

Ambulatory Surgery Centers

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Infection prevention

Will skin-prep practice change following new study results?

Strong evidence from a new 6-hospital study could lead many ORs to change their traditional practice for surgical skin preparation. In the first prospective, randomized study to compare the effect of 2 skin prep agents on the incidence of surgical site infections (SSIs) after clean-contaminated surgery, a chlorhexidine (CHG)-alcohol product came out ahead of a povidone-iodine scrub and paint, resulting in an infection rate 41% lower. The report is in the January 7, 2010, *New England Journal of Medicine*.

The 4-year study led by Rabi O. Darouiche, MD, involved 849 patients having clean-contami-

Related articles: p 9, 15, 18

nated surgery—409 were prepped with a product containing 2% CHG and 70% isopropyl alcohol (ChlorPrep), and 440 were prepped with 10% povidone-iodine. The CHG-alcohol group had an SSI rate of 9.5% compared with 16.1% in the povidone-iodine group, showing a significant difference.

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Patient safety

Preventing pressure ulcers: New lessons from Minnesota

New data from Minnesota hospitals offers more insight into preventing pressure ulcers during long surgical procedures. Data collected through the state's adverse event reporting system in 2009 found 13% of the 122 Stage 3, Stage 4, and unstageable pressure ulcers reported were related to long surgical procedures.

Attention to this potentially devastating complication has ramped up since Medicare announced it will no longer pay for Stage 3 and Stage 4 pressure ulcers that develop during a patient's hospital stay.

A statewide advisory group of

wound care and perioperative nursing experts came together to analyze the reports and develop recommendations. The group found 2 primary contributing factors:

- a lack of awareness of risk of skin breakdown by OR teams and a lack of communication of the risk during handoffs
- a lack of guidance for determining the types of surgical cases that increase the risk of skin breakdown.

They also found confusion about support surfaces and other practices for preventing pressure ulcers during surgery.

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One system's approach to physician alignment.



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Editorial

It took a Texas jury less than an hour on February 11 to return a not guilty verdict for Anne Mitchell, RN. An administrator at 15-bed Winkler County Memorial Hospital in the small town of Kermit, Texas, Mitchell was charged by the local sheriff with a felony after she reported concerns about a physician to the state medical board.

Conviction would have carried a jail sentence of up to 10 years and a \$10,000 fine.

Another nurse, Vickilyn Galle, RN, who assisted in writing the letter, was also charged, but the charges were dropped.

A heavy price

Though not guilty, Mitchell paid a heavy price. She and Galle were both fired by the hospital and amassed legal fees. The nurses had worked at Winkler for over 20 years.

They raised concerns with the medical board about Rolando G. Arafiles, Jr, MD. Mitchell was charged with "misuse of official information" for reporting the physician for what she alleged was a pattern of improper prescribing and performing minor surgery without surgical privileges. The nurses said they had taken their concerns to the hospital administration but said the concerns were not sufficiently addressed.

After the physician complained to the local sheriff that he was being harassed, the sheriff launched an investigation and filed criminal charges. Though the complaint was anonymous, the sheriff got information from the medical board that enabled him to identify the nurses. He obtained a search warrant for their work computers and found the letter.

What it can take to stand up for patients.

The information they allegedly misused was patient case numbers, although the medical board said such information can be used for reporting and is exempt from patient privacy regulations.

Texas law provides protection for whistleblowers but that doesn't extend to local prosecutors filing criminal charges, according to the Texas Nurses Association (TNA).

A duty to patients

The news reached far beyond west Texas. American Nurses Association President Rebecca M. Patton, RN, MSN, CNOR, called the action "outrageous," saying it undermined a basic tenet of the nurse's Code of Ethics—that nurses have a duty to the health and safety of their patients. TNA raised money for their defense.

The case is a reminder of what it can take to stand up for patients and the Code of Ethics.

The nurses have filed a federal suit against the hospital, its administrator, the county, and the physician.

"We're just in disbelief that you could be arrested for doing something you had been told your whole career was an obligation," said Mitchell. ♦

—Pat Patterson

Read more about the case at www.texasnurses.org/displaycommon.cfm?an=1&subarticlenbr=509#2

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(New)

Keynote: What would Florence do?

When did the health care crisis get to be a crisis? Was it last year with the capital crunch and reimbursement cutbacks? Was it the evolution of managed care and corporate medicine? Does it go back to when Medicare was established?

What would Florence Nightingale say about the health care crisis of today?

Joe Tye started asking that question after he read a book about Nightingale's legendary work caring for wounded soldiers during the Crimean War.

The more he learned, the more impressed he became not only with Nightingale's compassion but also with her leadership.

Tye, CEO of Values Coach, Inc, who describes himself as a "recovering hospital administrator," went on to write *The Florence Prescription: From Accountability to Ownership*—



Joe Tye

his take on what the legendary nurse leader would say if she were to return to a hospital today.

Tye will bring Florence's prescription to his keynote address at the Managing Today's OR Suite Conference September 29 to October 1, 2010, at the Walt Disney World Dolphin in Orlando.

No stranger to crisis

Nightingale was no stranger to crisis. At Scutari, she found an old

Turkish army barracks that had, almost as an afterthought, been converted into a hospital. The suffering soldiers knew her as the Lady with the Lamp, who made rounds to comfort the dying.

Nightingale also was no stranger to numbers. She kept meticulous patient records and accounts and gathered data on infections. She later used these records to analyze mortality rates in a forerunner to medical records and hospital epidemiology.

Tye says, "Nightingale was a caring and compassionate nurse, but she was also a tough manager who understood that efficient operations were essential. For example, she was the first to calculate and then work to reduce cost per patient day."

He is quick to add that her focus on productivity was based on her belief that wasted resources—including nurses' time—would not be available for patient care.

In *The Florence Prescription*, which is about a fictionalized hospital, Tye lays out a program for fostering a culture of ownership, strong values, compassion, and personal accountability.

"A culture of ownership is absolutely essential for recruiting and retaining great people, ensuring optimal productivity and safe care, and meeting the increasingly tough demands being placed on our industry by society at large," he says.

Health care, he says, needs "people who think like partners, who own their work rather than just renting a spot on the organization chart." ♦

Learn more about *The Florence Prescription* at www.theflorencechallenge.com

View the conference brochure and register at www.ormanager.com

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Infection prevention

Skin prep *Continued from page 1*

Asked why the infection rates in the study seemed high, Dr Darouiche responded that in this study, as in others, the SSI rates were assessed at 30 days postoperatively.

"Unfortunately, most reported rates of SSI underestimate the true rates," he says, "because they assess SSIs after a relatively short time; that is, at the time of hospital discharge or at the time of the postop clinic visit."

Dr Darouiche is professor of medicine and director of the Center of Prostheses Infection at Baylor College of Medicine in Houston.

"This is a well-done, randomized, controlled study," an infection control expert, Richard P. Wenzel, MD, told *OR Manager*.

"I would say this is a dramatic response for something that's fairly inexpensive and that doesn't add time to the procedure," says Dr Wenzel, an epidemiologist and professor of internal medicine at Virginia Commonwealth University, Richmond, who wrote an editorial accompanying the study.

Another recent study by Swenson et al from the University of Virginia Health System, Charlottesville, had a different result and a different research design. The researchers compared the effects of 3 skin preps—povidone-iodine scrub and paint with isopropyl alcohol between steps, CHG-alcohol (Chloraprep), and iodine povacrylex-alcohol (DuraPrep)—used in 3 different periods over 6 months. The lowest infection rate was seen in period 3 when iodine povacrylex-alcohol was used. The study was not randomized or blinded and was conducted in a single center. The authors say the study would need to be repeated in more hospitals before one skin prep method could be recommended over another.

The research supports a change in practice.

Four factors of a prep agent

Dr Darouiche told *OR Manager* that he and his colleagues considered 4 factors in comparing the CHG-alcohol and povidone-iodine skin preps:

- spectrum of activity
- rapidity of antimicrobial activity
- duration of residual activity
- potential for inactivation by bodily fluids, mainly blood.

Both products had similar broad-spectrum antimicrobial activity, but the CHG-alcohol had the upper hand for the other 3 factors:

- worked faster than povidone-iodine because of the alcohol, which is one of the most rapid agents for inactivating microorganisms
- had longer residual activity than povidone-iodine
- maintained its activity because unlike povidone-iodine, it is not inactivated by exposure to blood.

Cost considerations

Dr Darouiche noted that the cost of the povidone-iodine prep tray used in the study was about \$3, and the cost of the CHG-alcohol applicator was about \$6. On average, 2 applicators were used, depending on the size of the incision, for a total cost of \$12 for the CHG-alcohol, a difference of \$9 per patient.

Based on the study results, CHG-alcohol prevents at least 6 more cases of infection per 100 patients than povidone-iodine. The

\$900 in additional cost for CHG-alcohol for 100 patients is far less than the cost of treating 6 patients with SSIs.

Based on the study's finding that about 17 patients would need to have skin prep with CHG-alcohol rather than povidone-iodine to prevent one infection, times the difference in price, the cost to the facility is still under \$200, says Dr Wenzel. Duke researchers recently reported that a single case of methicillin resistant *Staphylococcus aureus* resulted in \$60,000 in additional charges compared with uninfected controls.

New standard of care?

The protection given by CHG-alcohol in the study was similar to the 49% reduction in vascular catheter-related bloodstream infections in ICUs in a meta-analysis that also found CHG superior to povidone-iodine, the authors note.

Dr Wenzel says the weight of the evidence from this study suggests that CHG-alcohol should replace povidone-iodine as the standard for preoperative skin preparation.

