

A STRATEGY FOR SUCCESSFUL IMPLEMENTATION OF BUNDLED PAYMENTS IN ORTHOPAEDIC SURGERY

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» Bundled payments are an innovative method to align payer and provider incentives in a way that maximizes patient-centric value creation. Public and private payers, as well as self-insured employers, are aggressively pursuing bundled payments as a way to improve care coordination and patient outcomes and to reduce costs, particularly in high-volume, high-cost areas such as total joint arthroplasty.

» Successful implementation of a bundled payment system requires clinical and administrative leaders who are committed to developing new systems of delivering care and willing to hold themselves accountable for both the costs and clinical outcomes associated with the care they deliver.

» The transition from a fee-for-service payment system to bundled payment is fraught with potential pitfalls that must be identified early and closely managed.

» By following the steps outlined here, institutions considering bundled payment for total joint arthroplasty can more quickly and effectively move toward implementation.

It is widely recognized that the current fee-for-service reimbursement system in health care provides an incentive to focus on the volume of health-care service provision over quality or value^{1,2}. Various payers and self-insured employers have experimented with an alternate payment methodology—bundled payments—in which a single lump-sum payment is made to all health-care providers (including facilities, physicians, and non-physician providers) for the entirety of a patient's episode of care³. This approach is intended to encourage coordination of services and communication across providers and to reduce costs by aligning

financial performance with high-quality outcomes. The Patient Protection and Affordable Care Act called for a large-scale pilot of bundled payment for Medicare patients, to be managed by the Center for Medicare & Medicaid Innovation (CMMI). In 2012, more than 400 hospitals from around the country were selected from hundreds of applicants for the CMMI Bundled Payments for Care Improvement (BPCI) program, for services spanning forty-eight Medicare diagnosis-related groups (DRGs).

Total joint arthroplasty is an ideal clinical procedure for use in a trial of bundled payment, as it is a high-volume

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procedure with substantial variation in both costs and patient outcomes^{4,5}; yet the clinical presentation and treatment of patients is relatively predictable and well understood.

Developing the organizational infrastructure to successfully implement bundled payments requires rethinking of current clinical and administrative practices. In this article, we outline a stepwise approach to enable a health-care organization to successfully implement bundled payment; this approach is based on our experience to date in implementing an inpatient bundled payment for total joint arthroplasty with the CMMI BPCI Initiative.

Steps for Success

1. Identify the Clinical Condition(s)

The first step in moving toward bundled payment implementation is to determine the clinical condition or conditions to which bundled payment will apply. The following key factors should be considered:

Volume

The condition or procedure should have sufficient volume to justify the effort necessary to implement bundled payment and to maximize the impact of clinical redesign and cost reduction. A potential rule of thumb is to select conditions or procedures that present at the average rate of one per business day (approximately 200 to 250 cases per year), although the volume threshold may differ according to the size and institutional priorities of the health-care organization. We suggest this threshold because low-volume conditions and procedures often present difficulties with regard to standardizing processes and implementing systems of care.

Variable Cost and Quality

Substantial room for improvement on both financial and quality dimensions should exist⁵. For patients who underwent total joint arthroplasty at our institution, there was a cost difference of more than 20% between the lowest and the highest-cost surgeons as well as known variability in key patient

outcomes such as surgical site infection, readmission, and reoperation.

Relatively Homogeneous Patient Population

The implementation of standardized clinical care pathways and the minimization of outlier risk are achieved through the selection of conditions with a relatively high degree of homogeneity across patients. For this reason, we chose primary total joint arthroplasty, since key factors such as patient age, preoperative functional status, and indication for surgery are more narrowly circumscribed than they are in other clinical conditions. Patients undergoing revision arthroplasty were excluded, given the greater variability in their clinical presentation, treatment, costs, and outcomes.

Robust Measurement Tools

Systems to track baseline and ongoing cost, quality, and operational metrics are fundamental to the successful implementation of bundled payments. Joint replacement registries and other condition-specific measurement tools can play an important role not only in the tracking of clinical outcomes but also in the evaluation of the operational and clinical impact of bundled payments.

Given these criteria, the most commonly selected clinical conditions and procedures for bundled payment are total joint replacement, congestive heart failure, chronic obstructive pulmonary disease, and coronary artery bypass surgery⁶. This paper draws from our experiences with developing a plan for bundled payments for primary total joint arthroplasty procedures.

