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Cost of Joint Replacement Using Bundled Payment Models

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Research BRIEF

Research to Improve the Nation's Health System

2017 . No. 1

COST OF JOINT REPLACEMENT USING BUNDLED PAYMENT MODELS

Amol S. Navathe, Andrea B. Troxel, Joshua M. Liao, Nan Nan, Jingsan Zhu, Wenjun Zhong, and Ezekiel J. Emanuel

JAMA Internal Medicine, January 2017

KEY FINDINGS

Medicare bundled payments for joint replacement produced significant savings for a hospital system and reduced Medicare payments. The savings were driven by reductions in implant cost and in post-acute care spending.

THE QUESTION

Bundled payments apply a fixed price to episodes of care, thereby incentivizing care coordination and efficiency. In 2009, the Centers for Medicare and Medicaid Services (CMS) piloted an orthopedic bundle, the Acute Care Episode (ACE) demonstration, for in-hospital costs only. In 2013, CMS expanded the voluntary model with Bundled Payment for Care Improvement (BPCI), which included both acute hospital and post-acute care (PAC) for 30 days. These projects led to the Comprehensive Care for Joint Replacement (CJR) program in 2016 - a mandatory bundled payment program for all 800+ hospitals in 67 urban geographic areas. CJR bundled payments include hospital, physician, and PAC services for 90 days.

The Trump administration and new CMS leadership will need to decide whether to continue to ramp up mandatory bundles, and have expressed misgivings about this approach. Evidence on the effects of bundled payment is more important than ever, while hospitals already in CJR need guidance in redesigning care. This observational study looks at whether bundled payment for joint replacement through the ACE and BPCI affected quality, hospital costs and post-acute care spending. Did the bundles save money, and if so, what produced those savings?

THE STUDY

The authors studied 3,942 patients who had major joint replacement of lower extremities, between 2008 and 2015 at Baptist Health System (BHS) in Texas. BHS is a clinically integrated network of five hospitals that participated in ACE and BPCI.

They matched Medicare claims data and BHS internal cost data for Medicare patients discharged from BHS hospitals for episodes of major joint replacement. They used Medicare claims to construct care episodes that included acute hospital facility payments, physician fees during hospitalization, and PAC payments up to 30 days after hospital discharge.

They analyzed changes in episode payments, internal hospital costs, and PAC spending across four study periods: the ACE baseline, when the hospital was paid fee-for service; the ACE period; a transition period between ACE and BPCI, when data were unavailable; and the BPCI period. They analyzed changes in quality using the 30-day readmission rate, emergency room visit rate, and proportion of episodes with a prolonged length of stay (PLOS).

THE FINDINGS

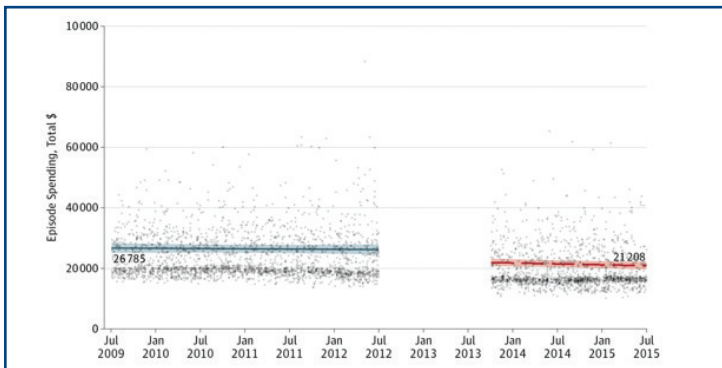
Episode Payments

Between 2008 (the baseline) and 2015, average Medicare payments to BHS for joint replacement without complications decreased nearly 21% from \$26,785 to \$21,208, with significant reductions only during BPCI. See graphic.

Average episode spending on cases with pre-existing complications decreased 13.8% between 2008 and 2015, although the decrease was not statistically significant.

Hospital Savings

Hospitals earned savings (that is, additional margins) by internal cost reductions, and for the BPCI period only, by decreasing PAC spending. By the end of 2015, 51% of savings came from internal reductions, mostly from decreasing the cost of implants and supplies, and 49% of savings



Episode Spending in ACE and BCPI Models. Blue line is fitted episode spending; red line is CMS target price under BCPI. Source: JAMA Internal Medicine

from a decrease in PAC spending, mostly from a decreased use of institutional care. Implant costs decreased by 29% from \$6,636 to \$4,716 over the study period.

PAC spending decreased only when it was included in the bundle (the BPCI model). From 2013 to 2015, average inpatient rehabilitation facility spending per episode declined 54% from \$2,601 to \$1,185, accounting for 45% of total hospital savings. Average skilled nursing facility spending per episode fell 24% from \$2,476 to \$1,875 and accounted for 19% of total hospital savings.

Quality of Care

From baseline to the end of 2015, the proportion of cases with prolonged length of stay (PLOS) decreased from 22% to 7%, while rates of readmissions and emergency room visits did not change. The severity of patient illness remained stable.

THE IMPLICATIONS

During a period in which Medicare payments for joint replacement episodes increased by 5% nationally, an early adopter of bundled payments saw a 21% decrease in total Medicare payments per uncomplicated joint replacement episode. This study identifies implant costs and institutional PAC spending as areas of potential major savings. These results can inform health systems in care redesign as Medicare moves to reimburse more services through bundled payments.

The authors draw several lessons from BHS's success in implementing bundled payments:

- Hospitals can save money by reducing implant costs and institutional PAC utilization, changes that can be made without intensive care coordination investments. BHS reduced implant costs by almost 30% (compared to a 15.5% reduction nationally) through its successful

gainsharing mechanism. Including surgeons in the decision making process enabled BHS to standardize implant use.

- Hospitals can generate savings without compromising on quality, or only selectively choosing the lowest-risk patients. During the study period, there were no significant changes in patient risk scores, hospital readmission or emergency room rates.
- Organizational and market characteristics can improve a hospital's performance in a bundled payment initiative. The authors suggest that BHS's success in BPCI can be partially attributed to building blocks established during ACE: data infrastructure and an orthopedic working group tracking variations in care. Additionally, BHS utilized home care services available in its local market to reduce the use of institutional PAC, allowing it to reduce PAC costs.
- How bundles are designed matters. In contrast to BPCI, the new CJR program involves a 90-day bundle, incorporates risk-adjusted hospital complications such as acute myocardial infarction and pneumonia into quality measurement, and utilizes regional benchmarks in computing hospitals' baselines.

While the BHS experience may not generalize to all providers, these results can provide guidance to other organizations by delineating how a high-performing system achieved its savings.

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ABOUT LDI

Since 1967, the Leonard Davis Institute of Health Economics (LDI) has been the leading university institute dedicated to data-driven, policy-focused research that improves our nation's health and health care. Originally founded to bridge the gap between scholars in business (Wharton) and medicine at the University of Pennsylvania, LDI now connects all of Penn's schools and the Children's Hospital of Philadelphia through its more than 200 Senior Fellows.

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Amol Navathe, MD, PhD, is an Assistant Professor of Health Policy and Medicine at Penn. He is a practicing physician, health economist and engineer with an expertise in delivery transformation and policy design. His work focuses on the use of data analytics and technology to enhance health care delivery, inform policy and improve physician and economic behavior.