Value-Based Payment Reforms in Cardiovascular Care: Progress to Date and Next Steps

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ABSTRACT: In an effort to curb excessive health care spending and incentivize high-quality care, many payers have implemented value-based payment reforms designed to pay for the quality rather than the quantity of health care services. Medicare, the largest payer in the United States, has implemented numerous value-based payment policies over the past decade, many of which affect cardiovascular care. In this review, we discuss some of these major nationwide value-based payment reforms as they relate to cardiovascular care and what we may expect in the future from cardiovascular value-based policies.

INTRODUCTION

Over the past 50 years, US health care spending has increased dramatically to nearly 18% (or $3.5 trillion dollars) of the country's gross domestic product as of 2017 (Figure 1).[1,2] Recognition of this excessive rate of health care spending has ushered in an era of significant health care payment reform with a shift from paying for the quantity of services to paying for the quality or value of care provided. This era of value-based payment reform has wide-reaching and important implications for US health care. To understand value-based payment reform, we must first define value. In its most simple form, high-value care is defined as high-quality care (eg, optimal patient outcomes) at the lowest achievable cost.[3] In the case of payment reform, cost is viewed from the perspective of the payer, which for the reforms discussed in this review is the Centers for Medicare and Medicaid Services (CMS). (Table 1 lists some of the common acronyms used in health care reform.)

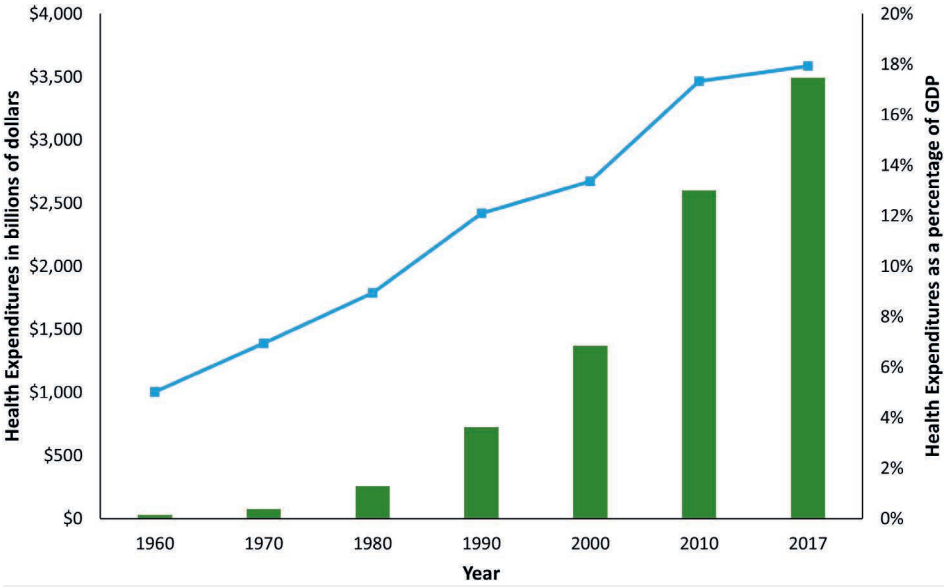

Figure 1.
Trends in United States Health Expenditures in selected years between 1960 and 2017. National health expenditures in billions of dollars (green bars and left-sided axis) and as a percentage of United States gross domestic product (GDP) (blue lines and right-sided axis). Publically available data was obtained from the National Center for Health Statistics.[2]

The passage of the Patient Protection and Affordable Care Act (ACA) in 2010 marked a significant milestone in the transition towards value-based payment, as did the passage of the Medicare Access and Children's Health Insurance Program Reauthorization Act (MACRA) in 2015. The MACRA legislation created the Quality Payment Program (QPP), another program used to link provider payment to quality.[4]

Given the prevalence and associated cost of caring for patients with cardiovascular disease, cardiovascular care has become a focus of many value-based payment reforms. Although many private payers have designed and implemented value-based payment policies, this review focuses on the current state of major nationwide Medicare value-based payment reforms as they relate to cardiovascular care and what we may expect in the future (Table 2).

