

# Hospital Infection Control & PREVENTION

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## The bottom of the iceberg: Is there a hidden hepatitis epidemic beneath all of the outpatient outbreaks?

*'Our concern is that this could represent the tip of an iceberg.'*

— Julie Gerberding, MD, MPH, former CDC director, reacting to a hepatitis outbreak in a clinic in Las Vegas.

Once thought of as shocking outliers, the continuing hepatitis outbreaks in ambulatory care settings and clinics increasingly suggest that for every cluster detected, many more

infections acquired in health care are being missed due to inadequate surveillance systems and lack of public health resources to investigate individual cases.

These infections may be counted among hepatitis cases of unknown origin, but they are not being traced back to transmission in health care settings. For example, the Centers for Disease Control and Prevention reports that in 2006, national viral hepatitis surveillance data revealed that 50% of

patients with acute hepatitis C virus (HCV) and hepatitis B virus (HBV) were reported without accompanying risk factor data.<sup>1</sup> Among patients for whom risk factor data were reported, 56% with acute HBV infection and 32% with acute HCV infection could not specify a known risk factor for their infection (such as injection drug use, sexual or household contact with another infected person, occupational exposure to blood, or needlestick injury.) How many of them were infected in a health care setting? The honest answer: No one knows.

"Even if it is, say, 5% or 10%, the denominator is in the thousands of patients," says Joseph Perz, PhD, acting team leader for prevention in the CDC's division of health care quality promotion. "Our concern in this area has been increasing. Increased awareness to the possibility of health care transmission in itself has resulted in more reports coming in to CDC. So,



**Evelyn McKnight**

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if health departments had the resources to really dig into some of these cases — to investigate the lack of traditional risk factors — it is quite likely [they would find] more health care-associated transmission."

A CDC review of outbreak information revealed 33 outbreaks in nonhospital health care settings in the past decade, including 12 in outpatient clinics, six in hemodialysis centers, and 15 in long-term care facilities, resulting in 448 people acquiring HBV or HCV infection.<sup>2</sup> Indeed, the situation in long-term care has the CDC considering whether to recommend universal HBV vaccination for nursing home residents. (**See related story, p. 30.**)

"Through our review, we were fairly easily able to identify these 33 outbreaks and nearly 450 people who were infected as a result of the receipt of their health care," **Nicole Thompson**, PhD, MS, lead author of the CDC study and an epidemiologist in the division of viral hepatitis, told *Hospital Infection Control & Prevention*. "But in our hepatitis surveillance, there are many reported cases with no obvious risk factors. It's possible and likely that there are a number of people who acquired their infection as a result of health care."

A comprehensive approach involving better viral hepatitis surveillance and case investigation, health care provider education and training,

professional oversight, licensing, and public awareness is needed to ensure that patients always are afforded basic levels of protection against viral hepatitis transmission, the CDC recommends.

"Part of this is a resource issue," Thompson says. "It is extremely resource-intense — in finance and personnel — to conduct investigations of a single case. Many of these health departments simply don't have the money to be able to conduct these investigations thoroughly."

## Call for infection prevention training

In each of those outbreaks, the route of infection was patient-to-patient transmission due to failure of health care personnel to adhere to fundamental principles of infection control and aseptic technique (for example, reuse of syringes or lancing devices), the CDC found. The general consensus is that the outbreaks reflect less greed and evil than simple ignorance, with basic needle safety practice with syringes and vials repeatedly violated.

"I actually believe, in most cases, they really don't know or understand — it is extremely concerning," says **Marion Kainer**, MD, MPH, FRACP, medical epidemiologist and director of

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the hospital infections and antimicrobial resistance program at the Tennessee Department of Health in Nashville. "I really would like everybody who touches a patient in a health care setting to be required to have attended some very basic infection control course and have their basic competency tested so we know they understand this," she says.

Until that happens, such outbreaks are likely to continue, but they almost certainly will not all be detected. In particular, surveillance for hepatitis C virus is so problematic that clusters of patients — let alone individual cases — acquired in ambulatory care settings may be unrecognized. With an estimated 3.2 million chronically infected people nationwide, HCV infection is the most common bloodborne infection in the United States.

"There is a good chance that we may be missing clusters, specifically of hepatitis C," Kainer says. "If you look at the outbreaks in ambulatory/surgery centers that have been identified, in many cases, it was an astute clinician who actually recognized, [for example,] that they had two patients with a rare genotype and both had had medical procedures. I am personally concerned that we are missing cases of nosocomial transmission."

Case identification is difficult, because simple lab tests do not reveal if the HCV case is of recent acquisition or represents longstanding, chronic disease. "There is no laboratory test that can tell whether hepatitis C is acute or chronic," she says. "You cannot tell on the actual laboratory result. What is problematic is that many physicians rely on laboratory results — they do not actually contact the health department with acute cases of HCV. They assume that the lab has taken care of it. The volume that we get of hepatitis C antibody tests is so high that it is physically impossible for us with the resources that we have to follow up on every single one of those to determine whether it is acute or chronic. We get like 50,000 to 70,000 electronic lab reports of that per year."

