospital payment rates, and not an increase in case-mix severity or greater intensity of services provided during an admission, may explain the increased payments for the index admission. Analyses reported in *Section 10* confirm that hospital payment rates grew more rapidly in Maryland than in the IPPS, especially during Year 4 of the All-Payer Model period. Faster growth in payment rates could be due to more generous rate updates under Maryland's rate-setting system or upward adjustments in charges by hospitals to compensate for reductions in hospital volume.

For Medicare beneficiaries, we found some evidence that outpatient care was shifted to nonhospital settings. Increases in the percentage of Medicare beneficiaries who had medical exam visits at physician offices drove the increase in total outpatient medical exam visits; the change in the percentage of beneficiaries with visits to hospital outpatient departments did not differ between Maryland and the comparison group. In contrast, for commercial plan members, there was no evidence that outpatient care was shifted to nonhospital settings; the percentage of commercial plan members with hospital outpatient visits increased more in Maryland than in the comparison group, while the percentage of commercial plan members with visits to physician offices declined more in Maryland than in the comparison group.

Trends in inpatient care-seeking at out-of-state hospitals—as evidenced by admissions of out-of-state Medicare beneficiaries to Maryland hospitals and admissions of Maryland Medicare beneficiaries to out-of-state hospitals—did not change after All-Payer Model implementation. Although there was a small upward trend in admissions of Maryland Medicare beneficiaries to out-of-state hospitals, this trend preceded the implementation of the All-Payer Model. Thus, it does not appear that global budget revenue constraints restricted Maryland residents' access to Maryland hospitals. Similarly, our analyses show no clear changes in the shares of nonresident admissions at Maryland hospitals.

As detailed in *Section 4*, we examined whether our findings were sensitive to the assumption of parallel or differential trends at baseline (see *Appendix J*). For the Medicare analysis, we used a model that assumed differential baseline trends. However, we found that 10 spillover outcomes had parallel trends for Medicare beneficiaries in Maryland and the comparison group during the baseline period. The results for 4 of the 10 outcomes changed in the sensitivity analysis using a model that assumed that Maryland and the comparison group were following parallel trends during the baseline period. The sensitivity analysis findings for the 6 other outcomes that were on parallel paths in the baseline period were the same as the main findings.

In contrast to our main findings, a model with parallel baseline trends identified a greater decline in LOS prior to PAC transfer in Maryland than in the comparison group. This decline, although small in magnitude, provides support to the hypothesis that the All-Payer Model incentivized hospitals to transfer patients to PAC sooner. However, using a model assuming baseline parallel trends, we found that the percentage of PAC transfers classified as major or extreme severity increased less in Maryland than in the comparison group. Although the sensitivity finding differs from that for the main analysis—in which the change in PAC transfers for admissions of major or extreme severity did not differ between Maryland and the comparison group-both the main and sensitivity analysis findings suggest that Maryland hospitals were not avoiding costly, complex patients as a result of the All-Payer Model. The Medicare sensitivity analysis also showed a greater increase in total pre-admission and post-discharge payments in Maryland than in the comparison group, indicating-unlike in the main analysis-that Maryland hospitals may be shifting inpatient services to pre-admission and post-discharge settings. Finally, in contrast to the findings from the main analysis, the model assuming baseline parallel trends showed a greater increase in the percentage of beneficiaries with medical exam visits to hospital outpatient departments in Maryland than in the comparison group. However, the sign and significance of overall D-in-D estimates for the total number of outpatient medical exam visits and the percentage of beneficiaries with visits to physician offices did not change between the main and sensitivity analyses. As a result, sensitivity analysis findings still provide some evidence of shifting care between hospital outpatient and nonhospital settings for Medicare beneficiaries during the All-Payer Model period.

For the commercially insured population, we assumed parallel baseline trends for the main analysis and differential baseline trends for the sensitivity analysis. We found that commercial plan members in Maryland and the comparison group had different baseline trends

for two spillover outcomes—the percentage of commercial plan members with medical exam visits at physician offices and the total number of outpatient medical exam visits across all sites of care. In contrast to our main findings, we found that both total outpatient medical exam visits and the percentage of commercial plan members with medical exam visits to physician offices increased more in Maryland than in the comparison group. These sensitivity findings were in the expected direction, lending support to the hypothesis that the All-Payer Model incentivized shifting care to nonregulated, nonhospital settings.

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SECTION 8 DID THE IMPACT OF THE MARYLAND ALL-PAYER MODEL VARY BY HOSPITAL OR BENEFICIARY CHARACTERISTICS?

Key Takeaways for Subgroup Analysis

- Teaching hospitals and high DSH percentage hospitals generally had smaller reductions in expenditures and utilization had poorer outcomes under the All-Payer Model than non-teaching and low/medium DSH percentage hospitals, particularly for unplanned readmissions and 14-day follow-up visit rates.
- Contrary to expectations, hospitals aligned with an ACO performed worse on patient follow-up visits than non-aligned hospitals under the All-Payer Model.
- Differences in the effect of the All-Payer Model between hospitals that had and had not been operating under a global budget through the predecessor TPR system were minimal.
- Beneficiaries with multiple chronic conditions and beneficiaries dually eligible for Medicare and Medicaid had greater reductions in expenditures and utilization relative to their comparison groups than their subgroup counterparts. These outcomes suggest that hospitals may have prioritized high-cost, high-need patients as they changed their care delivery practices. Additionally, these beneficiaries may have had the most to gain from the interventions implemented by Maryland hospitals during the All-Payer Model.
- We did not find consistent differences in selected utilization and expenditure impacts based upon a beneficiary's original basis for Medicare entitlement, race, or rural residency.

8.1 Research Questions

The effects of the All-Payer Model may differ among different types of hospitals and among population subgroups. Differences in the resources available to implement initiatives in response to global budgets, patient population, and market area conditions all may have affected how hospital utilization changed under the All-Payer Model. Likewise, beneficiary health status and socioeconomic characteristics also may have mediated beneficiary-level All-Payer Model impacts. In this section, we address the following research questions:

- How do impacts of the All-Payer Model differ by hospital characteristics?
- How do impacts of the All-Payer Model differ by beneficiary characteristics?

Selection of hospital and beneficiary characteristics for these analyses was guided by the literature and qualitative data collected during the evaluation. Both the hospital and beneficiary subgroup analyses were limited to the Medicare population.

The hospital subgroup analyses focused on the following hospital characteristics:

• **TPR system participation**: Hospitals that participated in the TPR system had longer experience with global budgets than those that did not. We hypothesized that they would be better able to respond to global budget incentives because of this

experience. Alternatively, we might observe less change in these hospitals' outcomes because the change in their payment model to global budgets preceded the All-Payer Model period. Furthermore, hospitals that participated in the TPR system are smaller, rural hospitals that might have had fewer resources to adapt to the All-Payer Model and, therefore, might perform worse than other hospitals. On balance, we did not have a definitive hypothesis about whether hospitals that participated in the TPR system would perform better or worse than those that did not.

- **Teaching status**: Teaching hospitals have higher levels of patient acuity than nonteaching hospitals because they are referral hospitals, and more complex patients are likely to seek care there. We hypothesized that teaching hospitals would perform worse than non-teaching hospitals, particularly on quality outcomes related to readmissions and care coordination, due to their more complex patients.
- **DSH percentage**: Hospitals with a high DSH percentage have patient populations that are more likely to be low-income and uninsured than other hospitals. High DSH percentage hospitals also serve patients who have greater social needs and market areas with fewer community-based providers that offer alternatives to hospital care. We hypothesized that high DSH percentage hospitals would have greater difficulty changing care delivery patterns because of these challenges and would perform worse than other hospitals.
- Accountable Care Organization (ACO) alignment: Hospitals that are a part of an ACO may have additional incentives to control TCOC and coordinate care across the delivery system, may be better integrated with other providers, and may have more developed care management resources available to them through this affiliation. We hypothesized that ACO-aligned hospitals would perform better than non-aligned hospitals as a result.

To measure potential differential impacts of the Maryland All-Payer Model across hospital settings, we selected several key admission-level outcomes:

- **Case-mix-adjusted payment per discharge**: We expected the payment within a DRG would decrease more in hospitals that were more successful in reducing patient care costs; however, as discussed in *Section 6*, the payment within a DRG might still increase if hospitals adjusted their payment rates to recoup lost revenue from utilization reductions.
- **DRG weight per admission**: We expected larger increases in admission severity in hospitals that were more successful in reducing unnecessary admissions.
- Unplanned readmissions within 30 days of discharge per 1,000 discharges: We expected larger decreases in readmissions in hospitals that were more successful in improving discharge planning and other care transition initiatives.

• **Percentage of discharges with a follow-up visit within 14 days of discharge**: We expected larger increases in post-discharge follow-up in hospitals that were more successful in coordinating care with nonhospital providers.

Beneficiary subgroup analyses examined the following characteristics:

- **Dual eligibility for Medicare and Medicaid**: Beneficiaries entitled to benefits from both Medicare and Medicaid may have more complex medical and social needs than other Medicare beneficiaries, which may make it more difficult to change their health care utilization. As a result of these differences, we hypothesized that outcomes for dually eligible beneficiaries would improve less than for beneficiaries eligible for Medicare only.
- Original reason for Medicare entitlement: Beneficiaries originally entitled to Medicare due to disability may have more complex medical needs than beneficiaries originally entitled due to age, which may make it more difficult to change their health care utilization. We hypothesized that outcomes for disabled beneficiaries would improve less than for aged beneficiaries because of their greater complexity.
- **Presence of multiple chronic conditions**: Beneficiaries with two or more chronic conditions may have more complex medical needs than those who do not have multiple chronic conditions, which may make it more difficult to change their health care utilization. Because of their greater complexity, we hypothesized that outcomes for beneficiaries who have multiple chronic conditions would improve less than for those who do not.
- **Race**: Beneficiaries who are not white may face systematic barriers to accessing healthcare that result in health inequalities, relative to white beneficiaries. They are also more likely to live in areas with fewer community-based alternatives to hospital care. As a result, we hypothesized that outcomes for non-white beneficiaries would improve less than for white beneficiaries.
- **Rural residency status**³³: Beneficiaries in rural areas may have reduced access to health care, higher rates of health disparities, and live in areas where they are more likely to receive care from hospitals that had participated in the TPR system. Reduced access to care, particularly community-based providers, and higher rates of health disparities may have made it more difficult to change rural residents' health care utilization and improve care coordination and care transitions. As noted earlier, the expected impact of receiving care from a hospital that had participated in the TPR system is unclear. On balance, we hypothesized that outcomes for rural residents would improve less than for residents of urban areas.

³³ Residency status was determined based on a beneficiary's county of residence and the 2013 Rural-Urban Continuum Codes (RUCC) assigned to that county. Beneficiaries were defined as urban if they resided in metropolitan areas with a RUCC of 1, 2, or 3. Beneficiaries were defined as rural if they resided in nonmetropolitan areas with a RUCC of 4, 5, 6, 7, 8, or 9. This included beneficiaries in an urban area adjacent to a metropolitan area and beneficiaries in a rural area.

We selected the following outcomes for the beneficiary subgroup analyses:

- **Total expenditures**: We expected smaller reductions in total expenditures among beneficiary subgroups whose outcomes we hypothesized would improve less.
- **Total hospital expenditures**: We expected smaller reductions in total hospital expenditures among beneficiary subgroups whose outcomes we hypothesized would improve less.
- **Inpatient facility expenditures**: We expected smaller reductions in inpatient facility expenditures among beneficiary subgroups whose outcomes we hypothesized would improve less.
- **ED visit expenditures**: We expected smaller reductions in ED visit expenditures among beneficiary subgroups whose outcomes we hypothesized would improve less.
- Other hospital outpatient department expenditures: We cannot predict the expected effect of the All-Payer Model on hospital outpatient department expenditures or on the direction of differences between beneficiary subgroups based on hypothesized relative improvement in outcomes because hospital efforts to reduce costs might be offset by initiatives to shift care from inpatient to outpatient settings.
- All-cause acute inpatient admissions per 1,000 beneficiaries: We expected smaller reductions in inpatient admissions among beneficiary subgroups whose outcomes we hypothesized would improve less.
- **ED visits per 1,000 beneficiaries**: We expected smaller reductions in ED visits among beneficiary subgroups whose outcomes we hypothesized would improve less.
- Unplanned readmissions within 30 days of discharge per 1,000 discharges: We expected smaller reductions in readmissions among beneficiary subgroups whose outcomes we hypothesized would improve less.
- Percentage of discharges with a follow-up visit within 14 days of discharge: We expected smaller increases in post-discharge follow-up visits among beneficiary subgroups whose outcomes we hypothesized would improve less.

The rates of unplanned readmissions and follow-up visits after discharge are included in both the hospital- and beneficiary-level analyses because both hospital and beneficiary characteristics may be linked to their frequency. Readmission rates may be driven by poor inpatient care, early discharge of complex patients, and limited follow-up following discharge, which can be related to hospital characteristics. The likelihood of readmissions also may be driven by beneficiary characteristics, such as the presence of multiple chronic conditions, limited access to primary care providers, and beneficiary behaviors. Follow-up visits may be driven by better coordination between hospitals and community providers and beneficiary characteristics, such as health problems that make it more difficult to get to a doctor's office, limited access to community providers, and beneficiary behaviors. The analyses assessed differences in the impact of the Maryland All-Payer Model between groups using a difference-in-difference-in-differences (DDD) model. We report D-in-D estimates derived from the DDD model for each subgroup relative to its comparison group counterpart (e.g., differences in change for Maryland and comparison group teaching hospitals and for Maryland and comparison group non-teaching hospitals), as well as the statistical test (p-value) for the equality of the D-in-D estimates for the subgroups (i.e., the statistical significance of the DDD estimate or the difference in All-Payer Model impacts between subgroups). We also show the difference in the change between Maryland and the comparison group for each subpopulation. These results are presented in the same manner as in *Sections 4–7*. Our interpretation and discussion focus primarily on the statistical significance of the DDD estimate. Details of the DDD model are in *Appendix A*. This section reports overall estimates for the first 4.5 years of the All-Payer Model; findings by year are in *Appendix I*.

8.2 Results

8.2.1 Did Outcomes Vary by Hospital Characteristic?

+	•	Case-mix-adjusted payment per discharge increased among hospitals that had not participated in the TPR system relative to their matched comparison group but it did not change among hospitals that had participated in TPR.
	•	Despite a stable mix of patient diagnoses, teaching hospitals performed worse relative to their comparison group than non-teaching hospitals during the All- Payer Model period on following up with patients within 14 days and reducing the 30-day readmission rate.
	•	Patient acuity increased more at high DSH percentage hospitals relative to their comparison group, which may have contributed to these hospitals' poorer performance on 14-day follow-up visits and unplanned hospital readmissions than other hospitals under the All-Payer Model.
	•	Contrary to our expectations, the rate of 14-day follow-up visits after hospital discharge declined among hospitals aligned with an ACO relative to their comparison group, whereas the follow-up visit rate for hospitals not aligned with an ACO increased.

8.2.1.1 TPR System Participation

Table 25 presents results from the DDD analyses comparing hospitals that did not participate in the TPR system and those that did.

• The change in hospital costs within a DRG relative to their comparison group was larger in hospitals that had not participated in the TPR system than in hospitals that had participated during the first 4.5 years of the Maryland All-Payer Model. Hospital costs within a DRG increased 9.7 percent more in Maryland hospitals that did not participate in the TPR system than in their comparison group, but the change for hospitals that had operated under the TPR system was not different from their comparison group.

Particinated Weighted		Expected direction -	Change in outco implemen	ome from baseline to ntation period	D–in–D estimate	Relative		p-value for test of	
in TPR	N	of outcome	Maryland	Comparison group	(90% CI)	difference %	p-value	subgroups	
Case-mix-adj	usted payme	nt per discharge (\$)				I			
No	2,589,832	\diamond	≈	*	1,006.89 (777.38, 1,236.39)	9.7	< 0.001	<0.001	
Yes	485,261	\diamond	*	*	-263.00 (-645.82, 119.82)	-2.8	0.26	<0.001	
DRG weight p	oer admissio	n							
No	2,589,832	≶			0.036 (0.008, 0.064)	2.3	0.03	0.72	
Yes	485,261		≈		0.047 (0.007, 0.086)	3.1	0.05	0.72	
Unplanned re	admissions v	within 30 days of discl	narge per 1,000 di	scharges					
No	1,650,058	≫	*	*	-0.2 (-4.8, 4.4)	-0.1	0.95	0.80	
Yes	315,693	*	*	*	0.9 (-5.1, 6.8)	0.6	0.81	0.80	
Percentage of	discharges	with a follow-up visit	within 14 days of	discharge					
No	1,828,935	≈			-0.2 (-1.2, 0.7)	-0.3	0.69	0.31	
Yes	347,144				-1.5 (-3.3, 0.3)	-2.4	0.17	0.51	
S Increase		Solution Decreas	e	O No change		Could move	e in either d	irection	
Change in	Change in expected direction Change in unexpected direction Change, could move in either direction								

Table 25Impacts on hospital outcomes by TPR system participation status,first 4.5 years of Maryland All-Payer Model implementation

Statistically significant difference between groups

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Table 25 (continued) Impacts on hospital outcomes by TPR system participation status, first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group; TPR = Total Patient Revenue.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjustment payment per discharge and DRG weight per admission. A logistic model was used to obtain estimates of the differences in probability of an unplanned readmission within 30 days of discharge and probability of a follow-up visit within 14 days of discharge. Probability of any unplanned readmissions estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges. Probability of a 14-day follow-up visit estimates were multiplied by 100 to obtain a percentage.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for DRG weight per admission, unplanned readmissions, and follow-up visit within 14 days included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage. The model for case-mix-adjustment payment included all previously mentioned covariates as well as the area wage index.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

• The change in admission severity, unplanned readmissions within 30 days of discharge, and percentage of discharges with a follow-up visit within 14 days did not differ between hospitals by whether they had participated in the TPR system relative to their comparison groups.

8.2.1.2 Teaching Hospital Status

Table 26 presents results from the DDD analyses comparing non-teaching and teaching hospitals.

- Admission severity increased more in Maryland non-teaching hospitals than in Maryland teaching hospitals during the first 4.5 years of the Maryland All-Payer Model. Admission severity increased 4.0 percent more among Maryland non-teaching hospitals than among those in their comparison group. The difference in the change for teaching hospitals was not statistically significant.
- Maryland non-teaching hospitals' performance on unplanned readmissions within 30 days of discharge improved during the first 4.5 years of the All-Payer Model but performance declined among Maryland teaching hospitals. The rate of unplanned readmissions within 30 days of discharge decreased 7.3 percent more among Maryland non-teaching hospitals than among comparison group non-teaching hospitals. For teaching hospitals, however, the unplanned readmission rate in Maryland increased in absolute terms and 8.8 percent more relative to their comparison group.
- Maryland non-teaching hospitals' performance on follow-up visits within 14 days after hospital discharge improved during the first 4.5 years of the All-Payer Model but performance declined among Maryland teaching hospitals. The percentage of discharges with a follow-up visit within 14 days increased 1.5 percent more among Maryland non-teaching hospitals than among comparison group non-teaching hospitals. During the same time period, the percentage of discharges with a follow-up visit within 14 days decreased in absolute terms among Maryland teaching hospitals and 4.5 percent more relative to their comparison group teaching hospitals.
- The change in hospital costs within a DRG did not differ between Maryland nonteaching and teaching hospitals relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

Weighter		Expected direction	Change in outcome from baseline to implementation period D-		D-in-D estimate Relativ			p-value for test of equality across
Teaching status	N	of outcome	Maryland	Comparison group	(90% CI)	difference %	p-value	subgroups
Case-mix-adjuste	ed payment p	oer discharge (\$)						
Non-teaching	1,851,577	\diamond	~	~	812.50 (607.65, 1,017.35)	9.0	< 0.001	0.02
Teaching	1,093,924	\diamond	*	*	779.88 (321.33, 1,238.44)	6.3	0.005	0.92
DRG weight per	admission							
Non-teaching	1,851,577	⊗	≈		0.059 (0.031, 0.087)	4.0	< 0.001	0.08
Teaching	1,093,924	⊗	≈		0.006 (-0.036, 0.048)	0.3	0.82	0.00
Unplanned readm	nissions with	in 30 days of discharg	ge per 1,000 dis	scharges				
Non-teaching	1,285,756	*	*	≫	-11.5 (-16.8, -6.2)	-7.3	< 0.001	<0.001
Teaching	649,953	≫		*	15.9 (10.8, 21.0)	8.8	< 0.001	~0.001
Percentage of dis	charges with	a follow-up visit with	nin 14 days of d	lischarge				
Non-teaching	1,385,752		≈		1.0 (0.1, 2.0)	1.5	0.08	<0.001
Teaching	775,048		*		-2.8 (-4.3, -1.3)	-4.5	0.002	~0.001
S Increase		Solution Decrease		No change		Could move	e in either d	irection
Change in expe	ected direction	Change in u	nexpected direction	on Change, co	uld move in either direc	tion		
Statistically sig	nificant differ	ence between groups						

Table 26
Impacts on hospital outcomes by teaching status,
first 4.5 years of Maryland All-Payer Model implementation

Table 26 (continued)Impacts on hospital outcomes by teaching status,first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjustment payment per discharge and DRG weight per admission. A logistic model was used to obtain estimates of the differences in probability of an unplanned readmissions within 30 days of discharge and probability of a follow-up visit within 14 days of discharge. Probability of any unplanned readmissions estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges. Probability of a 14-day follow-up visit estimates were multiplied by 100 to obtain a percentage.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for DRG weight per admission, unplanned readmissions, and follow-up visit within 14 days included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage. The model for case-mix-adjustment payment included all previously mentioned covariates as well as the area wage index.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.1.3 DSH Percentage

Table 27 presents results from the DDD analyses comparing low and medium DSH percentage hospitals with high DSH percentage hospitals.