ACRONYM	DEFINITION
ACA	Affordable Care Act
ACO	Patient Protection and Accountable Care Organization
AMI	Acute myocardial infarction
BPCI	Bundled Payment for Care Improvement
CMS	Centers for Medicare and Medicaid Services
DRG	Diagnosis-related group
HF	Heart failure
HRRP	Hospital Readmissions Reduction Program
HVBP	Hospital Value-Based Purchasing
MACRA	Medicare Access and Children's Health Insurance Program Reauthorization Act
QPP	Quality Payment Program

Table 1.
Common acronyms used in health care reform.

HOSPITAL READMISSIONS REDUCTION PROGRAM

Readmissions are common and costly.[5,6] Approximately 20% of Medicare beneficiaries are readmitted within 30 days of discharge at an estimated annual cost in excess of $17 billion dollars.[6] Moreover, hospital quality is associated with the risk of readmission independent of patient factors.[7] With the passage of the ACA, the Hospital Readmissions Reduction Program (HRRP) was established to incentivize improvements in hospital quality and reduce readmissions.[8] In fiscal year 2013, CMS began issuing penalties in the form of reduced Medicare reimbursements to hospitals that had higher-than-expected readmission rates for patients hospitalized for acute myocardial infarction (AMI), heart failure (HF), and pneumonia over the previous 3 years. Payment reductions were applied to all Medicare fee-for-service base payments for diagnosis-related groups (DRGs) at that hospital. Although penalties were initially capped at 1%, beginning in fiscal year 2015, the cap was increased to 3% of all payments. More recently, the targeted conditions have expanded to include patients hospitalized for chronic obstructive pulmonary disease, total hip and/or knee arthroplasty, and coronary artery bypass graft surgery (CABG).[8]

In a seminal analysis evaluating the effect of the ACA and HRRP, Zuckerman and colleagues determined that after passage of the ACA, readmission rates declined for all conditions under study, with the greatest decline for conditions targeted by the HRRP for readmission penalties.[9] They also found no significant change in the use of observation services related to passage of the ACA; this suggests that the reduction in measured readmissions was not driven simply by treating patients in observation units rather than readmitting them to the hospital. Between 2008 and 2016, risk-adjusted readmission rates declined from 24.8% to 20.1% for HF and 20.0% to 15.5% for AMI.[10] Reduction in readmissions has saved CMS billions of dollars.[10]

Despite these promising results, some have raised concerns that this large-scale national policy may be associated with unintended adverse consequences such as death. By incentivizing readmission reduction, the HRRP could unintentionally be associated with increased mortality by deferring admission of a patient who otherwise warrants it.[11,12] Another mechanism by which the HRRP may be associated with adverse outcomes is through hospitals shifting more resources towards readmission reduction and away from other quality improvement efforts aimed at mortality prevention.[11,12] Some have noted that in the current landscape of value-based payment reform, greater financial incentives are placed on reducing readmissions than reducing mortality.[13] Whether the HRRP has led to increased mortality remains controversial. Although two research teams found that the HRRP was associated with an increase in post-discharge mortality among Medicare patients hospitalized for HF,[14,15] this association was not demonstrated in other studies.[10,16,17] Despite this concerning and controversial finding, the HRRP continues.

HOSPITAL VALUE-BASED PURCHASING

Like the HRRP, the Hospital Value-Based Purchasing (HVBP) program was also established by the ACA.[18] Beginning in fiscal year 2013, the HVBP program tied hospital Medicare reimbursement to performance on a variety of quality metrics.[19] HVBP is funded by withholding approximately 2% of all DRG payments for inpatient hospitalizations to all participating hospitals. These withheld Medicare payments are then redistributed to the participating hospitals based on their performance in multiple quality domains, including clinical care, person and community engagement, safety, and efficiency and cost reduction. Although the program penalizes or rewards all inpatient hospitalizations, cardiovascular outcomes are disproportionately represented in the HVBP clinical outcome measures. For instance, in fiscal year 2018, two of the three mortality measures were related to cardiovascular care, including 30-day risk-standardized