As a result, Kainer is urging physicians, infection preventionists, and other clinicians in her state to alert the health department about any suspected acute HCV case, particularly if it may be linked to a health care setting.

"I told them that if you suspect that this is potential nosocomial transmission, make sure you note that and let the health department staff know it," she says. "And if you don't feel you are getting listened to, make sure that you

contact me. That is what I have done, but I am still concerned that we may be missing cases specifically of acute HCV."

## ***Surveillance varies across states***

It doesn't get any easier to identify nosocomial cases once they have been reported and put into the various surveillance groups. For example, after asymptomatic infection and underreporting were taken into account, approximately 19,000 new HCV infections occurred in 2006, the CDC estimates. Of the cases reported in 2006 for which information concerning exposures during the incubation period was available, the most common risk factor identified was intravenous drug use (54%). However, recent surgery was reported by 16% of patients, suggesting that transmission could have occurred through health care contact. By combining those patients with those infected during health care but included among those with no reported risk factors, one could argue that a substantial number of health care infections are occurring. However, this requires conjecture and extrapolation beyond the limited data, which are gathered in surveillance systems that may vary in definitions and intensity from state to state.

"I can tell you that nationally, [hepatitis] surveillance is all over the board," says **Elena M. Rocchio**, MA, viral hepatitis surveillance coordinator in the New York State Department of Health in Albany. "As far as health care as a risk factor — we do look for that. Because here in New York, we have had our share of experience with health care-acquired hepatitis, so it has become a very standard question."

Indeed, the department recently announced an investigation and look-back notification study after a patient was infected with HCV while undergoing dialysis treatment in New York City. Health officials confirmed that one patient contracted HCV after undergoing dialysis at the Upper Manhattan Dialysis Center of Beth Israel Medical Center. Approximately 170 patients have been notified that they may have been exposed to hepatitis C and other bloodborne viruses while being treated at the facility. The hospital declined comment when contacted by *HIC*. The investigation is ongoing, but Rocchio says "there were a number of things that could have led to transmission in this case."

Given the concerns about testing and under-reporting, the question remains how many such cases nationally may be occurring in ambulatory care without being investigated.

"That's a great question," Rocchio says.

"We really don't have an idea. We don't have a baseline to work from. It may seem like we are finding more, but it may be that we have become attuned to it. I think it has probably been happening for quite some time and surveillance systems for hepatitis are relatively new. It has a lot to do with the shift of health care into office-based settings as well. You don't have the traditional infection control oversight in a private physician office that you do in a hospital. That may be leading to more transmissions, but that's all anecdotal."

Nevertheless, the outbreaks are all the more disturbing because more patients are seeking treatment in ambulatory care. The CDC recently reported that the number of outpatient surgery visits in the United States increased from 20.8 million visits in 1996 to 34.7 million visits in 2006. Outpatient surgery visits accounted for about half of all surgery visits in 1996 but nearly two thirds of all surgery visits in 2006, the report said. The "National Survey of Ambulatory Surgery" includes surgery visits by children and adults and procedures performed in both hospital-based and free-standing surgery centers.<sup>3</sup> The procedures are certainly not becoming less invasive, but the patients keep on coming as a massive demographic change continues in health care delivery.

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## People, not numbers

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Among such patients was **Evelyn McKnight**, who thought breast cancer was her biggest worry when she sought treatment in an outpatient oncology center in Fremont, NE, in 2000.

"The nurse accessed our ports with a new needle and a new syringe to draw blood," she tells *HIC*. "She then put the blood in lab collection vials, she took off the needle, but used that same syringe to access a 500 cc saline bag. She drew off 10 cc saline to flush our ports, but in [doing so] contaminated that whole saline bag. In the morning, the saline bag was clear, but by the afternoon, it was cloudy pink with bits of sediment in it. A patient with known hepatitis C genotype 3A came to the clinic in March of 2000 for treatment, and 99 of us contracted the virus from that index patient."

Though the case count may eventually be surpassed by the HCV outbreak in Las Vegas — more than 50,000 people have been urged to be tested — the Nebraska outbreak was considered a "never event" and still remains the largest single-source outbreak of HCV in U.S. history. However, as infection preventionists know all too well, the outbreaks continue, with other patients such as McKnight receiving letters advising them that they may have been exposed to bloodborne viruses at a clinic. She now lives with HCV.

"At this time, I am pretty stable —I am very fortunate," she says. "It has caused me to lead a more healthy lifestyle. I always tried to be healthy, but I am very careful not to drink [alcohol], no fatty foods and foods that are high in iron because the liver has trouble metabolizing iron-rich foods. I'm careful to get moderate exercise as best I can and avoid stress however I can. I did do six months of ribavirin interferon [treatment] in 2004, but unfortunately, it was not successful. So I'm kind of on a day-by-day journey here."

Turning her personal tragedy into a national movement, McKnight founded the patient advocacy group HONOREform. She is gathering allies in a national effort to change the system through education and legislation. As undefined as it is, the largely hidden epidemic of hepatitis in ambulatory care has a human face in McKnight and other patients like her, even those who received those traumatizing notification letters but fortunately tested negative.