- Admission severity increased less in Maryland low and medium DSH percentage hospitals than in Maryland high DSH percentage hospitals during the first 4.5 years of the Maryland All-Payer Model. The admission severity increased 9.1 percent more among Maryland high DSH percentage hospitals than their comparison group. The difference in the change for low/medium DSH percentage hospitals was not statistically significant.
- Unplanned readmissions per 1,000 discharges decreased more in Maryland low and medium DSH percentage hospitals than in Maryland high DSH percentage hospitals during the first 4.5 years of the All-Payer Model. The unplanned readmission rate decreased 5.8 percent less among high DSH percentage hospitals in Maryland than their comparison group. The change for low and medium DSH percentage hospitals did not differ from their comparison group.
- Maryland low and medium DSH percentage hospitals' performance on the percentage of discharges with a follow-up visit within 14 days did not change during the first 4.5 years of the All-Payer Model, but high DSH percentage hospitals' performance declined. The follow-up visit rate among high DSH percentage hospitals in Maryland decreased in absolute terms and by 6.5 percent relative to their comparison group. The follow-up visit rate increased for low and medium DSH percentage hospitals in Maryland, but the increase was not different from their comparison group.
- The change in hospital costs within a DRG did not differ between high DSH percentage hospitals and low and medium DSH percentage hospitals in Maryland relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

			Change in ou to imple	itcome from baseline mentation period				p-value for test of equality
DSH percentage	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Case-mix-adju	sted payment	per discharge (\$)				_		
Low/Medium	2,368,414	\diamond	≈	⊗	748.59 (557.91, 939.26)	8.1	< 0.001	0.86
High	817,340	\diamond	≈	⊗	807.47 (240.66, 1,374.27)	6.4	0.02	0.80
DRG weight pe	er admission					-		
Low/Medium	2,368,414		≶		0.008 (-0.017, 0.033)	0.5	0.59	~0.001
High	817,340				0.147 (0.098, 0.196)	9.1	< 0.001	~0.001
Unplanned rea	dmissions witl	hin 30 days of discharg	ge per 1,000 di	scharges				
Low/Medium	1,558,564	ॐ	*	*	-1.7 (-6.3, 2.9)	-1.1	0.54	0.07
High	450,327	ॐ	*	*	10.4 (0.7, 20.1)	5.8	0.08	0.07
Percentage of d	lischarges witl	h a follow-up visit with	in 14 days of	discharge		-		
Low/Medium	1,672,536				0.8 (-0.1, 1.8)	1.2	0.15	<0.001
High	560,326		*		-4.1 (-6.0, -2.3)	-6.5	< 0.001	~0.001
♠ Increase		Solution Decrease		O No change		Could move i	n either dire	ction
Change in e	xpected directior	Change in un	nexpected directi	ion Change, co	uld move in either direct	ion		

Table 27
Impacts on hospital outcomes by DSH percentage,
first 4.5 years of Maryland All-Payer Model implementation

Statistically significant difference between groups

Table 27 (continued)Impacts on hospital outcomes by DSH percentage,first 4.5 years of Maryland All-Payer Model implementation

CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group; DSH = disproportionate share hospital.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjustment payment per discharge and DRG weight per admission. A logistic model was used to obtain estimates of the differences in probability of an unplanned readmissions within 30 days of discharge and probability of a follow-up visit within 14 days of discharge. Probability of any unplanned readmissions estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges. Probability of a 14-day follow-up visit estimates were multiplied by 100 to obtain a percentage.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for DRG weight per admission, unplanned readmissions, and follow-up visit within 14 days included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and DSH percentage. The model for case-mix-adjustment payment included all previously mentioned covariates as well as the area wage index.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.1.4 ACO Alignment

Table 28 presents results from the DDD analyses comparing hospitals not aligned with an ACO with ACO-aligned hospitals.

- Admission severity increased more among hospitals in Maryland not aligned with an ACO than among Maryland ACO-aligned hospitals during the first 4.5 years of the All-Payer Model. Admission severity increased 5.8 percent more among non-aligned hospitals in Maryland than in their comparison group. In contrast, the increase among ACO-aligned hospitals did not differ from their comparison group.
- The percentage of discharges with a follow-up visit within 14 days increased more among Maryland non-aligned hospitals than among Maryland ACO-aligned hospitals during the first 4.5 years of the All-Payer Model. The percentage increased 1.8 percent more among Maryland non-aligned hospitals relative to their comparison group, but it increased 2.2 percent less among ACO-aligned hospitals in Maryland relative to their comparison group.
- The change in hospital costs within a DRG and the rate of unplanned readmissions within 30 days of discharge did not differ between ACO-aligned and non-aligned hospitals in Maryland relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

ACO alignment	Weighted	Expected direction .	Change in ou to impler	tcome from baseline nentation period	D-in-D estimate	Relative		p-value for test of equality across
status	Ň	of outcome	Maryland	Comparison group	(90% CI)	difference %	p-value	subgroups
Case-mix-adjus	ted payment	per discharge (\$)						
Non-aligned	1,261,543	\diamond	≪	⊗	712.41 (412.52, 1,012.30)	6.9	< 0.001	0.50
Aligned	1,801,191	\diamond	≈	~	857.63 (576.08, 1,139.19)	8.5	< 0.001	0.59
DRG weight per	r admission							
Non-aligned	1,261,543	⊗			0.092 (0.056, 0.128)	5.8	< 0.001	0.001
Aligned	1,801,191		≶		0.000 (-0.031, 0.031)	0.0	1.00	0.001
Unplanned read	lmissions with	nin 30 days of discharg	ge per 1,000 di	scharges				
Non-aligned	782,129	ॐ	≫	ॐ	0.8 (-4.7, 6.3)	0.5	0.81	0.72
Aligned	1,198,693	ॐ	*	*	-0.9 (-6.5, 4.6)	-0.6	0.79	0.73
Percentage of d	ischarges with	n a follow-up visit with	in 14 days of o	lischarge				
Non-aligned	880,061			\$	1.2 (0.0, 2.3)	1.8	0.09	0.006
Aligned	1,315,340			\$	-1.5 (-2.7, -0.4)	-2.2	0.03	0.000
S Increase		Solution Decrease		O No change		Could move	e in either d	irection
Change in ex	pected direction	Change in u	nexpected directi	on Change, co	uld move in either direc	tion		

Table 28Impacts on hospital outcomes by ACO alignment status,first 4.5 years of Maryland All-Payer Model implementation

Statistically significant difference between groups

Table 28 (continued)Impacts on hospital outcomes by ACO alignment status,first 4.5 years of Maryland All-Payer Model implementation

ACO = accountable care organization; CI = confidence interval; D-in-D = difference-in-differences; DRG = diagnosis-related group.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in case-mix-adjustment payment per discharge and DRG weight per admission. A logistic model was used to obtain estimates of the differences in probability of an unplanned readmissions within 30 days of discharge and probability of a follow-up visit within 14 days of discharge. Probability of any unplanned readmissions estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges. Probability of a 14-day follow-up visit estimates were multiplied by 100 to obtain a percentage.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for DRG weight per admission, unplanned readmissions, and follow-up visit within 14 days included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage. The model for case-mix-adjustment payment included all previously mentioned covariates as well as the area wage index.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.2 Did Outcomes Vary by Beneficiary Characteristics?



8.2.2.1 Dual Eligibility for Medicare and Medicaid

Table 29 presents the results from the DDD analyses comparing outcomes for Medicare beneficiaries by Medicare-Medicaid dual eligibility status.

- Dually eligible beneficiaries in Maryland had a larger reduction in total expenditures than those eligible for Medicare only during the first 4.5 years of the All-Payer Model. Total expenditures decreased 4.6 percent more among dually eligible beneficiaries and increased 2.0 percent less among Medicare-only beneficiaries in Maryland relative to their comparison groups.
- The reduction in total hospital expenditures was larger among dually eligible beneficiaries in Maryland than among those who are not dually eligible during the first 4.5 years of the All-Payer Model. Total hospital expenditures decreased in absolute terms and by 4.6 percent relative to their comparison group among dually

eligible beneficiaries in Maryland, while expenditures increased 3.7 percent less among Medicare-only beneficiaries.

- The reduction in ED visit expenditures was larger among dually eligible beneficiaries in Maryland than among those who are not dually eligible during the first 4.5 years of the All-Payer Model. ED visit expenditures decreased in absolute terms and by 35.1 percent relative to their comparison group among dually eligible beneficiaries; expenditures increased 28.9 percent less among Medicare-only beneficiaries in Maryland.
- The reduction in the rate of all-cause acute inpatient admissions was larger among dually eligible beneficiaries in Maryland than among those who are not dually eligible during the first 4.5 years of the All-Payer Model. The inpatient admission rate decreased 10.0 percent more among dually eligible beneficiaries and decreased 5.4 percent more among beneficiaries eligible for Medicare only in Maryland relative to their comparison groups.
- The likelihood of having a follow-up visit within 14 days of discharge increased less for dually eligible beneficiaries in Maryland than those eligible for Medicare only during the first 4.5 years of the All-Payer Model. The percentage of discharges with a follow-up visit within 14 days increased 4.1 percent less among dually eligible beneficiaries in Maryland relative to their comparison group. The increase in the percentage of discharges with a follow-up visit within 14 days did not differ between Medicare-only beneficiaries in Maryland and Medicare-only beneficiaries in the comparison group.
- The change in inpatient facility expenditures, other hospital outpatient department expenditures, ED visits, and unplanned readmissions within 30 days of discharge did not differ between dually eligible and Medicare-only beneficiaries relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

			Change in outco to implemen	ome from baseline ntation period				p-value for test
Dual status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Total PBPM (\$)						_		
Medicare only	8,551,964	*			-16.98 (-27.53, -6.42)	-2.0	0.008	0.002
Dual	1,693,796	*	*	*	-66.93 (-92.44, -41.42)	-4.6	< 0.001	0.002
Total hospital P	PBPM (\$)*					_		
Medicare only	8,551,964	*			-17.21 (-25.14, -9.28)	-3.7	< 0.001	0.08
Dual	1,693,796	ॐ	*		-39.22 (-59.61, -18.83)	-4.6	0.002	0.08
Inpatient facilit	y PBPM (\$)							
Medicare only	8,551,964	*			6.42 (-0.77, 13.60)	1.9	0.14	0.48
Dual	1,693,796	*	*	*	-1.74 (-21.85, 18.38)	-0.3	0.89	0.48
ED visits PBPM	I (\$)					_		
Medicare only	8,551,964	*			-5.63 (-6.65, -4.61)	-28.9	< 0.001	<0.001
Dual	1,693,796	*	*		-17.69 (-21.09, -14.28)	-35.1	< 0.001	~0.001

Table 29
Impacts on hospital outcomes by Medicare-Medicaid dual eligibility status,
first 4.5 years of Maryland All-Payer Model implementation

			Change in outco to implemen	ome from baseline station period				p-value for test of equality
Dual status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Other hospital o	outpatient dep	oartment PBPM (\$)						
Medicare only	8,551,964	\diamond	≈	≶	-18.00 (-20.76, -15.24)	-17.9	< 0.001	0.55
Dual	1,693,796	\diamond	≈	≶	-19.80 (-23.74, -15.86)	-14.4	< 0.001	0.55
All-cause acute	inpatient adn	nissions per 1,000 popu	ilation			-		
Medicare only	8,551,964	*	*	*	-14.9 (-19.8, -9.9)	-5.4	< 0.001	<0.001
Dual	1,693,796	ॐ	*	*	-57.2 (-70.1, -44.3)	-10.0	< 0.001	<0.001
ED visits per 1,0	00 population	n						
Medicare only	8,551,964	*			8.4 (2.4, 14.4)	2.5	0.02	0.22
Dual	1,693,796	*	*		-7.7 (-31.2, 15.8)	-0.7	0.59	0.25
Unplanned read	missions with	in 30 days of discharg	ge per 1,000 disch	arges				
Medicare only	1,597,380	ॐ	*	*	-0.9 (-5.2, 3.5)	-0.6	0.74	0.80
Dual	382,067	*	*	*	0.6 (-8.3, 9.5)	0.3	0.91	0.80

Table 29 (continued)Impacts on hospital outcomes by Medicare-Medicaid dual eligibility status,
first 4.5 years of Maryland All-Payer Model implementation

Table 29 (continued) Impacts on hospital outcomes by Medicare-Medicaid dual eligibility status, first 4.5 years of Maryland All-Payer Model implementation

			Change in outco to implemen	ome from baseline ntation period				p-value for test of equality	
Dual status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups	
Percentage of discharges with a follow-up visit within 14 days of discharge									
Medicare only	1,565,592		≶	⊗	0.5 (-0.4, 1.5)	0.7	0.38	<0.001	
Dual	629,810				-2.6 (-3.6, -1.7)	-4.1	< 0.001		
Increase		Solution Decrease		On the other of the other othe		Could move is	n either dire	ction	
Change in expected direction Change in u		nexpected direction	Change, cou	uld move in either directi	on				

Statistically significant difference between groups

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditure measures. A negative binomial model was used to obtain estimates of the differences in the number of all-cause acute inpatient admissions and ED visits. A logistic model was used to obtain estimates of the differences in probability of unplanned readmissions within 30 days of discharge and the percentage of discharges with a follow-up visit within 14 days. Number of admissions and number of ED visits estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. Probability of any unplanned readmission estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for readmissions and 14-day follow-up included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

Table 29 (continued) Impacts on hospital outcomes by Medicare-Medicaid dual eligibility status, first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

* Total hospital PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.2.2 Original Reason for Medicare Entitlement

Table 30 presents the results from the DDD analyses comparing outcomes for Medicare beneficiaries who were originally entitled to Medicare based on age with those whose original entitlement was due to disability.

- The reduction in ED visit expenditures was larger among Medicare beneficiaries originally entitled due to disability in Maryland than among those originally entitled due to age during the first 4.5 years of the Maryland All-Payer Model. ED visit expenditures decreased in absolute terms and by 32.0 percent relative to their comparison group among disability-entitled Medicare beneficiaries in Maryland relative to their comparison group and increased 29.5 percent less among age-entitled beneficiaries.
- The reduction in other hospital outpatient department expenditures was larger among Medicare beneficiaries originally entitled due to age than among those originally entitled due to disability during the first 4.5 years of the Maryland All-Payer Model. Other hospital outpatient department expenditures increased 17.6 percent less among age-entitled Medicare beneficiaries and 15.8 percent less among disability-entitled beneficiaries relative to their comparison groups. Although the relative decrease was larger, the absolute decline was smaller for age-entitled beneficiaries (D-in-D estimate: -\$16.80 PBPM) than for disability-entitled beneficiaries (D-in-D estimate: -22.54 PBPM).
- Unplanned readmissions decreased more among beneficiaries originally entitled to Medicare based on disability in Maryland than among those originally entitled to Medicare based on age during the first 4.5 years of the Maryland All-Payer Model. The rate of unplanned readmissions declined 6.2 percent more among those originally entitled due to disability in Maryland relative to their comparison group. The decrease in the rate of unplanned readmissions among those originally entitled due to age in Maryland did not differ from their comparison group.
- Beneficiaries originally entitled to Medicare based on age in Maryland had a larger increase in the likelihood of having a follow-up visit within 14 days of discharge than those originally entitled to Medicare based on disability during the first 4.5 years of the All-Payer Model. The increase in the percentage of discharges with a follow-up visit within 14 days did not differ between those originally entitled to Medicare based on age in Maryland and their comparison group. The percentage of discharges with a follow-up visit within 14 days decreased 4.0 percent among beneficiaries originally entitled due to disability in Maryland relative to their comparison group.
- The change in total expenditures, total hospital expenditures, inpatient facility expenditures, all-cause acute inpatient admissions, and ED visits did not differ between beneficiaries originally entitled to Medicare based on disability and those entitled based on age relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

Original reason			Change in outcome from baseline to implementation period					p-value for test
for Medicare entitlement	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Total PBPM (\$)								
Aged	8,121,678	ॐ			-23.08 (-34.13, -12.03)	-2.7	< 0.001	0.47
Disabled	2,160,303	ॐ			-31.54 (-50.84, -12.23)	-2.4	0.007	
Total hospital PB	PM (\$)*							
Aged	8,121,678	ॐ			-19.55 (-27.81, -11.29)	-4.3	< 0.001	0.71
Disabled	2,160,303	*			-22.74 (-37.43, -8.05)	-2.9	0.01	0.71
Inpatient facility	PBPM (\$)							
Aged	8,121,678	ॐ			2.95 (-4.43, 10.33)	0.9	0.51	0.19
Disabled	2,160,303	ॐ			13.85 (-1.13, 28.83)	2.3	0.13	0.18
ED visits PBPM ((\$)					_		_
Aged	8,121,678	ॐ			-5.70 (-6.74, -4.66)	-29.5	< 0.001	-0.001
Disabled	2,160,303	*	*		$-14.05 \\ (-17.03, -11.07)$	-32.0	< 0.001	<0.001

Table 30Impacts on beneficiary outcomes by original reason for Medicare entitlement,
first 4.5 years of Maryland All-Payer Model implementation

Original reason			Change in outco to implemen	me from baseline tation period				p-value for test	
for Medicare entitlement	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups	
Other hospital ou	tpatient dep	artment PBPM (\$)							
Aged	8,121,678	\diamond		*	-16.80 (-19.20, -14.39)	-17.6	< 0.001	0.01	
Disabled	2,160,303	\diamond		*	-22.54 (-26.66, -18.42)	-15.8	< 0.001	0.01	
All-cause acute inpatient admissions per 1,000 population									
Aged	8,121,678	≫	*	*	-20.7 (-25.7, -15.7)	-7.4	< 0.001	0.12	
Disabled	2,160,303	ॐ	*	≫	-29.5 (-40.0, -19.1)	-6.0	< 0.001	0.12	
ED visits per 1,00	0 populatior	1							
Aged	8,121,678	≫	8	8	6.1 (0.1, 12.1)	1.9	0.09	0.69	
Disabled	2,160,303	ॐ	8		10.2 (-8.8, 29.2)	1.1	0.38	0.09	
Unplanned readmissions within 30 days of discharge per 1,000 discharges									
Aged	1,715,191	≫	*	*	1.1 (-3.0, 5.3)	0.7	0.66	0.02	
Disabled	265,630	*	*	*	-12.6 (-22.8, -2.4)	-6.2	0.04	0.03	

Table 30 (continued)Impacts on beneficiary outcomes by original reason for Medicare entitlement,
first 4.5 years of Maryland All-Payer Model implementation

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Table 30 (continued)Impacts on beneficiary outcomes by original reason for Medicare entitlement,
first 4.5 years of Maryland All-Payer Model implementation

Original reason			Change in outco to implemen	ome from baseline Itation period				p-value for test of equality		
for Medicare entitlement	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups		
Percentage of dise	Percentage of discharges with a follow-up visit within 14 days of discharge									
Aged	1,511,984	≶	⊗		0.4 (-0.5, 1.3)	0.6	0.42	~0.001		
Disabled	683,417		\bigcirc		-2.4 (-3.5, -1.3)	-4.0	< 0.001	<0.001		
S Increase		Solution Decrease		No change		Could move in	either dire	ction		
Change in expected direction Change in u		nexpected direction	Change, cou	uld move in either directi	on					

Statistically significant difference between groups

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditure measures. A negative binomial model was used to obtain estimates of the differences in the number of all-cause acute inpatient admissions and ED visits. A logistic model was used to obtain estimates of the differences in probability of unplanned readmissions within 30 days of discharge and the percentage of discharges with a follow-up visit within 14 days. Number of admissions and number of ED visits estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. Probability of any unplanned readmission estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for readmissions and 14-day follow-up included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage.

