

## Implantable Medical Devices for Hip Replacement Surgery: Economic Implications for California Hospitals

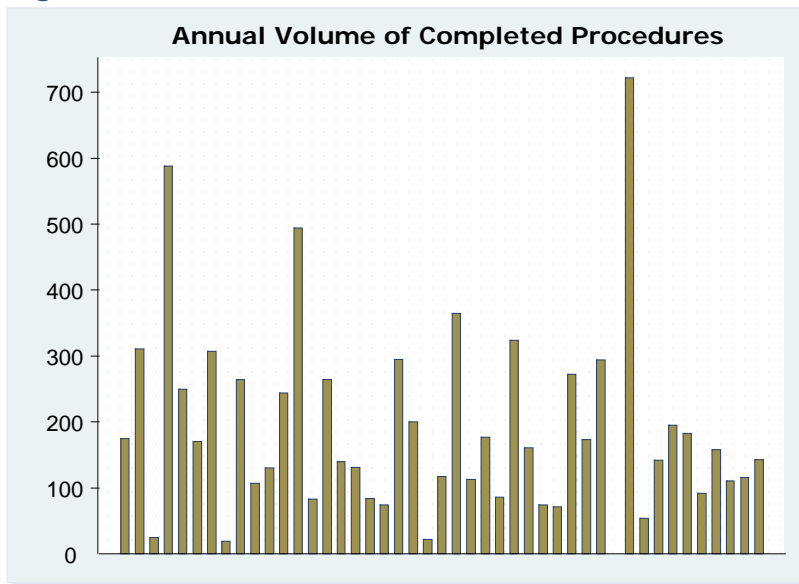


The Berkeley Center for Health Technology (BCHT) has been working with the Integrated Healthcare Association (IHA) on its Value-Based Purchasing of Medical Devices (VBP) Project, which has included the collection and analysis of hospital and patient data on seven orthopedic, cardiac, and spinal procedures.

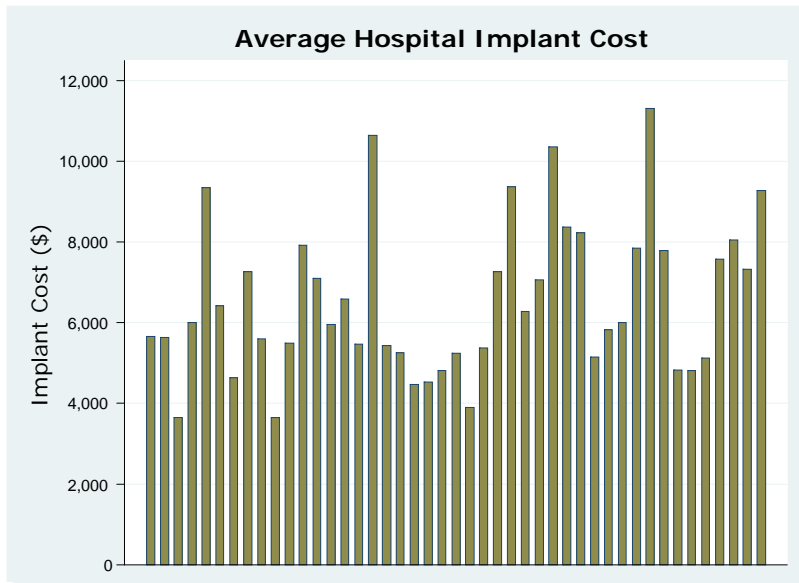
This Issue Brief is the second in a series that comes out of this project, and presents findings on implant costs, complications, total surgical costs, and insurance reimbursement for hip replacement surgery.

Forty-five hospitals in California participated in the full collection initiative, providing data on device costs, length of stay, total procedure costs, complications, reimbursements, and patient characteristics. Hospital participants are diverse in terms of whether they belong to a hospital system, urban or rural location, for-profit or non-profit status, teaching status, and bed size. All data are from 2008.

