Health Policy and Cardiovascular Medicine

Will Bundled Payments Change Health Care?
Examining the Evidence Thus Far in Cardiovascular Care

Terry Shih, MD, MS; Lena M. Chen, MD, MS; Brahmajee K. Nallamothu, MD, MPH

Episode-based, “bundled” payments have come to the forefront of the national discussion on combating rising healthcare costs. In the currently dominant fee-for-service model for reimbursement, hospitals, physicians, and postacute care providers file distinct claims and are paid separately for provided services even when they are related to a single episode of care. However, this approach to payment encourages fragmented care, with little incentive for resource stewardship, coordination, or communication across multiple providers. In contrast, bundled payments seek to align the interests of providers by providing a fixed payment for all services given during a single episode of care. This payment is distributed among all providers in a healthcare system involved with that patient, including hospitals and other facilities. Although not a new policy initiative, bundled payments have resurfaced in the current era of healthcare reform, with its advocates arguing that it can curtail healthcare costs while simultaneously improving quality.

Cardiovascular care is the arena in which implementation of bundled payments is arguably most visible and may be most impactful. Many previous demonstrations of bundled payments have concentrated on cardiovascular conditions, and it is likely that future efforts will continue to do so, with good reason. First, cardiovascular diseases are common, costly, and deadly and therefore are important in national discussions for healthcare reform. Second, care for cardiovascular disease involves multiple providers from different disciplines (primary care, cardiology, cardiac surgery, anesthesiology, radiology). Lastly, cardiovascular patients receive care in multiple healthcare settings (hospital, outpatient primary care and subspecialty clinics, skilled nursing facility, etc). Given all these factors, bundled payments have the potential to substantially improve care coordination and to generate savings for cardiovascular care.

In the present article, we further explore bundled payment initiatives and their potential advantages and disadvantages, focusing our review on previous and current bundled payment programs for cardiovascular conditions. We end by discussing what implications these programs might have as healthcare reforms take further shape in the coming years.

The Rationale Behind Bundled Payments

Under a typical bundled payment agreement, healthcare providers receive a fixed, lump-sum payment to be divided at their discretion among the facilities and providers involved with a discrete episode of care for a given patient. The intent of the policy is to decrease healthcare spending while maintaining or improving quality of care. Previous studies illustrating large variation in healthcare costs associated with index hospitalization, physician services, readmissions, and postacute care have highlighted the potential for cost savings with bundled payments.

Providers (eg, hospitals, physician groups, etc) participating in bundled payments agree with payers on a target price for select clinical conditions, typically adjusted for episode severity. To set a target price, payers often look at overall variation and mean pricing in historical payments for all facets of an episode of care to establish a case rate. Payers then enter into negotiations with providers to set a target bundled price, sometimes 1% to 2% below the case rate or below projected spending growth. Under this model, a participating provider is incentivized to provide efficient care, reducing the number and cost of services contained in the bundle.

In typical bundled payment models, providers and payers share in savings and losses. When actual healthcare costs fall below the lump-sum payment, both parties keep a portion of the difference as additional profit. Conversely, the provider must provide extra services at a loss when healthcare costs exceed the lump-sum payment, although payers mitigate some of this loss. The potential for savings for payers lies in upfront discounted payments for episodes of care, as well as shared savings with providers when costs fall below the lump-sum payment. In this model for reimbursement, healthcare systems will be challenged to improve resource stewardship, cooperation, and coordination among disparate medical services. Those healthcare systems that improve the most in these arenas have the greatest potential for savings.

Bundled payments are a middle ground in the spectrum of healthcare payment models (Figure). On the one hand, they are a considerable shift from the traditional fee-for-service model, in which providers are reimbursed separately for each distinct service provided. Yet, importantly, bundled payments are not representative of global payments, or capitation, in which a healthcare system is paid a lump-sum payment per attributed patient over a distinct time period, regardless of the number of distinct episodes of care. Additionally, global
payments are intended to encompass care across multiple conditions that a patient may require, whereas each individual episode of care is distinct and reimbursed separately in a bundled payment model. There are other alternative payment and delivery system reforms that fit between the extremes of fee-for-service and global payments on the spectrum of health-care payment. These include value-based payments, in which health systems or providers are given additional payments for high-quality care or levied financial penalties for poor-quality care, and accountable care organizations, in which certain services or conditions may be covered in a capitated model but other ancillary services may still be provided under the fee-for-service model.