2. Identify Clinical and Administrative Champions

One of the primary goals of bundled payment is to give providers the incentive to coordinate multidisciplinary care and to improve communication across providers⁷. However, the existing clinical and administrative organizational structures of most hospitals do not facilitate this type of cooperation. As such, clear strategic direction and continuing

involvement from the highest levels of hospital leadership (e.g., chief executive officer, chief operating officer) are needed in order to successfully implement bundled payment. Departments are usually held accountable to department-specific outcomes, such as patient volume or revenue, which in a bundled payment scenario could shift dramatically as care is redesigned across the continuum and metrics are tracked at the episode or patient level. To make bundled payments a success, clinical and administrative leaders must be willing to operate outside of existing paradigms. They must have sufficient authority—either formal (e.g., via position or title) or informal (e.g., via peer reputation or acclaim)—to convene providers and staff from across the organization, and they must have the vision to guide a different way of thinking about patient care. Many provider organizations have well-respected clinical and administrative leaders who are outspoken and skeptical about the staying power of payment reform initiatives such as bundled payments. Substantial investments of time and authority are required to get a bundled payment program off the ground, and without strong, committed clinical and administrative champions, the effort will not be successful. In our experience, the commitment of two senior physician leaders and the early engagement of top hospital administrators were fundamental to getting the project off the ground. A constant focus on moving the project forward and the ability to break down institutional barriers are required, since the success of bundled payment implementation greatly hinges on hammering out the new details for every aspect of patient care and financial reimbursement within this new methodology. Bundled payment implementation forces institutions to collaborate across existing departmental divisions, in order to develop the new processes and work flows to optimize patient outcomes and reduce costs.

3. Define the Episode

The episode is the specific set of activities that occur during a defined time period

for which the institution will accept bundled payment⁵. The starting-point definition of the episode is the clinical condition or procedure, but there are a wide variety of factors to consider, including the following:

Starting Point or Trigger

Many episodes are initiated by the acute inpatient stay, but other events can be considered; for example, the first outpatient visit to a specialty clinic, the initial diagnosis of a chronic disease, and the transfer to a post-acute care facility. The trigger needs to be a clearly identifiable, standard event that initiates the treatment course for each patient in a particular episode. Initially, we explored starting the episode at the time of the referral from the primary care physician to the orthopaedic surgeon, as that is the first indication of a potential need for surgery and the first opportunity to coordinate care across the continuum. However, given that a large proportion of our patients come from a wide range of outlying geographical areas with diverse primary-care networks, the steering committee decided to limit the scope to the inpatient encounter only. This was seen as a limitation on the full potential of bundled payments, and it was a choice that was made to limit the risk associated with assuming a bundled payment to the portion of the episode that was directly under our control. A thorough understanding of existing processes and their variability is necessary before determining the trigger for bundled payment. The trigger should be institution and condition specific.

Duration of the Episode

The majority of episodes are defined in relation to a fixed number of days after the initial discharge from the acute inpatient stay (e.g., inpatient stay plus ninety days after discharge)⁵. Extending the episode length increases the risk exposure to providers, but it may also provide physicians with the incentive to initiate longer-term management and coordination of the patient's condition at an earlier stage to mitigate these risks.

A historical analysis of our total episode costs shows that nearly a third of the total costs are incurred in the first thirty days after discharge. As the total episode length increases, a greater share of costs is expended on post-acute services, with as much as 50% of the total cost of the episode traced to this segment of care at ninety days after discharge.

Inclusion and Exclusion Criteria

- *Services:* As with episode length, the broader the inclusion criteria, the greater the risk exposure, as well as the greater the potential upside and impact on clinical outcomes, such as surgical site infection rates and functional outcomes. Of the options available to us under the CMMI criteria, we selected the narrowest model in terms of scope. This model covers the inpatient stay and any readmissions within thirty days. Post-acute care services are not included in this bundle, although several of the other CMMI BPCI models (Appendix 1) include such care. One of the most important considerations in making this decision is whether or not your health-care organization has formal or informal relationships with post-acute care facilities, such as acute rehabilitation facilities and skilled nursing facilities. These relationships can range from established partnerships (including joint ventures or being part of the same ownership entity) to having identified point people at each high-volume post-acute facility to which you refer patients. Without these communication and collaboration channels, a wide-scoped bundled payment program cannot be successful.

