

Medicare Bundled Payment Programs for Joint Replacement

Anatomy of a Successful Payment Reform

Andrew M. Ryan, PhD

Since its inception, how Medicare pays hospitals has been a work in progress. Medicare originally paid hospitals by reimbursing them for the cost of each “item” of care delivered, such as laboratory tests, medications, and procedures. While



Related articles [pages 892 and 901](#)

this was advantageous for hospitals, it ultimately led to an unsustainable increase in Medicare spending.¹ In 1983, the Reagan administration responded by implementing a major payment reform: prospective payment. Under prospective payment, hospitals are paid a single fixed amount for an entire hospitalization, based on the diagnosis for which a patient is hospitalized. This creates incentives for hospitals to be more efficient during the hospitalization, reduce length of stay, and avoid nonessential tests and procedures.

Prospective payment led to historic reductions in Medicare spending growth for inpatient care,² but it was never perfect. Physician fees were not part of prospective payment nor was any care received after the hospitalization, such as readmissions or postacute care from skilled nursing facilities or home health care services. Prospective payment based on diagnosis also did not account for variation in quality, paying outstanding hospitals the same as low-quality hospitals.

The Centers for Medicare & Medicaid Services (CMS) have now initiated additional Medicare payment reform, from prospective payment to bundled payment. Bundled payment extends the clinical “episode” to include not only the hospitalization but also postdischarge care, generally up to 90 days after discharge. Under bundled payment, hospitals are assigned a target price for each clinical episode, can receive shared savings if spending is less than the target price, and are subject to penalties if spending is greater than the target price. Two articles in this issue of *JAMA* evaluate new bundled payment programs.^{3,4}

The article by Finkelstein and colleagues³ evaluated the Comprehensive Care for Joint Replacement (CJR) program. Spending on postacute care explains much of the variation in hospital episode spending, especially for joint replacement surgery.⁵ In the CJR program, CMS randomized 75 metropolitan statistical areas (MSAs) to be mandatorily subject to CJR and 121 to control. CMS ultimately excluded 8 of the MSAs assigned to CJR, leaving 67 in the treatment group. In an interim analysis of the first performance year of this 5-year program, using an instrumental variable analysis,

the authors found that CJR was associated with a 2.9-percentage point decline in discharges to institutional post-acute care (including skilled nursing, long-term care, and inpatient rehabilitation facilities) in its first 6½ months (95% CI, -4.95 to -0.90). In addition, the program was not associated with changes in targeted quality measures (ie, a composite measure of complication rates following total hip or knee arthroplasty and patient experience) or nontargeted quality measures (such as 90-day all-cause readmission rates or emergency department visit rates).

This preliminary analysis provides the strongest evidence to date that mandatory bundled payment can work to reduce health care use.⁶ The methods used by Finkelstein et al are rigorous and transparent. By taking advantage of a randomized policy experiment—a rare occurrence in policy reform—the authors make a highly plausible case that their findings represent causal relationships.

Finkelstein et al also found that the CJR program was associated with a nonstatistically significant decrease in total Medicare spending (a \$453 reduction per joint replacement episode; 95% CI, -\$909 to \$3). However, CJR was associated with a net increase in total spending after accounting for shared savings that were returned to hospitals. This observation is likely because hospitals were eligible for shared savings, but not risk, during the first year of program implementation. As the incentives in CJR increase over time, with greater opportunities for shared savings and the addition of further risk, spending reductions may increase in magnitude as hospitals converge on more efficient care pathways.

That CJR was a mandatory program provides reassurance that typical hospitals—not just those that volunteer to participate in bundled payment—have the resources and wherewithal to improve under these programs. In fact, hospitals participating in the voluntary Bundled Payment for Care Improvement (BPCI) program were expressly excluded from CJR. As a result, the intervention was conducted among hospitals that were presumably less interested in reforming practice. Evidence that CJR worked in this context is an important finding, supporting the mandatory rollout of bundled payment programs.

Efficacy, though, is only one side of policy evaluation. The article by Navathe and colleagues⁴ in this issue of *JAMA* evaluates the other side: potential unintended consequences of bundled payment programs. First, because bundled payment creates incentives for hospitals to reduce payments

within each episode, hospitals may respond by increasing the volume of episodes. Second, because target prices under the bundled payment programs do not account for variation in patient severity across hospitals, hospitals may respond by attempting to shift their case mix toward patients with lower severity. This is particularly important with joint replacement, because indications for such procedures are not well established.