CHARACTERISTIC	HOSPITAL READMISSIONS REDUCTION PROGRAM (HRRP)	HOSPITAL VALUE-BASED PURCHASING (HVBP)	ACCOUNTABLE CARE ORGANIZATION (ACO)	BUNDLED PAYMENT FOR CARE IMPROVEMENT (BPCI)
Implementation date	2012	2012	2012	BPCI: 2013 BPCI Advanced: 2018
Mandatory vs voluntary participation	Mandatory	Mandatory	Voluntary	Voluntary
Summary of policy design	Hospitals with higher-than-expected readmission rates for targeted conditions were penalized in the form of reduced Medicare reimbursements for all DRG payments.	Hospital Medicare DRG payments are tied to hospital performance on a variety of quality metrics.	Groups of health care entities voluntarily assume responsibility for the spending and outcomes of a group of patients. ACOs that reduce spending and meet certain quality benchmarks can share in the savings. Some ACOs are in two-sided risk arrangements where they share in savings and also bear financial risk if spending is above targets.	Effectively pay hospitals a fixed amount for delivering quality care over a period of time (usually 90 days) after a qualifying event.
How does it involve cardiovascular care?	Targeted conditions include AMI, HF, and CABG.	Risk-standardized mortality rates for AMI and HF are included in the hospital performance measures.	CV conditions are not specifically targeted by ACOs. Many patients with CV disease are cared for by ACOs, and ACO quality benchmarks include CV conditions.	BPCI Advanced includes many CV episodes in which hospitals and physician groups may participate.

Table 2.
Summary of Medicare Value-Based Payment Reforms in Cardiovascular Care. AMI: acute myocardial infarction; CV: cardiovascular; DRG: diagnosis-related group; HF: heart failure; CABG: coronary artery bypass graft

mortality rates for AMI and HF. However, contemporary policy evaluations have failed to demonstrate the impact of HVBP on either AMI or HF mortality.[20,21] Furthermore, HVBP was not associated with improvements in clinical processes of care or patient experience.[20] Although the HVBP program continues, its intended benefits have yet to be demonstrated for cardiovascular care.

ACCOUNTABLE CARE ORGANIZATIONS

One of the earliest policies implemented after passage of the ACA was Medicare's Accountable Care Organization (ACO) program. ACOs are groups of doctors, hospitals, and other health care providers who voluntarily assume responsibility for the spending and quality outcomes of a defined group of patients or beneficiaries.[22] ACOs that reduce spending (ie, keep health care payments below a benchmark price) and meet certain quality thresholds are eligible to share in a portion of the savings. More ACOs are participating in two-sided risk arrangements, in which they both share in a portion of savings (upside risk) or bear financial risk for a portion of spending above spending targets (downside risk).[23] With implementation of the CMS QPP, ACOs are considered advanced alternative payment models. As such, providers participating in ACOs may be eligible for 5% incentive payments as a part of the QPP.[4]

Initial evaluations of Medicare Shared Savings Program ACOs, the largest of the Medicare ACO programs, demonstrated that participation in this program was associated with spending reductions.[24,25] Although ACO programs are not designed around specific cardiovascular conditions, many patients with cardiovascular disease are cared for by providers that participate in ACOs. Additionally, as with the HRRP and HVBP, ACO quality benchmarks include many cardiovascular conditions. There have been several studies evaluating the effects of ACOs on cardiovascular care. For instance, McWilliams et al. found that among patients with cardiovascular disease or diabetes, receipt of care in an ACO was not associated with clinically meaningful changes in the use of, or adherence to, common guideline-based cardiovascular and antidiabetic medications.[26] Sinha and colleagues evaluated whether admission to an ACO versus non-ACO hospital for AMI or HF was associated with changes in early (index admission to 90 days post-discharge) and late (91-365 days post-discharge) spending.[27] Although they found no significant differences in early spending, they noted significant savings in late spending; this suggests that ACOs, which are designed to focus on the overall long-term care of patients, may be synergistic with other value-based policies such as the HRRP and bundled payment models that target the early post-discharge time period.[27] Lastly, recent research demonstrated that ACOs that included participating cardiologists were associated with reduced spending for patients with cardiovascular disease compared with ACOs that lacked participating cardiologists, which suggests that inclusion of cardiologists in ACOs may be a strategy for reducing health care spending for patients with cardiovascular disease.[28] However, as ACO models continue to expand, the inclusion and optimal role of cardiologists in these novel payment models requires further investigation.