<u>How to interpret the findings</u>: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.
Table 30 (continued)Impacts on beneficiary outcomes by original reason for Medicare entitlement,
first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

* Total hospital PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.2.3 Presence of Multiple Chronic Conditions

Table 31 presents results from the DDD analyses comparing outcomes for Medicare beneficiaries who have multiple chronic conditions with those who do not.

- Beneficiaries in Maryland with multiple chronic conditions had a larger reduction in total expenditures than those without multiple chronic conditions during the first 4.5 years of the All-Payer Model. Total expenditures increased 2.7 percent less among beneficiaries with multiple chronic conditions in Maryland relative to their comparison group. The increase in total expenditures among beneficiaries in Maryland that did not have multiple chronic conditions did not differ from their comparison group.
- Beneficiaries in Maryland with multiple chronic conditions had a larger reduction in total hospital expenditures than those without multiple chronic conditions during the first 4.5 years of the All-Payer Model. Total hospital expenditures increased 4.2 percent less among Maryland beneficiaries with multiple chronic conditions relative to their comparison group. The increase in total hospital expenditures among Maryland beneficiaries that did not have multiple chronic conditions did not differ from their comparison group.
- Beneficiaries in Maryland with multiple chronic conditions had a larger reduction in ED visit expenditures than those without multiple chronic conditions during the first 4.5 years of the All-Payer Model. ED visit expenditures increased 31.5 percent less among Maryland beneficiaries with multiple chronic conditions relative to their comparison group and increased 23.2 percent less among Maryland beneficiaries without multiple chronic comparison group.
- Beneficiaries in Maryland with multiple chronic conditions had a larger reduction in other hospital expenditures than those without multiple chronic conditions during the first 4.5 years of the All-Payer Model. Other hospital expenditures increased 17.9 percent less among Maryland beneficiaries with multiple chronic conditions relative to their comparison group and they increased 14.4 percent less among Maryland beneficiaries without multiple chronic relative to their comparison group.
- All-cause acute admissions decreased more among beneficiaries in Maryland who did not have multiple chronic conditions than among those who with multiple chronic conditions during the first 4.5 years of the All-Payer Model. The rate of all-cause acute inpatient admissions decreased 11.2 percent more among Maryland beneficiaries without multiple chronic conditions relative to their comparison group and decreased 6.9 percent more among beneficiaries with multiple chronic conditions relative to their comparison group. Although the relative decrease was larger, the absolute decline was smaller for beneficiaries without multiple chronic conditions (Din-D estimate: -10.7 admissions per 1,000 Medicare beneficiaries) than for beneficiaries with multiple chronic conditions (D-in-D estimate: -24.9 admissions per 1,000 Medicare beneficiaries).

			Change in outcome from baseline to implementation period					p-value for test
MCC status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Total PBPM (\$)							
Non-MCC	1,444,474	*			-5.68 (-17.98, 6.63)	-1.8	0.45	0.005
MCC	8,837,507	*			-28.64 (-40.67, -16.61)	-2.7	< 0.001	0.005
Total hospital F	PBPM (\$)*							
Non-MCC	1,444,474	*			-7.66 (-17.08, 1.77)	-4.0	0.18	0.008
MCC	8,837,507	ॐ			-24.04 (-33.11, -14.96)	-4.2	< 0.001	0.008
Inpatient facilit	y PBPM (\$)					_		
Non-MCC	1,444,474	*			1.83 (-7.29, 10.95)	1.4	0.74	0.61
MCC	8,837,507	ॐ			4.81 (-3.99, 13.62)	1.1	0.37	0.01
ED visits PBPM	I (\$)							
Non-MCC	1,444,474	*			-2.44 (-3.13, -1.74)	-23.2	< 0.001	<0.001
MCC	8,837,507	*			-8.38 (-9.92, -6.84)	-31.5	< 0.001	~0.001

Table 31	
Impacts on beneficiary outcomes by multiple chronic conditions status,	
first 4.5 years of Maryland All-Payer Model implementation	

			Change in outco to implemen	me from baseline station period				p-value for test of equality
MCC status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Other hospital o	outpatient dep	oartment PBPM (\$)				_		
Non-MCC	1,444,474	\diamond	~	*	-7.05 (-10.12, -3.98)	-14.4	< 0.001	<0.001
MCC	8,837,507	\diamond	~	*	-20.47 (-23.15, -17.78)	-17.9	< 0.001	<0.001
All-cause acute	inpatient adm	uissions per 1,000 popu	ulation					_
Non-MCC	1,444,474	*	*	*	-10.7 (-15.3, -6.1)	-11.2	< 0.001	<0.001
MCC	8,837,507	*	*	*	-24.9 (-30.7, -19.0)	-6.9	< 0.001	<0.001
ED visits per 1,0	000 population	n						
Non-MCC	1,444,474	ॐ	8	8	$1.1 \\ (-6.0, 8.1)$	0.5	0.81	0.24
MCC	8,837,507	ॐ	*	*	7.9 (-0.7, 16.6)	1.6	0.13	0.24
Unplanned read	lmissions with	in 30 days of discharg	ge per 1,000 disch	arges				
Non-MCC	67,507	ॐ	*	*	3.5 (-13.0, 20.0)	3.4	0.73	0.68
MCC	1,910,564	*	*	*	-0.6 (-4.7, 3.5)	-0.4	0.80	0.00

Table 31 (continued) Impacts on beneficiary outcomes by multiple chronic condition status, first 4.5 years of Maryland All-Payer Model implementation

Table 31 (continued)Impacts on beneficiary outcomes by multiple chronic condition status,
first 4.5 years of Maryland All-Payer Model implementation

			Change in outcome from baseline to implementation period					p-value for test		
MCC status	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups		
Percentage of discharges with a follow-up visit within 14-days of discharge										
Non-MCC	98,931	\$	*		-1.4 (-3.6, 0.8)	-2.7	0.30	0.44		
MCC	2,093,487	\$			-0.4 (-1.2, 0.4)	-0.6	0.44	0.44		
Increase		Solution Decrease		No change		Could move i	n either dire	ction		
Change in expected direction Change in unexp			nexpected direction	Change, co	uld move in either direct	ion				

Statistically significant difference between groups

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; MCC = multiple chronic conditions; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditure measures. A negative binomial model was used to obtain estimates of the differences in the number of all-cause acute inpatient admissions and ED visits. A logistic model was used to obtain estimates of the differences in probability of unplanned readmissions within 30 days of discharge and the percentage of discharges with a follow-up visit within 14 days. Number of admissions and number of ED visits estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. Probability of any unplanned readmission estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for readmissions and 14-day follow-up included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

Table 31 (continued)Impacts on beneficiary outcomes by multiple chronic condition status,
first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

* Total hospital PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

• The change in inpatient expenditures, ED visits, unplanned readmissions within 30 days of discharge, and percentage of discharges with a 14 day follow-up visit did not differ between Medicare beneficiaries in Maryland with and without multiple chronic conditions relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

8.2.2.4 Race

Table 32 presents results from the DDD analyses comparing outcomes for white and non-white Medicare beneficiaries.

- White beneficiaries in Maryland had a larger reduction in total expenditures than nonwhite beneficiaries during the first 4.5 years of the All-Payer Model. Total expenditures increased 3.9 percent less among white beneficiaries in Maryland relative to their comparison group. The increase in total expenditures among nonwhite beneficiaries in Maryland did not differ from their comparison group.
- White beneficiaries in Maryland had a larger reduction in total hospital expenditures than non-white beneficiaries during the first 4.5 years of the All-Payer Model. Total hospital expenditures increased 5.8 percent less among white beneficiaries in Maryland relative to their comparison group. The increase in total hospital expenditures among non-white beneficiaries in Maryland did not differ from their comparison group.
- Non-white beneficiaries in Maryland had a larger increase in inpatient expenditures than white beneficiaries during the first 4.5 years of the All-Payer Model. Inpatient hospital expenditures increased 5.3 percent more among non-white beneficiaries in Maryland relative to their comparison group. The increase in inpatient hospital expenditures among white beneficiaries in Maryland did not differ from their comparison group.
- Non-white beneficiaries in Maryland had a larger reduction in ED visit expenditures than white beneficiaries during the first 4.5 years of the All-Payer Model. ED visit expenditures among non-white beneficiaries in Maryland decreased in absolute terms and by 40.4 percent relative to their comparison group. ED visit expenditures increased 26.4 percent less among white beneficiaries in Maryland relative to their comparison group.
- White beneficiaries in Maryland had a larger reduction in other hospital expenditures than non-white beneficiaries during the first 4.5 years of the All-Payer Model. Other hospital expenditures increased 18.5 percent less among white beneficiaries in Maryland relative to their comparison group and increased 14.4 percent less among non-white beneficiaries.
- Non-white beneficiaries in Maryland had a larger reduction in the rate of all-cause acute inpatient admissions than white beneficiaries during the first 4.5 years of the All-Payer Model. Inpatient admissions decreased 8.3 percent more among non-white

beneficiaries in Maryland relative to their comparison group and decreased 6.5 percent more among white beneficiaries.

- White beneficiaries in Maryland had a larger increase in the likelihood of having a follow-up visit within 14 days of discharge than non-white beneficiaries during the first 4.5 years of the All-Payer Model. The percentage of discharges with a follow-up visit within 14 days increased 3.3 percent less among non-white beneficiaries in Maryland relative to their comparison group. The increase in the percentage of discharges with a follow-up visit within 14 days did not differ between white beneficiaries in Maryland and the comparison group.
- Although the change in the rate of unplanned readmissions for white and non-white beneficiaries in Maryland did not differ from their respective comparison groups, the performance of white beneficiaries improved relative to non-white beneficiaries during the first 4.5 years of the All-Payer Model. White beneficiaries had a larger decrease in the rate of unplanned admissions than their comparison group while non-white beneficiaries in Maryland had a smaller decrease than their comparison group.
- The change in the rate of ED visits did not differ between white and non-white Medicare beneficiaries in Maryland relative to their comparison groups during the first 4.5 years of the Maryland All-Payer Model.

			Change in outcome from baseline to implementation period					p-value for test
Race	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Total PBPM	(\$)							
Non-white	3,027,246	≫		8	-4.31 (-21.65, 13.02)	-0.4	0.68	0.004
White	7,254,735	≫			-35.84 (-46.57, -25.11)	-3.9	< 0.001	0.004
Total hospita	l PBPM (\$)*							
Non-white	3,027,246	≫		8	-3.31 (-14.72, 8.11)	-0.6	0.63	<0.001
White	7,254,735	ॐ			-28.81 (-36.93, -20.70)	-5.8	< 0.001	<0.001
Inpatient fac	ility PBPM (\$)					_		_
Non-white	3,027,246	ॐ			23.77 (12.28, 35.26)	5.3	< 0.001	<0.001
White	7,254,735	ॐ			-3.36 (-10.84, 4.11)	-0.9	0.46	<0.001
ED visits PB	PM (\$)					_		
Non-white	3,027,246	ॐ	*		-11.63 (-14.18, -9.08)	-40.4	< 0.001	<0.001
White	7,254,735	*			$-6.02 \\ (-7.18, -4.86)$	-26.4	< 0.001	<0.001

Table 32
Impacts on beneficiary outcomes by race,
first 4.5 years of Maryland All-Payer Model implementation

			Change in outco to implemen	me from baseline tation period				p-value for test
Race	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Other hospita	l outpatient de	partment PBPM (\$)						
Non-white	3,027,246	\diamond	~		-15.44 (-19.20, -11.69)	-14.4	< 0.001	0.07
White	7,254,735	\diamond	~		-19.43 (-22.08, -16.77)	-18.5	< 0.001	0.07
All-cause acut	e inpatient ad	missions per 1,000 pop	ulation					
Non-white	3,027,246	*	*	≫	-30.3 (-38.4, -22.2)	-8.3	< 0.001	0.04
White	7,254,735	*	*	*	-19.9 (-25.5, -14.3)	-6.5	< 0.001	0.04
ED visits per	1,000 populatio	on						
Non-white	3,027,246	*	8	8	-2.7 (-16.0, 10.6)	-0.5	0.74	0.13
White	7,254,735	ॐ	*	*	9.1 (1.9, 16.3)	2.3	0.04	0.15
Unplanned re	admissions wit	hin 30 days of discharg	ge per 1,000 disch:	arges				
Non-white	3,027,246	*	*	≫	6.4 (-1.6, 14.4)	3.4	0.19	0.08
White	7,254,735	*	*	*	-3.0 (-7.4, 1.4)	-1.9	0.26	0.08

Table 32 (continued)Impacts on beneficiary outcomes by race,first 4.5 years of Maryland All-Payer Model implementation

Table 32 (continued) Impacts on beneficiary outcomes by race, first 4.5 years of Maryland All-Payer Model implementation

			Change in outc to impleme	ome from baseline ntation period				p-value for test			
Race	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups			
Percentage of	Percentage of discharges with a follow-up visit within 14 days of discharge										
Non-white	3,027,246		⊗	⊗	-2.0 (-3.4, -0.7)	-3.3	0.01	0.006			
White	7,254,735		⊗	⊗	0.3 (-0.6, 1.2)	0.5	0.53				
S Increase		Solution Decrease		😑 No change		Could move i	n either dire	ction			
Change in expected direction Change in unexp			nexpected direction	Change, co	uld move in either direct	tion					

Statistically significant difference between groups

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditure measures. A negative binomial model was used to obtain estimates of the differences in the number of all-cause acute inpatient admissions and ED visits. A logistic model was used to obtain estimates of the differences in probability of unplanned readmissions within 30 days of discharge and the percentage of discharges with a follow-up visit within 14 days. Number of admissions and Number of ED visits estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. Probability of any unplanned readmission estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for readmissions and 14-day follow-up included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage.

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

* Total hospital PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.2.2.5 Rural Residency Status

Table 33 presents results from the DDD analyses comparing outcomes for Medicare beneficiaries residing in rural areas with beneficiaries residing in urban areas.

- Beneficiaries in Maryland residing in rural areas had a larger reduction in total hospital expenditures than beneficiaries residing in urban areas during the first 4.5 years of the All-Payer Model. Total hospital expenditures among Maryland beneficiaries living in rural areas decreased in absolute terms and by 11.3 percent relative to their comparison group; expenditures increased 3.6 percent less among Maryland beneficiaries living in urban areas relative to their comparison group.
- Beneficiaries in Maryland residing in rural areas had a larger reduction in other hospital outpatient department expenditures than beneficiaries residing in urban areas during the first 4.5 years of the All-Payer Model. Other hospital outpatient department expenditures decreased in absolute terms and by 22.8 percent among Maryland beneficiaries living in rural areas relative to their comparison group; expenditures increased 16.8 percent less among Maryland beneficiaries living in urban areas relative to their comparison group.
- Beneficiaries in Maryland in urban areas had a larger decrease in all-cause acute admissions than beneficiaries in rural areas during the first 4.5 years of the All-Payer Model. The rate of all-cause acute inpatient admissions decreased 7.5 percent more among Maryland beneficiaries in urban areas relative to their comparison group. The decrease in the rate of all-cause acute inpatient admissions among beneficiaries in rural areas of Maryland did not differ from the change in their comparison group.
- Beneficiaries in Maryland in urban areas had a larger increase in the rate of ED visits than beneficiaries in rural areas during the first 4.5 years of the All-Payer Model. The rate of ED visits increased 2.1 percent more among Maryland beneficiaries in urban areas relative to their comparison group, whereas the rate of ED visits increased 7.8 percent less among Maryland beneficiaries in rural areas relative to their comparison group.
- Although the change in inpatient expenditures for Maryland beneficiaries residing in both urban and rural areas did not differ from their respective comparison groups, the performance of rural beneficiaries improved relative to urban beneficiaries during the first 4.5 years of the All-Payer Model. Rural beneficiaries in Maryland had a larger decrease in inpatient expenditures relative to their comparison group while urban beneficiaries in Maryland had a larger increase.
- The change in total expenditures, ED visit expenditures, unplanned readmissions, and the percentage of discharges with a follow-up visit within 14 days did not differ between rural and urban residents in Maryland relative to their comparison groups during the first 4.5 years of the All-Payer Model.

			Change in outcome from baseline to implementation period					p-value for test of equality
Residency	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Total PBPM (\$)							
Rural	460,143	*	*		-34.60 (-60.31, -8.89)	-3.9	0.03	
Urban	9,814,131	*			-24.63 (-35.83, -13.42)	-2.6	< 0.001	0.55
Total hospital	PBPM (\$)*					_		
Rural	460,143	*	≫		-55.78 (-80.02, -31.53)	-11.3	< 0.001	0.02
Urban	9,814,131	ॐ			-18.93 (-27.13, -10.73)	-3.6	< 0.001	0.02
Inpatient facil	ity PBPM (\$)					-		
Rural	460,143	ॐ	*	*	-26.79 (-54.26, 0.68)	-7.4	0.11	0.07
Urban	9,814,131	ॐ			6.34 (-1.65, 14.34)	1.6	0.19	0.06
ED visits PBP	M (\$)							
Rural	460,143	ॐ			-5.26 (-8.23, -2.29)	-20.8	0.004	0.24
Urban	9,814,131	*	*		-7.59 (-9.03, -6.15)	-31.3	< 0.001	0.24

Table 33
Impacts on beneficiary outcomes by residency,
first 4.5 years of Maryland All-Payer Model implementation

			Change in outco to implemen	me from baseline tation period				p-value for test
Residency	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups
Other hospital	outpatient de	partment PBPM (\$)						
Rural	460,143	\diamond	*	*	-23.73 (-29.11, -18.34)	-22.8	< 0.001	0.00
Urban	9,814,131	\diamond	~	*	-17.68 (-20.25, -15.11)	-16.8	< 0.001	0.09
All-cause acute	e inpatient adr	nissions per 1,000 pop	ulation					
Rural	460,143	ॐ	*	*	-0.2 (-19.3, 18.8)	-0.1	0.98	0.05
Urban	9,814,131	ॐ	*	*	-24.1 (-29.5, -18.7)	-7.5	< 0.001	0.05
ED visits per 1	,000 populatio	n						
Rural	460,143	ॐ			-40.1 (-63.5, -16.7)	-7.8	0.005	<0.001
Urban	9,814,131	ॐ			9.3 (1.3, 17.3)	2.1	0.05	<0.001
Unplanned rea	dmissions wit	hin 30 days of discharg	ge per 1,000 disch	arges				
Rural	86,391	ॐ	*	*	0.9 (-8.6, 10.5)	0.6	0.87	0.94
Urban	1,893,319	ॐ	*	*	0.2 (-4.0, 4.3)	0.1	0.95	0.24

Table 33 (continued)Impacts on beneficiary outcomes by residency,first 4.5 years of Maryland All-Payer Model implementation

Table 33 (continued) Impacts on beneficiary outcomes by residency, first 4.5 years of Maryland All-Payer Model implementation

			Change in outcome from baseline to implementation period					p-value for test			
Residency	Weighted N	Expected direction of outcome	Maryland	Comparison group	D-in-D estimate (90% CI)	Relative difference %	p-value	across subgroups			
Percentage of	Percentage of discharges with a follow-up visit within 14 days of discharge										
Rural	93,092				1.2 (-1.1, 3.6)	1.9	0.38	0.22			
Urban	2,101,200				-0.6 (-1.4, 0.3)	-0.8	0.29	0.22			
S Increase		Solution Decrease		No change		Could move i	n either dire	ction			
Change in expected direction Change in unexpected dire			nexpected direction	Change, co	uld move in either direct	ion					

Statistically significant difference between groups

CI = confidence interval; D-in-D = difference-in-differences; ED = emergency department; PBPM = per beneficiary per month.