"If we have 300,000 to 500,000 infections in 30 million operations each year, and we can reduce that by some 40%, we're looking at potentially 120,000 fewer infections. It would be an important change that would have a big yield," he noted.

In selecting skin antiseptics, AORN recommends assessing patients for allergies to antiseptics—CHG and povidone-iodine have both triggered allergic reactions.

AORN also notes that alcohol-based products pose fire and chemical skin burn risks. Products with alcohol must be allowed to dry thoroughly before drapes are applied to reduce the fire risk.

Dr Darouiche notes that 3 patients each in the povidone-iodine

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Tips for leading a practice change

A new study provides strong evidence that surgical skin prep with chlorhexidine gluconate (CHG)-alcohol is superior to povidone-iodine scrub in preventing surgical site infections (related article).

What if most of the surgeons in your OR use povidone-iodine? How can you introduce the new evidence to the surgeons and convince them to consider a change?

New England Baptist Hospital in Boston, which performs 10,000 procedures a year for a complex caseload, made the change in 2007.

"Implementing such a change in an orthopedic hospital is no small feat," says Maureen Spencer, RN, MEd, CIC, the infection control manager, who notes the conversion took about 5 months. At the time, surgeons were using either povidone-iodine scrub and paint or povidone-iodine-alcohol. Spencer shared her tips about making the change.

Start with the evidence

Spencer started by presenting the evidence to the surgeons. A 2007 review in the *Journal of Bone and Joint Surgery* graded the evidence on infection prevention for orthopedic surgery and found the "literature strongly suggests that chlorhexidine gluconate is superior to povidone-iodine for preoperative antisepsis for patients."

Spencer showed the surgeons the review and discussed with them the conclusions, references, and recommendations.

The discussion was part of an infection prevention effort in surgical services to move to a "chlorhexidine platform," including the following:

- All patients would take preoperative showers with 4% CHG (Hibiclens) 2 days before and the morning of surgery.
 - For skin prep in the OR, 2% CHG and 70% isopropyl alcohol (ChloraPrep) would be used.
 - Antimicrobial dressings would be applied postoperatively.
- "We didn't anticipate what we were going to be up against when we introduced the change in skin preparation," Spencer notes. "The orthopedic surgeons had always used iodine and saw no reason to use anything different."

To become better acquainted with the orthopedic surgeons, Spencer had already begun attending their monthly staff meetings. At first, she says the surgeons were skeptical about her attendance but now regard her as a colleague and peer.

Have infection prevention support

Having infection prevention support in surgical services is essential, notes Spencer, adding that a perioperative department as large as New England Baptist's could use a dedicated infection preventionist.

She has been assigned 2 perioperative staff nurses—1 for the total joint service and 1 for spinal surgery—to help implement new initiatives. "It's great because they know the surgeons and the staff. They also can get the information to me quickly if there's a problem."

Spencer adds, "I have been able to show the administration how important it is to integrate infection control into the OR and into surgical practice."

The evidence plus administrative support are what win the day with new infection prevention initiatives, she notes.

Draw on company expertise

Spencer called on support from company representatives and clinical consultants to assist with the skin-prep product conversion. One key was to have a nurse specialist from the company with a background in critical care nursing and infection control on hand in the OR for 3 weeks. Spencer also spent more than a week in the OR herself, reassuring the staff and addressing surgeon concerns.

"You need to take at least 6 months to a year to implement a change in surgeons' practice," Spencer advises. "You have to keep working at it and have consistent follow-up. I have infection control issues on their staff agenda every month."

Address surgeon concerns

One concern the surgeons had with making the change was that the iodophor-impregnated incise drape wouldn't stick to the skin after ChloraPrep was applied. The iodophor products they had been using had a polymer that helped the barrier drape adhere to the skin.

The problem was addressed by allowing the ChloraPrep to dry for a minimum of 3 minutes. Then after applying the incise drape, the surgeon or nurse would rub a sterile towel on the adhesive drape to warm up the adhesive. "They were then able to get a nice adhesion, and it made the change

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much easier to implement," Spencer says.

She estimates that 70% to 80% of the surgeons at New England Baptist now use the CHG-alcohol prep, and it is used for all total joint procedures. Some neurosurgeons will not switch because of a warning on the ChlorPrep label that it should not have contact with the meninges.

Some orthopedic surgeons take extra measures, Spencer notes. A couple scrub and paint with povidone-iodine and then use ChlorPrep. "We are fine with that. It is not that much more expensive, even though it is probably a waste of product," she says.

She says the hospital has not seen a difference in its surgical site infection rates since the change to CHG-alcohol more than 2 years ago. The overall orthopedic infection rate was already low at 0.4% in 2007 before the CHG platform was introduced; it is now at 0.2%. The infection rate fell from 0.7% to 0.2% in 6 years following a variety of infection prevention initiatives.

—Judith M. Mathias, RN, MA

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“There were no serious allergic reactions.”

Skin prep

Continued from page 6

group and in the CHG-alcohol group had pruritus, erythema, or both around the incision linked to the skin prep solutions. There were no serious allergic reactions, chemical skin burns, or fires in the operating room.

The Centers for Disease Control and Prevention (CDC) "Guidelines for the prevention of intravascular catheter-related infections" recommend 2% CHG-based preparations for cleaning vascular catheter insertion sites. But the CDC does not recommend which antiseptics to use for the preop skin prep.

"Overall," says Dr Wenzel, "the consistency with which CHG-alcohol has been shown to reduce infections is very strong, and the research supports a change of standard practice."

Cardinal Health funded the study and provided both skin-prep products. (ChlorPrep is now sold by CareFusion.) Dr Darouiche says the companies had no access to the data. ♦

—Judith M. Mathias, RN, MA

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What's the value of preop bathing?

Preoperative baths or showers to prevent surgical infections have played to mixed reviews. Enthusiasm was dampened after a systematic Cochrane review in 2006, updated in 2009, examined 7 trials and found no clear evidence of a benefit for bathing or showering with chlorhexidine gluconate (CHG) over a placebo.

Preop bathing or showering is recommended by the Centers for Disease Control and Prevention 1999 Guidelines for the Prevention of Surgical Site Infection and by AORN. AORN notes that there is evidence that showers with CHG reduce microbial counts but not enough evidence to link the decrease definitively to a reduction in surgical site infections (SSIs).

Could instructions be the key?

What could be lacking are standardized patient instructions, suggests Charles Edmiston, Jr, PhD, professor of surgery and hospital epidemiology at the Medical College of Wisconsin, Milwaukee.

Edmiston says he reviewed the individual studies included in the Cochrane review and found a number of flaws. Noted among them was the absence of standardized instructions for patients on how to use the CHG.

To test whether patient instructions could make a difference, he and his group conducted a 2-part study reported in 2008 in the *Journal of the American College of Surgeons*.

In the first part, 10 volunteers were told to shower with CHG but given no instructions. Results showed that in the vast majority, the skin concentration of CHG was below that required to kill skin *Staphylococcus*.



In the second part of the study, 60 patients were divided into groups to use 4% CHG scrub or 2% CHG disposable polyester cloths and given explicit instructions on how to use the products, including leaving the scrub on for 2 minutes (with a timer in the shower).

Those results found 4% CHG scrub and 2% CHG cloths both yielded significant concentrations on the skin and other anatomical sites. Subjects who showered or cleaned twice with either product had better results than those who did so only once.

Take-away messages

The take-away messages, Edmiston says:

- Patients should shower or cleanse not once but twice with CHG prior to surgery.
- Instructions must be standardized. For example, if using CHG scrub, patients should be told how much to use; specifically how to apply it; to avoid eyes, nose, and ears; and to wait 2 minutes before rinsing it off.

"If it is going to work, it has to be a standardized practice that is carefully explained to patients," he says, suggesting this should be part of the preoperative education nurses provide.

The research was funded by Sage Products, which makes the 2% CHG cloths. Edmiston says the

vendor had no influence over how the study was conducted or the results.

Evidence on CHG cloths

Edmiston's group has also compared the 2% CHG cloths with the 4% CHG scrub for skin concentrations and reduction of microorganisms.

In an early study, they saw a greater log reduction of microbes in the groin with the 2% cloths compared with 4% CHG.

"We hypothesized that the polyester cloth allowed an exfoliation process to drive CHG into the skin, the sebaceous glands, and hair follicles," he says.

In the preop shower study published in 2008, the CHG cloths achieved significantly higher skin concentrations than the 4% CHG scrub, even when applied in a standardized process, perhaps because there is no rinsing with the cloths, he told *OR Manager*.

When the 2% CHG cloths were used at night and in the morning, the concentration was 350 times that needed to kill skin *Staphylococci*, while the concentration with 4% CHG was 25 times the level needed.

Edmiston pointed out the 2% CHG cloths can be used by patients who can't shower, enabling them also to achieve high concentrations of CHG on the skin.

Skin irritation?

Does showering or cleaning with CHG cause skin irritation?

Of the study's 60 subjects, Edmiston says 5 or 6 had episodes of skin irritation, but these were not serious enough to have caused surgery to be canceled. He notes that CHG, as a chemical formulation, could react with other sub-

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Infection prevention

Preop bathing *Continued from page 9*

stances, such as lotions, creams, deodorants, or hair removers. He advises telling patients not to apply other products to their skin when using a CHG preparation.

Stepping up infection prevention

A small Minnesota hospital saw its surgical site infection rate for total joint replacements go down after the 2% CHG cloths were introduced. Deb Eiselt, RN, BSN, the hospital's infection prevention and control professional, reported on the results in *Orthopedic Nursing* and in a poster session at the Institute for Healthcare Improvement meeting in December 2009.

