

Paying for Performance Improvement in Quality and Outcomes of Cardiovascular Care: Challenges and Prospects

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ABSTRACT: Over the past two decades, Medicare and other payers have been looking at ways to base payment for cardiovascular care on the quality and outcomes of care delivered. Public reporting of hospital performance on a series of quality measures began in 2004 with basic processes of care such as aspirin use and influenza vaccination, and it expanded in later years to include outcomes such as mortality and readmission rates. Following the passage of the Affordable Care Act in March 2010, Medicare and other payers moved forward with pay-for-performance programs, more commonly referred to as value-based purchasing (VBP) programs. These programs are largely based on an underlying fee-for-service payment infrastructure and give hospitals and clinicians bonuses or penalties based on their performance. Another new payment mechanism, called alternative payment models (APMs), aims to move towards episode-based or global payments to improve quality and efficiency. The two most relevant APMs for cardiovascular care include Accountable Care Organizations and bundled payments. Both VBP programs and APMs have challenges related to program efficacy, accuracy, and equity. In fact, despite over a decade of progress in measuring and incentivizing high-quality care delivery within cardiology, major limitations remain. Many of the programs have had little benefit in terms of clinical outcomes yet have led to marked administrative burden for participants.

However, there are several encouraging prospects to aid the successful implementation of value-based high-quality cardiovascular care, such as more sophisticated data science to improve risk adjustment and flexible electronic health records to decrease administrative burden. Furthermore, payment models designed specifically for cardiovascular care could incentivize innovative care delivery models that could improve quality and outcomes for patients. This review provides an overview of current efforts, largely at the federal level, to pay for high-quality cardiovascular care and discusses the challenges and prospects related to doing so.

INTRODUCTION

The last two decades saw remarkable changes in the way that quality and performance in cardiovascular care were measured and incented (Figure 1). Beginning in the early 2000s and accelerating following the passage of the Affordable Care Act (ACA) in March 2010, Medicare and other payers have increasingly moved towards value-based and alternative payment models in which payment is tied to the quality and outcomes of care. However, the focus on payment for quality and outcomes has heightened the need to ensure accurate and equitable measurement. This manuscript provides an overview of past and current efforts, largely at the federal level, to pay for high-quality cardiovascular care and discusses the challenges and prospects related to doing so.

VALUE-BASED PAYMENT PROGRAMS IN CARDIOVASCULAR MEDICINE

The first step in the move towards measuring and rewarding performance in cardiovascular medicine was public reporting. In

2004, Hospital Compare was created as the first national public reporting program; it was designed to incentivize providers to improve their performance through peer pressure and to allow consumers to select providers based on performance. Hospitals were incented to participate because their annual Medicare payment updates were tied to reporting data to the federal government on a series of key quality measures. Initially, these measures only included processes of care, such as aspirin being given for acute myocardial infarction; however, they expanded to include public reporting of clinical outcomes such as mortality and readmission rates for acute myocardial infarction and heart failure, added in 2008 and 2011, respectively.¹

Following public reporting, Medicare and other payers moved forward with pay-for-performance programs, more commonly referred to as value-based purchasing (VBP) programs. One of the first such programs was the Hospital Readmissions Reduction Program, which penalized hospitals up to 3% of their Medicare reimbursements based on their readmission rates for heart failure, acute myocardial infarction, and pneumonia.

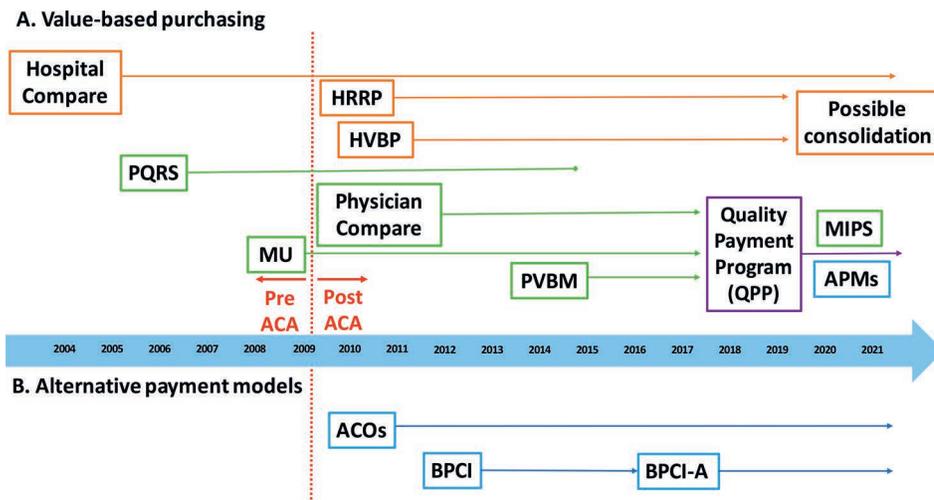


Figure 1.