- *Inclusion and exclusion criteria:* It is important to define which patients and episodes of care will be included and excluded from the bundle. Many bundles exclude certain patient or procedure types that substantially increase the financial and clinical risks, such as patients with multiple medical comorbidities or complex, atypical procedures. Such patients and procedures are often associated with a high degree of variability in both cost and outcomes, often due to factors that are outside the control of the

provider. Bundled payments take into account the factors that are within the purview and control of providers as well as the factors that are deemed to be outside the control of providers (e.g., nonmodifiable patient comorbidities); this combination of provider accountability and risk adjustment serves to reduce costs while adding value to the patient experience. Exclusions could also be based on the payer type, age of the patient, transfer status, or other administrative factors. For the CMMI BPCI initiative, there were no clinical up-front exclusion criteria, only administrative ones linked to various Medicare coverage types. At our institution, we decided not to include revision total joint arthroplasty in the bundled payment program, as the clinical experience of our surgeons indicated that the treatment course and outcomes associated with revision total joint arthroplasty were more variable than those associated with primary total joint arthroplasty, thus adding more risk and greater uncertainty to the risk that we would assume under a bundled payment plan.

- *Readmissions:* Most—but not all—bundles include related readmissions in order to give providers the incentive to make use of multidisciplinary strategies to reduce readmissions. Defining what a “related” readmission is can be a very contentious process, with payers and health-care purchasers on one end taking a very broad view (basically any subsequent admission, within the defined period, that is not trauma related or that is not a new cancer diagnosis) and provider organizations employing a much narrower definition (e.g., only including readmissions that represent well-established hospital-acquired conditions or that are directly tied to the surgical episode.) CMMI counts nearly all subsequent inpatient encounters within thirty days as a “related” readmission, with the exception of trauma and new cancer diagnosis-related admissions. The process of determining the scope of related readmissions also helps to align incentives across payers and providers.

4. Define Performance Metrics and the Gainsharing Model

The ability to track performance on an ongoing basis is crucial to the successful implementation of bundled payment⁸. Performance should be defined on clinical, operational, and financial dimensions. Target metrics need to be determined in advance, with regular reporting to all relevant stakeholders built into the bundled payment. The level at which metrics should be collected and reported is a key decision and strongly influences accountability mechanisms, as people and organizations tend to gravitate toward visible, auditable metrics that they view as being most under their purview to influence. For example, metrics that are collected and reported at the individual physician level may drive a behavior that is different from that driven by metrics measured at the departmental or procedure level. We are planning to track performance at the departmental and individual physician levels, with the bundled payment and nonbundled payment populations being delineated. We are also aiming for monthly reporting of most metrics, to enable feedback and course correction in as close to real time as possible (Appendix 2).

Participation in a registry effort such as the California Joint Replacement Registry (CJRR) or the Function and Outcomes Research for Comparative Effectiveness in Total Joint Replacement (FORCE-TJR) Registry can help facilitate collection and comparison of physician-specific performance measures, including both process and outcome measures⁹. While tracking metrics at the institution level is vital, the impact of bundled payment on the wider population can be extrapolated by comparing hospital-specific outcomes under bundled payment with larger data sets collected by joint replacement registries and similar condition-specific data aggregators. Through organizations such as the CJRR, hospitals participating in bundled payments can track their short-term and long-term outcomes and conduct analyses of clinical and

operational effectiveness both before and after implementation of a bundled payment system. Performance can be benchmarked against state and national averages as well.

These metrics undergird the gainsharing model. An aspect of many bundled payment programs, gainsharing enables the sharing of any cost savings achieved with the providers and staff involved in the episode of care. This is intended to incentivize providers to change their behavior and focus on optimizing outcomes and reducing costs. However, it is important to set quality and safety thresholds that must be achieved before any transfer of funds takes place. Such a system creates a safeguard against any stinting of care that may occur if only cost savings are taken into account in the gainsharing methodology¹⁰. In addition, the definition of cost savings must be agreed upon in advance—some actions may only be shifting costs upstream or downstream, without reducing costs across the entire episode of care. There may also be start-up and ongoing expenses that are necessary to run a bundled payment program, and these should be funded by any cost savings achieved.