Lakeview Hospital in Stillwater, Minnesota, began stepping up prevention efforts when its total joint infection rate rose to 2.36%. The cloths were introduced in 2006 after other interventions failed to make a difference. For skin prep, surgeons primarily use iodophors.

"We set up a trial using the CHG cloths in the preop area initially for total joints and spine surgery," Eiselt told *OR Manager*. Previously, the patients had used a povidone-iodine scrub. After the trial, the surgeons were on board, and the CHG cloths are now included in the preop order sets.

The total joint infection rate has come down to 1.1% for the 6-OR hospital, which performed 1,034 joint replacements and 632 spine procedures in 2009.

Total joint patients receive the cloths during their preop education class, called Joint Connection. They are given specific instructions to clean with the cloth after their last bath or shower before surgery and to allow the skin to air dry. Other patients use the cloths in the holding area.

"A lot of patients, especially in our Joint Connection class, are knowledgeable about infections, so they are very engaged in what they can do to prevent an infection," Eiselt says. ♦

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Have an idea?

Do you have a topic you'd like to see covered in *OR Manager*? Have you completed a project you think would be of help to others? We'd be glad to consider your suggestions.

Please e-mail

Editor Pat Patterson at
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Nominate OR Manager of the Year

Each year at the Managing Today's OR Suite conference, a perioperative manager or director is named OR Manager of the Year.

This year's conference will be September 29 to October 1 in Orlando, Florida.

The OR Manager of the Year will receive an expense-paid trip to the meeting, including airfare, hotel, meals, and registration.

In recognizing an individual manager or director, the award honors all perioperative nurse leaders for their important roles. It is a way of celebrating nursing management in surgical services.

Readers of *OR Manager* are invited to nominate a manager or director for the award. Simply write a letter of about 300 words describing what makes the manager deserving of the award. The nominating letter may be accompanied by supporting letters from other facility leaders and staff.

Send the entry to:

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The deadline for entries is July 1. Nominations are judged by the *OR Manager* advisory board. ♦

A conference brochure, registration form, and hotel reservations are available at:
www.ormanager.com

Patient safety

Pressure ulcers *Continued from page 1*

"Patients under anesthesia are among our highest risk patients because they cannot move," says Denise Nix, RN, MS, CWOCN, a member of the advisory group and an ostomy and wound care expert. She is an advisor to the Minnesota Hospital Association and coauthor of *Acute and Chronic Wounds: Current Management Concepts* (Mosby Elsevier, 2007).

The advisory group began by consulting professional guidelines, including those of AORN and an international body, and then developed recommendations to address issues they were seeing in Minnesota (sidebar).

Recommendations

The Minnesota recommendations and guidance are intended to address these issues. Anne Hanzel, RN, MSN, MA, senior director of perioperative services at the University of Minnesota, Fairview, and a member of the statewide advisory panel, talked with *OR Manager* about her organization's efforts to prevent pressure ulcers.

Risk factors in surgery

The recommendations say that surgical patients with the following should be considered at high risk for a pressure ulcer:

- any procedure lasting longer than 4 hours
- cardiac, vascular, trauma, transplant, or bariatric surgery or procedures involving at-risk positioning such as sitting
- patients with weight or nutritional extremes—obese or thin, small in stature.

Skin assessment

The guidelines recommend a thorough preop skin inspection on the day of the procedure before handoff to the perioperative team.

It is suggested that nurses use a script, such as the following:

"Because we know that being in one position for a period of time, such as in surgery, can put you at risk for getting a bedsore, or what we call a pressure ulcer, I am going to take just a couple of minutes and check your skin from head to toe now before you go into surgery."

At the University of Minnesota, Fairview, nurses use the script in their head-to-toe skin assessments on the day of surgery, Hanzel says. Because the medical center's patients are highly complex, nurses assess all patients before surgery, being alert for:

- the patient's age
- body size
- temperature
- anesthetics to be used
- length of surgery
- nutritional status.

At first, Hanzel says nurses thought patients might push back about the skin inspection. "But there has been no pushback. Even if a patient asks about it, the nurse explains, and patients have been fine with that."

The condition and appearance of the skin and any abnormalities are documented in the electronic record, where it can be accessed by circulating nurses in the OR.

Handoffs

The recommendations advise that the handoff from preop nurses to the OR team include:

- the most recent Braden Scale information (the Braden Scale is an evidence-based tool for scoring pressure ulcer risk. www.bradenscale.com)
- any history of pressure ulcers
- location of any existing pressure ulcers.

One obstacle is that ORs and nursing units often use different electronic documentation systems,

What support surfaces are ORs using?

Results of an informal survey of 51 hospitals in Minnesota.

What criteria does your hospital use to determine if a patient is at high risk for pressure ulcer development in the OR?

- Braden assessment 38%
- Length of procedure 26%
- No criteria 23%
- Patient characteristics 15%
- Braden assessment plus other criteria 13%
- Not applicable (lengthy procedures not performed) 5%.

Support surfaces used in OR

For patients not at risk for pressure ulcer development

- Standard OR mattress 61%
- Mattress with pressure redistribution properties beyond standard surface 39%.

For patients deemed at high risk for pressure ulcer development

- Standard OR mattress 44%
- Mattress with pressure redistribution properties beyond standard surface 56%.

Source: Minnesota Hospital Association.

making it difficult to access information on risk factors electronically.

"We realized that if up-to-date communication is going to occur, there has to be a system for oral or written handoffs," Nix says.

At the University of Minnesota, the patient's skin condition is included in the preop briefing conducted in the OR before the case begins (illustration, p 13).

Continued on page 12

Preoperative briefing process

The briefing at the University of Minnesota, Fairview, includes the patient's skin condition.

Brief* Hard-stop process

Occurs before position/prep/drape

1. Initiated by surgeon: "Let's do the Brief."
2. Team focuses on the Brief discussion.
3. Introductions.
4. Suggested content for developing a shared mental model:

Surgeon: Type of case, review equipment, critical times, positioning, VTE prophylaxis, other.

Circulator: Allergies, x-rays, implants as appropriate, skin care plan, other.

Scrub person: Instruments/supply concerns, medications on the sterile field, other.

Anesthesia care provider:

Physiologic concerns, blood availability, preop block placed, beta blockers, antibiotic(s), other.

*Note:

- The Brief must occur before positioning, prep, and drape.
- A surgeon, circulator, scrub person, and anesthesia care provider must be present for the Brief.
- If the attending surgeon has not conducted the Brief in person or by speaker phone prior to positioning, prep, and drape, he/she will be paged by the circulator. The attending may delegate the Brief to a chief resident, fellow, physician assistant, or fellow attending surgeon only if he/she is properly informed of the case details.
- A team may Brief once prior to the first of multiple similar procedures done in succession.

Time-out* Hard-stop process

Occurs after surgeon has scrubbed and gowned, just prior to incision

1. Initiated by surgeon: "Let's do the time-out."
2. Team ceases all other activity.
3. Circulating nurse:
 - a. Reads the following from the patient's Affirmation of Informed Consent:
 - i. Patient name.
 - ii. Procedure.
 - iii. Laterality of procedure (and level) as appropriate.
 - b. Notes position of patient.
4. Team verification:

Anesthesia care provider:

- a. Reads patient's name from the anesthesia record and states shorthand version of procedure.
- b. States antibiotic name, dose, time of administration, and time next dose is due.

Scrub person:

- a. States shorthand version of procedure for which he/she has set up.
- b. Verbally confirms he/she sees the surgical site marking (if applicable).
- c. If anatomical diagram is used in lieu of physical site marking, circulating nurse and team use diagram to verbally acknowledge the surgical site.

Surgeon:

- a. States patient's name, complete procedure, and site.

*Note:

- Each time the patient is moved from supine to prone (or vice versa) after the time-out, another time-out is necessary immediately following the repositioning.
- If the patient has multiple procedures scheduled with a different attending surgeon(s), a time-out will be conducted immediately prior to the initiation of each procedure.

Debrief

Occurs before the surgeon leaves the OR

1. Verify procedure.
2. Confirm postop diagnosis.
3. Confirm wound class.
4. Verify specimen(s) handling.
5. Confirm blood loss.
6. Discuss concerns/issues for this patient/case.
7. Complete OR case log.

Source: University of Minnesota, Fairview, Minneapolis.

Pressure ulcers *Continued from page 11*

After surgery, the skin condition is checked again, documented, and included in the handoff to the postanesthesia care unit (PACU). PACU nurses in turn recheck the skin before transferring the patient to the postop unit.

To aid communication for pa-

tients coming to surgery from inpatient units, the electronic documentation system includes a "transfer of care" report that collects critical elements for the handoff.

"By accessing the report, the perioperative RN can see the skin condition and related assessments in greater detail," Hanzel explains. "It's a nice way to bring together

information that is important in transitioning patients to the next provider."