The authors evaluated these potential unintended consequences in the context of the BPCI program, focusing on the subgroup of hospitals that elected to enroll for lower extremity joint replacement (LEJR). The authors found that Model 2 BPCI participation (the predominant model in BPCI) was not significantly associated with a change in overall market-level LEJR volume. The mean quarterly market LEJR volume increased by 3.8% in non-BPCI markets from 3.8 episodes per 1000 beneficiaries before to 3.9 episodes per 1000 beneficiaries after BPCI launched, and in BPCI markets increased 4.4% from 3.6 to 3.8 episodes per 1000 beneficiaries (adjusted difference-in-differences estimate, 0.32%; 95% CI, -0.06% to 0.69%; $P = .10$). The authors also found that BPCI was significantly associated with a differential change in only 1 of 20 indicators of clinical severity, suggesting participating hospitals did not substantially alter their case mix in response to the program.

The findings of no significant increases in case volume or large-scale changes in patient composition after BPCI implementation are, as the authors note, “reassuring.” Similar evidence was observed by Finkelstein et al who found that CJR did not lead to increases in case volume, shifts toward lower-severity patients, or reductions in quality.

However, Navathe et al do report shifts in patient composition that bear continued monitoring, particularly in regards to the case-mix measures related to prior health care use. The authors report that the proportion of patients with prior use of a skilled nursing facility declined, and there were nonsignificant declines in prior use of inpatient rehabilitation and acute care hospitals. These findings are similar to a study by Dummit et al⁶ who found that BPCI was associated with favorable selection with respect to prior use of inpatient hospital care, home health, and skilled nursing. Taken together, the reports by Navathe et al⁴ and Dummit et al suggest that hospitals in the BPCI program may have shifted the composition of patients toward somewhat healthier patients.

Why might there be favorable selection in the BPCI but not in CJR? One possibility is that favorable selection was unrelated to incentives in the BPCI and instead represented an underlying trend among hospitals that chose to join the program. Navathe et al found that case volume for joint replacement increased more in markets with BPCI hospitals than in markets without BPCI hospitals, although this difference was not statistically significant. However, the fact that Finkelstein et al did not find such a shift suggests that this increase in volume was likely not caused by participation in a bundled payment program. Instead, hospitals that joined BPCI may have been more strategically oriented toward increasing case volume. Under such an orientation, patients

with more uncertain indications for LEJR may have received surgery, leading to a shift toward more favorable case mix.

It is also possible, however, that the shift in case mix represents true risk aversion among hospitals participating in the BPCI. Recent research has shown that hospitals with greater clinical severity will be financially penalized in these programs,⁷ which could increase the incentives to avoid high-risk patients. This problem may be exacerbated after new CMS payment regulations for joint replacement. CMS recently announced that total knee arthroplasty will be removed from the “inpatient-only list,” allowing the procedure to be performed in hospital outpatient departments or ambulatory surgery centers.⁸ Total hip arthroplasty is also being considered for removal from the inpatient-only list. These procedures are central to both the CJR and to BPCI Advanced, the next wave of bundled payment reform.⁹ With the decision by CMS to remove joint replacement from the inpatient-only list, hospitals that more successfully triage low-severity patients to outpatient surgery will be left with a greater share of high-severity patients undergoing inpatient joint replacement. These patients will cost more to treat, potentially creating financial disadvantage for hospitals in the bundled payment programs if such differences in clinical severity are not adequately taken into account.

However, CMS is rightfully concerned that severity adjustment may become a means for hospitals to up-code severity and “game” the program. This tension between appropriately accounting for variation in hospital risk while minimizing the ability for hospitals to game performance measures is central in alternative payment models.¹⁰ One solution may be for CMS to incorporate more risk adjustment in these programs, coupled with more aggressive auditing of hospital records.

Another question for bundled payment is whether the successes related to joint replacement can be extended to other surgical and medical diagnoses. Because much of the savings in bundled payment programs have been concentrated among payments to institutional postacute care and clinical facilities,^{3,7,11} surgical conditions that do not have this spending profile may be more challenging to improve. Episodes for medical conditions, especially those for exacerbations of chronic disease, may also be less amenable to improvement under bundled payment. Recent research suggests that BPCI was not associated with successfully reducing spending for medical conditions, including congestive heart failure, pneumonia, chronic obstructive pulmonary disease, sepsis, and acute myocardial infarction.¹² Other population-based payment models may be needed to drive value in the broader population of patients.¹³

Nevertheless, the new research on bundled payment in this issue of *JAMA* is encouraging. Given the increasing number of joint replacements at younger and younger ages, it is important that these procedures be a focus of cost and quality initiatives.¹⁴ The findings reported by Finkelstein et al and Navathe et al suggest that prospective payment to hospitals can be improved through common sense and straightforward bundled payment reforms. These programs should be continued and expanded, particularly for patients undergoing elective surgical procedures.