**Advantages and Disadvantages of Bundled Payments**

There are many possible advantages of bundled payments over alternative payment models (Table 1). First, a lump-sum payment has the potential to discourage unnecessary care. In the traditional fee-for-service model, additional care translates to additional revenue, so physicians have little financial incentive to reduce unnecessary tests. In addition, in the current fee-for-service model, there is no financial incentive to avoid complications or readmissions. In fact, hospitals with high complication rates historically have collected higher Medicare payments than hospitals with low complication rates. At the other extreme, bundled payments also have advantages over global payments that there is no constraint on the number of episodes that can be reimbursed. For example, there is a strong disincentive in traditional capitation to care for patients with severe congestive heart failure who may require frequent hospitalizations. Healthcare systems received the same annual payment for that patient regardless of the number of times the patient is hospitalized in a year. In bundled payment agreements, the incentive to avoid these patients is mitigated because each individual episode of care would be reimbursed. Finally, with the introduction of a single bundled cost, bundled payments also increase transparency and predictability of costs for patients and payers. Patients and payers may prefer this method of reimbursement; thus, hospitals that enter into bundled payment agreements may also benefit from expanded referral bases and increased market share as a result of preferred agreements.

There are also potential disadvantages to moving from the current fee-for-service model toward bundled payments, and these may affect stakeholders differently (Table 1). First, bundled payments are better suited for surgical procedures like coronary artery bypass grafting (CABG), in which there is a discrete beginning and end of an episode. However, the boundaries of where one episode ends and another begins are less clear for some chronic medical conditions such as congestive heart failure. Second, although bundled payments may discourage unnecessary care, it is possible that the pendulum may swing too far in the opposite direction with their use. With bundled payments, healthcare systems may limit access to consultants or necessary services may be denied to patients for the sake of additional savings. Third, bundled payments do not discourage unnecessary episodes of care and patients would still be at risk for unwarranted hospitalizations and procedures because they would still be covered under this model. Other potential disadvantages to bundled payments are related to care of complex patients, many of whom are cared for at academic centers. Under any reimbursement model, there are always ways to “game” the system, and bundled payments are no different. Healthcare systems may still avoid “sick” patients in situations in which they anticipate that the bundled payment may not cover the expected healthcare costs, or patients may also be “upcoded” to draw larger reimbursement. Another related concern is that providers may avoid coding complications of care that may require increased healthcare costs until the defined time period covered by a bundled payment agreement has expired (eg, waiting to diagnose a sacral decubitus ulcer on postoperative day 31 when the bundled payment agreement covers care up until postoperative day 30). Finally, it is also possible that academic health centers may be disadvantaged by bundled payments. In addition to patient care, these centers prioritize research and teaching. Without consideration of this concern and special

![Figure: Spectrum of healthcare payment models and delivery system reforms. Bundled payments represent a middle ground in between the current fee-for-service model and global payments or capitation.](http://circ.ahajournals.org/Downloaded from)
In 1984, soon after the introduction of the IPPS, the Texas Heart Institute developed CardioVascular Care Providers, Inc, bundling hospital and physician charges together for cardiovascular surgery. The plan was initially offered in 1984 to non-Medicare patients (<65 years old) and was extended to Medicare patients who required CABG in 1993. Detailed evaluations of the program have been limited, although the authors from the institution have claimed that the plan was beneficial for patients, physicians, and providers. Patients received high-quality medical care with little or no out-of-pocket expense and increased access to care by a decrease in the costs of medical care. Physicians were able to establish and expand patient referral bases and to reduce overhead expenses as a result of streamlined billing processes. Payers experienced large savings for cardiovascular care and were better able to forecast costs for cardiovascular care.