Similar to performance metrics, the level at which gains are shared must be determined prior to the start of a bundled payment program. Some institutions choose to share gains broadly, such as at a department or nursing-unit level. Others opt for individual provider and staff-level incentives. This decision hinges on a thorough understanding of the episode of care and the type of behavior change that is desired. The level of accountability that the organization wants to drive should determine the target of the incentives. The success of certain episodes of care may depend on a few discrete decision-makers whose direct contribution to quality and financial outcomes can be measured. For example, if implant variability is identified to be the primary barrier to making bundled payments financially viable, a handful of surgeons hold the decision-making authority of whether or not to

standardize. Other institutions require small changes across a wide group of stakeholders, without clear lines of direct accountability. Process changes that improve communication and reduce duplication of services within multiple departments and across the continuum of care are an example of this. In order to be effective, gainsharing models should reflect the care process and the key levers for change. Furthermore, institutions need to be realistic about the amount of likely financial gains, particularly in the initial years of bundled payment implementation. Devising a complicated gainsharing methodology for a small pool of cost savings—or possibly none at all—may be overkill in the early stages of implementation.

5. Map Episode of Care and Costs

Once the episode is clearly defined, it is necessary to map it in its entirety. This is a fundamental step to ensure that all stakeholders have a shared understanding of the episode and of the tasks performed by others. The map should be constructed from the patient's perspective, with use of patient-shadowing techniques and staff interviews, and should reflect the so-called "typical" or standard patient flow across the full episode of care¹¹. Using a patient-centered methodology clearly highlights areas of transition and handoff, which a provider-centered focus can often miss. Each staff type should be identified, and key decision points that drive variations in care should be clearly indicated. If possible, each step in the map should have a corresponding time estimate. These maps should draw upon direct observation to the fullest extent possible. After the initial drafts are developed, they should be validated via multidisciplinary sessions composed of all of the front-line staff involved in that phase of care. To develop our initial maps, we employed volunteers to follow patients through the full episode of care and observe several cycles of work at each stage. Then we vetted the process steps and time estimates with a cross section of staff from each stage of the

episode—outpatient visit, surgery, and inpatient stay. This process resulted in a representative map of the “typical” patient episode that was accepted by all members of the care team, with important variations highlighted. For example, this methodology highlighted that some surgeons were using peripheral nerve infusion catheters for all patients, while others were only doing blocks for total knee arthroplasty patients, a difference that has implications both in terms of outcomes and costs.

To speed up the process, it is possible to develop a map based on the input of the multidisciplinary staff, starting first with a high-level outline of the process and then refining the map on the basis of input from front-line staff. However, we recommend starting with

direct observation if possible, preferably by staff members who do not work in that area on a daily basis, as they will be more attuned to process inefficiencies.

Process Mapping (Fig. 1)

Process mapping uses standard symbols to indicate the flow of a patient through the episode and the resource intensity of the various staff and providers who are interacting with the patient¹². For example, Figure 1 shows the first set of tasks with regard to a patient being transferred from the post-anesthesia care unit (PACU) on the day of surgery to the inpatient orthopaedic nursing unit. The colors indicate the type of staff, the bottom right-hand box indicates the number of minutes it took to complete the task, and the top right-hand box

indicates the type and number of resources that were involved in that task. In this way, it is easy to see at a glance the types of resources involved in any given phase of care, the standard sequence of tasks, and the resource intensity of each step.

In addition, the map can serve as the basis for cost estimation based on resource intensity for each stage of the episode. This is accomplished through time-driven activity-based costing (TDABC), which is a methodology to account for actual resource utilization across the episode of care in a detailed way¹³. First, direct costs associated with supplies and other tangible items that are consumed in the direct provision of care are attributed to the episode. Second, personnel costs are attributed to the