Support surfaces

For patients at risk for pressure ulcers, the Minnesota and AORN recommendations strongly advise using an OR mattress with "pressure-redistributing properties greater than the

Safe Surgery Process The Brief

WHY	WHEN	WHO	WHAT IF	HARD STOP
<ul style="list-style-type: none"> • Introduce/greet team members • Develop a shared mental model • Discuss the case/concerns 	<ul style="list-style-type: none"> • Prior to positioning • If not done, RN will page the attending surgeon • Hard stop occurs until Brief is done 	<ul style="list-style-type: none"> • All disciplines: <ul style="list-style-type: none"> —Surgeon —OR RN —Scrub person —Anesthesia care provider 	<ul style="list-style-type: none"> • The surgeon needs to be paged for the Brief? <ul style="list-style-type: none"> —Surgeon may Brief by phone. —Surgeon may delegate Brief to an informed chief resident, fellow, physician assistant, or fellow attending surgeon. • There are multiple repetitive cases scheduled in the OR? <ul style="list-style-type: none"> —Repetitive sequential cases may be briefed all at once at the beginning of the day. • People refuse to participate in the Brief? <ul style="list-style-type: none"> —A Hard stop is called. 	<ul style="list-style-type: none"> • The case does not progress. • A leadership person is called to assist. <p>Call hierarchy:</p> <ul style="list-style-type: none"> —Unit supervisor —Charge nurse —Nurse manager —Director —Medical director

Source: University of Minnesota, Fairview, Minneapolis.

standard OR mattress.” (The standard mattress is defined as 1 to 2 inches of foam covered with a vinyl or a nylon fabric).

An informal survey of hospitals in Minnesota found a mix of surfaces was used. There was confusion about what surfaces were used and the terminology used to describe them (sidebar, p 11).

“What one person called gel is different from what another called gel. There are 2-inch gel pads that are not that effective. Conversely, you have the viscous, fluidized products that are often mistaken for gel. These are considered by many as the top of the line for pressure redistribution,” Nix says.

There was also confusion about foam.

“Memory or viscoelastic foam is profoundly different from the standard, or elastic foam,” she says.

Quite a bit of work on support surfaces has been performed outside the OR. Nix suggests that some of this, particularly standardized terminology from the National Pressure Ulcer Advisory Panel, could be used in perioperative care to reduce confusion and improve communication.

Unfortunately, science to guide support surface selection is lacking.

“There needs to be more comparative studies and information,” Nix says.

Standardizing surfaces

Standardizing support surfaces is one way to improve prevention by mistake-proofing product selection, Nix suggests. Replacing surfaces one at a time as they wear out can result in a mixture of products that makes it hard to select the right surface for a patient.

In her organization, communication with the purchasing department has helped.

“Now the purchasing department knows exactly what to order, and we know we aren’t getting new products that aren’t effective,” she says. “They are still replacing the surfaces by attrition, but at

Continued on page 14

Pressure ulcers *Continued from page 13*

least nothing new is being purchased that isn't going to prevent pressure ulcers."

The University of Minnesota, with its complex patients, has moved to an advanced fluidized pressure redistribution mattress for 16 of its 21 ORs. Because these are expensive, the mattresses have been added gradually, Hanzel notes.

"Because the OR schedule changes dynamically, it's hard to make sure you have the right mattress on the right bed. So we have put these advanced surfaces on most of our beds," she says. The decision to move to the advanced mattresses was made after networking with another academic medical center that has used this mattress for 10 years with a much reduced rate of injury.

Lateral transfer

Regarding lateral transfer, the basic recommendation in the Minnesota guidelines is to move the patient without dragging the body, which can cause a shearing injury.

A variety of transfer devices are available. Examples mentioned in the guidelines are:

- Samarit Rollboard
- Hovermatt (HoverTech)
- AirMatt
- Z-Slider (Sandel Medical).

Positioning, repositioning

The Minnesota recommendations include specific pointers for positioning. Two of these are to:

- Ensure that responsibility for positioning and repositioning the patient is assigned and well defined.

The reports showed "there was a lot of confusion in the OR about who positions the head during long cases," Nix says. At some facilities, the anesthesia provider is responsible; at others, it was not

There was confusion about surfaces.

clear who had responsibility, or if it was even done.

- When the patient is in the supine position, suspend the patient's heels off the surface.

The University of Minnesota uses pillows to fully suspend patients' lower legs.

"We used to use gel pads under the feet and head, but we no longer do," says Hanzel. The reason: "Gel settles out over time. Some of our gel pads had pits where the heels would rest."

Handoff after surgery

In the handoff to the PACU, the guidelines advise that perioperative nurses communicate:

- patient positioning in the OR (eg, lateral, prone)
- any existing pressure ulcers
- patient's preoperative Braden Scale score.

For patients at risk for pressure ulcers, the guidelines say to consider upgrading the surface, such as using a gurney with a pressure redistribution surface.

In the handoff to the nursing unit, the recommendation is to communicate the patient's position in the PACU (suggesting that the patient be placed in an alternative position if not contraindicated); any existing pressure ulcers; and the patient's postoperative Braden score.

Value of collaboration

Nix and Hanzel both say that the collaboration of perioperative nurses and wound care specialists

is making a difference in the prevention of pressure ulcers.

Hanzel, who is on the hospital's pressure ulcer prevention committee, now reviews every report that comes into the facility's Safe Skin registry to see if the patient had a procedure, whether in the OR, GI lab, or cath lab. If the report is from another department, she refers it to the director. If it's from surgery, she reviews the perioperative patient chart to see, "Did we identify the problem and begin care? Did we share the information with the next provider in our SBARs and through documentation of findings?"

An added benefit of the statewide project, Nix says, was learning "how eager both parties are to participate, once they are given time and support from their facilities. There is so much we can learn from each other." ♦

Access the Minnesota Hospital Association recommendations for pressure ulcer prevention in the OR at www.mnhospitals.org/index/patient1

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Total joints: Toward zero infections

The Hospital for Special Surgery (HSS) in New York City has one of the highest volumes of total joint replacements in the world. It also has one of the lowest surgical site infection (SSI) rates.

The hospital, which performs about 8,000 joint replacements a year, was recently commended by the New York State Department of Health for its low infection rate for hip replacements—0.1%, significantly lower than the state average of 1.3%. Nationally, the average is 0.9% for patients with 1 risk factor and 1.87% for patients with 2 or 3 risk factors, according to the Centers for Disease Control and Prevention (CDC).

New York is the first state to use the CDC's National Healthcare Safety Network (NHSN) system for reporting hospital-acquired infections. Hip replacement was included for the first time in the July 2009 report.

OR Manager talked with Thomas P. Sculco, MD, surgeon-in-chief, and Ron Perez, RN, JD, CNOR, assistant vice president for surgical services, about their infection control practices.

Dr Sculco acknowledges that HSS has an advantage because as an exclusively orthopedic facility, it doesn't have the same types of bacterial flora as general hospitals.

Rapid surgery, regional anesthesia

Surgery is performed quickly, with the average surgical time for a joint replacement about 1 to 1½ hours. The duration of surgery is an independent risk factor for SSI, according to the CDC.

"All of our joint replacement operations are done with regional



Total joint surgery is performed within a Plexiglas enclosure to protect patients from contaminants.

anesthesia," Dr Sculco says. "We use hypotensive anesthetic techniques that reduce bleeding, which we have pioneered for the past 15 to 20 years. That allows the operation to proceed more rapidly." In hypotensive anesthesia, the mean arterial pressure is reduced to 50 mmHg, which reduces blood loss. (A description is at www.hssanes.org/for-professionals/hypotensive-epidural-anesthesia.htm.)

Another advantage of a high-volume specialty center is that procedures can be performed systematically using specialized teams, which helps in completing procedures expeditiously. "We try to keep consistent staffing with the surgeons," Perez says.

A special enclosure

During surgery, patients are isolated from the environment and surgical team as much as possible to minimize exposure to contaminants. Operating rooms are equipped with laminar airflow. In addition, within each OR, surgery is performed

within a Plexiglas enclosure with the patient's head outside the enclosure (illustration). Instruments and implants are passed through an opening. The enclosure is used for all joint replacements.

"A lot of the bacteria that settle in incision sites are attached to dust particles, so we filter out the dust particles," Dr Sculco explains.

Though the enclosures are costly to maintain, he says the hospital believes the investment is worthwhile because "an infection after a joint replacement is a catastrophe."

The panel system can be dismantled quickly after surgery and stored in each OR.

As an additional safeguard, OR teams wear body exhaust suits ("space suits"), which help protect patients from bacterial shedding.

Regarding laminar airflow, in a recent review on SSI prevention, the American Academy of Orthopaedic Surgeons (AAOS) says: "Decades of use of laminar flow

Continued on page 16

Total joints *Continued from page 15*

operating room ventilation in combination with other infection control measures have improved infection rates; however, no uniform opinion about laminar flow efficacy has developed." The CDC considers laminar airflow for orthopedic implant operations to be an unresolved issue.

Environmental cleaning

ORs are cleaned after every case according to standards. Terminal cleaning of each OR is performed every night, which includes wiping down the entire room, panels, and all furniture and equipment. The process is monitored by the surgical services infection prevention nurse.

"She observes the unit assistants and the way they are cleaning to make sure they maintain the highest standard," Perez says. Staff competencies are checked regularly.

The infection prevention RN, who is dedicated to surgical services, reports to the infection control department.

Patient skin prep

Prior to surgery, all patients attend a preoperative education class, where they learn about the procedure and what to expect during recovery. During the class, patients are given a bottle of chlorhexidine gluconate (CHG) solution and instructed on how to shower with it before surgery.

Povidone-iodine is used for the surgical skin prep; CHG is substituted if the patient is allergic to povidone-iodine. Perez and his team recently conducted an evidence-based review to compare CHG versus povidone-iodine for the skin prep and planned to make a final decision about which prepa-



The cleaning process is monitored.

ration to use. (In the meantime, in a new report of a randomized trial, skin preps with CHG-alcohol resulted in a significantly lower SSI rate than those with povidone-iodine. The report by Darouiche et al appeared in the January 7, 2010, *New England Journal of Medicine*. See related article.)