Timeline of federal efforts to improve quality of cardiovascular care. (A) Timeline for various value-based purchasing (VBP) programs divided by hospital-level (orange) and physician-level programs (green). The HRRP and HVBP were created after the ACA and will potentially be consolidated, with other federal hospital programs, into a single program in 2022. Prior physician-level programs such as PQRs, MU, and PVBM were consolidated into the QPP in 2019. The QPP has two main components, MIPS and APMs. (B) The two main APMs for cardiovascular care include ACOs and BPCI-A. ACA: Affordable Care Act; ACO: Accountable Care Organization; APM: Alternative Payment Model; BPCI: Bundled Payments for Care Improvement; BPCI-A: Bundled Payments for Care Improvement-Advanced; HRRP: Hospital Readmissions Reduction Program; HVBP: Hospital Value-Based Purchasing Program; MIPS: Merit-based Incentive Payment System; MU: Meaningful Use Program; PQRs: Physician Quality Reporting System; PVBM: Physician Value-Based Modifier Program; QPP: Quality Payment Program

Hospital Value-Based Purchasing is another hospital-level program that was a component of the ACA. In this budget-neutral program, a portion of payments to hospitals are withheld and subsequently redistributed among hospitals based on their performance on a set of quality metrics in four core domains: safety, clinical care, efficiency and cost reduction, and patient/caregiver-centered experience. Cardiovascular disease features within each category, including specific measures such as heart failure mortality, acute myocardial infarction mortality, and, most recently, condition-specific cost measures for these two conditions.

A similar sequence of events, moving from public reporting to pay-for-performance, has taken place in the

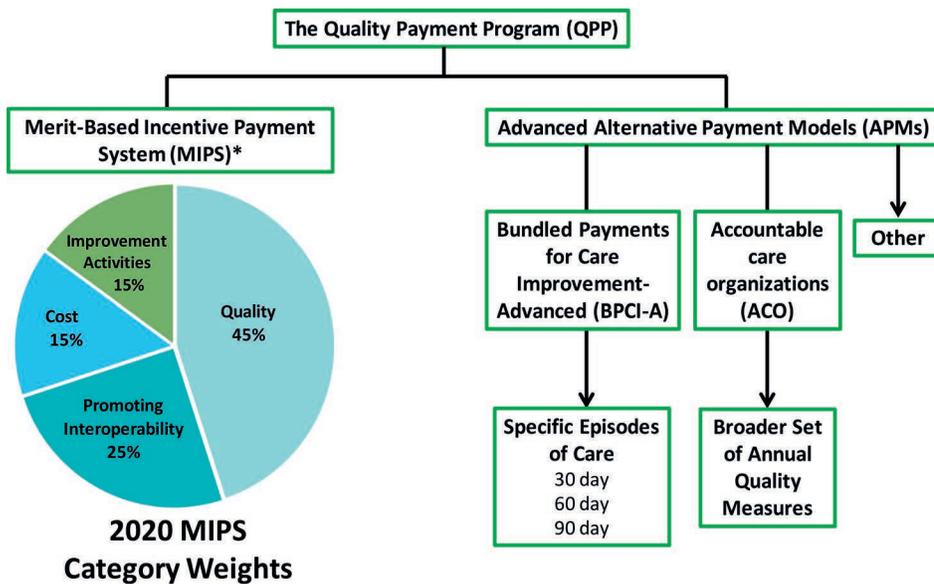
physician setting. The Physician Quality Reporting System was established in 2006 as a voluntary system but transitioned into a penalty program in 2011, when physicians and group practices faced negative payment adjustments for failing to report their performance data. Subsequently, a VBP program for physicians, the Physician Value-Based Modifier (PVBM), created a payment withhold that was redistributed according to how they performed on quality, outcome, and cost measures. Building on this program, the 2015 Medicare Access and CHIP Reauthorization Act created a mandatory nationwide Quality Payment Program that consists of two “tracks” for clinicians: (1) Merit-based Incentive Payment System (MIPS), or (2) alternative payment models (APMs) (Figure 2). The default

program for practicing clinicians is MIPS, which has four core components that consist of quality, promoting interoperability (related to the Meaningful Use program), cost, and practice improvement activities (such as using patient portals and participating in quality improvement programs and registries). Clinicians can opt out of MIPS if they participate in a qualifying APM.