In 1991, the Health Care Financing Administration, now the Centers for Medicare & Medicaid Services,
initiated the Medicare Participating Heart Bypass Center Demonstration. The demonstration was initially implemented in 4 hospitals and then was expanded to include 3 additional hospitals in 1993, until the termination of the program in 1996. Medicare paid each of the participating hospitals a bundled payment for CABG. This bundled payment was meant to cover all inpatient and physician services and any costs related to readmissions. Hospitals and physicians were free to divide up the bundled payment any way they chose. Additionally, all participating hospitals

<table>
<thead>
<tr>
<th>Demonstration</th>
<th>Dates</th>
<th>Site</th>
<th>Enrollees</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>CardioVascular Care Providers, Inc</td>
<td>1984–present</td>
<td>Texas Heart Institute</td>
<td>Initially non-Medicare patients undergoing cardiovascular surgery, later expanded to all patients in 1993</td>
<td>Payers experienced savings in cardiovascular care and providers were able to establish and expand patient referral bases. Patients benefited from high-quality medical care with little to no out-of-pocket expenses. Study was limited to a single-center retrospective analysis.</td>
</tr>
<tr>
<td>Medicare Participating Heart Bypass Center Demonstration</td>
<td>1991–1996</td>
<td>7 Hospitals: St. Joseph’s Hospital, Atlanta, GA, 1991</td>
<td>Medicare patients undergoing CABG</td>
<td>Medicare spending in participating hospitals decreased by 10% over the 5 y of the demonstration. Three of 4 hospitals decreased costs. Quality of care was maintained on the basis of outcome measures. However, multiple challenges were identified, including large administrative burden to implementation and difficulty coordinating revenue sharing between hospitals and physicians.</td>
</tr>
<tr>
<td>ProvenCare</td>
<td>2006–present</td>
<td>Geisinger Health Plan</td>
<td>At first, patients undergoing elective CABG Program has since expanded to multiple conditions, including hip replacement, cataract surgery, PCI, bariatric surgery, and perinatal care</td>
<td>Bundled payments implemented in coordination with evidence-based pay-for-performance program. Hospital charges decreased 5%. Adherence to evidence-based process measures increased from 59% to 100%. No changes were seen in outcome measures. Study was performed at a highly integrated healthcare delivery system with no control group. Results may not be generalizable to other healthcare settings.</td>
</tr>
<tr>
<td>Medicare Acute Care Episode Demonstration</td>
<td>2009–2012</td>
<td>5 Hospitals: Hillcrest Medical Center, Tulsa, OK</td>
<td>Medicare patients undergoing cardiovascular procedures and orthopedic joint replacements</td>
<td>Modest savings ($585) per episode for Medicare Part A and B expected payments. However, payments for post–acute care services (which are not included in bundled payment) increased, resulting in a net $319 savings per episode. The largest savings were for orthopedic procedures. No aggregate effects on quality of care or patient outcomes were seen.</td>
</tr>
<tr>
<td>PROMETHEUS Payment model</td>
<td>2006–present</td>
<td>3 Initial sites: Crozer Keystone Health System–Independence Blue Cross, Chester, PA Employer’s Coalition on Health, Rockford, IL Priority Health–Spectrum Health, Grand Rapids, MI Later expanded to multiple other regional sites</td>
<td>Patients being treated for 1 of 21 defined bundles ranging from chronic or acute medical conditions and procedures</td>
<td>Bundled payments implemented in coordination with pay-for-performance program and with allowance for care of complications. Initially, pilot sites encountered many difficulties executing bundled payment contracts, citing multiple implementation challenges with bundle definitions, implementing quality measurement, determining accountability, and engaging providers. More recently, PROMETHEUS Payment pilots have been initiated multiple regional pilots with evaluations ongoing. Results are pending.</td>
</tr>
<tr>
<td>Bundled Payments for Care Improvement</td>
<td>2012–present</td>
<td>National pilot program</td>
<td>Medicare patients treated for 1 of 48 eligible clinical conditions</td>
<td></td>
</tr>
</tbody>
</table>

CABG indicates coronary artery bypass grafting; PCI, percutaneous coronary intervention; and PROMETHEUS, Provider Payment Reform for Outcomes, Margins, Evidence, Transparency, Hassle-Reduction, Excellence, Understandability, and Sustainability.
were able to enter into private managed care contracts using bundled payments for cardiac surgery.