<u>Methods</u>: A weighted least squares model was used to obtain estimates of the difference in expenditure measures. A negative binomial model was used to obtain estimates of the differences in the number of all-cause acute inpatient admissions and ED visits. A logistic model was used to obtain estimates of the differences in probability of unplanned readmissions within 30 days of discharge and the percentage of discharges with a follow-up visit within 14 days. Number of admissions and number of ED visits estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 beneficiaries. Probability of any unplanned readmission estimates were multiplied by 1,000 to obtain an approximate rate per 1,000 discharges.

Models adjusted for person-level variables (age category, gender, race, dual Medicare-Medicaid eligibility status, original reason for Medicare entitlement based on disability, presence of end-stage renal disease, hierarchical condition category risk score, number of chronic conditions in the previous year) and county-level variables (metropolitan/non-metropolitan, population density per square mile, percentage uninsured, percentage without high school diploma, percentage with a college degree, percentage in poverty, and supply of short-term, acute care hospital beds and primary care physicians). The models for readmissions and 14-day follow-up included all previously mentioned covariates, as well as the hospital covariates: resident-to-bed ratio, number of beds, and disproportionate share hospital percentage.

How to interpret the findings: A *negative* value for the regression-adjusted D-in-D corresponds to a *greater decrease* or a *smaller increase* in an outcome after implementation of the All-Payer Model in Maryland relative to the comparison group. A *positive* value corresponds to a *greater increase* or a *smaller decrease* in an outcome in Maryland than in the comparison group. The relative difference is the D-in-D estimate as a percentage of Maryland's baseline period adjusted mean. A p-value less than 0.10 for the test of equality across subgroups indicates a statistically significant difference in the D-in-D estimate between the subgroups.

Table 33 (continued)Impacts on beneficiary outcomes by residency,first 4.5 years of Maryland All-Payer Model implementation

NOTES: The same baseline period is used for the D-in-D estimate for all implementation periods, so the adjusted mean is the same for each year and for the implementation period overall. For continuous outcomes estimated using linear models, the year-specific regression-adjusted D-in-D may not match exactly with the D-in-D calculated from the adjusted means because of rounding. Additionally, the overall regression-adjusted D-in-D may not match the D-in-D calculated from the overall adjusted means because we use different weights for these estimates. For binary and count outcomes estimated using nonlinear models, the regression D-in-D estimate may not match the D-in-D calculated from the adjusted from the adjusted means because in nonlinear specifications the D-in-D calculated from the regression-adjusted means is known to be a biased estimator for the treatment effect. As such, the nonlinear regression D-in-D is calculated with a different method. See *Appendix A* for additional detail.

* Total hospital PBPM includes payments for inpatient facility services, emergency department visits, observation stays, and other hospital outpatient department services.

SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

8.3 Discussion

The All-Payer Model had differential effects on some subgroups within Maryland. For hospital subgroups, teaching hospitals and high DSH percentage hospitals tended to perform worse than other hospitals. Among beneficiary subgroups, we found evidence suggesting that the largest impacts were achieved among sicker, more complex patients.

We hypothesized that there might be larger impacts in hospitals that had participated in the TPR system prior to the All-Payer Model because they had longer experience with global budgets. Alternatively, there might be smaller impacts in hospitals that had participated in TPR because their transition to global budgets preceded the All-Payer Model period. In addition, as smaller hospitals in rural areas, they may have had fewer resources to adapt to the All-Payer Model. Although we saw little difference based upon a hospital's TPR experience, there was a large increase in case-mix-adjusted payment per discharge relative to the comparison group among hospitals that had not participated in TPR but no difference among hospitals that had participated. As noted in Section 6, relative increases in case-mix-adjusted payment per discharge could be caused by faster growth in Maryland hospital payment rates relative to IPPS payments in comparison hospitals. Analyses in Section 3 show hospitals that had not participated in the TPR system had larger budget increases during the All-Payer Model period than hospitals that had participated. Absent differential changes in the patient volume assumptions underlying their budgets, this would be reflected in larger increases in the payment rates of hospitals that had not participated in the TPR system. In addition, there is some evidence to support faster payment growth as a result of rate adjustments that hospitals were permitted to make to regain lost revenue from decreased utilization in order to meet their global budgets. Among beneficiary subgroups, we found a larger decrease in the inpatient admission rate among Medicare beneficiaries living in urban areas relative to their comparison group, but there was no difference in the decrease in admission rates for beneficiaries living in rural areas. Because there is a large overlap between beneficiaries who live in urban areas and those who are admitted to hospitals that had not participated in TPR, the larger increase in case-mix-adjusted payment per admission for non-participating hospitals could be due to a difference in the rate adjustments that these hospitals made to regain revenue from decreased utilization.

We found several differences in outcomes based on the teaching status of hospitals. As hypothesized, teaching hospitals performed worse than non-teaching hospitals on several measures. Despite a greater increase in case-mix severity among non-teaching hospitals, the 14-day follow-up visit and 30-day unplanned readmission rates significantly improved for non-teaching hospitals relative to their comparison group after All-Payer Model implementation, whereas teaching hospitals' outcomes declined relative to their comparison group. It is notable that the unplanned readmission rate for teaching hospitals increased from the baseline to the All-Payer Model period, despite the declining trend in Maryland hospitals overall. Even though case-mix severity did not change for teaching hospitals relative to their comparison group, they have a higher case-mix severity than non-teaching hospitals both before and after All-Payer Model implementation. Hospital leaders noted that patient compliance was a challenge in changing patterns of care, and this may have posed a greater challenge for teaching hospitals must balance the demands of providing patient care, while also teaching and conducting research, which may have

led to slower changes in patient care practices. It is also important to note that non-teaching hospitals' performance in reducing the 30-day readmission rate, which was a key goal of the All-Payer Model, could be related to their success in improving the 14-day follow-up visit rate.

We also found differences in outcomes by DSH percentage. We hypothesized that high DSH percentage hospitals might have smaller expenditure reductions and less improvement in patient health outcomes as these hospitals serve complex, high-need patient populations. Among high DSH percentage hospitals, we saw significant increases in case-mix severity and unplanned readmissions, and a significant decrease in the 14-day follow-up visit rate relative to their comparison group. In contrast, there was no difference in the change in these outcomes for low and medium DSH percentage hospitals relative to their comparison group. The relative increase in higher acuity patients may explain why high DSH percentage hospitals performed worse on following up with patients and preventing hospital readmissions. Compliance with follow-up visits that could prevent a readmission also may have been more difficult for more complex patients.

Although we expected more favorable outcomes among ACO-aligned hospitals, our findings did not support this hypothesis. We found few differences in outcomes by whether hospitals were aligned with an ACO or not. Although non-aligned hospitals' case-mix severity increased more than their comparison group, this was not the case for ACO-aligned hospitals. ACO-aligned hospitals may have had an incentive to avoid more complex cases to achieve shared savings. Despite having a similar increase in patient acuity, the 14-day follow-up visit rate increased less for ACO-aligned hospitals relative to their comparison group after All-Payer Model implementation, while it increased more for hospitals not aligned with an ACO. This finding contrasts with what we would expect under the ACO model. Given an ACO's contractual arrangements with both inpatient and outpatient providers, the ACO-participating hospitals should have better alignment with community physicians to improve the follow-up visit rate, as well as greater incentives to improve follow-up care to achieve shared savings. It is not clear why ACO-aligned hospitals performed worse than other hospitals with regard to patient follow-up.

Variations in the impacts of the Maryland All-Payer Model were seen most consistently across beneficiary subpopulations. There were larger and more favorable changes under the All-Payer Model across dually eligible beneficiaries and beneficiaries with multiple chronic conditions than for other Medicare beneficiaries. In addition, beneficiaries originally entitled to Medicare due to disability experienced larger decreases in 30-day readmissions than their comparison group during the All-Payer Model period, whereas the decrease for age-entitled Medicare beneficiaries did not differ from their comparison group. Beneficiaries with multiple chronic conditions and those dually eligible for Medicare and Medicaid had significantly larger declines in all-cause acute admissions than their counterpart Medicare beneficiaries during the Maryland All-Payer Model as well, although the reduction relative to baseline period rates was smaller for beneficiaries with multiple chronic conditions. These outcomes suggest that there may have been increased efforts to improve care coordination and management of high-cost, high-utilizing beneficiaries under the All-Payer Model. Additionally, these beneficiaries may have had the most opportunity to improve under the reforms of the Maryland All-Payer Model. Furthermore, where we observed differential changes in total expenditures and expenditures for the categories of service analyzed, expenditure growth was almost always slower relative to their comparison groups for these population categories. However, some of this may be explained by changes in hospital rates rather than changes in utilization or care delivery patterns. Although PBPM expenditures for ED visits grew more slowly for all three groups than for other Medicare beneficiaries relative to their comparison groups, the change in the ED visit rate did not differ for any.

We also found differences in outcomes based upon beneficiaries' reported race, but the pattern was not consistent. Inpatient admissions declined for both white and non-white beneficiaries, but the relative and absolute declines were larger among non-white beneficiaries. We cannot determine based on these analyses whether the larger reduction in admissions reflects greater success at avoiding unnecessary admissions or impediments to accessing hospital care. Expenditure outcomes, however, were generally more favorable for white Medicare beneficiaries than non-white. Total and total hospital PBPM expenditures for white beneficiaries grew more slowly in Maryland than the comparison group, whereas there was no difference in the growth for non-white beneficiaries. Likewise, ED and other hospital expenditures decreased more for white beneficiaries relative to their comparison group than for non-white beneficiaries. We do not have evidence that the larger relative decreases in expenditures for white beneficiaries were driven by relative reductions in utilization. It is possible, therefore, that they are explained by differential changes in hospital rates charged.

Similarly, we found that the Maryland All-Payer Model had varying impacts for residents of rural and urban areas. Total hospital and inpatient hospital expenditures decreased more in rural areas than urban areas relative to their comparison groups during the All-Payer Model period. Inpatient admissions of urban residents declined more in Maryland than in the comparison group but there was no difference in the change for residents of rural areas. On the other hand, ED visits increased more than the comparison group in urban areas, but increased less in rural areas during the All-Payer Model period. Better access to outpatient care alternatives in urban areas and barriers resulting from geographic isolation in rural areas might drive the greater success in reducing inpatient admissions in urban areas. The larger increase in the ED visit rate in urban areas of Maryland might reflect avoided inpatient admissions. Taken together these results suggest that urban hospitals were more successful in changing the utilization patterns of their patients and thus they were more likely to raise their rates to meet their global budgets.

As detailed in <u>Section 4</u>, we conducted analyses to assess whether our findings were sensitive to whether we assumed parallel or differential trends in the baseline period (see **Appendix J**). For the Medicare analysis, we used a model that assumed differential baseline trends. We found the percentage of discharges with a follow-up visit within 14 days had parallel trends prior to the All-Payer Model for all four hospital subgroup categories.³⁴ Of these, the direction of the difference between the subgroups changed for only one category in the sensitivity analyses. In the sensitivity analysis, hospitals that had participated in TPR had a significantly larger increase in 14-day follow-up than hospitals that had not participated; in the main analysis, hospitals that had participated in TPR had a smaller increase than hospitals that

³⁴ We considered an outcome to have parallel baseline trends if we found parallel trends for both subgroups within a category.

had not participated but the difference between the subgroups was not statistically significant. For teaching status and ACO alignment the direction of the difference between subgroups was the same in the sensitivity analyses and the main analyses, but the differences were only significant in the main analyses. Findings for differences between subgroups by DSH percentage were the same in the sensitivity and the main analysis. Unplanned readmissions had parallel trends for hospital subgroups by DSH percentage, and these findings were also the same in the sensitivity and the main analysis.

Across the five beneficiary-level subgroups, 15 out of 45 outcomes had parallel trends during the baseline period. Of these, the direction or the significance of the difference between the subgroups changed for seven outcomes in the sensitivity analyses. In four cases, the significance of the difference between subgroups changed in the sensitivity analyses, although the direction of the difference was unchanged: (1) the difference between beneficiaries based on original reason for entitlement for readmissions was not significant in the sensitivity analysis but significant in the main analysis; (2) the difference between beneficiaries based on multiple chronic condition status for all-cause admissions was not significant in the sensitivity analysis but significant in the main analysis; (3) the difference between beneficiaries based on multiple chronic condition status for readmissions was significant in the sensitivity analysis but not significant in the main analysis; and (4) the difference between beneficiaries based on multiple chronic condition status for 14-day follow-up visits was significant in the sensitivity analysis but not significant in the main analysis. In three cases the significance and direction of the difference between subgroups changed in the sensitivity analysis: (1) in the sensitivity analysis, residents of urban areas had a larger reduction in total expenditures than residents of rural areas, while the main analysis showed a larger, but not significantly different, reduction for residents of rural areas; (2) in the sensitivity analyses, whites had a smaller, but not significantly different, increase in 14-day follow-up visits than non-whites, but in the main analyses whites had a larger relative increase; and (3) in the sensitivity analyses, beneficiaries with multiple chronic conditions had a smaller reduction in total expenditures than beneficiaries who did not have multiple chronic conditions, but in the main analyses they had a larger reduction.

SECTION 9 HOW ARE HOSPITAL IMPLEMENTATION STRATEGIES ASSOCIATED WITH PERFORMANCE UNDER THE ALL-PAYER MODEL?

Key Takeaways for Hospital Implementation Strategies and Performance

- Maryland hospitals operating under global budgets nearly universally employed some strategies, including using dedicated analytics staff, using data and analytic tools, using Maryland's health information exchange, employing care coordination and care management staff, employing discharge planners, employing social work staff, implementing patient care transition programs, and using patient care plans.
- Nearly half of the 28 implementation strategies examined were associated with better financial or patient care performance. Hospitals seeking to improve their operating margin and readmission rate could consider adopting these strategies.
 - Two strategies were associated with improvement in both financial and patient care performance:
 - Employing physicians
 - Providing clinically specific patient education, coaching, or self-management programs

- Eight additional strategies were associated with better patient care performance only:

- Relying on customized data analytics to operate under the All-Payer Model
- Having a chief executive or financial officer as the designated implementation leader
- Referring patients to hospital funded or supported alternative care settings
- Having outside consultants perform data analytics
- Providing patients with a hospital funded or supported supply of prescription drugs at discharge
- Investing in interventions that address social determinants of health
- Engaging physicians in the implementation of All-Payer Model-related strategies
- Using data analytics as one of the most important tools for operating under the All-Payer Model
- Three strategies were associated with better financial performance only:
 - Participating in the Care Redesign Program (CRP) to improve relationships with physician partners in anticipation of the Total Cost of Care Model
 - Participating in the CRP to improve financial alignment with physicians
 - Using Maryland's health information exchange as one of the most important tools for operating under the All-Payer Model
- Participating in the CRP to gain access to Medicare data and other data sources was the only strategy associated with poorer financial and patient care performance.

9.1 Research Questions

Maryland hospitals used multiple strategies to operate under the All-Payer Model during the 5 years of model implementation. This section of the report aims to answer the following research questions:

- What All-Payer Model implementation strategies were used in hospitals with successful outcomes?
- What All-Payer Model implementation strategies were absent in hospitals that do not have successful outcomes?

To answer these questions, we first examined similarities and differences in the strategies Maryland hospitals adopted. We then examined how these similarities and differences were associated with hospital-level outcomes. Details on the methods used for this analysis are presented in *Appendix A*. In these analyses, we examined hospital responses about their use of 28 strategies in five key domains:

- (1) designating an implementation leader (2 strategies);
- (2) using data to inform decision-making and operations under the All-Payer Model (9 strategies);
- (3) implementing staffing and clinical care delivery-related strategies (12 strategies);
- (4) having a systematic process to identify opportunities for improvement (1 strategy); and
- (5) having processes to align physicians and clinical staff with the hospital's efforts to meet its global budget targets (4 strategies).

Information about hospitals' use of these strategies were derived from a survey of Maryland hospitals conducted in the last quarter of 2018. Qualitative data from hospital site visits provided additional contextual information about the strategies. The survey instrument and results are in *Appendix B*.

The outcomes focused on two measures of hospital-level performance:

- Operating margin, which represents the hospital's financial health
- 30-day unplanned readmission rate, which represents patient care outcomes

We selected these measures to cover two different facets of hospital operations financial and patient care—that we anticipated could be associated with implementation strategies. Additionally, Maryland hospitals showed considerable variation in these two outcomes; we needed variation in outcomes to be able examine the association between implementation strategies and outcomes. Because of the large number of cases in these analyses (46 acute care hospitals in Maryland), we assigned hospitals to one of four groups for each outcome based on the direction and degree of change in the outcome from the baseline period to June 30, 2018.³⁵ The four categories used throughout this section are the following:

- Hospitals with declining financial or patient care performance from the baseline period to the All-Payer Model period
- Hospitals with low improvement in financial or patient care performance
- Hospitals with medium improvement in financial or patient care performance
- Hospitals with high improvement in financial or patient care performance

Table 34 presents the definitions for each of the four financial and patient care performance categories. *Appendix A* provides more detail about how the cut points for the category definitions were generated. The financial performance analysis included 46 cases and patient care performance analysis included 45 cases, reflecting the number of hospitals for which we had complete data.³⁶

	Financial performance	Patient care performance			
Category	Definition	Category	Definition		
Decline	The average operating margin decreased from the baseline period to the All- Payer Model period	Decline	The average readmission rate increased from the baseline period to the All- Payer Model period		
Low improvement	The average operating margin increased up to 28.4 % from the baseline period to the All-Payer Model period	Low improvement	The average readmission rate decreased up to and equal to 10.0% from the baseline period to the All-Payer Model period		
Medium improvement	The average operating margin increased greater than 28.4% and up to and equal to 56.8% from the baseline period to the All-Payer Model period	Medium improvement	The average readmission rate decreased greater than 10.0% and up to or equal to 20.0% from the baseline period to the All-Payer Model period		

Table 34Definition of performance measure categories

³⁵ Although Maryland All-Payer Model ended on December 31, 2018, our quantitative analyses only include data until June 30, 2018.

³⁶ Our comparisons did not include financial and patient care performance data for Holy Cross Hospital Germantown and patient care performance data for University of Maryland Medical Center at Dorchester. Holy Cross Hospital Germantown opened in 2014 and, therefore, did not have baseline data to calculate operating margin and readmission rate during the baseline timeframe. University of Maryland Medical Center at Dorchester bills and collects revenue under the University of Maryland Medical Center at Easton's Medicare billing number. University of Maryland Medical Center at Dorchester's readmissions are included under University of Maryland Medical Center at Easton.

	Financial performance	Patient care performance			
Category	Definition	Category	Definition		
High improvement	The average operating margin increased greater than 56.8% from the baseline period to the All-Payer Model period	High improvement	The average readmission rate decreased greater than 20.0% from the baseline period to the All-Payer Model period		

Table 34 (continued)Definition of performance measure categories

We identified strategies that were associated with successful outcomes by looking for patterns in their adoption that indicated a strategy was more likely to be used by hospitals in categories with higher levels of improvement. We classified the likelihood of hospitals in a performance category adopting a strategy in the following way:

- All hospitals in a performance category used a strategy, represented by a filled circle.
- The percentage of hospitals in a performance category that used a strategy was more than the average across all hospitals, represented by a half-filled circle.
- The percentage of hospitals in a performance category that used a strategy was less than the average across all hospitals, represented by an empty circle.