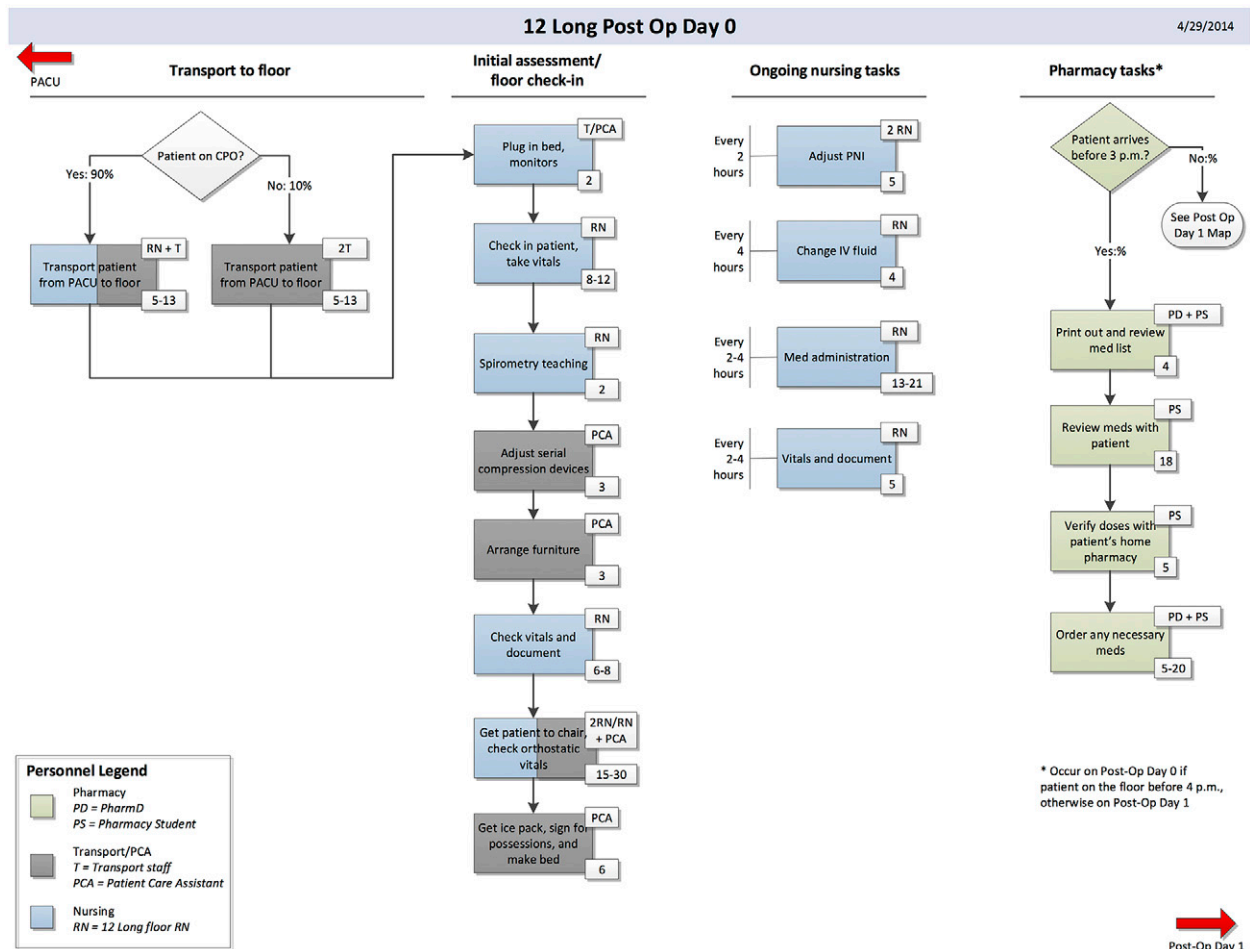


Fig. 1 Process map for inpatient stay on postoperative Day 0. CPO = continuous pulse oximetry.

episode by using the internal cost data of the health-care institution to determine an hourly rate that takes into account both the direct and indirect cost for the types of staff that are directly involved in patient care. This rate, applied to the time estimates in the map by resource type, yields the total episode cost by segment of care. TDABC analysis can bring to light the true cost of variability and serves as a methodology to enable informed cost-benefit decisions with regard to improvement interventions. It is also a fundamental underpinning of ensuring a focus on value for the patient, as outcomes per cost unit can be accurately determined and assessed. Our TDABC analysis highlighted that the major areas of cost difference across surgeons and procedures was in implants, drugs, and supplies, as opposed to inpatient or outpatient care. It will also serve as a way to track the cost savings achieved through our care redesign efforts. Other methodologies can be used, based on data from existing accounting systems, but they often lack the link back to clinical processes at a detailed level. For instance, most hospital accounting systems charge the same flat fee for an inpatient room on an orthopaedic floor. However, the resource intensity in terms of nursing, rehabilitation, and other providers' time (costs that are usually built in to the room charge) are dramatically different for a patient who is undergoing a revision arthroplasty versus a patient who is undergoing primary arthroplasty. TDABC can be used to quantify the actual cost of consumed resources, going beyond allocations.