**Figure One**



**Figure Two**



All of the procedures for which data were collected involve the implantation of medical devices—in this case, artificial hip joints—that are “physician preference items” (PPI). In contrast to the majority of supplies used in a hospital, surgeons are generally responsible for choosing which devices to implant, and can develop preferences for brands or functional levels. Historically, PPIs are a source of conflict between hospitals and surgeons, as a surgeon’s choice is not necessarily made with the hospital’s desire to contain costs in mind. An overarching goal of the VBP Project has been to help hospitals and physicians align their incentives when it comes to the purchase of PPIs, as this alignment is critical to the efficiency of surgical service lines.

Hip replacement and other surgical procedures constitute the core of the orthopedic service lines that, in turn, constitute the economic core of many hospitals in California and the United States. According to the American Academy of Orthopaedic Surgeons, there are nearly 200,000 hip replacements in the U.S. each year and the volume is growing rapidly as the population ages and obesity puts added pressure on joints and bones. By 2030, the demand for this procedure is projected to more than double, due in part to population aging, the obesity epidemic, and patients seeking improved quality of life.<sup>1</sup> Together, hip, and knee replacement surgery constitute the largest category of hospital expenditure for Medicare.

**The Annual Volume of Procedures Varies Substantially Across Californian Hospitals**

The annual number of hip replacements across surveyed hospitals is shown in Figure One. The lowest volume hospital completed a total of 11 hip replacements in 2008, whereas the highest volume hospital completed 439. The average hospital volume was 97 procedures.

## The Cost of Hip Replacement Implants

All procedures studied showed striking variation in the cost of devices both across and within hospitals, controlling for disease severity. For hip implants, average implant costs vary by a factor of more than three across hospitals.

Figure Two shows variation in average hip replacement implant cost per case across the 45 California hospitals for which full data were collected. Costs range from \$3,645 to \$11,308, with an average of \$6,531. This represents only a portion of the total variation in device cost, as there was also wide within-hospital variation, which remained even after controlling for patient age, principal diagnosis, co-morbidities, complications, and whether they were discharged to home or to a nursing home.

### A Majority of Surveyed Hospitals Obtain Over 80% of Hip Devices From Just Two Vendors

Hospital efforts to manage device costs vary in their effectiveness, given that implant devices are physician preference items. It can therefore be difficult to coordinate purchasing across all of the facility’s surgeons. As a possible remedy, a hospital may choose to contract with a small number of device manufacturers, which can also incentivize manufacturers to offer lower prices in order to secure contracts.

Several California hospitals get the majority of their devices from two manufacturers; over two-thirds get 80% or more of their hip devices from two vendors, and four hospitals get all of their implants from only two vendors, although these are different vendors across hospitals. Figure Three shows the percent of hip devices purchased from the largest and second largest vendors in each surveyed hospital.