BUNDLED PAYMENT

In Medicare's fee-for-service payment system, hospitals, clinicians, and other health care entities are paid separately for each service provided. This incentivizes health care entities to "do more." To incentivize the quality versus quantity of services provided, bundled payment models effectively pay hospitals a fixed amount for delivering quality care over a period of time. Specifically, bundled payment models aggregate all health care spending during an episode of care, most often a 90-day window after an index admission (Figure 2). Then, overall episode spending is reconciled against a benchmark or target price, and hospitals either pay or share in a portion of the difference. By holding hospitals accountable for all health care expenditures and the quality of care provided within an episode of care, bundled payment models are meant to incentivize care coordination and discourage unnecessary health care spending.

In April 2016, CMS implemented the Comprehensive Care for Joint Replacement (CJR) model, a mandatory bundled payment model for hip and knee replacement performed at hospitals in randomly selected metropolitan statistical areas. The CJR model was associated with modest reductions in Medicare spending without changes in quality.[29] On the heels of the CJR model, CMS announced another mandatory bundled payment program designed around episodes of care for AMI and CABG in December 2016.[30] However, in late 2017, the program was cancelled prior to its implementation. The reasons for cancellation included the need for greater flexibility in the design and implementation of other value-based innovations including new voluntary bundled payment models.

Despite cancellation of the mandatory cardiovascular bundled payment model, cardiovascular conditions have remained a focus of voluntary bundled payment models such as CMS' Bundled Payment for Care Improvement (BPCI) and, more recently, BPCI Advanced.[31] BPCI Advanced has a total of 35 clinical episodes, of which 11 are related to cardiovascular care. For the current year, the most common cardiovascular episodes that BPCI Advanced participants (hospitals or physician groups) have volunteered for include episodes designed around cardiac arrhythmia, AMI, and HF care (Figure 3).[32]

Given the success of bundling payments for surgical joint replacement,[29,33] many believe this payment model will yield similar reductions in spending for medical bundles including cardiovascular conditions. Unfortunately, results from evaluations of the voluntary BPCI program for cardiovascular conditions have been lackluster. In an evaluation of the BPCI program for multiple medical conditions including AMI and HF, Joynt Maddox and colleagues found no significant changes in several important outcomes, including Medicare payments, readmissions, and death.[34] In the Year 5 report of the BPCI program, the Lewin Group demonstrated no significant differential changes in 90-day episode payments for cardiovascular episodes including AMI, cardiac arrhythmia, cardiac valve procedures, HF, CABG, and percutaneous coronary intervention.[35]

It is important to note that the voluntary nature of current cardiovascular bundled payment models makes evaluations of these models inherently challenging and may limit the generalizability of findings. Indeed, Oseran et al. found that hospitals participating in cardiovascular bundles were different than nonparticipating hospitals in important ways, such as having higher AMI and HF volumes as well as cardiac intensive care units and catheterization laboratories.[36] Evaluations of BPCI Advanced, which began in October 2018, have not yet been published.