ALTERNATIVE PAYMENT MODELS IN CARDIOVASCULAR MEDICINE

While VBP programs are largely based on an underlying fee-for-service payment infrastructure, APMs aim to disrupt the underlying payment mechanisms to move toward payment for quality and efficiency. The two most relevant APMs to cardiovascular care include Accountable Care Organizations (ACOs) and bundled payments. Accountable Care Organizations are groups of hospitals and clinicians that assume risk for a broader set of quality measures and for their attributed patients' total costs of care, typically on an annual basis. In Medicare's largest ACO program, the Medicare Shared Savings Program, participants are still paid on a fee-for-service basis but are held accountable for both the quality and cost of care provided to their beneficiaries each year. This program includes a number of cardiovascular quality measures, such as preventable hospitalizations for heart failure, readmission rates, and the use of certain medications for patients with ischemic heart disease or heart failure. Thus, while ACO programs depend heavily on high-quality primary care, cardiovascular specialists also play a major role in these organizations.

The other relevant APM for cardiovascular care is bundled payments, currently being tested by Medicare through the Bundled Payments for Care Improvement (BPCI) Advanced program. Bundled payment arrangements are similar to ACO arrangements except that quality



and costs are evaluated over the course of an “episode,” which includes the continuum of care for a single medical event or condition such as a myocardial infarction or stroke. The episode is typically triggered by a hospitalization, and care is evaluated over a fixed, predetermined time, such as 30, 60, or 90 days in length, rather than an entire year. If Medicare payments for an episode of care are less than the target, the participant is eligible to keep a portion of the savings; however, if payments exceed the target, the participant must reimburse Medicare some of the difference.

CHALLENGES: EFFICACY

Despite transformational change over the past few decades, there are still challenges in determining a reimbursement method that leads to meaningful improvements in quality, outcomes, and costs (Figure 3). The most important challenge is efficacy because there is very little evidence that paying for performance in cardiovascular care, whether via VBP programs or APMs, has had a meaningful impact.

For example, the public reporting of processes and outcomes on Hospital Compare was not associated with improvements in mortality rates above and beyond secular trends,² and evaluations of value-based payment programs have been similarly disappointing. Studies have failed to find any association between the implementation of hospital value-based purchasing and improvement in patient outcomes.^{3,4} The Hospital Readmissions Reduction Program (HRRP) has been associated with a significant decrease in readmission rates for Medicare beneficiaries,⁵ although subsequent analyses have suggested that some of the reported improvements may have been due to changes in coding of comorbidities rather than actual improvements in clinical care.^{6,7} Concerns have also been raised that

Figure 2.

Diagram of the components within the Quality Payment Program (QPP). The QPP is composed of the Merit-Based Incentive Program (MIPS) and Alternative Payment Models (APMs). MIPS is the default program for clinicians and is composed of the following four elements (2020 weights reported): Quality 45%, Promoting Interoperability 25%, Cost 15%, Improvement Activities 15%. Clinicians can opt out of MIPS if they are enrolled in a qualifying APM; within cardiovascular care, this could mean either participating in an accountable care organization or being part of an organization that is participating in the Bundled Payments for Care Improvement-Advanced program.

Challenges for Improving Quality, Outcomes, & Cost in Cardiovascular Care		
Efficacy	Accuracy & Equity	Documentation, Gaming, & Burden
<p>Positive and/or Neutral Efficacy MSSP ↑/↔</p> <p>Neutral Efficacy Hospital Compare ↔ HVBP ↔ BPCI↔</p> <p>Mixed Findings HRRP ↑/↔/↓</p>	<p> Current use of administrative data</p> <p>❖ Lacks clinical granularity to capture differences in disease severity</p> <p>❖ Lacks components known to affect health (eg, frailty, SDoH)</p>	<p> Changes in documentation to “create improvement”</p> <p> Burden of collecting data</p>

Figure 3.

Challenges for improving quality, outcomes, and cost in cardiovascular care. The challenges facing the successful implementation of value-based, high-quality cardiovascular care include program efficacy, accuracy and equity, administrative burden, and data manipulation. BPCI: Bundled Payments for Care Improvement; HRRP: Hospital Readmissions Reduction Program; HVBP: Hospital Value-Based Purchasing Program; MSSP: Medicare Shared Savings Program; SDoH: social determinants of health

the HRRP may have been associated with an increase in mortality for heart failure patients,^{8,9} although findings have been somewhat mixed.

