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## 6 Ways to Stamp Out Superbugs

Healthcare-associated infections are on the decline, but antibiotic-resistant bacteria remain a constant threat.

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**TOO MUCH OF A GOOD THING** Be sure to discontinue antibiotic prophylaxis within 24 hours of surgery to avoid the antibiotic overuse that has led to the proliferation of superbugs.

First, some good news. Superbug infections are slowing down somewhat. The Centers for Disease Control and Prevention reported last month that patients' risk of acquiring healthcare-associated infections (HAIs) caused by

superbug strains of *Clostridium difficile* or Methicillin-resistant *Staphylococcus aureus* (MRSA) dropped by 16% between 2011 and 2015, as well as a 6% decrease in surgical site infections (SSIs).

Now, a dose of reality. The American College of Surgeons says SSIs are still the most common cause of HAIs and cost the healthcare system an estimated \$10 billion to treat each year. More importantly, patients who suffer post-op infections are 5 times more likely to be re-hospitalized and 2 times more likely to die after surgery. So while the CDC's findings are certainly encouraging, there's still plenty we can do to help stop the spread of antibiotic-resistant bacteria.

## 1. Go back to basics

Lowering HAI rates demands building your infection prevention program on a foundation of the fundamentals.

- **Patient warming.** Use active warming methods to prevent hypothermia in patients before, during and after surgery. Patients who are normothermic throughout their surgical stay are less likely to suffer post-op infections.
- **Instrument care.** Wipe visible tissue and blood from soiled instruments immediately after use and soak the tools in enzymatic detergent to prevent bioburden from forming in lumens and grooves. Your immediate-use cleaning efforts in the OR will make the decontamination process much easier in central sterile.
- **Hair removal.** Remove hair around the surgical site only as needed based on surgeon preference. Use clippers instead of razors and remove hair outside of the OR in pre-op. Loose hair fibers carry microorganisms that can colonize the surgical incision. Adhesive tape and sticky mitts are ineffective at collecting the fibers and time-consuming to use, so opt instead for surgical clippers with a vacuum-assisted device.
- **Traffic control.** Limit the number of staff in ORs to essential members of the surgical team and have needed equipment on hand to eliminate the need for circulators to leave the room during cases to hunt down missing items. Also keep door openings to a minimum.
- **Surgical attire.** Did you know you shed about 10 million particles from your skin each day and about 10% of them carry viable microorganisms? Make sure nurses and other staff members who work at the perimeter of the OR wear long-sleeved scrub jackets (and keep them buttoned or zipped!) to prevent contamination of the sterile field by skin that sheds from bare arms. Hair follicles are highly colonized with bacteria, so cover all hair, ears and the back of the neck.
- **Surface disinfection.** *C. diff* survives on surfaces for 35 to 200 days and MRSA for 14 to 300 days. To eradicate bacteria from OR surfaces, use cleaning and disinfectant products with fast dry times in order to increase cleaning compliance. Speed is important when preparing ORs for the next case, but make sure staff allow disinfectants to remain on surfaces for the manufacturer-recommended dry time.
- **Antimicrobial prophylaxis.** Pre-op antibiotics should be given within 60 minutes of incision time, dosed appropriately based on the patient's BMI and re-dosed if the surgical time exceeds 2 half-lives of the medication.

## 2. Screen for colonization



**BRINGING CLOSURE** Antimicrobial sutures have been shown to reduce SSI rates by 30%, and the CDC, WHO and American College of Surgeons recommend their use.

A patient who is MRSA-positive has a 30% to 60% increased risk of developing an SSI and needs to be treated with antibiotics before undergoing surgery. Patients are typically screened to determine if they are carriers several weeks before surgery and given topical mupirocin prophylaxis, which effectively eradicates *Staph aureus* in the nasal carriage. Patients who test positive for MRSA should have their surgical prophylaxis changed to vancomycin.

There's been a growing trend in surgical facilities to do away with screening and treating patients because it's labor intensive and expensive (it costs about \$120 for the screening and antibiotic treatments). I think that's a mistake. Surgeons need to know they're operating on MRSA patients and adjust the surgical prophylaxis.

Research is underway to show that nasal decolonization with alcohol- or povidone-iodine-based nasal antiseptic products are just as effective as mupirocin in nasal prophylaxis. When studies show the topical applications are effective options, mupirocin should no longer be used for universal nasal decolonization.

### 3. Prep the skin

Bathing with 4% chlorhexidine gluconate (CHG) liquid soap or 2% CHG-impregnated wipes hasn't been proven to reduce SSIs, but it's an important element of a broader risk-reduction strategy. Research has shown that CHG skin-prepping products require 2 applications to attain maximum antimicrobial benefit, so patients should apply 4 ounces of CHG liquid soap the night before and morning of surgery, and let it sit on the skin around the surgical site for 60 seconds before rinsing it off. For wipes, patients should apply 3 wipes the night before surgery and 3 wipes the morning of the procedure.

The removal of skin contaminants, oil and residual microorganisms at the surgical site is an important measure. If done properly, it reduces the amount of bacteria on the skin near the incision and lowers the risk of contaminating the surgical site. Effective skin preps work rapidly, especially if they are alcohol-based antiseptics combined with chlorhexidine or iodine. The addition of alcohol provides a residual persistence that continues to reduce resident microorganisms to subpathogenic levels with minimal skin and tissue irritation.

#### 4. Irrigate wounds

There is limited evidence to support the use of surgical irrigants with antibiotics. However, the antiseptic chlorhexidine, formulated in a 0.05% irrigation solution, may be used instead. It loosens and removes wound debris and flushes air contaminants before closure, which is especially important at the conclusion of joint replacement cases.

#### 5. Use antimicrobial sutures

On a suture, it takes only 100 staphylococci per gram of tissue for an SSI to develop. Sutures used in the surgical cavity and to close the surgical wound can be colonized with bacteria, which can lead to the development of biofilm that ultimately impedes the body's ability to fight infection. Antimicrobial sutures are an easy infection prevention intervention to prevent SSIs. They feel and work the same as standard sutures, so surgeons shouldn't resist making the transition, and they're relatively inexpensive. My former hospital system converted to antimicrobial suture for an additional \$35,000 per year. That's a relatively insignificant supply expense increase when you consider the cost of treating a single SSI.

#### 6. Protect skin incisions

Surgical wounds are delicate and most susceptible to infection until the epithelial barrier reforms, which occurs 48 to 72 hours after surgery. Until then, serum and blood can collect in the incision, making it a breeding ground for microorganisms. Adhesive wound-closing products are applied in minutes, maintain a strong microbial barrier for 7 to 10 days, and prevent bacteria from entering the wound. They simplify wound closure, provide excellent wound-healing strength, lessen pain and anxiety for patients, and improve cosmesis around healing areas.

#### Working toward zero

Winning the war against HAIs requires ongoing and coordinated efforts centered on a clearly defined goal of zero tolerance for post-op infections. Infection preventionists, surgical team members and surgeons should receive ongoing education, and your full financial and clinical support as they implement best practices that will wipe out superbugs once and for all. **OSM**

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