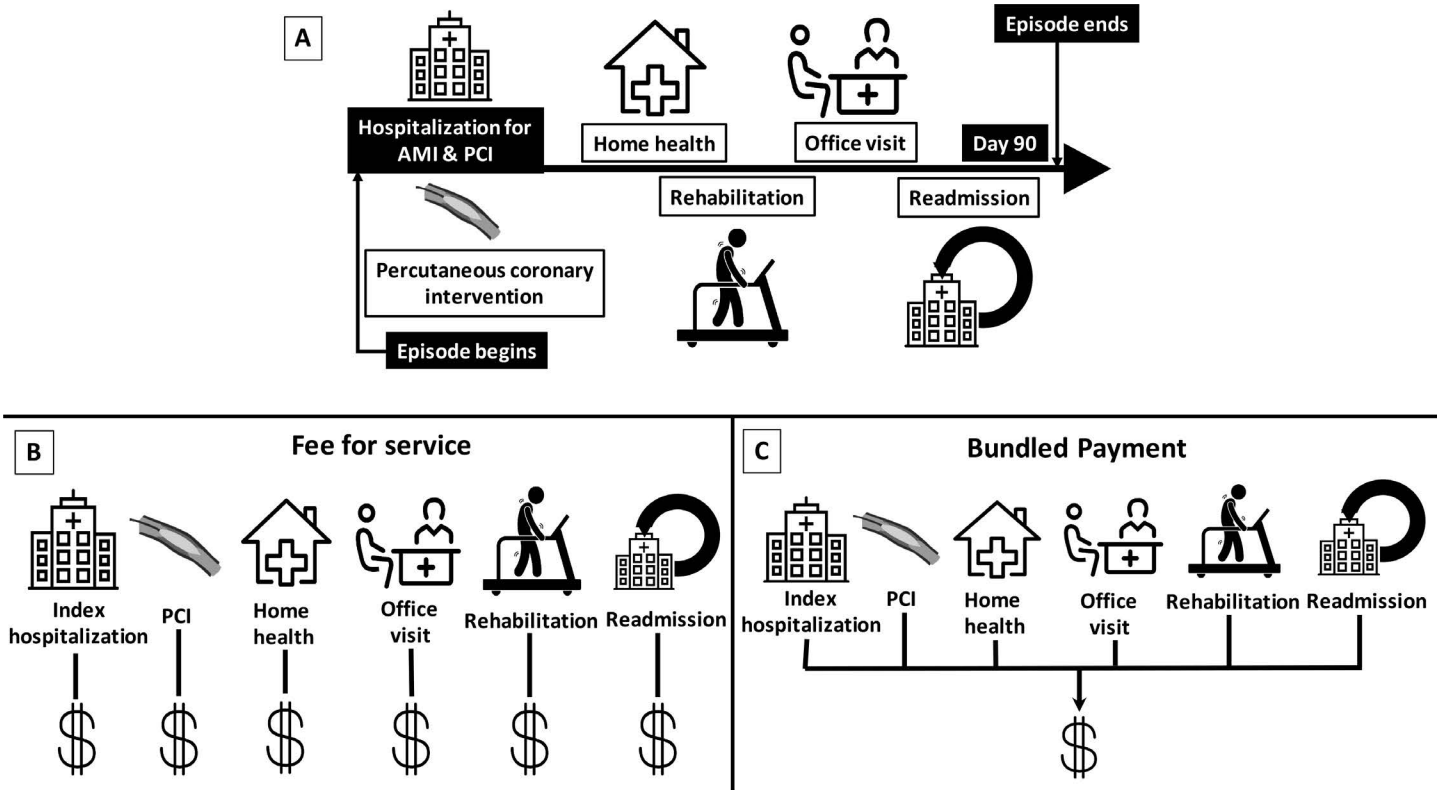

Figure 2.
Graphical representation of bundled payment versus traditional fee-for-service payment for an episode of care. (A) An example of an episode of care that begins with hospitalization for treatment of an acute myocardial infarction (AMI) with percutaneous coronary intervention (PCI) and includes related health care services through 90 days after discharge, including services such as home health care, outpatient rehab, and readmissions. (B) Traditional fee-for-service payment models reimburse hospitals and providers for each service delivered during the course of that 90-day episode of care. (C) In bundled payment models, hospitals are held accountable to a single benchmarked payment for the care delivered, regardless of the quantity of services provided.