6. Identify Opportunities for Improvement—Evidence-Based Analysis Versus Consensus-Based Opportunity Sourcing

After a shared understanding of the full episode is achieved through mapping, the most impactful areas for care redesign and cost reduction can be collectively identified. Some factors to consider include the stakeholder willingness to change and the magnitude of

improvements that can be achieved—both clinically and financially.

One starting point to identify areas for improvement is through a review of existing literature and other sources of best practices. Gaps between current institutional practice (as outlined in the care maps) and the documented evidence can be highlighted.

A complementary approach would be to determine focus areas for improvement through stakeholder consensus. Typically, there are several widely recognized “pressure points” that cause work flow inefficiencies or gaps in quality patient care. Addressing these areas can often secure goodwill among stakeholders and may serve as an engine for driving further improvement. Using a combination of evidence-based analysis and consensus-based opportunity sourcing will likely yield the most impactful areas for improvement.

7. Redesign Care to Improve Quality and Reduce Cost

The identification of focus areas will often lead to an outpouring of improvement ideas from stakeholders. A methodology to manage and prioritize these efforts is necessary. The approach must be multidisciplinary, since it is highly likely that the areas identified will require input from and change by a number of disciplines.

An approach with demonstrated success is the Lean continuous improvement methodology¹⁴. The Lean methodology, a management system and set of principles that originated with the Toyota Motor Company, empowers frontline staff to rapidly trial and implement changes to increase quality and reduce costs and can be a powerful way to source and sustain change. A fundamental principle of the Lean methodology as applied to health care is to view processes from the patient's perspective. This principle strongly complements the goals of bundled payment to encourage seamless, multidisciplinary care across the patient episode, instead of in the typical departmental or organizational siloes¹⁵. The Lean continuous

improvement methodology provides the tools and framework to map activities and identify wastes from the viewpoint of the patient, which has the additional benefit of aligning a diverse group of stakeholders around a common perspective¹⁵. Through repeated cycles of Lean continuous improvement work, an integrated, evidence-based, patient-centered care pathway that can reduce variation and improve patient outcomes can be developed. Multiple hospitals across the country have exhibited dramatic improvements in outcome and reduction in costs of care through the deployment of the Lean methodology¹⁶⁻¹⁸. Orthopaedics served as one of the first areas for implementation of the Lean methodology at our hospital. To date, we have conducted five, week-long improvement events focused on the perioperative episode for patients who have had total joint arthroplasty. This has resulted in reductions in patient lead time (the total amount of time it takes to get from the start of a process to the end of a process) during the inpatient stay, earlier identification of high-risk patients, more efficient turnover of operating rooms, and smoother handoffs from the PACU to the orthopaedic nursing unit. In addition to the operational improvements, this work has led to a culture change through which front-line staff and providers better understand the full continuum of care through which their patients move. They also better understand the ways in which staff members can work together to optimize the entire episode, not just the portion for which they are directly responsible.

8. Price and Market the Episode of Care

Once a reliable care pathway has been stably implemented and performance data are available, organizations can determine a fixed price for the episode of care. The price should take into account the actual cost of care delivery, and an expected standard deviation (as based on analysis of the data) should be built in to the price. If there are identifiable

up-front factors that drive differences in the care pathway—and therefore the cost (e.g., the number of comorbid conditions or the body mass index of the patient)—prices should reflect the varying resource intensity.

After determining a price at which the organization's operating costs are adequately covered for the vast majority of patients, the hospital can market its fixed price to commercial payers, large self-insured employers, accountable care organizations, and other health-care purchasers. In particular for high-volume, high-cost procedures with substantial existing market-price variability, such as total joint arthroplasty or cardiothoracic surgery, a guaranteed price and reliable outcomes are a major selling point that can drive additional volume to the institution¹⁹.

However, a risk that accompanies any price or quality guarantee is the potential downside risk associated with outlier cases. Having a separate process for identifying and paying for defined outliers (which the CMMI pilot does) is an important design element for implementing bundled payment. A thorough analysis of historical data can help to ground the discussion of the expected volume and cost of outliers. For the CMMI pilot, the prices are set on the basis of hospital-specific historical reimbursement data. This enables us to track cost savings and clinical outcomes against ourselves, instead of against market or peer benchmarks.