We identified three scenarios for strategies strongly associated with successful performance:

- All hospitals with high improvement used a strategy, and fewer than the average number of hospitals in the remaining categories used this strategy.
- All hospitals in the high improvement category and more than the average number of hospitals in the medium improvement category used a strategy, and fewer than the average number of hospitals in the remaining categories used this strategy.
- All or more than the average number of hospitals in all three improvement categories used a strategy, and fewer than the average number of hospitals in the decline category used this strategy.

We also identified a scenario for strategies that showed a more modest association with successful performance:

• More than the average number of hospitals in either the high performance category or both the medium and high performance categories used a strategy, and fewer than the average number of hospitals in the remaining categories used this strategy.

Finally, we identified a scenario for strategies associated with unsuccessful performance:

• All hospitals with declining performance used a strategy and fewer than the average number of hospitals in the remaining categories used this strategy.

We interpreted all other patterns as showing no relationship between adoption of the strategy and hospital performance.

We characterized a strategy as universal when more than 90 percent of Maryland hospitals (more than 43 hospitals) reported using the strategy. We could not examine the association between these strategies and hospital performance because there was insufficient variation among hospitals in their use. We do not include universal strategies in the tables in *Section 9.2* below.

We present the results of these analyses in tables, as illustrated in *Table 35*. The left column lists the strategies examined and the overall percentage of hospitals that reported using the strategy. For each strategy we use filled, half-filled, and empty circles to represent the likelihood of hospitals in a performance category using the strategy as described earlier. Each table examines strategies based on financial performance and then patient care performance categories. In the example below, Strategy 1 showed an association with unsuccessful financial performance because all hospitals in the declining financial performance category adopted the strategy and less than the average percentage in the financial performance improvement categories did so. For patient care performance, Strategy 1 was adopted by less than the average percentage of hospitals in the declining and high improvement categories and more than the average percentage in the medium and low improvement categories, so there was no association with patient care performance. Strategy 2 showed a modest association with successful financial performance because it was adopted by more than the average percentage of hospitals in the high improvement category and less than the average percentage in the other categories. Strategy 2 had a strong association with patient care performance because it was adopted by all hospitals in the high improvement category and more than the average percentage of hospitals in the medium improvement category, but less than the average in the low improvement and declining performance categories.

		Financial p	erformance	2	Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8)	Low improve- ment (N=15)	Medium improve- ment (N=11)	High improve- ment (N=12)	Decline (N=4)	Low improve- ment (N=13)	Medium improve- ment (N=19)	High improve- ment (N=9)
				\implies				⇒
Strategy 1 (71%)	•	0	0	0	0	•	•	0
Strategy 2 (77%)	0	0	0	•	0	0	•	•

Table 35Example results table

N = Number of hospitals in performance category.

All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

9.2 Results

Before examining the association between hospitals' performance and their use of strategies in the five key domains listed above, we summarize our findings in *Table 36*. In addition to the strategies shown in this table, Maryland hospitals adopted eight strategies near universally—using dedicated analytics staff, using data and analytic tools, using Maryland's health information exchange, employing care coordination and care management staff, employing discharge planners, employing social work staff, implementing patient care transition programs, and using patient care plans. Hospitals also implemented six strategies that were not associated with either financial or patient care performance—having a designated implementation leader, having in-house or hospital system financial operations staff perform data analytics to support the All-Payer Model, regularly using multidisciplinary care team rounding, using community health workers, regularly using defined quality or change management strategies, and using data analytics performed by the Maryland Hospital Association or other industry groups.

Strategy (percentage of hospitals reporting strategy)	Financial performance	Patient care performance
Currently uses employed physician staff (87%)	Strong	Modest
Currently provides patients with clinically specific patient education/coaching/self-management program (87%)	Modest	Strong
Participating in the CRP to gain access to Medicare data and other data sources (82%)*	Strong	Modest
Participating in the CRP to improve relationships with physician partners in anticipation of the Total Cost of Care Model (72%)*	Modest	
Participating in the CRP to improve financial alignment with physicians (67%)*	Modest	
Relies on customized data analytics to operate under the All- Payer Model (77%)		Strong
CEO or CFO is the designated implementation leader (62%)*		Strong
Currently refers patients to hospital funded/supported alternative care settings (85%)		Modest
Outside consultants performed data analytics to support the All-Payer Model (83%)*		Modest
Currently provides patients with hospital funded/supported supply of prescription drugs at discharge (79%)		Modest
Currently invests in interventions that address social determinants of health (75%)		Modest
Self-reported average level of physician engagement in the implementation of All-Payer Model-related strategies (6.7)		Modest

 Table 36

 Summary of strategies associated with financial or patient care performance

Table 36 (continued) Summary of strategies associated with financial or patient care performance

Strategy (percentage of hospitals reporting strategy)	Financial performance	Patient care performance
CRISP tools (e.g., Encounter Notification Service) is one of the three most important tools used to operate under the All- Payer Model (21%)	Modest	
Data analytics is one of the three most important tools used to operate under the All-Payer Model (19%)		Modest

CEO = Chief Executive Officer; CFO = Chief Financial Officer; CMS = Centers for Medicare and Medicaid Services; CRISP = Chesapeake Regional Information System for Our Patients; CRP = Care Redesign Program.

* Strategy adoption is reported for a subsample of hospitals.

9.2.1 What Was the Relationship Between Hospitals' Leadership and Performance?

- Although the majority of hospitals had a designated implementation leader, implementation leadership alone was not associated with better financial or patient care performance.
- Having a CEO or CFO lead All-Payer Model implementation was more common in hospitals whose patient care performance improved.

Organizational theory emphasizes the importance of leadership as a key driver of performance. Maryland hospital leadership responded to the All-Payer Model in different ways—some hospitals relied on their executive suite to serve as the hospitals' administrative and operational leaders; other hospitals relied more heavily on leadership at the system level; and other hospitals relied on department or unit leaders.

Table 37 shows findings about the presence of a designated implementation leader and the presence of a CEO or CFO designated implementation leader within hospitals by financial and patient care performance.

Table 37 Presence of a designated leader and a CEO or CFO designated implementation leader by hospital performance category

		Financial p	erformance	e	Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8; n=6)	Low improve- ment (N=15; n=8)	Medium improve- ment (N=11; n=11)	High improve- ment (N=12; n=9)	Decline (N=4; n=4)	Low improve- ment (N=13; n=8)	Medium improve- ment (N=19; n=14)	High improve- ment (N=9; n=7)
				Ų				
Presence of a designated implementation leader (72%)	●	0	٠	•	٠	0	●	•
CEO or CFO is the designated implementation leader (62%)*	•	0	●	0	0	•	•	•

CEO = Chief Executive Officer; CFO = Chief Financial Officer.

NOTE: The white row includes responses by the full survey sample. Shaded rows include responses from hospitals that reported having a designated implementation leader.

N = Number of hospitals in performance category; n = number of hospitals with a designated leader in performance category.

 \bullet = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

* Strategy adoption is only reported for hospitals with a designated implementation leader.

- **Designated implementation leader**. Seventy-two percent of hospitals indicated that they had a clearly designated leader for implementing strategies in response to the All-Payer Model. Although we expected that having a designated implementation leader would be more common in hospitals with greater improvements in performance, we did not find an association with either financial or patient care performance.
- **CEO or CFO designated implementation leader**. Sixty-two percent of hospitals with a designated implementation leader identified their hospital CEO and/or CFO as leading the implementation of their All-Payer Model strategies, including 15 percent that indicated they relied on multiple leaders in their executive suite. Hospitals in which leadership did not come from the executive suite most commonly had a designated leader who was a department chair or the vice president of a unit such as population health. Although we did not find an association between whether a hospital had a designated implementation leader who was a CEO or CFO and financial performance, we did observe an association between this strategy and improvement in patient care performance. Having a CFO or CEO as the designated implementation leader with improvements in patient care performance.

Site visit findings offer insights into why we did not find a stronger association between hospital performance and differing leadership strategies for the All-Payer Model. Even though staff at hospitals without a designated implementation leader described numerous challenges, including not having a mechanism to offer feedback to other hospital staff or their leaders, many of these hospitals promoted leadership strategies, such as encouraging transparent hospital management and change management among hospital staff, that echoed hospital staff perceptions of designated leaders' traits. Moreover, in some hospitals without a designated implementation leader, the heads of the medical or nursing staff served as leaders and advocates for front-line clinical staff implementing the All-Payer Model.

9.2.2 What Was the Relationship Between Hospitals' Use of Data and Performance?

- Nearly all hospitals used Maryland's health information exchange and data analytic tools, suggesting that these strategies may be foundational to operations under the All-Payer Model.
- Using customized data was associated with improvements in patient care performance.
- Hospitals that used customized data analytics often relied on in-house or hospital system dedicated analytic staff to provide this support, but those that more commonly used outside consultants performed better on patient care performance.

Data and data analytics are critical tools to support hospital understanding of the quality and cost of care they deliver, as well as to assess the impact of performance improvement strategies. For Maryland hospitals, data and data analytics were expected to support their efforts to meet their global budget targets and improve the quality of care provided.

Table 38 presents findings on hospitals' use of data and the data analytics by financial and patient care hospital performance.

• **CRISP tools and data analytics use**. Nearly all hospitals operating under the All-Payer Model used tools from Maryland's health information exchange, CRISP (98%), and data analytics (94%). Despite the universal adoption of these strategies, hospitals differed in the extent to which they relied on them.

Relying on CRISP as one of the three most important tools for operating under the All-Payer Model was modestly associated with improvement in financial performance—hospitals in the high improvement category were more likely to report this, whereas hospitals in all other financial performance categories were less likely. The pattern of hospital leaders who reported that they relied on CRISP as a key tool did not show an association with improved patient care performance.

We have notification through our health information exchange, CRISP, here in the state, just to notify, 'Hey, Doc, your patient was in the hospital,' but somebody has to read that notification. The docs have to understand it [which is a challenge.].

- Maryland hospital CMO

Table 38Most important data analytic tools and data sources used to operate under
the All-Payer Model by hospital performance category

		Financial p	erformance		Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8)	Low improve- ment (N=15)	Medium improve- ment (N=11)	High improve- ment (N=12)	Decline (N=4)	Low improve- ment (N=13)	Medium improve- ment (N=19)	High improve- ment (N=9)
				€				
CRISP tools (for example, Encounter Notification Service) is one of the three most important tools used to operate under the All- Payer Model (21%)	0	0	0	•	•	•	0	•
Data analytics is one of the three most important tools used to operate under the All- Payer Model (19%)	0	•	0	0	0	0	•	•

 \bullet = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

Using data analytics as one of the most important tools for operating under the All-Payer Model was modestly associated with better patient care performance; hospitals in the medium and high improvement categories were more likely to report this than hospitals in the declining and low improvement categories. However, this strategy was not associated with financial performance. Hospital leaders described ongoing data challenges, such as data timeliness and the amount of data, that may explain the lack of strong association between data analytics and hospital performance.

Table 39 presents hospitals' use of customized data analytics to operate under the All-Payer Model by performance category. In this context, customized data analytics refers to any type of data or data feeds that hospitals design, analyze, or present in a manner that is specific to the hospital. For example, customized data analytics may include the hospital's use of EMR data to create reports that compare physicians' or hospital units' individual patient outcomes.

Table 39 Use of customized data analytics and sources of customized analytics by hospital performance category

		Financial p	erformance		Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8; n=5)	Low improve- ment (N=15; n=9)	Medium improve- ment (N=11; n=11)	High improve- ment (n=12; n=10)	Decline (n=4; n=2)	Low improve- ment (n=13; n=11)	Medium improve- ment (N=19; n=15)	High improve- ment (N=9; n=7)
								\Rightarrow
Relies on customized data analytics to operate under the All-Payer Model (77%)	0	0	٠	•	0	•	•	•
In-house/hospital system financial operations staff performed data analytics to support the All-Payer Model (86%)*	0	•	●	0	•	0	●	•
Outside consultants performed data analytics to support the All-Payer Model (83%)*	0	•	•	0	0	0	•	•
Maryland Hospital Association or other industry group performed data analytics to support the All-Payer Model (53%)*	0	•	•	0	0	•	0	•

NOTE: The white row includes responses by the full survey sample. Shaded rows include responses from hospitals that reported relying on customized data analytics.

N = Number of hospitals in performance category; n = number of hospitals that use customized data analytics in performance category.

 \bullet = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

* Strategy adoption is only reported for hospitals that use customized data analytics.

• Customized data analytics use. More than three-quarters of Maryland hospitals reported relying on customized data analytics to operate under the All-Payer Model, and nearly all these hospitals had in-house or hospital system dedicated analytic staff (97%). Although hospitals that relied on customized data analytics more commonly showed medium or high improvements in financial performance than those with low improvements or declining performance, we do not find an association between this strategy and financial performance because hospitals with medium improvement were more likely to use this strategy than those with high improvement. Relying on customized data analytics to operate under the All-Payer Model was associated with improvements in patient care performance—this strategy was more common in

hospitals with improvements in patient care performance than in those with declining patient care performance.

• In-house/hospital system financial operations staff, outside consultants, and Maryland Hospital Association or other industry group data analytics use. Maryland hospitals' use of in-house or hospital system financial operations staff and Maryland Hospital Association or other industry group data analytics were not associated with financial performance or patient care performance. Using outside consultants to perform data analytics was not associated with financial performance, but it was modestly associated with improvements in patient care performance were more likely to report this strategy than hospitals with declining performance or low improvement.

During site visits, Maryland hospitals consistently described the critical role that meeting their quality-based reimbursement targets, including readmission rates, played in their All-Payer Model implementation success. The associations in these analyses suggest relying on customized data and using outside consultants may facilitate improvements in patient care performance.

9.2.3 What Was the Relationship Between Hospitals' Staffing and Clinical Care Delivery Strategies and Performance?

- Care coordinators, care managers, social work, and discharge planning staff were used nearly universally by hospitals operating under the All-Payer Model and nearly all hospitals regularly used care plans for patients.
- Patient education, coaching, and self-management programs were more commonly provided at hospitals with larger improvements in financial and patient care performance.
- Higher performing hospitals more commonly reported employing at least some of their physicians.
- Implementing interventions to address social determinants of health was modestly associated with patient care performance but not financial performance.

Among the strategies that Maryland hospitals implemented, two key groups directly affected patient care: staffing strategies and health care delivery strategies. *Table 40* shows the staffing-related strategies by financial and patient care performance.

		Financial p	erformance		Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8)	Low improve- ment (N=15)	Medium improve- ment (N=11)	High improve- ment (N=12)	Decline (N=4)	Low improve- ment (N=13)	Medium improve- ment (N=19)	High improve- ment (N=9)
				J				J
Currently uses community health workers (81%)	0	0	●	0	0	0	●	0
Currently uses employed physician staff (87%)	0	0	•	•	0	0	•	•

	Table 40		
Use of staffing strategi	es by hospita	l performance	category

 \bullet = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

- Care coordinator, care manager, social work, or discharge planning staff use. All hospitals used care coordination and care management staff regardless of performance category. In addition, nearly all hospitals used discharge planning staff (98%) and social work staff (92%). These three staffing strategies may be foundational to hospital operations under the All-Payer Model. During site visits, hospital leaders emphasized the importance of discharge planners, care coordinators and managers for achieving key hospital objectives under the All-Payer Model timely and appropriate discharges and care transitions to improve patient flow and reduce readmissions.
- **Community health worker use**. We observe no association between hospitals' use of community health workers and financial or patient care performance. There may not have been an association with performance because hospitals were providing the same types of community-based assistance and coordination regardless of whether they reported using community health workers. During site visits, we observed some hospitals used care managers and case managers to perform the same functions as community health workers. Also, some hospitals developed community health worker programs when the All-Payer Model began but discontinued their programs because patients refused to allow hospital staff to visit them at home or in their communities. Thus, using community health workers may not have been an effective strategy.
- **Employed physician use**. Employing at least some of a hospitals' physician staff was associated with improvement in financial performance and modestly associated with improvement in patient care performance. Our qualitative data illustrate that employed physicians may better align with hospital goals under the All-Payer Model, which in turn may help hospitals improve financial and patient care performance. It is also possible that hospitals with larger improvement in financial performance were more able to afford to employ physicians.

Certainly, employment is a mechanism by which you can alter, in a very meaningful way, someone's behavior. Rather than contracting with the community physician group, it's easier for me to employ our physicians and then I create, through my employed model, variables and parameters and performance targets that are associated with the utilization and appropriate utilization that I'm talking about.

Maryland hospital leader

<u>*Table 41*</u> presents clinical care delivery strategies by financial and patient care performance.

		Financial p	erformance		Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8)	Low improve- ment (N=15)	Medium improve- ment (N=11)	High improve- ment N=12)	Decline (N=4)	Low improve- ment (N=13)	Medium improve- ment (N=19)	High improve- ment (N=9)
•								\Rightarrow
Currently refers patients to hospital funded/ supported alternative care settings (85%)	0	0	٠	0	0	0	•	•
Currently provides patients with hospital funded/supported supply of prescription drugs at discharge (79%)	0	•	•	0	0	0	0	•
Currently provides patients with clinically specific patient education/coaching/self- management program (87%)	0	0	•	0	0	•	•	•
Currently uses regular multidisciplinary care team rounding (89%)	0	0	•	0	•	0	•	0
Currently invests in interventions that address social determinants of health (75%)	0	0	•	0	0	0	•	•

Table 41Use of clinical care delivery strategies by hospital performance category

 \bullet = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \circ = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

- **Patient care transition program use and patient care plan use**. Nearly all hospitals used patient care transition programs (92%) and nearly all regularly used patient care plans (94%). Because these strategies were universal, we could not identify an association with financial or patient care performance.
- **Referring patients to hospital funded or supported alternative care settings**. Referring patients to hospital-funded or hospital-supported alternative care settings was not associated with improved financial performance. This strategy had a modest association with better patient care performance.
- Providing patients with a hospital funded or supported supply of prescription drugs at discharge. Providing patients with a hospital funded or supported supply of prescription drugs at discharge was modestly associated with patient care performance and was not associated with financial performance. Although we expected hospitals with high improvement in financial performance to more commonly use this strategy, we may not have observed an association because providing free prescription drugs for discharged patients can be expensive and requires a long-time horizon to recoup the upfront expense and influence financial performance. We also expected that providing patients with a supply of prescription drugs at hospital discharge would reduce the likelihood of hospital readmission and, therefore, improve patient care performance. The association with patient care performance may not have been stronger because patients may not have always taken the medications provided.
- **Providing patients with clinically specific patient education/coaching/selfmanagement programs**. Providing patients with clinically specific patient education, coaching, and self-management training had a modest association with improvement in financial performance and a strong association with improvement in patient care performance. Despite the association of this strategy with patient care performance, clinical staff we talked to during site visits were skeptical about the effectiveness of these programs at sustaining long-term patient behavior change.
- **Regular use of multidisciplinary care team rounding.** Multidisciplinary care team rounding was not associated with either financial or patient care performance. The goal of multidisciplinary rounding is to improve clinical staff communication, patient engagement, and patients' flow throughout the hospital. During site visits, we heard wide variation in how hospitals implemented multidisciplinary rounding how they used the rounding, the types of staff that participated, and how frequently rounds were conducted. Because of this variation, the effectiveness of this strategy may differ among hospitals and could explain the lack of association with hospital performance.
- **Investments in social determinants of health interventions**. Investment in interventions to address social determinants of health was not associated with hospital financial performance and was modestly associated with improvement in patient care performance. Our site visit data reinforce this association; hospitals frequently shared stories about the importance of addressing social determinants of health for patients'

ability to remain healthy and avoid unnecessary hospital readmissions. For example, some hospitals arranged transportation for patients to and from the hospital or even follow-up care in the community.

[We] also knew that one of the social determinants at least in rural areas is transportation, so we have a van that goes a 16 mile route that will go to the residential area to the grocery store to the park to the hospital.