To evaluate the demonstration, researchers compared participating hospitals with control hospitals from the same markets that were reimbursed in the traditional DRG per-case basis and in which physicians were reimbursed with the fee-for-service model. Medicare spending in participating hospitals decreased by 10% over the 5 years of the demonstration.\textsuperscript{14}

Eighty-six percent of the decrease was attributable to savings from bundled payments directly, with 5% of the decrease related to lower postdischarge care expenses, which were not bundled. Nine percent of savings were derived from shifts in market share from higher-cost nondemonstration hospitals to lower-cost demonstration hospitals. In terms of hospital costs derived from detailed hospital microcost information on each patient, 3 of the 4 original demonstration hospitals decreased costs between 18% and 40%. One hospital experienced increases in costs of 10% to 24% for the 2 DRGs covered under the demonstration for unclear reasons.

Of the 4 original demonstration hospitals, 2 facilities experienced significantly increased margins, and the other 2 experienced a decrease, although the margins remained positive overall for all 4 facilities. In terms of physician payments, 4 major specialties all received fixed bundled payments regardless of services provided to different patients: the surgeon, the anesthesiologist, the cardiologist, and the radiologist. Other consulting physicians were paid their usual allowable Medicare fees out of designated funds that were a percentage holdback from these 4 specialties.

Results of an examination of noneconomic outcomes were less clear. There was a small but significant increase in the rate of complications for demonstration hospitals over the course of the demonstration. However, despite this increase in complications, mortality decreased significantly over the time course of the demonstration.\textsuperscript{14}

There also were challenges to the demonstration identified through direct feedback from hospital managers, nurses, and physicians.\textsuperscript{14} Some consultants felt that the quality of care was being compromised as a result of cutting back of consultant services. Additionally, most sites reported that they significantly underestimated the administrative burden required to implement the bundled payment system, including coordinating the revenue sharing between hospitals and physicians. Overall, results of the demonstration were mixed. Some hospitals were more successful than others. Hospital staff stated that aligning surgeon and hospital incentives to reduce costs was absolutely critical in changing practice patterns and improving department efficiency.

More Recent Bundled Payment Initiatives

Bundled payments have also been implemented with private insurers (Table 2). In 2006, the Geisinger Health Plan, a large nonprofit integrated delivery system in Pennsylvania, implemented ProvenCare.\textsuperscript{15} At the time, Geisinger had \textapprox 210000 members in a total service area population of roughly 2.6 million people. ProvenCare was implemented in 3 facilities for elective CABG and included a bundled payment for CABG that included preoperative evaluation and workup, all hospital and physician fees, postacute care, including cardiac rehabilitation, care for postoperative complications, and readmissions within 90 days from surgery. The bundled payment was implemented in conjunction with an evidence-based, pay-for-performance program, which included the introduction of 40 best-practice components adopted from 20 clinical practice guidelines. The program attracted national attention in popular media and was the subject of an editorial in the \textit{New England Journal of Medicine}.\textsuperscript{16-18}

Retrospective observational analysis of Geisinger’s 3 tertiary/quaternary medical centers compared 137 patients who underwent elective CABG in the year before implementation of ProvenCare with 117 patients who underwent elective CABG after implementation of the program.\textsuperscript{15} Hospital charges were found to decrease 5% among ProvenCare patients. There were no changes in postoperative length of stay and modest, non-significant reductions in total length of stay (6.3 days before versus 5.3 days after) and in 30-day readmissions (7.1% before versus 6.0% after). Additionally, significantly more patients were discharged to home after surgery (81.0% before versus 90.6% after; \textit{P} < 0.05). Importantly, adherence to the 40 best-practice components increased from 59% to 100% after implementation of the program (\textit{P} = 0.001). This did not translate to any statistically significant changes in health outcomes (mortality, readmissions, complications), although the study had limited statistical power in this regard owing to the sample size of the study. Importantly, it was reported that purchasers were highly receptive to bundled payments for CABG, citing a high valuation of financial predictability and aversion to open-ended risk and high costs of postoperative complications and treatment failures.\textsuperscript{15}