Studies examining the effectiveness of APMs such as the Medicare Shared Savings Program have generally found that they are associated with small amounts of savings and no major improvements in quality or outcomes.^{10,11} Studies examining the predecessor of BPCI Advanced (formerly BPCI) have not demonstrated an association with improvements in quality, outcomes, or costs for medical conditions including heart failure or acute myocardial infarction.¹²

CHALLENGES: ACCURACY AND EQUITY

Another crucial challenge for using financial incentives to improve quality and outcomes in cardiovascular care is the issue of accuracy and equity. Here, the science of performance measurement is critical to consider. For many of the measures in cardiovascular quality improvement, risk adjustment is used in an attempt to level the playing field when comparing the respective performances of hospitals or practices. Most risk adjustment models use administrative claims data, which is easier and less resource intensive to implement compared to models that incorporate medical records and biometric data. However, administrative data lacks granularity on clinical comorbidities—for example, people are classified by whether or not they have heart failure rather than by their NYHA class or ejection fraction—and therefore may not capture true differences in disease severity. Most current claims-based risk adjustment models also lack information on frailty, adherence, social determinants of health, and other factors that strongly influence clinical outcomes.¹³⁻¹⁵ Consequently, models tend to be inaccurate in determining performance and can be inequitable when used to assign publicly reported performance scores or used in value-based payment programs. For example, the HRRP has penalized safety-net hospitals that care for clinically and socially high-risk populations despite data suggesting that roughly half of the worse performance of these hospitals is due to the complexity of the population they serve.¹⁶⁻¹⁸ The outpatient-based PVBM program also disproportionately penalized physicians and practices serving patients with high levels of social or medical risk.^{19,20}

CHALLENGES: DOCUMENTATION, GAMING, AND BURDEN

Another concern for programs that measure and reward performance in cardiovascular medicine is that reporting entities may manipulate the data that gets reported or entered into administrative claims in order to increase the apparent risk of their patients. For example, as noted above,

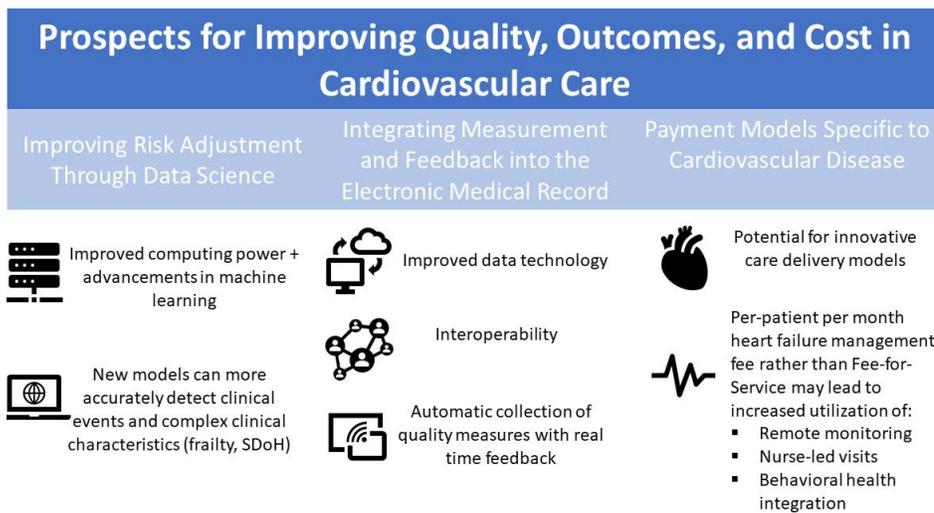
two studies have shown that the initial decrease seen in readmissions after the HRRP was implemented was due to changes in hospital documentation rather than underlying improvements in the quality of care.⁶ Similarly, a study examining changes in door-to-balloon time during public reporting for percutaneous coronary intervention quality measures showed that a significant amount of improvement over time was due to a higher proportion of cases being excluded for “diagnostic uncertainty” rather than true changes in processes of care.²¹

Another related challenge in value-based reimbursement is the burden of collecting and reporting data. Since many current quality measures cannot be automatically calculated from claims or even efficiently pulled from the electronic medical record, they require hand abstraction by trained personnel. Providers have to collect different measures for different payers and may even have to collect the same measures but in different formats across different payers. One study estimated that, on average, US-based physician practices spend 785 hours dealing with reporting of quality measures per physician on staff.²² The burden of collecting and reporting these measures can be particularly problematic for small hospitals and small practices, which may lack the necessary access to capital to invest in technological infrastructure and personnel; this may be one reason why consolidation continues to occur in the cardiovascular practice community.²³