– Maryland hospital leader

9.2.4 What Was the Relationship Between Use of Systematic Improvement Processes and Performance?

- Use of systematic improvement processes was not associated with either hospital financial or patient care performance.
- Some hospitals did not implement complex systematic process improvement models because of the high staff and financial resource demands and data collection fatigue among staff.

<u>*Table 42*</u> shows hospital use of quality or change management strategies by financial and patient care performance.

		Financial performance				Patient care performance			
Strategy (percentage of hospitals reporting strategy)	Decline (N=8)	Low improve- ment (N=15)	Medium improve- ment (N=11)	High improve- ment (N=12)	Decline (N=4)	Low improve- ment (N=13)	Medium improve- ment (N=19)	High improve- ment (N=9)	
				Ì					
Regular use of any specific quality or change management strategies (66%)	•	0	•	0	•	•	0	•	

Table 42Use of quality or change management strategies by hospital performance category

• = All hospitals in this category reported this strategy.

 \bullet = Percentage of hospitals in this category reporting this strategy is more than the average across all hospitals.

 \bigcirc = Percentage of hospitals in this category reporting this strategy is less than the average across all hospitals.

• Systematic process improvement use. Sixty-six percent of hospitals reported using systematic processes to identify areas of opportunity for improvement. Lean/Six Sigma was by far the most widely used strategy, but hospitals also reported using Define, Measure, Analyze, Improve and Control (DMAIC) and Kata. Use of any type
of systematic improvement process was not associated with either financial or patient care performance.

We anticipated that hospitals' systematic process improvement strategies would improve financial and patient care performance. However, our site visits highlighted that the types of systematic process improvements varied greatly across hospitals, which may contribute to the lack of association between using a systematic process improvement approach and financial or patient care performance.

From our site visits, we also learned that some hospitals may not have adopted complex systematic process improvement models like Lean/Six Sigma or DMAIC because of the high staff and financial resource demands and data collection fatigue among staff. Instead, these hospitals employed basic systematic process improvements such as a Plan, Do, Study, Act cycle, which they may not have described as systematic process improvements. These basic process improvements may have been as effective as more complex models for improving performance.

We don't have enough resources...to take care of [patients]. And half the time we're spending collecting data, metrics, checking the box, really not seeing the patient eye-to-eye, providing the type of care we used to do.

Maryland hospital staff

9.2.5 What Was the Relationship Between Physician Engagement and Performance?

- Higher physician engagement is modestly associated with improvement in hospitals' patient care performance but not associated with financial performance.
- Participating in the CRP to improve physician financial alignment and enhance physician partnerships were both modestly associated with improvements in financial performance.
- Participating in the CRP to gain access to Medicare data and other data sources was associated with worse financial and patient care performance. Many hospitals that joined for this reason had limited or no data analytic capacity and resources, which in turn could have contributed to declining financial and patient care performance.

The CRP was designed to help align and engage physicians in the All-Payer Model. The CRP was launched in July 2017 with participation by 16 hospitals and expanded to nearly all Maryland hospitals by the end of the model. Our survey asked hospitals to describe their rationale for participating in the CRP so that we could gain insights into their physicians' alignment with and engagement in the All-Payer Model, which in turn could affect hospital performance. We hypothesized that joining the CRP to improve physician alignment might indicate a hospital's physicians were not aware of or engaged in programs to address the key changes needed to operate under the All-Payer Model, which could make it more difficult for hospitals to meet financial or patient care goals. Other reasons for joining the CRP may reflect challenges that hospitals faced with their current data infrastructure or partnerships. In turn, these challenges may impact or be reflected in their financial or patient care performance.

<u>*Table 43*</u> presents feedback related to physician engagement and hospitals' rationale for participating in the CRP by financial and patient care performance. For physician engagement, we compared the average physician engagement score reported by hospitals in each category with the overall average physician engagement score.³⁷

Table 43
Physician engagement scores and Care Redesign Program participation reasons by hospital
performance category

		Financial p	erformance		Patient care performance			
Strategy (average across all hospitals/percentage of hospitals reporting strategy)	Decline (N=8; n=4)	Low improve- ment (N=15; n=15)	Medium improve- ment (N=11; n=10)	High improve- ment (N=12; n=9)	Decline (N=4; n=3)	Low improve- ment (N=13; n=10)	Medium improve- ment (N=19; n=16)	High improve- ment (N=9; n=8)
				\Rightarrow				\implies
Self-reported average level of physician engagement in the implementation of All- Payer Model-related strategies (6.7)	•	0	•	0	0	0	•	•
Participating in the CRP to improve financial alignment with physicians (67%)*	0	0	•	0	Đ	0	•	0
Participating in the CRP to improve relationships with physician partners in anticipation of Total Cost of Care Model (72%)*	0	0	•	0	Ð	0	•	Ð
Participating in the CRP to gain access to Medicare data and other data sources (82%)*	•	•	•	0	•	•	0	0

CMS = Centers for Medicare & Medicaid Services; CRP = Care Redesign Program.

NOTE: The white row includes responses by the full survey sample. Shaded rows include responses from hospitals that reported participating in the Care Redesign Program.

N = Number of hospitals in performance category; n = number of hospitals participating in CRP in performance category.

 \bullet = All hospitals in this category reported this reason.

 \bigcirc = Physician engagement score for hospitals in this category is higher than the average across all hospitals/percentage of hospitals in this category reporting this reason is more than the average across all hospitals.

 \circ = Physician engagement score for hospitals in this category is lower than the average across all hospitals/percentage of hospitals in this category reporting this reason is less than the average across all hospitals.

* Strategy adoption is only reported for hospitals that are participating in the Care Redesign Program.

³⁷ We used two groups to classify hospitals' physician engagement scores: those having above average physician engagement scores (indicated by a half-filled circle) and those having below average physician engagement scores (indicated by an empty circle).

- **Hospital reported physician engagement**. Level of physician engagement was modestly associated with hospitals' improved patient care performance but not their financial performance. Factors such as physician employment or whether patient care targets are included in physician contracts, which may also be related to the level of engagement reported by physicians, could contribute to the association between engagement and patient care improvement. For example, hospitals where physicians participated in incentive-based contracts that included readmission rate targets might have reported higher levels of physician engagement and also might have had more success reducing readmissions.
- Rationale for CRP participation. Participating in the CRP to improve financial alignment between the hospital and its physicians or to improve hospital relationships with physician partners in anticipation of the TCOC Model was associated with better financial performance. On the other hand, these reasons for participating in the CRP were not associated with greater improvement in patient care performance. Participating in the CRP to gain access to Medicare data and other data sources was associated with poorer financial and patient care performance. Hospitals that participated in the CRP for this reason more commonly had declining and low improvement in financial and patient care performance. During out site visits, we learned that some hospitals' leaders relied on the CRP to help them identify areas for potential cost-savings and quality improvement. Many hospitals that joined for this reason had limited or no data analytic capacity and resources. Thus, participating in the CRP to gain access to data may reflect limited hospital analytic capacity, which could in turn contribute to declining financial and patient care performance.

9.3 Discussion

In this section, we examined 28 strategies organized into five key domains. Of these strategies, half emerged as related to at least one dimension of hospital performance. Two strategies were associated with improvements in both hospital financial and patient care performance—employing physicians and providing patients with a clinically specific patient education, coaching, or self-management program. Hospitals seeking to improve their operating margin and readmission rates could emphasize these strategies.

We also observe that eight strategies were implemented by nearly all Maryland hospitals—use of Maryland's health information exchange, use of data analytics, use of in-house or hospital system dedicated analytics staff, use of care coordinators or care management staff, use of discharge planners, use of social work staff, use of patient care transition programs, and regular use of patient care plans. Because they are widely adopted, these strategies cannot be tied to hospitals' financial and patient care performance, but they can be viewed as foundational for hospitals to operate under the All-Payer Model. They also could be common strategies that hospitals have implemented to adapt to other health care delivery reforms. Further qualitative research could help identify whether these features are intrinsic to Maryland's All-Payer Model implementation, hospital delivery system reform more broadly, or simply a reflection of features that hospitals have begun integrating into their care delivery to remain competitive and patient centered. Our qualitative data showed that hospitals adopted numerous approaches to integrating care coordination and care management staff and services into patient care. Some hospitals highlighted training nursing staff in care coordination as a means of improving unit and department efficiency. Other hospitals described developing or expanding a care coordination and management office within the hospital so that these staff could be available for patients regardless of their unit or care need. Further research examining the different ways that strategies such as care coordination are implemented could yield a more nuanced perspective on the impacts of these strategies and help identify related ones that could be associated with hospital performance under the All-Payer Model.

For six strategies, we found no association with both financial and patient care performance. It is possible that the five strategy domains included in these analyses have little effect on the specific performance outcomes examined. Alternatively, we may not find a clear pattern of association because hospitals' implementation of these strategies varied substantially. Also, other factors such as overall hospital budget size or hospitals' participation in other delivery system reforms may have a stronger association with these performance outcomes. Further research using multivariate regression modeling to control for these other factors might help identify relationships between these implementation strategies and hospital performance.

This analysis does not provide a causal perspective on hospital performance. Thus, we cannot determine whether hospitals' implementation of two strategies—employing physicians and providing patients with clinically specific education—improved hospital performance or whether improvements in hospital performance facilitated hospitals' ability or desire to implement these strategies. Our analysis has other limitations, including survey response bias and the small samples for sub-questions used to identify adoption of some strategies.

As Maryland hospitals move on to implementing the TCOC Model, further examination of how the 28 strategies presented in this analysis continue to be used and implemented by hospitals could prove important for understanding how Maryland hospitals continue to transform. Moreover, focusing on the two strategies that are related to improved hospital financial and patient care performance under the All-Payer Model could provide insights into whether these strategies remain related to performance under Maryland's expanded delivery system reform model.

SECTION 10 HOW DID HOSPITAL INPATIENT AND OUTPATIENT PAYMENT RATES UNDER ALL-PAYER RATE SETTING IN MARYLAND DIFFER FROM OTHER PAYMENT SYSTEMS?

Key Takeaways for Hospital Inpatient and Outpatient Payment Differentials

- Depending on the year and the basis for comparison, Medicare payment rates for inpatient admissions were 33 to 44 percent higher under Maryland's all-payer rate-setting system than under the IPPS.
- Depending on the year, commercial insurer payment rates for inpatient admissions were 11 to 15 percent lower in Maryland than in a matched comparison group.
- Medicare claims for hospital outpatient services were paid at a rate 58 to 66 percent higher in Maryland than they would have been under the OPPS.
- All-payer rate setting is expected to harmonize payment rates among payers. However, these findings suggest that higher Medicare inpatient payments were not fully offset by lower commercial insurance payments. This finding does not consider payments for Medicaid admissions, which are expected to be higher under all-payer rate setting.
- These estimated payment rate differentials are unlikely to translate directly into Medicare savings if Maryland hospitals were brought under Medicare's prospective payment system. A transition to the Medicare prospective payment system could lead to more complete diagnosis coding on hospital claims and changes in utilization of hospital and nonhospital services that would offset savings from lower Medicare payment rates.

10.1 Questions

The analyses in this section address the following research questions:

- What were the magnitude and direction of the difference in inpatient payment rates for Medicare in Maryland compared with the IPPS?
- What were the magnitude and direction of the difference in inpatient payment rates for commercial payers in Maryland compared with what they would have been if the state did not have all-payer rate setting?
- What were the magnitude and direction of the difference in hospital outpatient payment rates for Medicare in Maryland compared with the OPPS?

Because Maryland's all-payer rate-setting system harmonizes payments among payers other than modest discounts for Medicare and Medicaid—some have hypothesized that Medicare payment rates are higher and commercial insurer payment rates are lower than they would be if Maryland hospitals operated under the IPPS and OPPS. The analyses described in this section examine this hypothesis by comparing Medicare and commercial insurance inpatient and hospital outpatient payment rates under Maryland's all-payer rate-setting system with those that would be expected under the IPPS and OPPS. These analyses differ from the analyses of expenditure changes presented in *Section 4* because these analyses only examine differences in price and do not reflect utilization differences between Maryland and the comparison group. In addition, estimates in *Section 4* are based on differences between Maryland and the comparison group in the change in expenditures following implementation of the All-Payer Model, while these analyses are based on cross-sectional comparisons of payment rates under Maryland's all-payer rate-setting system and other payment systems.

The analyses compared the weighted average payment per inpatient admission in Maryland and a comparison group for the same mix of admissions; these payments were not standardized to remove adjustment factors such as indirect medical education (IME) and DSH. We also examined the weighted average payment per hospital outpatient visit. Using the same mix of admissions and hospital outpatient visits controls for utilization differences between Maryland and the comparison group, so the comparison only reflects payment rate differences. We used two comparisons for the Medicare inpatient payments in Maryland: (1) Medicare payments for admissions to a group of matched comparison hospitals that operated under the IPPS and (2) Medicare claims for admissions to Maryland hospitals that were repriced to approximate payment by Medicare if Maryland had operated under the IPPS and there was no change in utilization. The analyses of commercial insurer payments used admissions in comparison hospital market areas in the MarketScan database. For hospital outpatient visits, we compared actual Medicare payments to Maryland hospitals under all-payer rate setting with payments on those claims after they were repriced to approximate payments by Medicare if Maryland had operated under the OPPS and there was no change in utilization. The analytic methods are described in Appendix A.

10.2 Results

10.2.1 How Did Payment Rates for Medicare Inpatient Admissions in Maryland Compare with Payments under the IPPS?



Comparison group analyses. *Table 44* shows the difference in payment rate levels by year between Maryland and comparison group hospital admissions. We evaluated the growth in payments over time, as well as the difference in payments, for both groups. The weighted average payment differential ranged from 33 to 43 percent higher in Maryland than in the comparison group for the same mix of DRGs. The average payment for Maryland hospitals grew by 31 percent, from \$12,712 in 2011 to \$16,079 in 2018. (Data for 2018 included claims for services provided through June 30 only.) In the comparison group, average payment per admission for the same distribution of DRGs as Maryland grew by 19 percent, from \$9,424 in 2011 to \$11,218 in 2018. The rate of growth in payments was higher for the comparison group between 2011 and 2012 and between 2015 and 2016; it was higher for Maryland in all other periods. The growth in Maryland's payment rates was notably larger between 2016 and 2017 and

between 2017 and 2018, increasing by 6.5 and 5.0 percent, respectively. *Figure 52* is a graphical representation of the average payments over time, which shows the growing divergence in 2017 and 2018.

Considering the average payment differential per admission in each year and the total number of Medicare admissions per year, we calculated that Medicare paid an additional \$764 million per year for admissions in Maryland, on average, than it would have if claims had been paid under the IPPS. The estimated total additional payment during the 7.5-year period as a result of the payment differential was approximately \$5.7 billion. These estimates are based on the payment rate differential applied to utilization under Maryland's payment system. They reflect differences in payment rates only and do not account for changes in utilization that might occur if Maryland hospitals operated under Medicare's prospective payment system. Therefore, it is unlikely Medicare would see this amount of savings if Maryland hospitals transitioned to IPPS. *Section 10.3* provides further discussion of why it is inappropriate to interpret the findings in this way.

	-		-						
Payments	2011	2012	2013	2014	2015	2016	2017	2018*	Overall
Maryland payments (\$)	12,712	12,901	13,313	13,553	14,172	14,372	15,308	16,079	13,870
Comparison group payments (\$)	9,424	9,726	9,897	9,971	10,138	10,467	10,841	11,218	10,124
Difference in payment (%)	35	33	35	36	40	37	41	43	37
Maryland payment annual growth rate (%)	NA	1.5	3.2	1.8	4.6	1.4	6.5	5.0	3.4
Comparison group payment annual growth rate (%)	NA	3.2	1.8	0.7	1.7	3.2	3.6	3.5	2.5
Payment differential per admission (\$)	3,288	3,175	3,416	3,582	4,034	3,905	4,467	4,860	3,746
Total Medicare FFS admissions	221,510	212,237	207,981	203,988	201,047	197,049	188,715	95,763	1,528,290
Total payment differential (\$ in millions)	728	674	710	731	811	770	843	465	5,733

Table 44Weighted average Medicare payment per admission and payment differential for
Maryland and comparison group hospitals, 2011–2018

FFS = fee-for-service; NA = not applicable.

* 2018 includes claims through June 30, 2018.

NOTE: All calculations are presented in calendar years.

SOURCES: Chronic Conditions Data Warehouse Medicare fee-for-service claims; HSCRC hospital discharge data.

Figure 52 Weighted average Medicare payment per admission by year for Maryland and comparison group hospitals, 2011–2018



SOURCE: Chronic Conditions Data Warehouse Medicare fee-for-service claims.

Repriced claims analyses. We examined the difference in payment rate levels by year between actual payments and hypothetical IPPS payments derived from repriced claims for Maryland hospital admissions (*Table 45*). The actual Maryland payment rates ranged from 36 to 44 percent higher than they would have been if Maryland hospital claims were paid under the IPPS. The annual growth rate was higher for Maryland's actual payments than they would have been if Maryland was paid under IPPS in all years, although the difference in the growth rate varied over time. The largest difference in the growth rate was from federal FY³⁸ 2014 to federal FY 2015, when Maryland's actual payments increased by 3.1 percent, while IPPS payments grew by only 0.6 percent. Overall, actual payments in Maryland grew by 13 percent, from \$13,092 in federal FY 2013 to \$14,770 in federal FY 2017; payments would have grown by 6 percent over this time period if Maryland hospitals had been paid under IPPS, from \$9,617 in federal FY 2013 to \$10,229 in federal FY 2017. *Figure 53* is a graphical representation of trends in average payments, which shows a widening gap over time, especially in FY 2017.

Although the number of Medicare admissions declined over time, the total payment difference increased because of the increasing payment differential per admission. The estimated total additional payment during the 5-year period was nearly \$4.0 billion, or an average of \$798 million per year. Similar to the comparison group analyses described above, these estimates do not account for changes in utilization that might occur if there was a change in the hospital payment model and should not be interpreted as Medicare savings if Maryland hospitals operated under IPPS.

³⁸ Federal Fiscal Year: October 1–September 30.

Payments	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Overall
Maryland actual payments (\$)	13,092	13,637	14,066	14,315	14,770	14,004
Maryland IPPS payments (\$)	9,617	9,907	9,963	10,120	10,229	9,979
Difference in payment (%)	36	38	41	41	44	40
Maryland actual payment annual growth rate (%)	NA	4.2	3.1	1.8	3.2	3.1
Maryland IPPS payment annual growth rate (%)	NA	3.0	0.6	1.6	1.1	1.6
Payment differential per admission (\$)	3,475	3,731	4,103	4,195	4,541	4,025
Total Medicare FFS admissions	207,981	203,988	201,047	197,049	188,715	998,780
Total payment differential (\$ in millions)	723	761	825	827	857	3,992

Table 45Average Medicare payment per admission and payment differential for actual Maryland
hospital claims and claims repriced to IPPS payments, FY 2013–2017

FFS = fee-for-service; NA = not applicable.

NOTE: Total Medicare admissions were calculated on a calendar-year basis. The payment differential was calculated on a federal fiscal-year basis.

SOURCES: Chronic Conditions Data Warehouse Medicare fee-for-service claims; repriced Medicare claims data from Lewin Group; HSCRC hospital discharge data.

Figure 53 Average Medicare payment per admission for actual Maryland hospital payments and claims repriced to IPPS payments, FY 2013–2017



10.2.2 How Did Payment Rates for Commercially Insured Inpatient Admissions in Maryland Compare with Payments in Areas That Did Not Have All-Payer Rate Setting?

• Between 2011 and 2017, commercial insurer payment rates for inpatient admissions were 11 to 15 percent lower in Maryland than in a matched comparison group, as expected under all-payer rate setting.