CARDIOVASCULAR VALUE-BASED PAYMENT REFORMS: NEXT STEPS

If the recent past is any indication, value-based payment programs will continue to expand as CMS and other insurers aim to tie more payments to quality and outcomes. Indeed, evaluations of CMS' QPP[4]—one of CMS' newest value-based payment reforms—are likely forthcoming. How value-based payment programs evolve will remain critical to their overall success. Although there currently are several value-based payment policies, each incentivizing quality and containing costs in different ways, they all face several common challenges. For instance, there is ongoing work around defining quality and value based on outcomes that are most relevant and meaningful to patients.[37] We believe that these challenges will be tackled in the coming years and represent some of the important next steps of value-based payment reform.

The way in which value-based payment reforms account for differences in patient risk profiles is critical given that more medically complex patients frequently require more care to deliver a similar outcome compared with less complex patients. Many value-based policies account for these differences through statistical risk-adjustment methods. However, not all programs account for patient risk in a similar manner. For instance, similar to the CJR program, the previously proposed mandatory cardiovascular episode payment model did not plan to employ risk-adjustment to account for patients' medical complexity. In a simulation analysis, Markovitz and colleagues demonstrated that adjusting for medical complexity and social risk factors would have narrowed the gap in reconciliation payments for high medical complexity hospitals, safety-net hospitals, and minority-serving hospitals.[38]

Although other value-based programs such as HRRP and HVBP use claims-based risk-adjusted outcome measures to determine financial penalties, such measures may be inaccurate or prone to gaming. This highlights the inherent tension of adequate risk adjustment. On one hand, not adjusting for patients' medical

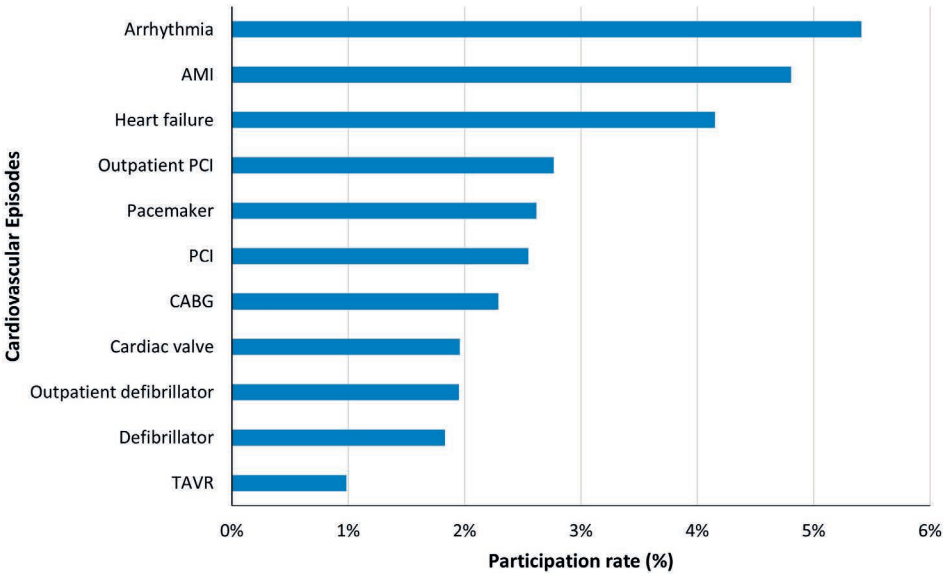

Figure 3.
Participation in specific cardiovascular episodes as a percentage of all episodes that participants (ie, hospitals and physician groups) volunteered for in Model Year 3 of BPCI Advanced (N = 12,717). All episodes are initiated as inpatient clinical episodes except for outpatient PCI and outpatient defibrillator. Data were obtained from the publically available BPCI Advanced model year 3 participant file.[33] BPCI: Bundled Payment for Care Improvement; AMI: acute myocardial infarction; PCI: percutaneous coronary intervention; CABG: coronary artery bypass graft; TAVR: transcatheter aortic valve replacement

complexity may incentivize one to avoid caring for complex patients. On the other hand, adjusting for patient risk using data that could be gamed may result in rewarding hospitals that are better at modifying their coding practices rather than rewarding ones that are better at reducing spending and improving quality. A substantial part of the decline in risk-adjusted readmission rates after implementation of the HRRP was related to changes in claims-based measures of patient severity.[39,40] Such changes in measured severity may be partly related to an increased opportunity for hospitals to code more secondary diagnoses on discharge claims due to CMS' expansion of secondary diagnostic coding positions, which jumped from 9 to 24 in January 2011.[40,41] Prior research has demonstrated that adding clinical variables to claims-based risk-adjustment models improves their predictive accuracy.[42] Therefore, with the widespread adoption of electronic health records, natural language processing algorithms may help to more accurately capture patient risk factors, quality of care, and patient outcomes in the future.[43,44]