Figure Three

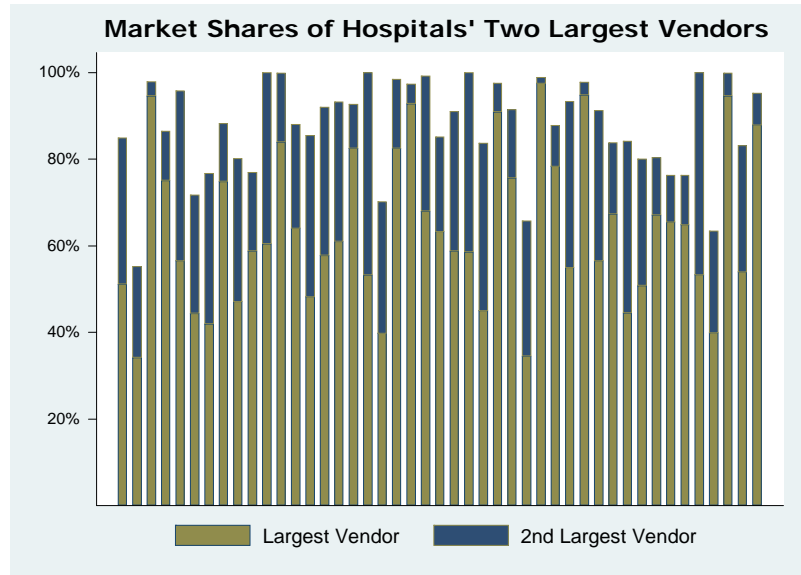
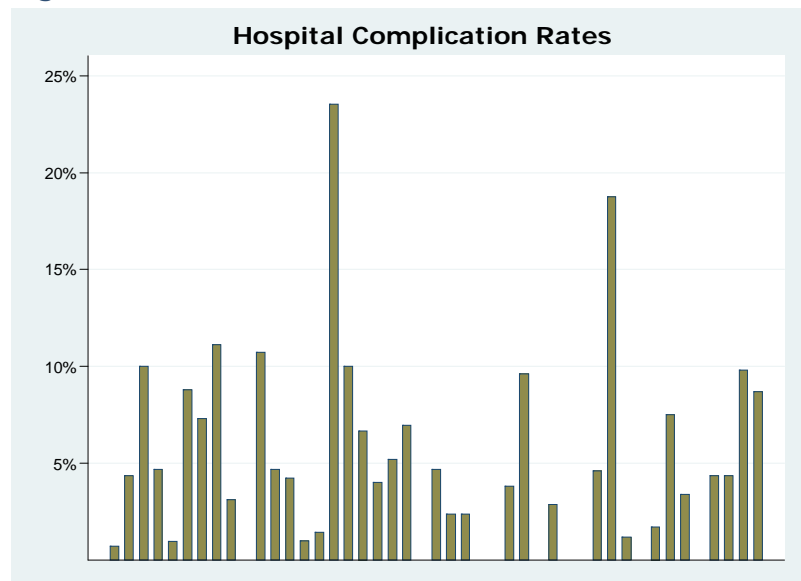
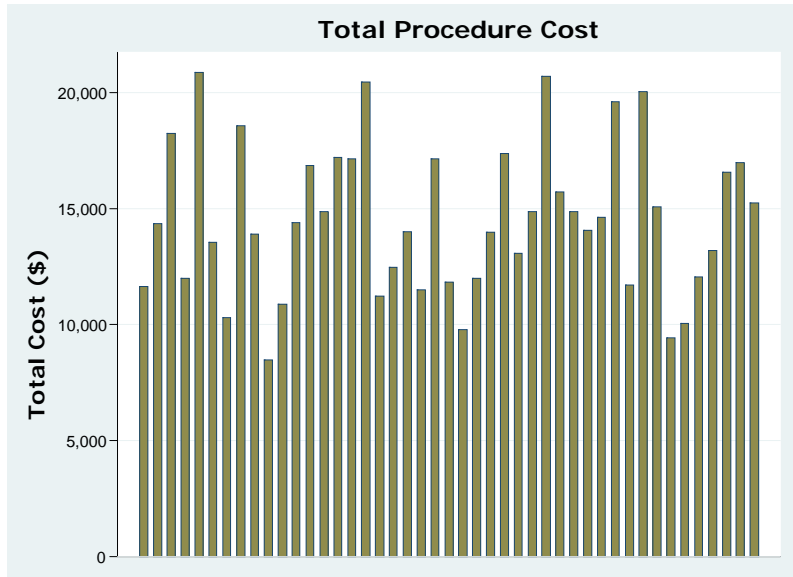