Table 46 shows the difference in payment rate levels by year between Maryland residents and residents of the comparison group market areas using commercial insurer claims data from the MarketScan database. The weighted average payment differential ranged from 11 to 15 percent lower in Maryland than in the comparison group for the same mix of DRGs. The average Maryland payment grew by 31 percent, from \$12,943 in 2011 to \$16,987 in 2017. For the same distribution of DRGs as in Maryland, the average payment per admission in the comparison group grew from \$14,549 in 2011 to \$19,649 in 2017, an overall growth of 35 percent. There was no clear pattern of faster growth in one group over the other—Maryland and the comparison group each had faster growth in 3 of the 6 years. *Figure 54* is a graphical representation of the average payments over time. Both groups appear to be increasing at a similar rate except in 2012 when the comparison group had markedly higher growth, although the overall increase was slightly larger for the comparison group over time.

Payments	2011	2012	2013	2014	2015	2016	2017	Overall
Maryland payments (\$)	12,943	13,434	13,707	13,933	15,469	15,094	16,987	14,509
Comparison group payments (\$)	14,549	15,757	15,577	16,320	17,750	17,565	19,649	16,738
Difference in payment (%)	-11	-15	-12	-15	-13	-14	-14	-13
Maryland payment annual growth rate (%)	NA	3.8	2.0	1.6	11.0	-2.4	12.5	4.8
Comparison group payment annual growth rate (%)	NA	8.3	-1.1	4.8	8.8	-1.0	11.9	5.3
Payment differential per admission (\$)	-1,606	-2,323	-1,870	-2,388	-2,281	-2,471	-2,662	-2,229
Total commercial insurance admissions	243,772	234,072	220,210	208,563	198,991	196,184	195,314	1,497,106
Total payment differential (\$ in millions)	-392	-544	-412	-498	-454	-485	-520	-3,336

Table 46Weighted average commercial insurance payment per admission and payment differential
for Maryland and comparison group residents, 2011–2017

NA = not applicable.

Commercial Payment Rate

NOTE: All calculations were on a calendar-year basis. Overall payments and overall spending growth rates are a simple average of the 7 years.

SOURCES: MarketScan commercial insurer claims database; HSCRC hospital discharge data.

Figure 54 Weighted average commercial insurance payment per admission for Maryland and comparison group residents, 2011–2017



Applying the average payment differential from this sample of commercial admissions to the total number of commercial admissions in Maryland, we estimated that annual commercial insurance payments to Maryland hospitals ranged from \$392 to \$544 million lower than they would have been if hospitals were paid rates by commercial insurers similar to those in states without all-payer rate setting. Although the number of admissions declined steadily over time, the total payment difference increased from the previous year in all years except 2013 because of the increasing payment differential per admission. In aggregate, estimated payments were \$3.3 billion lower in Maryland for 2011–2017, or an average of \$477 million per year. Similar to the Medicare analyses, these estimates reflect payment rate differences only and do not account for changes in utilization that might occur if commercial insurance payment rates were no longer established under all-payer rate setting.

10.2.3 What Was the Net Effect of Medicare and Commercial Insurance Inpatient Payment Differentials on Aggregate Payments to Maryland Hospitals?



To estimate the overall effect of all-payer rate setting on Maryland hospital payment rates, we compared the net inpatient payment differential at the state level for Medicare and commercial payers to see if the higher Medicare payments were partially or fully offset by lower commercial insurance payments. Overall, the net difference in inpatient payments to Maryland hospitals for Medicare and commercially insured admissions calculated using Medicare payment rates for comparison group hospitals was higher in all years, ranging from \$130 million higher in 2012 to \$357 million higher in 2015 (*Table 47*). The net difference in payments to Maryland hospitals calculated using repriced IPPS claims ranged from \$263 million higher in 2014 to \$371 million higher in 2015. This analysis only measured the effect of payment rate differentials and did not consider utilization changes that might occur as a result of a change in the hospital payment model. Thus, these estimates should not be interpreted as reductions in hospital payments that would be expected if all-payer rate setting ended in Maryland.

comparison group (using a		ve estin		nctiiou	ologics		
Payments	2011	2012	2013	2014	2015	2016	2017	2018*
Medicare inpatient payment difference vs. comparison group (\$ in millions)	728	674	710	731	811	770	843	465
Medicare inpatient payment difference vs. repriced claims (\$ in millions)	NA	NA	723	761	825	827	857	NA
Commercial insurance inpatient payment difference vs. comparison group (\$ in millions)	-392	-544	-412	-498	-454	-485	-520	NA
Net inpatient payment difference to hospitals vs. comparison group for Medicare (\$ in millions)	337	130	299	233	357	285	323	NA
Net inpatient payment difference to hospitals vs. repriced claims for Medicare (\$ in millions)	NA	NA	311	263	371	342	337	NA

 Table 47

 Net difference in Medicare and commercial insurance payments for Maryland and comparison group using alternative estimation methodologies

NA = not available.

* 2018 includes claims through June 30, 2018.

NOTE: IPPS calculations were on a federal fiscal-year basis. All other calculations were on a calendar-year basis.

SOURCES: Chronic Conditions Data Warehouse Medicare fee-for-service claims; repriced Medicare claims data from Lewin Group; HSCRC hospital discharge data.

10.2.4 How Did Payment Rates for Medicare Hospital Outpatient Visits in Maryland Compare with Payments under the OPPS?



Between federal FYs 2013 and 2017, Medicare payment rates for hospital outpatient visits were 58 to 66 percent higher in Maryland than they would have been under the OPPS.

We examined the difference in payment rate levels by year between actual payments and hypothetical OPPS payments derived from repriced claims for Maryland outpatient hospital services (*Table 48*). The actual Maryland payment rates ranged from 58 to 66 percent higher than they would have been if Maryland hospital claims were paid under the OPPS. The average Maryland payment grew by 16 percent, from \$714 per claim in federal FY 2011 to \$829 per claim in federal FY 2017. If Maryland hospitals had been paid under the OPPS, the average payment per claim in the comparison group would have grown from \$430 in federal FY 2011 to \$503 in federal FY 2017, an overall growth of 17 percent. There was no clear pattern of faster growth under Maryland's all-payer rate-setting system and the OPPS—each payment system had faster growth in 2 of the 4 years. *Figure 55* is a graphical representation of the average payments over time.

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Payments	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Overall
Maryland actual payments (\$)	714	746	764	789	829	772
Maryland OPPS payments (\$)	430	473	468	488	503	475
Difference in payment (%)	66	58	63	62	65	63
Maryland actual payment annual growth rate (%)	NA	4.6	2.3	3.3	5.0	3.8
Maryland OPPS payment annual growth rate (%)	NA	10.0	-1.0	4.3	3.0	4.1
Payment differential per visit (\$)	284	274	296	301	326	297
Total Medicare FFS hospital outpatient visits	1,259,575	1,724,429	1,817,679	2,218,546	1,787,089	8,807,318
Total payment differential (\$ in millions)	358	472	538	543	583	2,493

Table 48Average Medicare payment per hospital outpatient visit and payment differential foractual Maryland hospital claims and claims repriced to OPPS payments, FY 2013–2017

FFS = fee-for-service; NA = not applicable.

NOTE: Total Medicare hospital outpatient visits were calculated on a calendar-year basis. The payment differential was calculated on a federal fiscal-year basis.

SOURCES: Chronic Conditions Data Warehouse Medicare fee-for-service claims; repriced Medicare claims data from Lewin Group; HSCRC hospital discharge data.

Figure 55 Average Medicare payment per hospital outpatient visit for actual Maryland hospital payments and claims repriced to OPPS payments, FY 2013–2017



Considering the average payment rate differential per hospital outpatient visit in each year and the total number of Medicare hospital outpatient visits, we calculated that Medicare paid an additional \$358 to \$583 million per year for federal FYs 2013–2017 than it would have if Maryland claims were paid under the OPPS. During this period, the overall number of Medicare claims for hospital outpatient visits increased slightly, which accounts for some of the increase in additional payment, but the payment differential also increased over this same period. The estimated total additional payment during the 5-year period was approximately \$2.5 billion, or an average of \$499 million per year. Similar to the inpatient analyses, these estimates account only for differences in payment rates and do not consider changes in utilization patterns that might occur if the hospital payment model in Maryland changed.

10.3 Discussion

Maryland's all-payer rate-setting system eliminates the payment differential by payer that is present in other states by establishing uniform payment rates for all payers, other than a modest discount for Medicare and Medicaid. These analyses confirm the expectation that Medicare payment rates for both inpatient and hospital outpatient services were higher and commercial payer inpatient rates were lower under all-payer rate setting. Our findings for both inpatient and outpatient services, which have been updated with additional data, are consistent with those in previous evaluation reports.

We examined trends in payment rates to see whether the difference between Maryland's and other payment systems changed following implementation of the All-Payer Model. Under the All-Payer Model, Maryland hospitals were allowed to adjust their charged rates in response to changes in hospital volume to meet the upper limits of their global budgets. As discussed in *Section 3*, hospitals most commonly increased their charges in response to utilization reductions. Therefore, we expect Maryland all-payer rates to exceed Medicare IPPS and OPPS rates by a larger percentage after the All-Payer Model was implemented in 2014. We found larger

differentials in the years after All-Payer Model implementation for Medicare inpatient payments but no discernible trend in the differential for inpatient payments for the commercially insured population or for Medicare hospital outpatient payments. However, we have only 1 year of preimplementation data for the outpatient payment analyses, making it difficult to identify differences between the time periods.

Medicare hospital inpatient payment rates grew markedly faster in the most recent data periods included in this report-2017 and 2018-than in earlier periods. Inpatient rates increased by 6.5 percent in calendar year 2017 and 5.0 percent in calendar year 2018. OPPS payments, which increased 4.8 percent in federal FY 2017, also grew faster than in previous years. The growth rates in Maryland exceeded both IPPS and OPPS payment rate increases during federal FY 2017. As described in Section 3.2.2, the rate increases in 2017 resulted from the large rate adjustments that hospitals were permitted to make in the fourth quarter of state FY 2017³⁹ (April through June 2017) to compensate for systematically low hospital volumes in the first half of the year. More rapid growth in inpatient payment rates in calendar year 2018 reflects larger increases in hospital global budgets from state FY 2017 to state FY 2018 (see Section 3.2.1) and, for many hospitals, accompanying larger increases in the underlying hospital rates set by HSCRC. In addition, data for 2018 represent only the latter portion of state FY 2018 (January–June 2018), when hospitals are most likely to make rate adjustments to ensure they meet their global budget (see Section 3.2.2). From January through June 2018, most hospitals' charges were greater than their established rates. For example, from April through June 2018, 27 hospitals charged rates that exceeded the 5 percent rate corridor, and nearly all these hospitals (22) charged rates that exceeded their established rate order.

Using two separate methods to estimate the Medicare inpatient payment differential in Maryland compared with payments under IPPS, we found that higher Medicare payment rates were partially, but not fully, offset by lower commercial insurance inpatient payment rates under all-payer rate setting. However, these analyses do not represent a comprehensive all-payer perspective. We were unable to assess whether lower commercial insurance payment rates were passed on to consumers in the form of lower premiums. This is an important area for future research, though one that is outside the scope of this analysis. Incorporating comparisons of Medicaid rates is another area for future research. We were not able to compare Medicaid payment rates because of Medicaid claims and encounter data limitations described in *Appendix F*. These include absence of DRG codes on inpatient records in the TAFs and absence of payment amounts for encounter data from managed care organizations, which enroll more than 90 percent of Medicaid beneficiaries in Maryland who are not 65 and older or disabled. Hospitals likely received higher payments from Medicaid represents 21 to 25 percent of hospital admissions and 17 to 21 percent of the charges.

While these analyses show that Medicare payment rates were relatively higher in Maryland compared with what they would have been under IPPS and OPPS, the estimated payment rate differential should not be interpreted as Medicare savings if Maryland hospitals transitioned to the prospective payment system. There are two principal reasons the payment rate

³⁹ State Fiscal Year: July 1–June 30.

differential alone is not equivalent to Medicare savings if Maryland were to transition to IPPS and OPPS: (1) coding of patient diagnoses on hospital claims could change and (2) use of hospital and other services could change. It is difficult to predict the coding and utilization changes that might occur and how Medicare payments would change because Maryland hospitals have never operated under Medicare's prospective payment system. However, we performed several sensitivity analyses to assess how the payment differential compares with an alternative scenario in which Maryland's global budget system is replaced by IPPS and OPPS.

A set of sensitivity analyses examined the impact of diagnosis coding changes that might occur if Maryland hospitals operated under IPPS. Unlike hospitals operating under IPPS, Maryland hospitals' payments for inpatient services are not tied to patient diagnoses reported on claims. Undercoding of secondary diagnoses on Maryland hospital claims would lead to less complex DRG categorizations. Specifically, DRGs with complicating or comorbid conditions and major complicating or comorbid conditions may be less prevalent in the Maryland claims. If this is the case and diagnosis coding on Maryland hospital claims became more complete under IPPS, Medicare would pay for a more complex hospital case mix than what is reflected in current claims. To the extent this occurs, the estimated payment differential, which is based on current coding practices, would overstate Medicare savings. To test these hypotheses, we conducted several sensitivity analyses to estimate the Maryland hospital case mix if they had the same incentives to code diagnoses as under IPPS and to assess the impact on Medicare payments.

One sensitivity analysis compared diagnosis reporting using matched admissions in Medicare claims and Maryland hospital discharge data (see *Appendix K*). Diagnoses in hospital discharge data were derived from medical records, and hospital payment system incentives are not expected to affect diagnosis coding in medical records. This analysis indicated that the bias from underreporting diagnoses in claims data was minor. Although more diagnoses were reported in hospital discharge data, the differences were not large. From 2011 through 2018, discharge data had a mean of 16.3 diagnoses per admission compared with 15.9 in Medicare claims data. The case-mix severity index based on the two data sources was also similar—1.52 using discharge data and 1.50 using claims data. This difference suggests IPPS payments in Maryland were underestimated by about 1.3 percent because of underreporting of diagnoses in Medicare claims.

An additional sensitivity analysis of the impact of diagnosis coding changes compared the average payment per discharge for comparison group hospitals using their actual case mix with the average payment using the Maryland hospital case mix. This analysis assumed that case mix in a well-matched comparison group, such as the one used in this evaluation, reasonably approximates what Maryland hospitals' case mix would be if they had the same incentives to code and report diagnoses as IPPS hospitals. Depending on the year, payments were 1.8 to 5.8 percent lower using the Maryland hospital case mix, suggesting a slightly higher underestimate of IPPS payment rates in Maryland than the matched admissions analyses showed. Analyses in an earlier report⁴⁰ provided some further evidence of diagnosis undercoding in Maryland claims. We found that 37 percent of admissions in Maryland in 2015 for heart failure and shock were categorized in the DRG with major or complicating conditions compared with 48 percent of comparison group admissions for these conditions.

Although the bias from undercoding diagnoses in Maryland hospital claims is modest, adjusting for this would not account for changes in utilization of hospital and other services that might occur if Maryland transitioned to IPPS and OPPS. Another set of sensitivity analyses used the comparison group to approximate utilization and expenditure patterns that would be observed in Maryland under IPPS and OPPS. These analyses compared regression-adjusted mean PBPM payments between Maryland and the matched comparison group in the first 4.5 years following implementation of the All-Payer Model (January 2014 through June 2018) to estimate how annual Medicare expenditures would change if Maryland transitioned to the prospective payment system, accounting for both payment rate and utilization changes.⁴¹

The estimated difference in inpatient facility payments, \$68.85 PBPM (see *Appendix Table I-3*), implies annual Medicare payments would be \$571 million lower if Maryland transitioned to the prospective payment system. This stands in contrast to the estimates derived from the rate differential, which ranged from an average of \$804 to \$818 million annually during the All-Payer Model period based on the two main rate analyses presented above. The estimated reduction in Medicare expenditures derived from the difference in regression-adjusted PBPM payments is smaller because it reflects the overall impact of Maryland's financing and regulatory structure for inpatient hospital services, not only the difference between Maryland's all-payer rates and IPPS.

The estimated difference in payments for outpatient hospital services (ED visits and other hospital outpatient department services), \$0.98 PBPM, implies expenditures for hospital outpatient services would be reduced by about \$8 million annually under OPPS. In contrast, the OPPS rate analysis estimated an annual differential of \$534 million per year during the All-Payer Model period. Taking into account both payment rate and utilization changes, we see that the estimated difference in total payments for both inpatient and outpatient hospital services, \$69.83 PBPM (*Appendix Table I-1*), suggests Medicare's annual payments to Maryland hospitals would be \$577 million lower under IPPS and OPPS.

⁴⁰ Haber, S., Beil, H., Adamache, W., Amico, P., Beadles, C., Berzin, O. K. G., ... Wright, A. F. (2016). *Evaluation of the Maryland All-Payer Model: First annual report*. Centers for Medicare & Medicaid Services. <u>https://downloads.cms.gov/files/cmmi/marylandallpayer-firstannualrpt.pdf</u>

⁴¹ Regression-adjusted payments during this period were derived from the D-in-D model that assessed differences between Maryland and the comparison group in the change in expenditure trends from a baseline period (2011 through 2013) to the All-Payer Model period (see *Tables 1* and *3* in *Section 4.2*). These estimates should be similar to, but could differ slightly from, regression-adjusted estimates based on data from the 2014 through 2018 period alone. The difference between estimated Medicare PBPM expenditures for Maryland and the comparison group were multiplied by the average number of FFS Medicare beneficiary months per year from 2014 through 2018 (8,299,769) to obtain estimates of the annual difference in payment.

Maryland's financing and regulatory structure for hospital services may affect Medicare expenditures for services beyond acute hospital care. Although we cannot predict with certainty how hospitals and the health care system overall would respond if Maryland moved to IPPS and OPPS, it is likely there would be impacts beyond hospital services. Therefore, expected changes in total Medicare expenditures may provide a better estimate of the impact of transitioning Maryland hospitals to IPPS and OPPS. The estimated difference in total Medicare expenditures, \$31.73 PBPM (*Appendix Table I-1*), implies total Medicare payments including nonhospital services would be \$263 million lower annually if Maryland hospitals operated under IPPS and OPPS. This is substantially less than the estimated \$577 million reduction in payments for hospital services alone because expenditures for nonhospital services were lower in Maryland under the global budget system than in the comparison group. For example, PAC spending levels were substantially lower in Maryland (see *Appendix Table I-7*).⁴²

Additional limitations to the rate differential estimates are not addressed by the sensitivity analyses. Two limitations affect the Medicare payment rate differential estimates, and a third affects the commercial payment rate differential.

Although all analyses showed substantial Medicare payment rate differences between Maryland and the comparison group, other factors could explain some of the differences. Inpatient payment rate differences between Maryland and the comparison areas may be the result of factors related to location and facility characteristics, including cost differences based on wages and other input prices, and IME, DSH, UCC, and other adjustments. Payments for comparison hospitals can be standardized to remove IME, DSH, UCC, and wage adjustments, but we were not able to obtain information needed to standardize payments for Maryland hospitals. Therefore, our analyses used payments that were not standardized. Although our comparison hospital selection implicitly controlled for many of these factors, differences between Maryland and the comparison group in the distribution of admissions within a DRG by hospital type may still contribute to payment rate differences. For example, if relatively more cases occurred at community hospitals in Maryland while relatively more occurred in teaching hospitals in the comparison group, the comparison group payment rates may have been biased upward. However, the repriced claims analyses calculated the IPPS payment counterfactual from the same set of claims as the actual payment, which ensures that location and facility type differences are held constant. The differential in Medicare inpatient payment rates under the repriced claims method is similar to the differential using the matched comparison group, which suggests that the comparison group analyses are likely not biased by differences in hospital location and facility type. The OPPS payment rate differential was calculated using repriced claims only and, therefore, is not subject to potential bias due to differences between Maryland and comparison group hospitals in location and facility type. Taken together, despite the lack of standardization, the two sets of results provide reasonable assurance that this did not drive the results.

⁴² Maryland's hospital regulatory system contributes to this difference. Maryland regulations do not permit hospitals to designate distinct part units for psychiatric, rehabilitation, and long-term hospital stays. As a result, some admissions that are included in inpatient expenditures in Maryland under its current system would be classified as non-hospital services if the hospitals were paid under PPS.