There were several limitations of this evaluation and its relevance for bundled payments. At the time of implementation, the Geisinger Health Plan was already a high-functioning, integrated healthcare delivery system with an electronic health record. This suggests that the healthcare system had both the resources to implement the program and perhaps a more limited opportunity to demonstrate improvement. Additionally, the success behind ProvenCare may lie in the fact that Geisinger Health Plan functions as both a payer and an integrated provider system, allowing easier alignment of incentives among the payer, hospitals, physicians, and post—acute care facilities. The program may not have resulting in the same successes in other healthcare settings. Furthermore, ProvenCare was applied only to elective CABGs. Although ProvenCare was applied to 117 elective CABG patients over a 1-year period, in the same time period, an additional 290 non-elective CABGs were performed that were excluded from the ProvenCare program.\textsuperscript{15} This limits the generalizability of their results. Applying the same program to other types of patients or other delivery models of care may not yield similar results. Additionally, the analysis did not have a control group of hospitals; thus, it is difficult to discern whether the improvements seen in the program were an independent effect resulting from the implementation of ProvenCare or whether there were existing secular trends. Finally, the bundled payment in ProvenCare was implemented concurrently with a pay-for-performance package. It is impossible to discern whether improvements were attributable to the bundled payments, the financial incentive to implement evidence-based practices,
or their combination. Nonetheless, this pilot program demonstrated the possibility of decreasing healthcare costs and resource use while simultaneously maintaining or improving the quality of care provided in a large healthcare system. The program has since expanded to percutaneous coronary intervention, bariatric surgery, and perinatal care.29

There are currently other bundled payment programs in progress (Table 2). In 2009, Medicare initiated another demonstration of bundled payments: the Medicare Acute Care Episode demonstration.20 The demonstration seeks to implement bundled payments for orthopedic joint replacements and cardiovascular procedures (CABG, valve replacement, pacemaker and defibrillator procedures, and angioplasty). The program provided a lump-sum payment for hospital and physician services accrued during an inpatient stay in 5 demonstration hospitals. Importantly, postacute care services were not included in the demonstration. Initial results report modest savings with no appreciable differences in quality of care.21 An analysis comparing Acute Care Episode demonstration hospitals with nonparticipating hospitals revealed an average savings of $585 per episode from combined Medicare Part A and B expected payments (facility and physician payments). However, payments for postacute care services (which were not included in the bundle payment) increased. Therefore, the per-episode net savings was $319, for a total net savings of approximately $4 million across 12,501 cardiovascular and orthopedic procedures. The largest savings were for orthopedic procedures, whereas the smallest saving per episode was for percutaneous coronary intervention procedures ($71). Evaluation of 22 quality-of-care, resource use, and case-mix measures did not reveal any aggregate effect.21 As a result of the modest success of the demonstration, some proponents have suggested expanding the program with the inclusion of postacute care services.22 Additionally, because hospitals were more successful in achieving savings for orthopedic procedures than for cardiac procedures, additional work may focus solely on the types of procedures that may benefit the most from this payment model.

In 2006, with funding from the Commonwealth Fund and the Robert Wood Johnson Foundation, the PROMETHEUS (Provider Payment Reform for Outcomes, Margins, Evidence, Transparency, Hassle-Reduction, Excellence, Understandability, and Sustainability) Payment model was initiated.23 The model, managed by the Health Care Incentives Improvement Institute, seeks to develop a single bundled payment for all services related to care of a single condition based on evidence-informed case rates. PROMETHEUS Payment has developed evidence-informed case rates, adjusted for patient severity and complexity, for multiple acute, chronic, and inpatient conditions and procedures, including acute myocardial infarction and congestive heart failure.24 Additionally, there is a pay-for-performance aspect to the program, with incentive payments for meeting specific quality metrics, including provider collaboration. In addition, there is an allowance calculated in the evidence-informed case rate for care of complications. This allowance for potentially avoidable complications is paid out either to cover the costs of caring for complications or as a bonus to providers if complications are avoided. Thus, the largest profit margins exist for healthcare systems that provide high-quality care with a low incidence of complications.

