Preventing Infection After Hip and Knee Replacements

Simple practices improve care while reducing costs.

Knee and hip replacements are two of the most commonly performed surgeries in the United States, with more than 1.1 million combined cases performed annually. Within the next two decades, that number is predicted to exceed 4 million. Depending on patient risk, it is estimated that between 6,000 and 20,000 surgical site infections (SSIs) develop each year in the U.S. after knee and hip replacements, and these numbers, too, are expected to rise.

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Increasingly, when healthcare executives try to relate these statistics to what happens in their own institutions, they see that SSIs following hip or knee arthroplasty can lead to catastrophic personal and financial consequences for patients and families and increased costs to providers. With this tremendous opportunity to improve care for patients in mind, the Institute for Healthcare Improvement launched Project JOINTS (Joining Organizations IN Tackling SSIs) in April 2011 to speed the adoption of proven practices to prevent SSIs after hip and knee replacement surgery.

What we are learning from the more than 500 facilities across the U.S. participating in this federally funded initiative demonstrates that healthcare leaders have an important role to play in preventing unnecessary harm to thousands of people every year.

Infection Rates: Your Patients’ Perspective

The Centers for Disease Control and Prevention’s December 2009 National Healthcare Safety Network report noted knee replacement postoperative infection rates ranging from 0.68 percent to 1.60 percent, depending on patient risk. Hip replacement infection rates ranged from 0.67 percent to 2.4 percent. Many organizations compare their SSI rate to those numbers and may not necessarily think they have a problem. What if, however, you look at your infection rate from your patients’ perspective? Imagine undergoing multiple surgeries, experiencing prolonged periods of medical and physical therapy, having to use a wheelchair or walker, and enduring months of recuperation, considerable pain and sizeable out-of-pocket expenses. Picture the permanent disability and long-term financial problems that many patients who develop SSIs following knee or joint replacement have to endure. Suddenly, even one patient developing an SSI is too many, especially when it can be avoided.

There are simple, affordable practices organizations can put into place to reduce SSIs. By bathing or showering with chlorhexidine soap or wipes for three days prior to surgery and applying mupirocin (when a patient’s Staphylococcus aureus screening is positive), patients can reduce their risk of infection. (For more on these practices, see sidebar on page 69.) Effective implementation of these practices requires patient education.

Effective patient education occurs when clinicians and patients discuss together what they can do jointly to reduce SSIs. In a healthcare culture where much is done to patients and not necessarily with them, the Project JOINTS
practices give providers an opportunity to engage patients in their own care in ways that not only help prevent SSIs but also increase patient satisfaction. While surgeons may initially worry about potentially frightening patients by explicitly addressing the risk of infection, we have found the opposite to be true. Participants in Project JOINTS report that patients express appreciation for the frank communication, including being given the necessary information to help prevent SSIs. Project JOINTS offers free patient education tools and resources, available on ihi.org, to help clinicians educate patients on infection prevention.

As the number of hip and knee arthroplasty procedures quadruples and healthcare organizations face public reporting on infections, careful attention to infection reduction for these procedures will be critical to reducing costs, improving health and enhancing the patient experience.

Putting all the Project JOINTS recommendations into practice has led many facilities to create or enhance already-existing “joint classes” for patients a few weeks prior to surgery. Joint classes inform patients about what to expect on the day of surgery, during hospitalization and during the rehabilitation process. Pre-admission testing is included in this visit, and many Project JOINTS participants also incorporate patient education on the use of chlorhexidine and mupirocin. Even without joint classes, facilities can integrate these procedures into their pre-admission testing process.

Doing everything possible to reduce harm is obviously good for patients. It is also worth noting that improved outcomes also offer providers a way to distinguish themselves in an increasingly competitive market in which patients have more access to information (online, through word of mouth, etc.). Joint replacement surgeries are often elective, allowing patients the flexibility and time to “shop around” for providers. A number of Project JOINTS participants report that patients have told them they chose their facilities after hearing about their efforts to prevent SSIs, sometimes rejecting their geographically closest providers to do so.