Remote infections treated

Patients are screened preoperatively for any infections remote from the surgical site, such as dental abscesses or urinary tract infections.

"We're very aggressive," says Dr Sculco. "If the patient has any evidence of an infection anywhere prior to surgery, we make sure that is dealt with."

Every patient has a urine culture prior to surgery. If the culture is positive with an antibiotic-resistant organism, the surgery may be cancelled.

Postoperative urinary tract infection has been identified as a risk factor for periprosthetic joint infection in several studies but not all, AAOS says in its review. It is unclear whether there is an association between preoperative bladder infections and deep prosthetic infection.

Instrument processing

With its large orthopedic volume, the hospital doesn't need to rely much on loaner instrument sets, which make up only about 5% of sets. Loaner sets can be a chal-

lenge because they must be delivered far enough in advance to allow for the appropriate reprocessing.

When loaner sets are used, Perez says they are brought into the central supply department for decontamination and then are wrapped, sterilized, and brought to the operating room like all of the other instrumentation. ❖

The New York State report on hospital-acquired infections is at www.health.state.ny.us/statistics/facilities/hospital/hospital_acquired_infections/2008/docs/hospital-acquired_infection.pdf

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Take This Quick Quiz

- Have you just moved into your first OR management position?**
- Do you have staff who would make good managers but need to acquire management skills?**
- Is your next career step to advance into an OR management position?**

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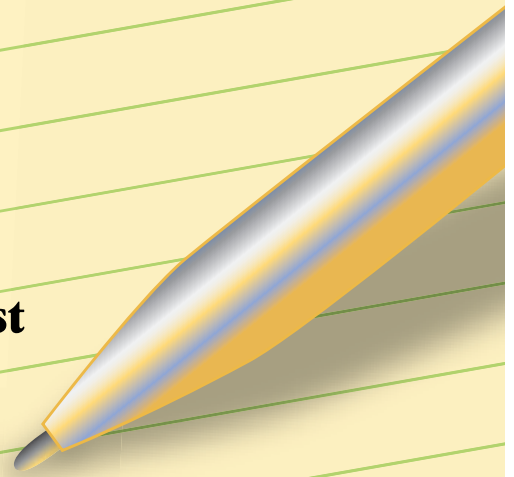
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What is the OR's role in SSI surveillance?

Under the Joint Commission's National Patient Safety Goal 07.05.01 on preventing surgical site infections (SSIs), organizations are required to measure their SSI rates. They also need to provide process and outcome measures, such as SSI rates, to key stakeholders; for example, surgeons and senior administrators.

Perioperative nurses play an important role in surveillance by making sure accurate data are collected to be used in measuring and monitoring SSI rates:

- the patient's wound class
- American Society of Anesthesiologists physical status
- length of the surgical procedure.

These 3 elements make up the SSI risk index used by the Centers for Disease Control and Prevention (CDC) to collect and report SSI rates. The rates are gathered and reported by the CDC's National Healthcare Safety Network (NHSN) (sidebar, p 19).

Documenting accurately

If the wound class isn't recorded correctly, a patient can be assigned to the wrong risk index, which can skew the data.

"When we have done auditing in the OR, we have found some wound classes are inaccurate," says Shannon Oriola, RN, CIC, COHN, the lead infection control practitioner at the Sharp Metropolitan Medical Campus in San Diego.

"Nurses need to be reminded about what happens if they don't put the right wound class." For example, if a patient's wound is classified as clean-contaminated when it should be documented as contaminated or dirty, the patient won't be bumped to a higher risk cate-



Does your staff know SSI rates?

gory, which is the basis for reporting SSI rates.

The role of surveillance

Surveillance is a cornerstone of infection prevention. Gathering SSI data with feedback to surgeons was shown in research starting in the 1960s to be important to reducing infections. The CDC outlines recommendations for surveillance in its *Guideline for Prevention of Surgical Site Infection*, 1999.

As part of the patient safety goal, the Joint Commission requires SSI rates to be measured for the first 30 days after surgery except for implant procedures, which must be followed for a year.

Following up on patients

Surveillance is challenging because most surgery is performed in the outpatient setting.

Stephen Streed, MS, CIC, system director for epidemiology for Lee Memorial Health System, Fort Myers, Florida, says his organization has several ways to detect postoperative infections for outpatients:

- A postop patient is admitted to the hospital for treatment of an infection.
- Physicians' offices self-report to the hospital using a set of criteria and a list of their recent surgical patients.
- If physicians send lab cultures

to the hospital, infection preventionists can search for keywords like "wound culture" in the microbiology reports.

- Keyword searches can be performed for emergency department visits using words that indicate an SSI.

Reporting of infections by surgeons has long been an accepted way to conduct surveillance. Cruse and Foord reported more than 30 years ago that giving feedback to surgeons was associated with a reduction in SSIs.

"Self-reporting by physicians actually works pretty well," Streed says. "They are very good at letting us know if a patient is admitted or there is something else we need to know about." In general, surgeons' response rates to questionnaires are fairly high (72% to 90%), the CDC reports. In contrast, mail questionnaires to patients had a low response (15% to 33%).

Electronic surveillance

Infection surveillance software, though costly, is giving infection preventionists new power to detect SSIs.

"The intent is to have data-mining software that is sensitive enough to pick up most infections so we don't have to go through reams of paper," Oriola says. That frees preventionists to spend more time on case analysis and education.

The software will be even more helpful as electronic health records become more widely adopted, giving facilities readier access to data from physicians' offices and outpatient clinics.

In a 2008 analysis, the Association for Professionals in Infection Control and Epidemiology found evidence

Where can we find SSI rates?

The Centers for Disease Control and Prevention (CDC) collects and reports SSI data through the National Healthcare Safety Network (NHSN). Facilities volunteer to participate and submit infection data in a standardized manner.

What are the latest SSI rates?

The latest report, for 2006-2008, is posted at www.cdc.gov/nhsn/index.html

The SSI rates are reported in Table 22 by procedure code.

If you want to compare your facility's SSI rates and ratios with those of NHSN, the CDC says you must collect your data according to the method described by NHSN.

Basic SSI risk index

NHSN uses a risk index that assigns surgical patients to categories based on 3 major risk factors:

1. Duration of procedure
2. Wound class: Contaminated (Class 3) or dirty/infected (Class 4)
3. ASA classification of 3, 4, or 5, referring to the American Society of Anesthesiologists physical status.

Reference

Edwards J R, Peterson K C, Mu Y, et al. National Healthcare Safety Network (NHSN) report: Data summary for 2006 through 2008, issued December 2009. *Am J Infect Control*. 2009;37:703-805. www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.pdf

was insufficient to make a business case that electronically enhanced surveillance yields cost savings for a hospital or society at large. Hospi-

Graphs show surgeons' performance.

tals still have to do their own analysis to see if such a system would be justified in their own institution, the report concluded.

Seeing the big picture

In a new twist on surgeon feedback, Streed is giving some of the specialties a graph that shows each surgeon's performance without identifying them.

An added step is to tell each surgeon which data is his or hers so the surgeon can compare with colleagues.

"Surgeons are a competitive lot. If they are at the upper end of the curve, they will try to discover what they are doing differently and what their colleagues are doing better," Streed says.

The feedback is also consistent with the patient safety principle of making harm more visible, he points out. "Harm in this case is the development of an SSI. We think a lot of these are preventable, particularly those with a low-risk index, low-risk procedures, and healthy patients.

"Sometimes surgeons get busy and don't see the aggregate, so this helps them see the bigger picture."

Does your staff know your SSI rate?

Feedback to perioperative nursing staff is also important.

"There seems to be a disconnect. OR nurses almost never know what their infection rates are—even a ballpark," says Kathleen

Kohut, RN, MS, CIC, CNOR, an independent infection prevention consultant.

Though data isn't collected on all procedures, managers can provide feedback to teams participating in procedures where SSI data is collected, such as cardiac and orthopedic surgery.

It's one more step in raising awareness. ♦

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A Lean process for OR technology

With tighter budgets and long lists of technology requests, organizations need a fair and systematic way to set priorities. At Virginia Mason Medical Center (VMMC) in Seattle, where Lean manufacturing principles are part of the culture, it was natural to apply Lean to the review of new surgical supplies and technology.

The existing process was more like “a speed bump to yes,” Steve Schaefer, vice president for finance, told *OR Manager*.

The new more robust process, which includes a more active role for physicians, also takes less time, 15 to 16 days compared to 45 days before.

Previously, new product requests were submitted using an online form to the purchasing department. The purchasing department gathered the information it could and forwarded the request to the appropriate VP, who often held the request, awaiting more information. The requesting physician would pressure the VP, who would generally say yes. The 45 days left physicians tapping their feet, and there was little coordination with other departments, such as finance.

The new process helps to build consensus among specialists and to align technology acquisitions with the organization’s goals (sidebar). Schaefer estimated the improvements will yield supply cost savings of \$1 million in 2009, about 1% to 2% of its supply spend. Costs will also be avoided because of items not purchased.

Leader in Lean

VMMC, a nonprofit integrated delivery network, is a national leader for Lean in health care, hav-

“
**Physicians
were tapping
their feet.**
”

ing embraced the Toyota-pioneered approach to quality improvement in 2000.

“It’s the water we swim in,” Schaefer, says. Simply stated, in a Lean culture, everyone strives to eliminate waste and inefficiency. All VMMC personnel are trained in Lean, including the physician CEO Gary S. Kaplan, MD, other senior executives, and physicians. Many travel to Japan for 2 weeks to observe Lean in action.

Bringing physicians in

All of the stakeholders realized product review needed improvement. Because most technology requests come from physicians, VMMC needed a way to bring them into the process.