9. Evaluate Results and Iterate

Clinical and financial performance must be tracked on an ongoing basis, based on agreed-upon metrics and reporting mechanisms. A multidisciplinary steering committee should be accountable for this regular review and should have the authority to make operational adjustments as needed. The steering committee needs to include clinical champions from all involved services, unit nursing leadership, and representatives from finance and quality, at a minimum. It is to be expected that in the initial phases, close monitoring and

readjustment will be necessary, as the organization learns how to best manage patients in a more holistic manner. For example, cost savings or operational changes in one area may have unintended downstream implications. The providers (both hospital and physician) must remain flexible and nimble in order to respond to these developments. Through ongoing iteration and continuous process and quality improvement, the goals of bundled payment can be achieved.

Implementation Challenges

While bundled payments are an exciting development in the pursuit of higher value care, there are a number of very real implementation challenges that institutions will face as they attempt to roll out this new payment methodology. It is important to recognize these potential stumbling blocks up front and to work toward minimizing their impact as the implementation of bundled payment is broadened.

- *Competing incentives in a hybrid payment environment:* For the vast majority of institutions and clinical areas, there is a long way to go before the majority of payments are administered in a bundled manner. Yet, waiting until the entire payment system has made the shift toward episode-based payments will leave an institution far behind the curve⁴. That means that in today's environment, certain actions that make sense in a bundled payment, such as offering higher-touch services to reduce readmissions, will directly reduce revenue as collected under a fee-for-service system. For example, hiring clinical care coordinators to manage patients across the care continuum can decrease readmissions and emergency department visits, but under the current fee-for-service system this would directly reduce revenue from the additional admissions and visits, as well as incur cost. This tension can also play out at a departmental level, where providers may be compensated on the basis of work relative value units or other volume-based measures instead of on the basis of the

quality outcomes achieved or expenditures averted. A detailed analysis—both financial and clinical—of these trade-offs is necessary, and institutions must make an informed decision as to whether or not to participate. Mechanisms to compensate short-term “losers,” as well as longer-term initiatives to redesign incentive structures, will be necessary to encourage broad-based participation in the care redesign required by bundled payment. We have started to identify and address these tensions, but we expect to operate in a hybrid payment environment for some time.

- *Stress on the existing administrative and data-collection infrastructure:* Carving out a subset of patients within a clinical condition or department to be reimbursed in a bundled manner can cause a substantial amount of manual work for administrative staff. Current financial and data systems are built to support fee-for-service care and will likely require manual manipulation to appropriately track bundled payments. For example, in our program, an administrative assistant has to separately flag the patient in the electronic health record, and the claims are analyzed one by one on the back end to ensure proper coding, submission, and payment. From the first step of correctly identifying these patients to ensuring that all participating providers are paid out of a single bundled payment, a number of administrative work flows need to be adapted to enable bundled payment. Managing this dual administrative structure is difficult and creates the risk of patients and payments slipping through the cracks or metrics being incorrectly tracked and reported. A more high-touch management approach for bundled payment patients may be necessary in the early stages of implementation, until data systems catch up. We are using the CMMI BPCI program as a trial for developing organization-wide tools for bundled payment so that, as more payers and conditions are reimbursed in this way, we can process these patients and payments more efficiently.

Conclusions

Bundled payments can be an effective mechanism to align payer and provider incentives to work in a more patient-centered way. However, implementing bundled payments requires committed clinical and administrative leadership to develop new systems of delivering and optimizing care. The transition from a fee-for-service payment system to bundled payment is fraught with potential pitfalls that must be identified early and closely managed. By following the steps outlined in this review, organizations considering bundled payment can move toward implementation more quickly and efficiently.

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Appendix 1: Overview of Center for Medicare and Medicaid Innovation Bundled Payments for Care Improvement Initiative

The Center for Medicare and Medicaid Innovation (CMMI) was established in 2010 with the passage of the Affordable Care Act. Its mission is to test “innovative payment and service delivery models to reduce program expenditures...while preserving or enhancing the quality of care for those individuals who receive Medicare, Medicaid, or Children’s Health Insurance Program (CHIP) benefits.”⁵ In 2011, the CMMI announced the launch of the Bundled Payments for Care Improvement (BPCI) Initiative, which called upon hospitals, post-acute care facilities, physician group practices, and health systems to apply for a pilot program to test bundled payments for different types of care episodes. The goal of the initiative is to demonstrate whether bundled payments will achieve the goals of “higher quality, more coordinated care at a lower cost to Medicare⁶.”