Consider the ROI
As healthcare leaders, placing undue emphasis on cost reduction risks shifting focus away from our primary purpose—providing the best care possible for patients—and can alienate some of our most dedicated clinicians. Especially in the current healthcare environment it’s essential for responsible.

### Practices to Reduce SSIs After Total Hip and Knee Arthroplasty

Comparative effectiveness research has identified three relatively simple and affordable practices that substantially reduce surgical site infections after hip and knee replacement surgery. The Institute for Healthcare Improvement’s Project JOINTS aims to accelerate the spread of the following three practices in conjunction with two applicable Surgical Care Improvement Project (SCIP)* practices (appropriate antibiotic use and appropriate hair removal):

- Clinician use of an alcohol-containing antiseptic agent for preoperative skin preparation
- Patient use of chlorhexidine wipes or soap for three days prior to surgery
- Clinician screening and decolonization of *Staphylococcus aureus* intranasal mupirocin and chlorhexidine wipes or soap

These practices are described in detail in the How-to Guide: Prevent SSI for Hip and Knee Arthroplasty, available on IHI’s website at: [http://www.ihi.org/explore/SSIHipKnee/Pages/default.aspx](http://www.ihi.org/explore/SSIHipKnee/Pages/default.aspx).

*SCIP is the national initiative to reduce surgical complications sponsored by the Centers for Medicare & Medicaid Services in collaboration with a number of national partners.*
leaders to analyze the return on investment for all improvement efforts.

Studies indicate that the estimated economic impact of one infection is approximately $100,000 in hospital costs alone after hip arthroplasty and $60,000 after knee arthroplasty. This is three to four times the average cost of the initial surgery, and these excess costs are absorbed by hospitals, patients and payors. Though infections following hip and knee replacement surgery are not currently on the list of hospital-acquired conditions denied reimbursement by the Centers for Medicare & Medicaid Services, there is an emerging consensus that many of these infections are avoidable, and it is likely that their costs will increasingly be borne by providers.

The screening and decolonization treatment regimen alone has been shown to reduce the risk of infections due to *Staphylococcus aureus* by 60 percent compared to control groups, according to a 2010 article in the *New England Journal of Medicine* by Lonneke Bode, MD, Jan Kluytmans, MD, PhD, Heiman Wertheim, MD, PhD, et al. Though costs vary by setting, it’s also worth noting that the associated costs of implementing the Project JOINTS practices are marginal (see sidebar, below) compared to the costs of an infection.

Effective patient education occurs when clinicians and patients discuss together what they can do jointly to reduce surgical site infections.

Hospitals can expect administrative and clinical costs associated with incorporating these practices into their presurgical and surgical workflow. However, organizations can offset these costs through the benefits of infection prevention, decreased readmissions and decreased lengths of stay. As these practices increasingly become part of routine care for other types of surgery—such as spinal and obstetrical procedures—having these practices built into the hospital workflow will lead to considerable benefits to other service lines.

With a growing number of organizations participating in Project JOINTS reporting they have gone months without a single hip or knee SSI, early results would indicate that adding these recommended practices to a hospital’s workflow has the potential to accelerate infection prevention efforts. As the number of hip and knee arthroplasty procedures quadruples and healthcare organizations face public reporting on infections, careful attention to infection reduction for these procedures will be critical to reducing costs, improving health and enhancing the patient experience. Healthcare leaders should be ready to lead these efforts.

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### Costs of Implementing Project JOINTS Practices

<table>
<thead>
<tr>
<th>Supplies</th>
<th>Approximate Cost per Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol-containing antiseptic agent</td>
<td>$1 to $4</td>
</tr>
<tr>
<td>Chlorhexidine wipes or soap</td>
<td>$5 to $8</td>
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<tr>
<td>Standard culture for Staph screening</td>
<td>$20 to $50 per Staph test using culture</td>
</tr>
<tr>
<td>Polymerase chain reaction for Staph screening</td>
<td>$130 to $200 per Staph test using PCR</td>
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<tr>
<td>Mupirocin</td>
<td>$15</td>
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</tbody>
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