Multiple implementation challenges have been identified with PROMETHEUS Payment. The bundled payment model was initially piloted at few sites. However, these pilot sites had many difficulties executing bundled payment contracts between payers and providers.25 Other challenges include defining a specific “bundle,” defining the payment method, implementing quality measurement, determining accountability, engaging providers, and redesigning delivery. More recently, spurred by renewed interest in bundled payments as a result of the Affordable Care Act, many regional pilot programs have initiated PROMETHEUS payments for a variety of conditions.26,27 Further evaluations of the PROMETHEUS Payment model in pilot programs are ongoing; however, the Health Care Incentives Improvement Institute has identified full engagement of the chief executive officer, commitment by payer and provider, clean and complete claims and eligibility data, electronic medical record systems, and a sense of urgency to achieve progress as key ingredients necessary for even beginning the process of implementation.

**Medicare’s Bundled Payments for Care Improvement**

Perhaps the largest and most relevant ongoing program for providers is Medicare’s Bundled Payments for Care Improvement, a program developed by the Center for Medicare and Medicaid Innovation, which was created by the Affordable Care Act to test innovative payment and service delivery models.28 The program accepted applications from hospitals and other providers for the initiative in 2012. The initiative offered 4 different payment models that varied the type of services to be bundled together. Model 1 includes payments for the index hospitalization only; model 2 is the most all-encompassing, bundling all services around an index hospitalization, including readmissions, physician services, and postacute care; model 3 includes only postacute care payments; and model 4 includes facility and physician claims for the index hospitalization and readmissions paid prospectively. Model 2 is the most popular model to date, with participants selecting which services to include from up to 48 conditions, 15 of which are cardiovascular (Table 3).

Although still underway, preliminary analysis of the demonstration has identified significant barriers to the program with most of the key results pending.29 Thus far, what we do know is that few hospitals have enrolled in Bundled Payments for Care Improvement (<5% of eligible acute care hospitals). Participating hospitals were more likely to be teaching hospitals, nonprofit hospitals, and large hospitals. They were also more likely to be located in the Northeast. More than half of hospitals that chose to enroll in model 2 of the Bundled Payments for Care Improvement also limited their participation to only 1 or 2 of the 48 eligible conditions, with lower-extremity joint replacement the most common condition chosen, followed by many cardiac conditions, including congestive heart failure, CABG, and acute myocardial infarction. Hospitals tended to choose conditions for which postacute care and readmissions contributed a large portion to spending.
Table 3. Cardiovascular Conditions Included in Medicare's Bundled Payments for Care Improvement

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Coronary artery bypass grafting</td>
</tr>
<tr>
<td>Percutaneous coronary intervention</td>
</tr>
<tr>
<td>Pacemaker implantation</td>
</tr>
<tr>
<td>Cardiac defibrillator implantation</td>
</tr>
<tr>
<td>Pacemaker replacement or revision</td>
</tr>
<tr>
<td>Automatic implantable cardiac defibrillator generator or lead placement</td>
</tr>
<tr>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Acute myocardial infarction</td>
</tr>
<tr>
<td>Cardiac arrhythmia</td>
</tr>
<tr>
<td>Cardiac valve procedure</td>
</tr>
<tr>
<td>Other vascular surgery</td>
</tr>
<tr>
<td>Other major cardiovascular procedures</td>
</tr>
<tr>
<td>Medical peripheral vascular disorders</td>
</tr>
<tr>
<td>Atherosclerosis</td>
</tr>
</tbody>
</table>

Summary of the Evidence Thus Far

Bundled payment initiatives thus far have demonstrated modest potential to curb healthcare costs without decreasing healthcare quality and potentially even improving it. With various degrees of success, previous demonstrations such as the Medicare Participating Heart Bypass Demonstration and Geisinger’s ProvenCare have shown savings for payers, but these savings have been modest overall. Evidence for the quality of care has not demonstrated worsening care and, in fact, has shown improved performance in quality measures in some arenas. Geisinger’s ProvenCare, in which bundled payments were tied to pay-for-performance initiatives, is one example of improved quality measures. However, the evidence concerning the impact of bundled payments remains surprisingly limited. Few rigorous evaluations of bundled payment programs have been published, and those that have been published are retrospective analyses with limited control groups for comparison.