PROSPECTS: IMPROVING RISK ADJUSTMENT THROUGH DATA SCIENCE

Emerging methods in data science are being used to improve risk adjustment models, which may help address some of the limitations in measuring and rewarding performance in cardiovascular disease (Figure 4). When many of the current performance measures were developed, their sophistication was limited by computing power. However, better computing platforms and the ongoing explosion of progress in machine learning has led to increasingly sophisticated models that can more accurately predict clinical events (eg, mortality, acute kidney injury, bleeding risk) and therefore improve the fairness of performance measurement while also helping to better target clinical interventions.²⁴⁻²⁶

A number of recent studies have also shown that claims data can be used to detect more complex comorbidity states (eg, frailty), which holds significant promise for improving risk adjustment.²⁷⁻³¹ The advent of codes for social determinants of health in the International Classification of Diseases-Tenth Edition (ICD-10) also may provide an opportunity to collect this information more broadly than in the past and incorporate these parameters into risk prediction.³²



CONCLUSION

The ACA accelerated the attempt to deliver high-quality cardiovascular care, but many of the programs born from the ACA have had minimal to no benefit in terms of clinical outcomes while resulting in marked administrative burden. Furthermore, it remains unclear how accurate and equitable these programs have been, as they have been prone to gaming and associated with higher penalties for providers caring for high-risk populations. Despite these challenges, there are encouraging developments ahead. Improved integration of EMRs and advancements in machine learning and artificial intelligence will allow for more precise and accurate risk adjustment models while also decreasing administrative burden. In addition, novel payment models designed specifically for cardiovascular care could incentivize innovative care delivery models that could improve quality and outcomes for patients. With these prospects on the horizon, the new decade has the potential to bring us closer to an equitable, high-quality, value-based care delivery system.

KEY POINTS

- Medicare and other payers are increasingly moving towards value-based purchasing programs and alternative payment models to improve quality and outcomes for patients.
- Current efforts to improve care have challenges regarding program efficacy, accuracy and equity, administrative burden, and data manipulation.
- There are encouraging prospects for the successful implementation of value-based, high-quality cardiovascular care, such as improvements in data science for risk adjustment, decreased administrative burden, and potential innovative care delivery models.

Figure 4. Prospects for improving quality, outcomes, and cost in cardiovascular care. Encouraging prospects for the successful implementation of value-based, high-quality cardiovascular care include the incorporation of improved data science for improved risk adjustment, decreased administrative burden, and potential innovative care delivery models. SDoH: social determinants of health

PROSPECTS: INTEGRATING MEASUREMENT AND FEEDBACK INTO ELECTRONIC MEDICAL RECORDS

The first electronic medical record (EMR) was introduced by IBM in the 1960s,³³ but in many ways the promise of EMRs to improve quality and outcomes has still not been met.³⁴ However, ongoing improvements in data technology and a renewed emphasis on interoperability and user interface³⁵ could facilitate the automatic collection of quality measures with better risk adjustment as well as real-time feedback on performance.³⁶ Faster, more relevant feedback could drive performance improvement in a way that the current time-lagged opaque metrics do not, therefore improving efficacy, accuracy, and fairness while reducing burden.

PROSPECTS: PAYMENT MODELS SPECIFIC TO CARDIOVASCULAR DISEASE

Another potential solution that could improve both efficacy and accuracy is the development of payment models that are specific to cardiovascular

disease rather than “one size fits all.” In current programs such as MIPS, cardiologists, urologists, geriatricians, and other clinicians are all judged under one enormous program despite each practice having the option to submit data on any six of more than 300 distinct quality measures. Creating a payment model aimed at improving care and outcomes specifically for chronic cardiovascular disease could be an important tool in improving quality in this space. For example, a cardiology practice receiving a per-patient monthly management fee for heart failure rather than a visit-based fee-for-service might elect to implement remote patient monitoring, nurse-led visits, behavioral health integration, or other innovative care delivery models that aren’t well reimbursed under the current system. Tying payment to specialty society-endorsed quality guidelines that are measured equivalently across practices could improve the accuracy of various models. Such innovation has the potential to fundamentally change how care is delivered to patients with chronic cardiovascular disease.

Conflict of Interest Disclosure:

Dr. Joynt Maddox does contract work for the United States Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. There are no other financial conflicts of interest to report.

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pay for performance, value-based purchasing, alternative payment models, cardiovascular care

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