An additional concern about the Medicare payment differential is that Maryland's wage and IME adjustments are not properly calibrated, and the levels are lower than what they would be if Maryland hospitals were paid under IPPS. If this is the case, IPPS payments in repriced claims are lower than they would be with properly calibrated wage and IME adjustments. An assessment of the calibration of these adjustments is beyond the scope of this evaluation. Maryland hospitals also do not receive additional reimbursement for being sole community hospitals, Medicare-dependent hospitals, or rural referral centers under the current system. However, it is not clear if any Maryland hospitals would fall into these categories under IPPS.

The analysis of commercial insurance inpatient payment rate differentials has several limitations. Unlike the Medicare data, which include all Medicare FFS admissions, the MarketScan data used to estimate the commercial insurance payment rate differential are a subset of approximately 7 percent of commercial admissions in Maryland. These admissions predominately include large self-insured employers and are not representative of all commercial insurer claims data. Although a comparable statistic is not available for the comparison group, the MarketScan data presumably represent a similarly small percentage of the commercial insurance admissions in these areas. We compared MarketScan data for Maryland with Maryland's MCDB, the private insurer portion of Maryland's all-payer claims database (see Appendix K). Although the MCDB includes many more commercial admissions than the MarketScan data, it also is not representative of all commercial insurers in Maryland because it excludes self-insured employers. Despite these differences, unadjusted inpatient admission rates were very similar in MarketScan data and the MCDB. Monthly unadjusted inpatient facility expenditures per member were also similar, although slightly higher in MarketScan data. Although these analyses do not adjust for case mix differences, they suggest payment rates derived from MarketScan data may be a reasonable approximation of commercial insurance payment rates overall. However, we were not able to assess the representativeness of MarketScan's commercial insurer data for the comparison group.

In addition, we were not able to directly identify hospitals in MarketScan data, so the analysis used hospital admissions for residents of Maryland and residents of the comparison group hospital market areas to identify commercial insurance payments. As a result, this analysis included some hospitalizations that were not in a Maryland or comparison group hospital. Analyses of Medicare data showed that only about half of comparison group resident admissions were to the comparison group hospital in the market area where they resided. Although a similar percentage of Maryland residents was admitted to a hospital in the market area where they resided, about 90 percent of hospital admissions for Maryland residents were to a Maryland hospital. As a result, the Maryland claims used in the commercial insurance analyses were nearly all for admissions to Maryland hospitals, but a high percentage of the comparison group claims were for admissions to hospitals that were not in the comparison group and, therefore, were not matched to Maryland hospitals. This fact could bias the estimate of the payment differential if, for example, beneficiaries travelled outside of their market area for more specialized treatment that was more likely to be available from teaching or other hospitals with higher prices.

To assess the effect on the commercial insurance payment analyses of including admissions to hospitals that were not part of the comparison group, we applied the commercial insurance payment methodology to Medicare data and compared the comparison group payment estimate from this method to the estimate based on comparison group hospitals only. As discussed in the Second Annual Report on the All-Payer Model evaluation,⁴³ Medicare payments for the comparison group were 7 to 9 percent higher following the methodology used in the MarketScan analyses. If commercial insurance payment rate estimates were biased upward similarly in our analyses of MarketScan data, the magnitude of the commercial payment differential in Maryland would be overstated.

Despite these limitations, the analyses in this section demonstrate that Medicare payment rates were relatively higher and commercial payment rates were relatively lower in Maryland than in the comparison group and compared with what they would have been under IPPS and OPPS because of the harmonization of payment rates among payers under the state's all-payer rate-setting system. Although Medicare rate differentials would be eliminated if global budgets and all-payer rate setting were abandoned, the various sensitivity analyses indicate changes in payment rates would not necessarily translate directly into large Medicare savings if the IPPS and OPPS systems were enacted in Maryland.

⁴³ Haber, S., Beil, H., Adamache, W., Amico, P., Beadles, C., Berzin, O. K. G., ... Perry, R. (2017). Evaluation of the Maryland All-Payer Model: Second annual report. Centers for Medicare & Medicaid Services. <u>https://innovation.cms.gov/Files/reports/md-all-payer-secondannrpt.pdf</u>

SECTION 11 DISCUSSION

The 5 years of Maryland All-Payer Model operation saw marked progress in hospital engagement and willingness to transform delivery of services in response to global budgets. During the initial years of the model, hospitals varied in their understanding of fixed revenues, their acceptance of global budgets as their "new normal," and the extent to which they adopted new strategies to respond to model incentives. Although variation in hospital responses remained at the end of the All-Payer Model implementation period, all hospitals were actively pursuing and refining strategies to adapt their operations and care delivery to operate effectively under global budgets. Some strategies were adopted almost universally—increased investment in care coordination, discharge planning, and social work staffing; more emphasis on patient care plans and care transitions; and greater use of data and analytics to monitor and improve performance. However, only a few features of hospitals' responses to global budgets were related to both their financial and patient care performance under the All-Payer Model, including employing physicians and providing patients with clinically specific education, coaching, and self-management programs.

We do not have information on whether these strategies were adopted more widely by hospitals in Maryland than elsewhere in the country. However, American Hospital Association survey data for 2017⁴⁴ indicate Maryland hospitals were more likely than hospitals nationwide to offer a number of services that may be related to the strategies described by Maryland hospital leaders. These include community outreach (86% of Maryland hospitals vs. 71% nationwide); patient education center (86% of Maryland hospitals vs. 55% nationwide); urgent care services (34% of Maryland hospitals vs. 25% nationwide); mobile health services (25% of Maryland hospitals vs. 12% nationwide); and transportation services (34% of Maryland hospitals vs. 23% nationwide). On the other hand, Maryland hospitals were only slightly more likely to report they provided case management services (91% vs. 88% nationwide).

Hospitals faced differing challenges and facilitators in responding to global budgets, such as the extent of senior leadership involvement, patient clinical and sociodemographic characteristics that impacted their ability to alter utilization patterns, and availability of community resources in their local market. We found some evidence of poorer performance on selected outcomes for teaching hospitals and hospitals with high DSH percentages, perhaps because they serve patients with higher acuity and greater social needs. Contrary to expectations, hospitals that were aligned with ACOs did not have better outcomes than non-aligned hospitals.

Medicare expenditure growth, both in total and for hospital services, was slower in Maryland than in the comparison group over the first 4.5 years of the All-Payer Model. Medicare beneficiaries had 2.8 percent slower growth in total expenditures, resulting in \$975 million in total savings, during the All-Payer Model relative to the comparison group. This was largely driven by 4.1 percent slower growth in total hospital expenditures, which translated to \$796 million in savings. Although total expenditures did not change for commercial plan

⁴⁴ American Hospital Association. (2019). AHA hospital statistics. Health Forum LLC, American Hospital Association.

members through the fourth year of implementation, hospital service expenditures grew 6.1 percent less.

Throughout the All-Payer Model period, Medicare savings for hospital services consistently came from outpatient hospital services rather than inpatient services. Growth in Medicare payments for inpatient services did not differ for Maryland and the comparison group in any year following All-Payer Model implementation. Inpatient expenditures, however, grew more slowly among the commercially insured population in Maryland than in the comparison group. All-Payer Model impacts on expenditures for hospital outpatient services also differed for Medicare beneficiaries and commercial plan members. Medicare payments for both ED visits and for other hospital outpatient department services grew more slowly in Maryland than in the comparison group, whereas growth in commercial insurance payments for both types of services did not differ for Maryland and the comparison group.

The design of the All-Payer Model, which directly restricted hospital revenues, guaranteed Medicare savings on hospital expenditures as long as global budgets were set to grow more slowly than IPPS and OPPS payments. Furthermore, because hospitals were permitted to adjust their payment rates to recoup revenue that otherwise would have been lost from utilization reductions in order to meet their global budgets, growth in global budgets determined growth in per-beneficiary hospital expenditures. Therefore, utilization may provide more insight into the effects of the All-Payer Model than do expenditures.

We found larger reductions in inpatient admissions for both Medicare and commercial plan members in Maryland than in the comparison group following the implementation of the All-Payer Model and the magnitude of the relative reduction increased over the first 4 years of the model for both groups, but the difference was statistically significant only for Medicare. Inpatient admissions also trended downwards from the baseline period through the implementation period for Maryland Medicaid beneficiaries. The increasing effects over time could reflect Maryland hospitals' progress in developing strategies to adapt to global budgets and the maturation of these strategies in the later years of the All-Payer Model. In the Medicare population, we found larger reductions among beneficiaries who were dually eligible for Medicaid than among those eligible for Medicare only. Similarly, we found larger admission reductions for non-white than white beneficiaries.

Identifying an appropriate comparison group for Maryland was difficult due to longstanding differences in hospital payment policies between Maryland and the rest of the country. To minimize the influence of these differences we used multiple statistical approaches to test our findings. Total Medicare expenditures still grew more slowly in Maryland than in the comparison group using the alternative approach, but the difference did not reach statistical significance. However, we found that Maryland Medicare beneficiaries had total hospital savings and greater declines in inpatient admissions with both approaches. Because these measures are more closely tied to the goals of the Maryland All-Payer Model than total expenditures, we still conclude that the All-Payer Model produced positive outcomes for Medicare regardless of the statistical approach used.

Success in achieving other goals of the All-Payer Model, including reducing avoidable utilization, was mixed for both populations. We found encouraging evidence that the All-Payer

Model had larger impacts among sicker, more complex Medicare patients, including dually eligible beneficiaries and beneficiaries with multiple chronic conditions. This suggests that hospitals may have prioritized high-cost, high-need patients as they changed their care delivery practices. These beneficiaries also may have had the most opportunity to improve under the reforms of the Maryland All-Payer Model.

We found some evidence that hospital efforts to reduce inpatient utilization successfully targeted unnecessary admissions. Admissions for ACSCs declined more in Maryland than in the comparison group for both the Medicare and commercially insured populations. These declines could be due to hospital programs aimed at reducing utilization by improving care management and avoiding unnecessary hospitalizations. Still, the reductions in ACSC admissions are somewhat surprising because the All-Payer Model did not have direct mechanisms to increase access to community-based care (which was expected to drive reductions in ACSC admissions), and hospital leaders identified lack of engagement with community providers as a limitation of the model. Nonetheless, outpatient medical exam visits increased more for Medicare beneficiaries in Maryland than in the comparison group, and this greater access could have reduced ACSC admissions whether it was driven by the All-Payer Model or not.

Reducing readmissions was an important emphasis for hospitals, and they adopted a variety of strategies to address this goal. Such strategies included increased emphasis on managing care transitions after discharge; better patient education prior to discharge; provision of a free supply of prescription drugs or disease monitoring equipment at discharge; improved coordination with PAC facilities; and increased care coordination, care management, and social work staffing to support these initiatives. Although the unplanned readmission rate fell in Maryland during the All-Payer Model period, despite hospitals' efforts the decrease did not differ between Maryland and the comparison group for either Medicare or the commercially insured population. However, the reduction in readmissions for beneficiaries originally entitled to Medicare due to disability in Maryland was significantly larger than the reduction for their comparison group counterparts, whereas there was no difference for beneficiaries originally entitled due to age alone.

Reducing readmissions has been a target nationwide for several years, so the reduction observed for both Maryland and the comparison group is not unexpected. In addition, hospitals expressed frustration that lack of patient compliance and the absence of incentives for patients to change their behavior undermined their efforts. The unplanned readmission results differ from HSCRC's reporting on the performance of the All-Payer Model against the terms of Maryland's agreement with CMS, which showed the gap between the Medicare readmission rate in Maryland and readmission rates nationally had closed by the end of 2017.⁴⁵ Differences in the methodologies used may explain the differing findings. Unlike the unadjusted comparison with national rates used to monitor compliance with the agreement terms, the D-in-D estimates in these analyses are regression-adjusted and based on comparison with a set of hospitals and populations in market areas selected because they are comparable to those in Maryland.

⁴⁵ See: <u>https://hscrc.state.md.us/Documents/Modernization/Updated%20APM%20results%20through%20</u> <u>PY4.pdf</u>

Despite hospital efforts to improve patient care transitions following discharge, coordination with community providers did not improve under the All-Payer Model. The likelihood that a Medicare beneficiary had a follow-up visit within 14 days after being discharged from the hospital increased similarly in Maryland and the comparison group during the All-Payer Model period and increased less for commercial plan members. Likewise, the rate of ED visits after hospital discharge did not change relative to the comparison group for the Medicare population, but we found reductions relative to the comparison group for the commercially insured population. Although hospitals increasingly recognized the importance of developing partnerships with community providers, they found it difficult to engage providers in these relationships and primary care provider shortages were an additional barrier in some areas. The CCIP track within the CRP was intended to increase alignment between hospitals and community physicians, but participation was limited and program implementation was in preliminary stages during the All-Payer Model period. However, the overall findings mask subgroup differences-the follow-up visit rate increased for Maryland non-teaching hospitals and hospitals that were not aligned with an ACO relative to their comparison group counterparts, whereas it decreased for teaching hospitals and ACO-aligned hospitals in Maryland. The worse performance by teaching hospitals was expected because of the greater complexity of their patient population but, as noted earlier, the poorer performance by ACO-aligned hospitals was unexpected.

Shifting non-emergent ED use to other settings was another important focus for hospital leaders, who described investing in care managers to divert patients to other settings and using Maryland's health information exchange to identify frequent ED users. The ED visit rate for the commercially insured population in Maryland decreased relative to the comparison group and the ED visit rate declined among Medicaid beneficiaries in Maryland over the All-Payer Model period; however, the ED visit rate increased similarly for Medicare beneficiaries in Maryland and in the comparison group. Much like unplanned readmissions, hospital leaders described challenges changing patients' decision to go to the ED for care. Influencing ED visits may have been particularly difficult for patients with more complex health issues, who are more prevalent in the Medicare population. In addition, the Medicare outpatient ED visit rate could increase if hospitals were successful in reducing admissions of people seen in the ED. The larger decline in the percentage of ED visits that led to a hospitalization among Medicare beneficiaries in Maryland than in the comparison group supports this hypothesis, although the difference did not reach statistical significance.

Despite reductions in admissions for Medicare beneficiaries, inpatient facility expenditures did not grow more slowly than in the comparison group because utilization reductions were offset by increases in the payment per admission, both unadjusted and adjusted for case-mix severity. This is due to more rapid growth in payment rates in Maryland because of rate adjustments that hospitals were permitted to make within prescribed limits to regain lost revenue from decreased utilization to meet their global budgets. It was common for hospitals to make rate adjustments, and those that did so were far more likely to increase their rates above the rate order amount than to reduce them. Consistent with this, we generally found faster growth in Medicare inpatient payment rates in Maryland than in the IPPS following implementation of the All-Payer Model. Although faster growth in hospital costs within a DRG could also be due to increased service intensity during an inpatient stay for patients with the same condition in Maryland relative to the comparison group, global budgets created a disincentive to such increases, and, as noted earlier, we found evidence that expenditure growth slowed more for sicker, more complex patients under the All-Payer Model.

In contrast to Medicare, the difference in admission reductions between Maryland and the comparison group was not statistically significant for commercial plan members but inpatient facility expenditures declined relative to the comparison group because the payment per admission grew more slowly in Maryland. Payment per admission grew more slowly in Maryland because admission severity and payment rates increased less than in the comparison group. Decreased intensity of services utilized within a DRG in Maryland may have contributed also.

In contrast to inpatient services, Medicare ED expenditures grew more slowly in Maryland than in the comparison group during the All-Payer Model period even though growth in the ED visit rate was similar. These savings are due to slower growth in payment rates in Maryland relative to the comparison group that resulted from large increases in OPPS payments in 2014 and 2015.

In each year and during the All-Payer Model period overall, reductions in total Medicare expenditures exceeded reductions for hospital services alone. These findings indicate that the model reduced hospital costs without shifting costs to other parts of the Maryland health care system outside of global budgets or to out-of-state providers. We did not find evidence that the All-Payer Model led to unbundling of inpatient services for Medicare patients by shifting costs to pre-admission or post-discharge periods or to increased admissions to hospitals outside of Maryland. Although the likelihood of hospital patients being discharged to PAC increased more in Maryland than in the comparison group following All-Payer Model implementation, patients were not transferred to PAC sooner.

Medicare savings on nonhospital services were driven by reduced expenditures for PAC and professional services provided in hospital settings. Despite the increased likelihood of transfer to PAC following an inpatient stay, expenditures for PAC services, particularly SNF services, decreased more in Maryland than in the comparison group. This is likely due to the larger decrease in inpatient admissions in Maryland, because an inpatient stay is required to qualify for PAC services. The relative decrease in expenditures for professional services provided in hospital settings is also consistent with decreases in inpatient admissions and use of some hospital outpatient department services.

Maryland's all-payer hospital payment rates are explicitly intended to harmonize payments among payers. As a result, Medicare payment rates in Maryland are higher than they are in other states, whereas commercial insurance payment rates are lower. Both before and after implementation of the All-Payer Model, we found substantially higher Medicare payment rates under Maryland's all-payer rate-setting system than under the IPPS and OPPS. We also found substantially lower payment rates for commercially insured patients in Maryland than for those in the comparison group. Differences in Medicare payment rates do not provide an estimate of savings if Maryland hospitals were to move to IPPS and OPPS because they do not account for potential offsets to savings from payment rate reductions due to changes in use of hospital and other services, including efficiencies achieved under the All-Payer Model, if Maryland were to transition to IPPS and OPPS. Although inpatient findings could be biased by less complete diagnosis coding on hospital claims in Maryland, which results in assigning higher-complexity cases to less resource-intensive DRGs in Maryland hospitals than in other hospitals, our comparison of matched admissions in Medicare claims and Maryland hospital discharge data indicates that the bias from underreporting diagnoses in claims data is minimal.

Despite constraints on hospital revenues imposed by global budgets, most hospitals succeeded in keeping their revenues within 0.5 percent of their global budget and avoided penalties for exceeding this budget corridor. Hospitals regularly monitored their volumes and revenues to make rate adjustments that ensured they would meet their budget targets by the end of the year. Hospital operating margins increased after implementation of the All-Payer Model for most types of hospitals, as well as for all Maryland hospitals combined, although Maryland hospital operating margins remained below the average for community hospitals nationwide. During site visits, hospitals described strategies to improve their operational efficiency, including standardization of clinical practices, greater use of group purchasing, reconfiguration of staffing ratios, and consolidation of service lines across hospitals within a system. Nonetheless, many hospitals reported concerns about the adequacy of global budget updates and their ability to fund capital improvements, medical innovations, and population health initiatives for their communities.

Maryland's All-Payer Model was an unprecedented experiment that held hospitals accountable for operating under fixed, population-based revenue. Implementation of the All-Payer Model was characterized by a spirit of collaboration and trust between hospitals and HSCRC. Hospitals often expressed frustration about the complexity of the policies that governed the model, as well as the limited transparency and unpredictability of policy changes. In part, this reflected the evolution of policies as hospitals gained more experience with the model and the state's flexibility in adapting to individual hospital circumstances and conditions.

The All-Payer Model produced positive outcomes, without evidence of adverse effects on quality or patient outcomes. Nonetheless, limitations were recognized even in its initial design, particularly the model's exclusive focus on hospital services and lack of engagement of nonhospital providers. Contrary to expectations, placing constraints on hospital revenues alone did not lead to increased Medicare expenditures in other parts of the health care system. Still, the All-Payer Model had the greatest impact on outcomes that are directly under hospitals' control and outcomes like readmissions and follow-up visits after hospital discharge, which require collaboration with other providers in the community, generally did not improve. The CRP was a step toward addressing the lack of alignment between hospital incentives under global budgets and those of other providers. However, the CRP was not fully implemented by the end of the All-Payer Model period and it was not possible to assess its effectiveness in fostering alignment.

The All-Payer Model was envisioned as a stepping-stone to a population-based payment model that would hold hospitals responsible for use of all health care services by the populations they serve. The TCOC Model, launched in January 2019, addresses limitations in the All-Payer Model by continuing efforts to engage nonhospital providers through the CRP, recognizing the role of community-based primary care providers, and putting hospitals partially at risk for total patient care costs. The All-Payer Model demonstrated the feasibility of holding hospitals accountable for a population's use of hospital services. The next phase of Maryland's experiment will provide an opportunity to test whether these achievements can be sustained and expanded.