Clinical severity or medical complexity may not be the only type of risk that needs to be accounted for in value-based payment reforms. There is a growing body of literature demonstrating that frailty and social risk factors such as educational attainment, household income, and measures of neighborhood deprivation are also associated with health care spending and outcomes.[45] Until recently, value-based payment models did not adjust for social risk partly out of concern that it may excuse the delivery of lower-quality care to such patients.[46] Indeed, organizations that serve a higher proportion of low-income and minority patients have fared worse under pay-for-performance programs.[47] In response, value-based payment policies have started incorporating methods to account for social risk. For instance, in fiscal year 2019, the HRRP used a new peer group-based payment adjustment framework that levied penalties against similar hospitals based on the proportion of Medicare hospitalizations of patients who were considered dually eligible for Medicare and Medicaid–a proxy for low income and socioeconomic disadvantage. McCarthy and colleagues demonstrated that this new peer group-based framework resulted in a 14% net down-classification in penalty status of hospitals caring for patients with low socioeconomic status, which suggests that this new payment adjustment model may result in a more equitable distribution of penalties.[48]

In the future, we also expect CMS to make changes within programs to ensure that high-value appropriate care is incentivized for specific conditions. In a recent example, CMS changed how cardiac rehabilitation payments were handled in BPCI Advanced. Although cardiac rehabilitation is associated with improved patient outcomes,[49] payments for this service would previously have increased overall spending within a 90-day episode of care. Therefore, hospitals and providers in cardiovascular bundled payment models were disincentivized to prescribe cardiac rehabilitation given that it may increase 90-day spending. However, CMS recently made changes to cardiovascular episodes within BPCI Advanced to support the delivery of high-value care by removing cardiac rehabilitation spending from the total 90-day spending calculation and from the calculation of benchmarks.[31] Through ongoing collaborations between payers, providers, and patients, we expect to see continued changes to value-based payment reforms to ensure that high-value care is being appropriately incentivized.

CONCLUSION

Most people would philosophically agree that we should be paying for quality

rather than quantity in health care. However, while the concept of incentivizing high-quality care is simple, the design and implementation of policies to achieve that goal is not. This is due in part to the complexities of the US health care system, which comprises multiple payers, hospitals, and providers caring for a large and diverse population. In this review, we highlighted major nationwide Medicare value-based payment reforms and how they affect cardiovascular care. To date, the results of these value-based payment reforms for cardiovascular conditions have been mixed. Some programs, such as the HRRP, have resulted in significant reductions in readmissions and spending, whereas others, such as the BPCI program, have yielded no significant changes in cardiovascular quality and spending. As value-based payment reforms continue to expand and evolve, it is critical that we continue to rigorously evaluate all health care policies to ensure that they are reaching their intended goals without significant unintended consequences.

KEY POINTS

- Numerous value-based payment reforms have been developed and implemented in an effort to curb US health care spending and incentivize quality rather than quantity of care.
- Overall, nationwide value-based payment reforms have had mixed effects on cardiovascular quality and spending.
- As value-based payment reforms continue to evolve and expand, we expect changes to how clinical and social risks are considered and modifications to policy designs to ensure that high-value care is appropriately incentivized.

Conflict of Interest Disclosure:
The authors have completed and submitted the *Methodist DeBakey Cardiovascular Journal* Conflict of Interest Statement and none were reported.

Keywords:
health care reform, cardiovascular diseases, health expenditures, delivery of health care, quality of health care

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