Four different payment models were proposed, with varying inclusion criteria and durations. The CMMI’s intent is to trial various models and assess their relative effectiveness in achieving the program goals:

Model 1: Retrospective Acute Care Hospital Stay Only—this model covers only the inpatient stay, with physicians continuing to be paid separately by Medicare. However, in a departure from current procedure, the hospital and the physicians will be allowed to share any financial gains arising from care redesign or other efforts.

Model 2: Retrospective Acute Care Hospital Stay plus Post-Acute Care—this model begins with the inpatient stay and extends to all post-acute care provided thirty, sixty, or ninety days after discharge.

Model 3: Retrospective Post-Acute Care Only—this model is triggered by the inpatient stay, but the bundled payment only covers post-acute care provided thirty, sixty, or ninety days after discharge.

Model 4: Acute Care Hospital Stay Only—this model provides a single lump sum payment to the admitting hospital, from which the physicians and all other practitioners will be paid. Participating institutions are financially responsible for related readmissions to any hospital within thirty days after discharge.

Appendix 2: Draft of Bundled Payment Performance Dashboard*

	All Total Joint Arthroplasty Patients			Bundled Payment Population			Time Period
	Surgeon 1	Surgeon 2	Surgeon 3	Surgeon 1	Surgeon 2	Surgeon 3	
Clinical performance and quality							
SCIP Inf 9 Compliance (urinary catheter removed on POD 1 or 2)							Monthly
Total number of falls							Monthly
Blood utilization rate (THA)							Monthly
Blood utilization rate (TKA)							Monthly
PACU length of stay							Monthly
Unplanned ICU/step-down unit admission rate							Monthly
Surgical site infection rate (THA)							Monthly
Surgical site infection rate (TKA)							Monthly
Reoperation rate							Monthly
Medication reconciliation after discharge—metric TBD by CMS							Quarterly
Case mix index							Quarterly
Number of post-discharge phone calls requiring secondary triage and/or escalation							Monthly
CMS Physician Quality Reporting System participation rate							Annually
Percentage of patients with B-Care completion within 24 hr of discharge day							Monthly
30-day readmission rate							Quarterly
Patient-reported outcome measures							Quarterly
Mortality rate							Quarterly
Functional mobility							Quarterly
Financial performance							
Average cost per case (primary THA)							Monthly
Average cost per case (primary TKA)							Monthly
Average cost per case (bilateral)							Monthly
Implant cost per case (primary THA)							Monthly
Implant cost per case (primary TKA)							Monthly
Implant cost per case (bilateral)							Monthly
Non-core professional fees per case (primary THA)							Monthly
Non-core professional fees per case (primary TKA)							Monthly
Non-core professional fees per case (bilateral)							Monthly
Total contribution margin							Monthly
Total cost savings (change vs. previous year)							Monthly
Operational performance							
Lead time between OI appointment and surgery							Monthly
OR turns (cases per day)							Monthly
OR turnover time							Monthly
Average LOS (days) (primary THA)							Monthly
Average LOS (days) (primary TKA)							Monthly
Average LOS (days) (bilateral)							Monthly
Percentage of first cases starting before 7:35 AM							Monthly
Average case length (primary THA)							Monthly
Average case length (primary TKA)							Monthly
Average case length (bilateral)							Monthly
Case volume (primary THA)							Monthly
Case volume (primary TKA)							Monthly
Case volume (bilateral)							Monthly
Percentage of patients discharged before noon (orthopaedics unit)							Monthly
Average daily discharge time (orthopaedics unit)							Monthly
Patient experience							
Rate hospital top box percentage							Quarterly
Pain well controlled top box percentage							Quarterly

*B-care = bundled care, CMS = Centers for Medicare & Medicaid Services, ICU = intensive care unit, LOS = length of stay, OI = orthopaedic institute, OR = operating room, PACU = post-anesthesia care unit, POD = postoperative day, SCIP Inf 9 = Surgical Care Improvement Project Infection Indicator 9, TBD = to be decided, THA = total hip arthroplasty, and TKA = total knee arthroplasty.