Although evidence of the effects of bundled payments on outcomes remains limited, a recurring theme in bundled payment initiatives has been the challenges in program implementation. Recent attempts at implementing bundled payments for orthopedic conditions in California failed as a result of administrative burden, state regulatory uncertainty, and disagreements about bundled definition and assumption of risk. Context and local environment have affected the success of many bundled payment programs. Geisinger’s ProvenCare may have achieved success as a result of the streamlined, integrated design of its unique healthcare system. Alignment of incentives may have been easier to achieve because the Geisinger Health Plan is both the payer and provider. In contrast, the Medicare Participating Heart Bypass Demonstration highlighted the administrative challenges to implementation. Furthermore, the initial pilot sites for PROMETHEUS Payment models have encountered multiple obstacles resulting from sorting of the complex details associated with implementation. There may be significant differences in the readiness and capability of different hospitals and hospital systems to participate in bundling resulting from differences in integration and administrative leadership across the country.

Implications and Future Directions

Given this mixed picture of the evidence, it is important to place bundled payments in an appropriate context. On one hand, the future of bundled payments remains largely uncertain. The broader picture of healthcare payment reform after the Affordable Care Act has left many healthcare systems preparing for the possibility of numerous different and complex policy initiatives, including accountable care organizations, pay-for-performance and value-based purchasing programs, and patient-centered medical homes. Stakeholders may be hesitant to invest in bundled payments unless they are perceived to be a major initiative within the changing policy landscape. In addition, it is clear that challenges to their implementation have not been adequately addressed in key circumstances. Even after the success of the Medicare Participating Heart Bypass Demonstration in the 1990s, for example, bundled payments did not receive greater attention until a decade later with the Geisinger ProvenCare program.

However, it also is possible that big changes in the current healthcare landscape may be what ultimately pushes healthcare systems and payers toward bundled payment programs. The shift to electronic health records will allow easier cooperation and coordination of care, streamlining the development of these programs across multiple providers. Another prevailing trend in cardiovascular care that may facilitate the implementation of bundled payments is the increasing merger of private physician groups into integrated hospital-physician practices. This will have effects for both accountable care organizations and bundled payment agreements. Additionally, the shift away from traditional academic departments into service lines and heart teams, integrating cardiologists, cardiac surgeons, and anesthesiologists (as well as others), may facilitate the adoption of bundled payments. With improved collaboration from individuals traditionally separated in academic silos, the feasibility and ease of bundled payments may also improve. The introduction of transcatheter aortic valve replacement serves as a prominent example of improved cooperation among disparate medical providers.

If the implementation challenges highlighted in previous demonstrations can be overcome, bundled payments could significantly change the patterns of care delivery for cardiovascular patients. Although bundled payment programs have been initiated for many different cardiovascular conditions, bundled payments have the potential for the greatest savings for higher-cost patients who require more coordination of care such as those undergoing major procedures or patients with congestive heart failure and frequent annual hospitalizations.

Nevertheless, the future success (or lack thereof) of bundled payments will hinge on further rigorous evaluation of current ongoing pilot demonstrations. Thus far, cardiovascular procedures have been the focal point of many bundled payment projects. Whether the findings of these pilot projects can be generalizable to other cardiovascular conditions is unknown. Previous demonstrations have shown the potential for healthcare savings and improved quality, but they have also highlighted the challenges of implementation. Some of
these implementation challenges may abate with time, and if they do, bundled payments are likely to play a growing role in the evolving landscape of healthcare payment reform.

**Sources of Funding**

Dr Shih is supported by a grant from the National Institutes of Health (5T32HL07612309). Dr Chen is supported by a Career Development Grant Award (K08HS020671) from the Agency for Healthcare Research and Quality. This project is also supported by funding from the National Institute of Aging (grant No. P01AG019783). The views expressed herein do not necessarily represent the views of the US government.

**Disclosures**

None.

**References**


**Key Words:** health care costs, health policy, health services research, outcome assessment (health care)
Will Bundled Payments Change Health Care?: Examining the Evidence Thus Far in Cardiovascular Care
Terry Shih, Lena M. Chen and Brahmajee K. Nallamothu

Circulation. 2015;131:2151-2158
doi: 10.1161/CIRCULATIONAHA.114.010393
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2015 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/131/24/2151

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org/subscriptions/