Two major steps were to:

- create a supply chain oversight team
- hire a physician advisor.

The oversight team, described in a report from the Health Care Financial Management Association, *Engaging Physicians for Supply Chain Savings*, includes not only senior executives but also the chief medical officer, medical director, and physician advisor.

The team’s role is to maximize the value of the supply chain by ensuring all materials are used effectively and processes are cost-efficient. Having physicians on the oversight team creates a sense of

ownership in the supply chain, Schaefer said. Rather than being viewed as a separate department dictating policy, the supply chain “gets enterprise commitment and accountability,” he said.

A physician advisor

The second major step was to enlist a senior orthopedic surgeon, Paul Benca, MD, as the physician advisor to serve as a bridge between the administrators and physicians.

“I can go back and forth between the camps so we have good communication,” he says. His position is split between clinical and administrative duties.

Dr Benca says he can go to the physicians and ask for more information about their requests. He also brings the physicians information about costs and discusses how the purchase fits with the organization’s objectives.

“A lot of the section heads—including myself as head of the orthopedics section—weren’t even aware of products our staff members were requesting,” Dr Benca said.

“I think physicians understand the need to be good stewards. If you give them examples of what things are going to cost, they can make a better choice.”

Breaking down walls

Dr Benca has worked to break down walls between specialties to help get consensus on technology decisions. This is one improvement that came out of a rapid process improvement workshop on the product review process. The workshops, a Lean method, are short, intense projects that bring a team together to improve a process.

Three surgeons were involved

Strengthening product review

Improvements that helped Virginia Mason's product review to become leaner and more robust:

Added expertise

More expertise was added to the product review team, including clinical experts and representatives from the finance department, chargemaster and coding units as well as purchasing and contracting. Dr Benca brings the physicians' voice. VMMC's group purchasing organization, Amerinet, lends data analysis and benchmarking expertise.

Clearing requests

- A short section was added to the product request form requiring physicians who submit a request to justify the purchase and to clear the request with their section heads.
- Section heads review the request and discuss it with section members to see how the technology fits with the specialty's needs. They are encouraged to ask: "Can everybody in the section use this product? Does it allow us to do something we couldn't do before? Is it strategically important for the program?"

Financial analysis

The product review team must gather complete information about the product before forwarding the request to the finance office for review.

Product trials

The team encourages product trials. "We are happy to approve trials," Dr Benca says. "Trials can be very helpful."

//
We are going to look at true costs.
//

in the product review workshop, along with nurses and administrative staff from radiology, cardiology, and gastroenterology,

"You need a breadth of people in the room," says Schaefer. "It's eye-opening when you realize how each section deals with its own issues."

To make it easier for physicians to participate, VMMC sometimes shortens the workshops to 1 or 2 days rather than the usual 5 days. That's possible, Dr Benca notes, because physicians already have a background in Lean.

He also brought together physicians from technology-intensive areas—gastroenterology, interventional radiology, and the OR—to find out what they expect from the process. They, in turn, asked their sections. He learned that physicians wanted a process that is:

- reasonably quick
- nimble
- uses an electronic request form.

Single-site laparoscopic surgery

Laparoscopic equipment is a popular but pricey request, particularly for general surgery, urology, and gynecology. Two recent requests had annual price tags of \$100,000 with no increase in reimbursement.

To help vet these requests, Dr Benca formed an ad hoc task force of representatives from each specialty. VMMC is conducting a trial on single-incision laparoscopic surgery, new instrumentation that

allows surgeons to operate through a single incision in the umbilicus.

"The questions are, 'Is it worth what it is going to cost us? Does it really add anything?'" Dr Benca says. "We will go back after the trial to see if it makes sense to the requesters and ask them to justify the expense."

A plan for implants

Dr Benca plans to meet soon with the orthopedics section to review implant selection for hip and knee replacements. Part of the new approach will be to share implant costs with the physicians, which VMMC previously did not do.

Implant pricing does not seem to be an issue. "We have found through outside parties that our costs for orthopedic prostheses and cardiac implants are very competitive," he says.

Dr Benca plans to lead a cost analysis of newer approaches to treating joints, including partial knee replacements, hip resurfacing, and newer types of implants such as ceramic-on-ceramic components.

"We are going to look at the true costs of these products with the discounts and what our payers pay," he says. "I think that will help our physicians make intelligent choices to do what is best for patients but also try to keep the costs under control."

Schaefer and Dr Benca stress the product review process is a work in progress.

"The whole concept behind Lean methodology is one of continuous change and improvement," Schaefer says. "The process to eliminate waste never ends."

Breaking down the walls among specialties for technology decisions has been a major improvement "that will pay dividends year after year," Schaefer says. ♦

—Pat Patterson

A plan for fixing sterile reprocessing

Every morning when the central service (CS) staff arrived for work, they were greeted by a jumble of unprocessed sets left from the previous day. There were service problems with the OR, and morale was low.

“When the first shift came in, there was a never-ending pile of sets. They never got finished and they didn’t feel successful. Yet there was no understanding of why they couldn’t execute,” says Stephanie Karr, principal at Integrated Supply Solutions, LLC, Denver, who helped the department at this hospital get back on its feet.

With the department’s supervisors, Karr stepped back and looked at the whole process. The goal was to identify the key business drivers, opportunities for process improvement, and barriers to success and to determine how to achieve 100% of instrument processing daily. This evaluation and development of a staffing model helped achieve these objectives:

- align staff to the workload
- reduce an FTE of non-value-added activity
- reduce sets with missing instruments by 35%
- reduce unnecessary rapid turnovers
- have 94% of its instrumentation available for case-cart picking (compared to 80% previously).

The project also had a positive effect on staff morale and the overall work environment. The staff could see the results of their work, there was a new sense of achievement, and a new bar was set. How did they do it?

Shutting off the noise

The first step was to eliminate

How accurate is case cart assembly?

the “noise”—inefficiencies that mask the true issues—by getting to a “zero baseline.” That meant cleaning up the backlog of sets so the project team could examine the existing process. The staff was brought in over a weekend to clear up the leftover sets.

The week-long assessment was started at 6 am on Monday. The assessment was followed by 4 weeks of data analysis, identification of opportunities and recommendations, and a presentation of results to staff, management, and leadership. Karr suggests any CS department could perform this type of analysis on its own by taking the following steps.

The assessment

Understand your business

During the assessment, evaluate how the department is functioning across all shifts. With the supervisors, observe reprocessing activities, and collect data.

“Having the supervisors as active participants really helps them understand where the hurdles are,” Karr says. “And it helps them stay vested in sustaining the gains.”

As part of the assessment, observe and document:

- The work environment, work ethic of the staff, and impact of leadership.

- The work activities executed and the timing of those activities.
- Activities or steps that don’t add value. For example, do certain activities require the staff to walk across the department? Is that necessary?
- What is the quality of sets coming back from the OR? Is the OR contributing to the inefficiency of the process?
- How accurate is case cart assembly? Audit a sample of carts to determine the accuracy rate.

During observations, talk with the staff. What do they think about the current process and how it could be improved? If you have identified potential improvements, share them with the staff and ask for their feedback.

Collect data

Collect data on the department’s operations. The goal of data collection is to evaluate and understand the relationship of staffing to the department’s current performance and how you want the department to perform in the future:

- What is the average daily volume of cases?
 - What is the mix of specialties?
 - How many sets are processed by hour of day and day of week?
 - Assess activities the staff are performing during decontamination, set assembly, case cart assembly, and so on.
 - What is the current staffing for each shift?
 - What non-value-added activities keep staff away from their assignment? Document the number of incidents and time per incident.
- In the facility where Karr con-

Sterile reprocessing

sulted, after starting from zero, the supervisors realized that sets didn't become available for assembly until about 10:30 am, even though many of the employees started their shifts at 7 am. That meant most of the first shift wasn't needed until after that time if they were finishing all sets the previous day.

The staffing model

Using the data collected, develop a staffing model that reflects the organization's workload and goals:

- Based on the assessment of activities, consider how staff roles can be organized the most efficiently. For example, what other activities make sense for the person running the steam sterilizers? When sets arrive that need a rapid turnaround, how can staff be deployed without affecting the productivity of regular set reprocessing?
- Determine when activities should take place during the work day.
- Determine the average work effort needed to accomplish the workload for those activities.
- Based on the work effort, determine the average number of FTEs needed per shift. (Be sure to incorporate factors for non-productive time and actual work hours.)

Once you have built the staffing model to reflect your workload and goals, compare the results to your current staffing structure. Don't be shocked if they are dissimilar.

Evaluate the staffing plan

Some things to keep in mind as you evaluate how to finalize your recommended staffing plan:

- Plan flexible staff positions so staffing can be adjusted on days when expected volume is higher

Start with top 3 inefficiencies.

or lower than average or when there is a heavy sick call.

- Evaluate opportunities to shift personnel between areas if you have more than one CS department or location.
- Evaluate the availability of agency or per diem staff to fill potential staffing gaps.
- Evaluate if you will use permanent staff, an on-call plan, or a combination for weekend work and evaluate the impact on the model.
- Consider the ease of hiring CS staff during off-shifts or nontraditional shifts.

Execute the staffing plan

Once you have finalized your plan, it is time to execute. This step may seem daunting, especially in unionized organizations because converting to the new model may require broad changes in staff roles and/or shifts.

"But the business impact will be well worth the effort if it is executed properly," Karr says.