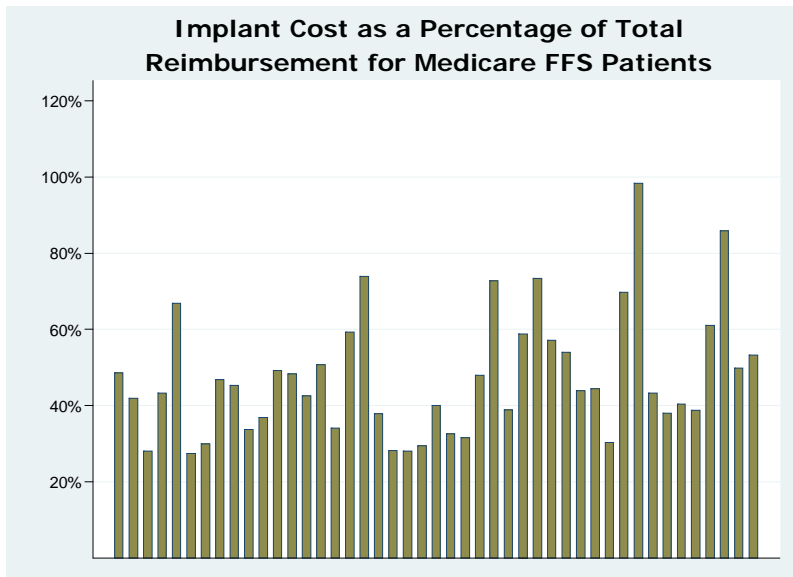
Figure Four



**Figure Five**



**Figure Six**



Consolidation of purchasing to a limited number of vendors may reduce device costs in the short term, however, it can also have long term costs. If, after a prolonged period of using the implant devices of one company, a surgical staff is forced to switch to another manufacturer’s devices, there will be substantial costs associated with the time it takes to adapt to new implant types. Also, there can be administrative costs associated with switching from one vendor to another.

**Variation across Hospitals Extends to Surgical Complications and Length of Stay**

A complication has been defined as an event severe enough to prolong a patient’s length of stay by one day, thus length of stay (LOS) and complication rates are related. Figure Four illustrates variation in complication rates across Californian hospitals, which range from 0% to 23.5%, with a mean of 4.9%. Average length of stay across participating hospitals ranged from 2.4 to 5.5 days, with a mean of 3.7 days. Lengths of stay for hip implants were very similar to those for knee implants, which ranged from 2.4 to 6 days, with an average of 3.5 days.

**Total Surgical Costs Vary by a Factor of Two and a Half**

Largely driven by complication rates, length of stay, and device costs, the total cost of hip replacement surgery varies by a factor of 2.5 across hospitals, from \$8,474 to \$20,874 with mean of \$14,510. Figure Five shows total surgical costs across participating Californian hospitals.

**The Cost of a Hip Implant Takes Up a Large Portion of Insurance Reimbursement**

The price of hip implants has risen over the past several years, which can strain the hospitals

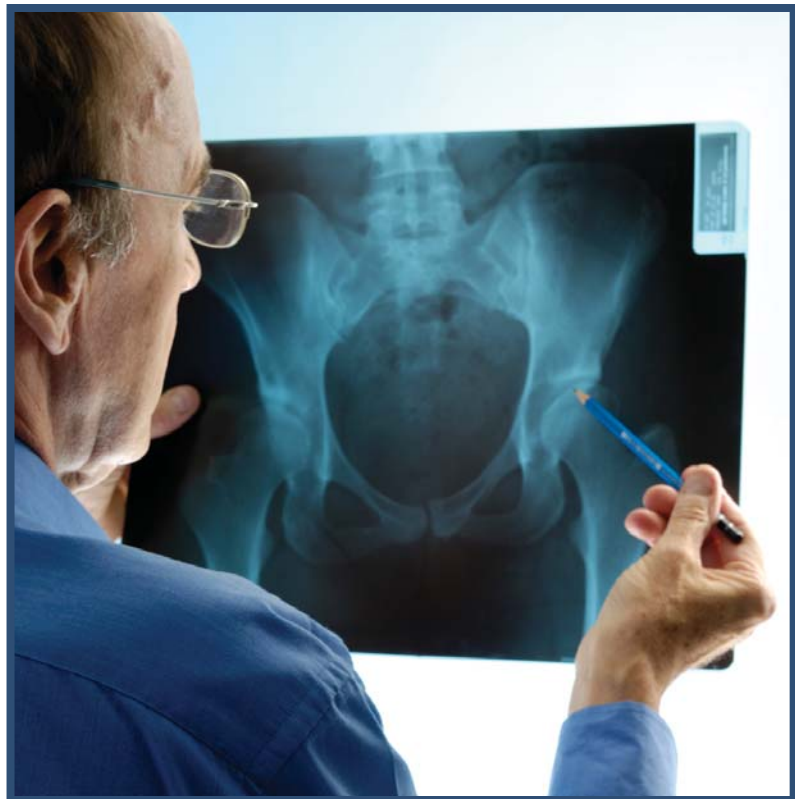
responsible for purchasing them. The impact of rising prices depends in part upon the ability of a hospital to pass these along to payers. For patients covered by Medicare, this ability is limited, as hospitals are paid a fixed amount (DRG) for all components of the procedure, except professional fees. The cost of orthopedic implants has been rising faster than DRG increases, which is especially concerning for hospitals, given that the majority of hip implant recipients are covered by Medicare.