ARTICLE INFORMATION

Author Affiliation: UnitedHealthcare, Health Care Management, University of Michigan School of Public Health, Ann Arbor.

Corresponding Author: Andrew M. Ryan, PhD, Department of Health Management and Policy, School of Public Health, University of Michigan, 1415 Washington Heights, SPH II, Room M3124, Ann Arbor, MI 48109 (amryan@umich.edu).

Conflict of Interest Disclosures: The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Additional Contributions: I thank Tedi Engler, BS, for editorial assistance, Chandy Ellimoottil, MD, MS, for helpful comments, and Shelly Grimaldi, BA, for discussions about joint replacement and Medicare spending.

REFERENCES

- Weisbrod BA. The healthcare quadrilemma: an essay on technological change, insurance, quality of care, and cost containment. *J Econ Lit*. 1991;29(2): 523-552.
- Davis C, Rhodes DJ. The impact of DRGs on the cost and quality of health care in the United States. *Health Policy*. 1988;9(2):117-131. doi:10.1016/0168-8510(88)90029-2
- Finkelstein A, Ji Y, Mahoney N, Skinner J. Mandatory Medicare bundled payment program for lower extremity joint replacement and discharge to institutional postacute care: interim analysis of the first year of a 5-year randomized trial [Published September 1, 2018.]. *JAMA*. doi:10.1001/jama.2018.12346.
- Navathe A, Liao J, Dykstra SE, et al. Association of hospital participation in a Medicare bundled payment program with volume and case-mix of lower extremity joint replacement episodes [Published September 1, 2018.]. *JAMA*. doi:10.1001/jama.2018.12345.
- Miller DC, Gust C, Dimick JB, Birkmeyer N, Skinner J, Birkmeyer JD. Large variations in Medicare payments for surgery highlight savings potential from bundled payment programs. *Health Aff (Millwood)*. 2011;30(11):2107-2115. doi:10.1377/hlthaff.2011.0783
- Dummit LA, Kahvecioglu D, Marrufo G, et al. Association between hospital participation in a Medicare bundled payment initiative and payments and quality outcomes for lower extremity joint replacement episodes. *JAMA*. 2016;316(12): 1267-1278. doi:10.1001/jama.2016.12717
- Ellimoottil C, Ryan AM, Hou H, Dupree J, Hallstrom B, Miller DC. Medicare's new bundled payment for joint replacement may penalize hospitals that treat medically complex patients. *Health Aff (Millwood)*. 2016;35(9):1651-1657.
- Centers for Medicare & Medicaid Services. Medicare program: hospital outpatient prospective payment and ambulatory surgical center payment systems and quality reporting programs. *Fed Regist*. 2017;82(217):52536-52637.
- BPCI Advanced. Centers for Medicare and Medicaid Services web page. <https://innovation.cms.gov/initiatives/bpci-advanced>. Updated August 20, 2018. Accessed August 20, 2018.
- Landon BE, Mechanic RE. The paradox of coding—policy concerns raised by risk-based provider contracts. *N Engl J Med*. 2017;377(13):1211-1213. doi:10.1056/NEJMp1708084
- Navathe AS, Troxel AB, Liao JM, et al. Cost of joint replacement using bundled payment models. *JAMA Intern Med*. 2017;177(2):214-222. doi:10.1001/jamainternmed.2016.8263
- Joynt Maddox KE, Orav EJ, Zheng J, Epstein AM. Evaluation of Medicare's bundled payments initiative for medical conditions. *N Engl J Med*. 2018;379(3):260-269. doi:10.1056/NEJMsa1801569
- Song Z, Rose S, Safran DG, Landon BE, Day MP, Chernew ME. Changes in health care spending and quality 4 years into global payment. *N Engl J Med*. 2014;371(18):1704-1714. doi:10.1056/NEJMsa1404026
- Lam V, Teutsch S, Fielding J. Hip and knee replacements: a neglected potential savings opportunity. *JAMA*. 2018;319(10):977-978.