Once you understand your baseline and have executed your staffing plan (or a version thereof), keep the staffing plan current. Re-evaluate the plan whenever a change is made in the process to gauge the impact on workflow and staffing. For example, if a decision is made to take lenses out of instrument sets to avoid breakage and process them separately, how many more minutes will be required to process the 2 sets? What is the total of extra min-

Key metrics to measure

Some key metrics to measure for sterile reprocessing:

- case volume
- staffing levels
- production volume
- work in process
- sets produced per staff minute
- sets needed per case.

utes per week? How will that affect staffing?

"If you don't take these changes into consideration, you will wonder why all of a sudden you are not meeting your staffing target," Karr says. "You may have introduced a step that is beneficial from a capital equipment standpoint. But how will that affect your production?" This concept also applies as you become more efficient. Gains achieved through process improvements should be updated in the model as well.

"It will reinforce the added value of your efforts and fiscal responsibility to the organization," Karr says. "Doing more with the same or less."

Moving forward: The top 3

Once you've conducted the observation and analysis, many opportunities will present themselves. Karr recommends starting with the top 3 inefficiencies to bring tangible improvement in a reasonable time.

For example, in the department where Karr consulted, each instrument set was assigned to a specific container. That meant the person assembling the set had to search for the container assigned to that set. This single step took over 1 additional FTE per week.

Continued on page 24

The solution was simple—make the containers more generic.

“All of a sudden, that non-value-added time disappeared,” Karr says.

Another area that may need attention is the storage room. Are sets stored in a logical sequence? Or must the staff zigzag to pick sets for a case? Are the most-used sets stored between knee and shoulder height to save strain on backs and shoulders? Is there extra space for growth? If not, new sets may need to be stored in an inconvenient place. Karr recommends leaving about 20% to 30% of shelf space free for future set purchases and replacements.

Sustaining gains

Once you have completed the assessment, the staffing model, and the first set of improvements, use metrics to measure and track your business regularly (sidebar, p 23). Evaluate and update the staffing model data elements based on improvements and changes. This will help you understand how changes may affect your workload and allow you to be more proactive. It will also enable you to track whether you are sustaining the gains. Then you will be able to set a new baseline upon which to improve.

By completing these steps, you will have a framework for developing a predictive staffing model to start managing day-to-day workload fluctuations.

“Think how powerful it would be to understand your business well enough to know your staffing needs 1 to 2 days out and be able to adjust your staffing. It takes managing your business to a whole new level,” Karr says. ❖

Stephanie Karr can be reached at s.karr@comcast.net or at 303/915-8206.

Forum

To the Editor:

I have read the article titled, “Blunting sharps injuries in the OR continues to be a work in progress” (January 2010) and would like to add information about research that I have carried out on the ability of the hands-free technique to reduce the risk of transmission of bloodborne pathogens.

Our research showed that when the surgical team as a whole used the hands-free technique at least 75% of the time, there was a statistically significant reduction in risk; this means that even if the technique was not used up to 25% of time, there was still a significant benefit.

In our first study, using the hands-free technique 75% to 100% of the time resulted in a statistically significant decrease in risk (60% decrease) in surgeries in which 100 mL or more of blood was lost (100 mL is not a lot of blood loss in surgery so the benefit existed in most surgeries).

In our second study, we found that using the hands-free technique 75% to 100% of the time resulted in a statistically significant decrease in risk (35% decrease) in all surgeries, no matter how much blood loss there was. The video that was developed as the intervention in this second study can be viewed free of charge at this site:

www.healthsystem.virginia.edu/internet/safetycenter/internetsafety-centerwebpages/SafetyinSurgery/SafetyinSurgery.cfm

In another study that we carried out published in the *AORN Journal* in 2006, we reported that the most significant barrier to using the hands-free technique identified by both surgeons and nurses was the surgeon’s reluctance to shift his or her gaze away from the surgical site or from the microscope to retrieve or return sharp items. And we emphasized that it is important

to distinguish between looking into a microscope and shifting one’s gaze from a surgical site. Shifting one’s gaze can usually be performed without losing procedural continuity, and learning to shift one’s gaze should be seen simply as acquiring a new surgical skill. The surgeon is not using a microscope or loop during most of an open-heart surgery. ❖

—Bernadette Stringer, RN, PhD

Project program manager, Occupational Health and Safety Agency for Healthcare, Vancouver, British Columbia, Canada

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In memoriam

Nathan L. Belkin, PhD, died February 22, 2010, in Florida. He was 83. An expert in surgical textiles and infection control issues, Belkin was a prolific author, with some 200 articles to his credit.

He had a 40-year career in the textile services industry, retiring in 1991. He was a founder of the American Reusable Textile Association and was active in a variety of standards-setting activities.

Ambulatory Surgery Centers

Walking the tightrope of costs, preference

Purchasing managers are used to walking a tightrope between tough bargaining with suppliers and respect for the product preferences of physicians. Eventually, purchasing professionals, as well as physicians, realize these goals need not be inconsistent.

The best value often is in the best product.

At many ambulatory surgery centers (ASC), meeting both financial and clinical goals is even more critical as well as more difficult. What if the owners are the practicing physicians, and they do not agree on the best product or vendor? What if each prefers a different product, even if it means forsaking the discount that could result from higher volumes with fewer vendors?

Physician-preference items typically are the high-priced products, such as orthopedic implants, that take up a large portion of the non-salary expense budget. For these items, surgeons often develop strong loyalties to the vendor rep-

“
**Compare
average case
costs.**
”

representatives they work with and become accustomed to using a particular vendor's products.

Sharing supply duties

According to an informal survey at the 2009 meeting of the Ambulatory Surgery Center Association, only about 30% of ASCs have full-time materials managers. At the rest, certain staff members take on supply chain duties in addition to their other responsibilities.

According to Armand Paladino, a consultant with the group purchasing organization (GPO) VHA, Inc, in Irving, Texas, it is usually a nurse who handles materials management. Generally, he says, “Oversight falls on the administra-

tor or director of nursing, and ordering of supplies falls on the surgical technologist (ST), who spends half the time scrubbing and half the time doing inventory management.” That is because at ASCs the staffing focus is clinical, he adds.

As an account executive for nonacute care services at VHA, Inc, Paladino works with member ASCs to develop supply chain strategies.

Reviewing purchasing

At many ASCs, the person who addresses physician preference issues is typically the administrator, he says. The administrator tracks the center's financial data and monitors costs along with individual physician records.

Most surgery centers have software for billing, which also contains inventory management data and physician preference cards.

With supply cost data in hand, the administrator then works with the materials management specialist, who is likely an ST, to review

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purchasing patterns and identify potential savings.

Armed with results of that analysis, the administrator sits down with the physicians or other center managers. Education is the key, Paladino notes. "Most physicians [at ASCs] are investors, so they have an incentive to keep costs down." In addition, ASCs are vulnerable to supply price variations, he notes, because they are paid by procedure.

Strategies for saving

He advises the use of what he calls "procedure-based supply modeling," in which the administrator compares average case costs by physician and uses the results to argue for standardization on one or two brands that offer the best value for the price.

"A number of surgery centers are going with that model," he says.

Standardization allows the ASC to return to the selected vendor with a demand for better pricing in return for a larger volume of business.

If the physicians cannot agree on a preferred vendor, an alternative is what is often termed "shelf pricing" or "capitation." The ASC reviews its case costs and industry benchmarks and determines the top price it is willing to pay for various products.

Surgeons are then free to use any products they wish but with the understanding that the ASC will not pay more than its set price.

A 2006 survey by the newsletter *Hospital Materials Management* found shelf pricing for hip im-



Communicate the business side.

plants, which had been out of favor for several years, was making a comeback as overall prices rose. The arrangement allows surgeons to select the newest technology or higher-end models under contracts that limit prices to those for standard models.

Savings over preference

If the surgeons are on board with the idea of standardization, an ASC can reap major savings through GPO contracts; most are accessible to ASC members. VHA, Inc, for example, has its own orthopedic contracts. The problem, Paladino notes, is that an ASC usually does not have the leverage with physicians that a hospital does so it is important to make the case for savings over preference.

As Paladino explains, "Physicians tend to come in with a clinical approach. Now [in an ASC], they are investors. It is the responsibility of management to communicate the business side and their financial responsibility."

Along with contractual price limits and volume discounts, Paladino says ASCs also can save by paying for implants and other expensive items on a consignment basis. "Typically, with high-cost items, we try to consign," Paladino says. Consignment allows the ASC

to have a range of items, such as implant components, on hand while paying only when each item is used. As Paladino points out, ASCs try to keep inventory levels low because of storage space limits, so often a better alternative is just-in-time delivery.

More art than science

The Capital Region Surgery Center (CRSC) in Albany, New York, decided about a year ago to draw the line on physician preference, and the effort netted savings of nearly \$250,000 on endoscopes used in joint arthroscopy, which were among the most expensive preference items. Reaching that point, however, was a complex process.

"It's more an art than a science," explains Jay Barringer, RN, a supervisor and team leader who is responsible for materials management.

CRSC, which opened in 2000, is owned by a group of orthopedic surgeons and performs about 8,500 cases a year.

"Because of the number of cases, we are able to standardize on supplies and equipment and purchase at a level to achieve the best possible pricing," Barringer says.

First, he and his staff examined the preference cards on file for each surgeon.

"You need to understand the full range of the different supplies and specifications they are looking for," he notes.

After identifying the products favored by most of the surgeons, Barringer began to look for a GPO that could provide the most favorable contract terms for them. Man-

agement decided to use contracts from Novation, the purchasing arm of VHA.

The number of vendors varies by product. Physicians retain their choice of suture (a high-preference but relatively low-priced product) and implant materials. But for powered equipment there is only one contracted vendor: ConMed Linvatec in Largo, Florida.