Figure Six presents implant cost as a percent of Medicare fee-for-service (FFS) reimbursement across Californian hospitals, which ranges from a low of 27.4% to a high of 98.3%, with an across-hospital average of 47.4%. Figure Seven illustrates implant costs as a percentage of total reimbursement for commercial patients, which is generally lower than implant costs as a percentage of Medicare FFS payments, and ranges from 10.8% to 57.2%, with an average of 30.4%.

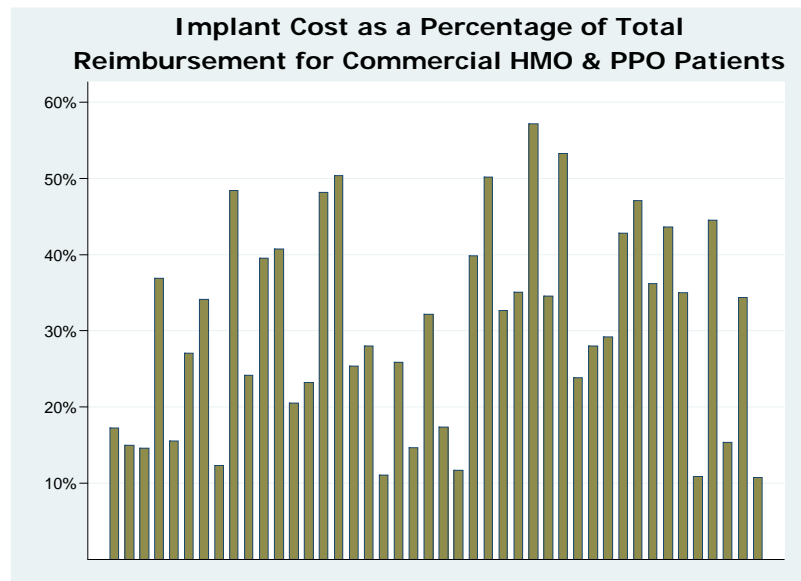
In contrast to Medicare payments, commercial payments are determined in negotiations with health plans. Hospitals generally have some leverage in these negotiations, which allows them to charge higher rates and, in some cases, to 'carve out' the price of a device from reimbursement for the procedure itself, which isolates them from increased device costs.

**Conclusion**

The number of hip implant surgeries will continue to grow over the next several years as the population ages, which makes containing the costs of this procedure all the more important for Californian hospitals. The variation in devices costs across hospitals suggests that significant savings are possible for some institutions if they can work with both their affiliated surgeons and device manufacturers in order to bring costs down. Uncovering across-hospital variation in device costs



**Figure Seven**



and other drivers of total surgical costs is important, but it is also only a preliminary step towards improving the performance of surgical service lines. Sophisticated and value-based purchasing by physicians and hospitals will, in turn, create stronger incentives for device manufacturers to develop new implants that are both of higher quality and of lower cost than those they replace.

<sup>1</sup> Wilson NA, Schneller ES, Montgomery K, Bozic KJ. Hip and knee implants: current trends and policy considerations. *Health Affairs* 2008;26(6):1587-1598.

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