CRSC buys custom packs for each type of surgery, such as knees, shoulders, and upper and lower extremities. Cardinal Health in Dublin, Ohio, delivers the packs twice weekly to the center's small storeroom, and staff pull the packs 24 hours prior to surgery.

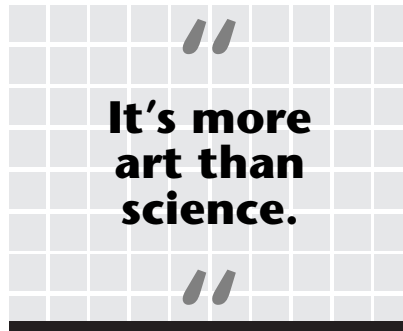
Convincing physicians

As Paladino warned, education was the key to convincing physicians that it would be in their own best interest to standardize.

"Our owners are our users," Barringer explains. "We know what every procedure costs down to the penny. For every doctor who performs a procedure, we can tell them exactly what the procedure costs are."

The center's board meets monthly to review financial results, he says, and when outliers appear with costs that vary widely from the average, often peer pressure brings these physicians into line with their colleagues.

Peer pressure continues to be critical as new physicians join the growing organization. "Our experience here is that we're a very progressive orthopedic group," he says, "and every year we add new physicians to the group. These new doctors have been trained on the



latest technology. Our process is to indoctrinate them into our system, that we take our costs very seriously."

Getting started

Barringer says CRSC's experience can help any ASC that would like to tackle the preference issue. He recommends the following steps:

- Obtain the preference cards and study them carefully.
- For each product, determine if a majority of physicians favors a certain model or vendor.
- With a list of preferred products in hand, contact GPOs to find the one most able to meet your needs through its contracts.
- Work with that GPO to establish par levels.
- Select a distributor that carries products from the GPO.
- Set up a delivery schedule.

When most or all of the physicians agree on most product choices, standardizing is fairly easy.

Open dialog

Problems arise when one or more insist on their choice for clinical reasons, even if their colleagues disagree. The answer is communication.

"It's OK to have differences," Barringer says, "but the surgery

center needs to know the true cost, including staff and overhead, and the physician needs to be open-minded."

If the center has precise knowledge of all of its costs, management will be in a position to work out compromises or make exceptions in special cases without sacrificing the bottom line, he says.

"You can make exceptions if the physician is otherwise profitable," he advises. "Any smart surgery center is going to look at the big picture. It's all about showing them the data and having an open dialog."

Meanwhile, he says, managers must not lose sight of the fact that clinical priorities must always come first.

"Patient safety and patient outcomes are the number one priorities; everything after that will take care of itself," he says. ❖

—Paula DeJohn

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Pilot finds ASC infection control lapses

Infection control lapses were found in two-thirds of ambulatory surgery centers (ASCs) during pilot surveys conducted in 68 facilities in 3 states in 2008, the Centers for Disease Control and Prevention (CDC) reported.

The CDC says 18% of the facilities had lapses in 3 or more of 5 categories.

The pilot surveys tested an infection control worksheet that government surveyors have since been using as a routine part of ASC surveys. The worksheet assesses compliance with the infection control standards in the Medicare ASC Conditions for Coverage (CfCs).

The pilot was conducted in Maryland, North Carolina, and Oklahoma in June through October 2008. During the pilot, the surveyors were trained to use the new tool and instructed to observe at least one procedure during each inspection.

The CDC found no statistically significant associations between the presence of an infection control lapse and the number of procedures performed per month or facility type.

The results of the pilot were reported at the Fifth Decennial International Conference on Healthcare-Associated Infections March 18-22, 2010, in Atlanta. ❖

The Centers for Medicare and Medicaid Services infection control requirements are detailed in the CMS interpretive guidelines for surveyors. The guidelines and other CMS documents are available from the ASC Association at www.ascassociation.org.

Pilot survey: ASC infection control lapses

Infection control category	Facilities with lapses*	Examples of lapses
Hand hygiene, use of gloves	12/62 (19%)	4 facilities had providers who failed to perform hand hygiene after contact with blood, body fluids, or nonintact skin.
Injection and medication safety	19/67 (28%)	18 facilities used single-dose medication for >1 patient.
Equipment reprocessing	19/67 (28%)	4 facilities reused single-use devices; eg, bite blocks.
Environmental cleaning	12/64 (19%)	8 facilities did not appropriately clean surfaces in the OR after procedures.
Handling of blood glucose monitoring equipment	25/54 (46%)	11 facilities used a single spring-loaded lancet device for multiple patients.

**Sample size (n) varies per infection lapse due to incomplete data on some of the audit tools.*

Source: Centers for Disease Control and Prevention.

Small ASC Medicare update recommended

A government advisory panel has recommended a 0.6% inflation update for Medicare payments to ambulatory surgery centers for 2011.

The recommendation came from the Medicare Payment Advisory Commission (MedPAC). Though MedPAC does not have an official role in setting the inflation update, its recommendations are influential with Congress and the Centers for Medicare & Medicaid Services (CMS).

In the absence of congressional action, the projected inflation update for 2011 would be 1.4%, the ASC Association reports.

MedPAC also recommended that ASCs report cost and quality data. The panel advised Congress to require ASCs to submit cost data to CMS, which would decide what index to use for ASC payment updates.

MedPAC is an independent agency that advises Congress on Medicare issues. ❖

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New training kit for malignant hyperthermia

The Malignant Hyperthermia Association of the United States has introduced a new training kit to help OR staff better prepare for MH emergencies.

The kit includes a 22-minute video of a mock drill and cards that detail how to prepare for a drill and specific responsibilities of participants. The kit also includes case scenarios, frequently asked questions, and a demonstration on mixing dantrolene. The kit costs \$150. ❖

—<http://medical.mhaus.org/index.cfm/fuseaction/Content.Display/PagePK/MockDrillKit.cfm>

Sepsis, pneumonia after surgery take heavy toll in lives and costs

Two common hospital-acquired conditions, sepsis and pneumonia, killed 48,000 patients and cost \$8.1 billion in 2006 alone, according to a large national study.

In a separate analysis of outcomes associated with surgery, the researchers found that nearly 20% of patients who developed sepsis after surgery died as a result. Patients with sepsis stayed in the hospital 22 days longer at an extra cost of \$33,000 per person.

Patients who developed postoperative pneumonia were in the hospital for an extra 14 days at a cost of \$46,000. In 11% of cases, patients died from the pneumonia.

Comprehensive approach needed

"In many cases, these conditions could have been avoided with better infection control in hospitals, says Ramanan Laxminarayan, PhD, one of the authors.

"The nation urgently needs a comprehensive approach to reduce the risk posed by these deadly infections," he added.

The researchers analyzed 69 million discharges from hospitals in 40 states. ❖

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At a Glance

Better outcomes for hospitals highly specialized in orthopedics

Postoperative mortality rates were twice as high (1.4% vs 0.73%) for patients having hip and knee replacements in hospitals that were the least specialized in orthopedic surgery compared to those that were the most specialized in a study published in the *British Medical Journal*.

Patients at the most specialized hospitals had lower rates of serious complications such as infections, deep vein thrombosis, and myocardial infarctions.

The findings were based on Medicare data of nearly 1.3 million patients who had hip or knee replacements at 3,818 US hospitals between 2001 and 2005.

—Hagen T P, Vaughan-Sarrazin M S, Cram P. *Brit Med J*. 2010;340:c165.

Robotic prostate surgery growing despite unproven results

Though more patients are asking for it and surgeons are learning the technique, robotic-assisted prostate surgery has not been proven to have better outcomes than open surgery and is more expensive, reports the Feb 13 *New York Times*. Last year, 86% of men who had prostate can-

cer surgery had robot-assisted procedures, yet no large studies are planned or underway to see if robot-assisted prostate surgery gives better, worse, or equivalent long-term cancer control than the traditional methods.

Researchers say the robot is an example of how technology can spread long before investigators know whether it is worthwhile. Patients may end up making life-changing decisions based on little more than assertive marketing or surgeon preference.

—*www.nytimes.com*
(registration required)

FDA clears Kimberly-Clark sterilization wrap for Steris low-temperature sterilization systems

On March 3, Kimberly-Clark Health Care received Food and Drug Administration clearance for use of its Kinguard One-Step Sterilization Wrap in conjunction with Steris Corporation's AMSCO V-Pro sterilization systems. The company says the wrap provides the protection of double wrapping in a single step, which cuts the time to open or wrap sequential wrapping in half. The V-Pro 1 and V-Pro 1 Plus Low Temperature Sterilization Systems process heat and moisture-sensitive

devices using vaporized hydrogen peroxide.

—*www.steris.com*

Concerns mount over metal-on-metal artificial hips

Adverse effects caused by metal-on-metal implants for total hip replacements and resurfacing procedures have prompted some orthopedic surgeons to reduce or stop the use of these devices, according to the March 3 *New York Times*. In some cases, the devices wear quickly, generating high volumes of metallic debris that is absorbed into the body. This can spark inflammatory reactions that cause groin pain, soft-tissue destruction, and destruction of bone. Some devices are requiring replacement within 1 to 2 years rather than the standard 15 years.

Metal-on-metal implants are used in approximately one-third of hip replacements, and studies estimate 1% to 3% of recipients could be affected by the problem.

All major orthopedic companies sell the metal-on-metal implants. Several companies said in statements that the implants did not pose a significant risk and that the incidence of metal debris problems was extremely low. ❖

—*www.nytimes.com*
(registration required)