"It really shakes one's confidence in the health care system," she says. "It's really a deep loss — a sense of betrayal and disillusionment. Because of the collective suffering [of all exposed patients], I am confident that there will be sweeping improvement in infection control in the United States. That's the solace that I take."

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# Federal infection laws on horizon for clinics

*Broad-based coalition begins needle safety campaign*

In a move that may clear the way for federal legislation aimed at preventing outbreaks of bloodborne diseases in ambulatory care, a broad-based coalition of patient safety advocates and health care groups has launched a national education campaign on needle safety.

Adding political clout is Majority Leader Harry Reid (D-NV), who represents the state where some 50,000 people were urged to be tested for hepatitis and HIV after undergoing treatment at an endoscopy clinic in Las Vegas. Indeed, plans call for the campaign to start in Nevada and then look to expand nationally, using the highly publicized Vegas outbreak as a springboard for broader educational and legislative action.

The "One & Only Campaign" will focus on the recurrent theme of the outbreaks — reuse of syringes and contaminated medication vials — by educating health care providers and patients about standard injection safety practices that ensure patient safety.

"Basically, the tenet is one needle, one syringe, and one time," says campaign co-chair **Evelyn McKnight**, who founded the group HONOREform after being infected with hepatitis C virus in an outpatient cancer center in Nebraska in 2000. "[Reid] is very interested in securing funds to go the CDC to move forward this national education campaign. We're developing a training video, handouts, and we will have a web site."

Though McKnight has every reason to be outraged about acquiring HCV while seeking treatment for cancer, she sees the ongoing outbreaks as primarily an education problem that can and must be addressed.

"Of course, there are also some bad actors driven by greed or indifference; but for the most part, the providers are not thinking through the process," she says. "They feel safe once they have switched out the needle but they are not thinking of the downstream consequences of the syringe being contaminated."

The education campaign is expected to set the stage for federal legislation toughening regulatory oversight of infection prevention in ambulatory care offices and clinics, McKnight tells *Hospital Infection Control & Prevention*.

"That is a separate [campaign] involving our patient advocacy, nonprofit [branch]," she says. "We have been meeting since November and thinking about putting together a piece of legislation that would go toward preventing these types of outbreaks. There are lots of different pieces and lots of different ways of looking at this, so we are still in the process of picking out two or three things that are priorities. We can't change the world all at once."

## Oversight hindered by IP shortage

Among the proposals under discussion is a federal bill requiring oversight of ambulatory clinics by infection preventionists and/or accrediting organizations such as The Joint Commission. "We have to vet that to see if that would be in a federal purview or if we have to take that in a state-by-state march," she says. "The number of outpatient procedures has grown exponentially. We need more oversight of these clinics."

As this issue went to press, The Joint Commission was meeting with the Nevada legislature about expanding its role in the state and had already agreed to report any infection control deficiencies it uncovers to public health officials. The problem is that many freestanding clinics do not have Joint Commission accreditation, a situation that may be subject to change as the negotiations progress. The idea of enlisting IPs into oversight roles has been discussed by state lawmakers in Nevada as well, but there is one compelling snag: There is a shortage of IPs.

"It's a resource and work force issue," says **Marion Kainer**, MD, MPH, FRACP, medical epidemiologist and director of the hospital infections and antimicrobial resistance program at the Tennessee Department of Health in Nashville. "We have a shortage of infection preventionists. I think these areas would all benefit from having infection preventionists' [oversight]. I know that these are tough times and resources are limited, but this is basic patient safety. I am sure people would not mind spending an extra two dollars a visit if they could be assured that the most basic infection control measures are taken care of."

While very involved in the issue, Kainer is not a member of the education campaign. Some kind of continuing education credits in infection control for all health care providers also could be part of the solution, she says. More funding for health

departments to conduct more aggressive investigations and follow-up on single cases certainly would help define the magnitude of the problem and help interrupt subsequent transmission, Kainer adds. "Ideally, we would like to have more staff to follow up on these and ask questions in greater detail," she says. "I think most health care departments would — it is totally resource-dependent."

Though it cannot be part of any legislative initiative, the Centers for Control and Prevention will be a key partner in the education campaign through its advocacy group the CDC Foundation. Indeed, campaign materials specifically point to a recently published CDC review article that documents 33 outbreaks of viral hepatitis in nonhospital health care settings over the last decade.<sup>1</sup>

"There is something lacking in terms of pre-service education," says **Joseph Perz**, PhD, a co-author of the study and acting team leader for prevention in the CDC's division of health care quality promotion. "The basic understanding of how pathogens like HCV virus are transmitted is lacking among many providers. Basic aseptic technique and related concepts are perhaps not being taught or emphasized, as they need to be. Really, an emphasis on just basic infection control may have been lost in the process of trying to educate [workers] about increasingly complex health care delivery."

As a result, the education campaign includes a set of training materials designed to remind health care workers that syringes must be used one time only. It also will produce a set of patient-focused materials designed to empower patients, helping erect another layer of protection.

"While providers ultimately must be held responsible for following all safety standards, we want patients to feel empowered and able to speak up if they have a concern," says **Charlie Stokes**, CEO/president of the CDC Foundation and campaign co-chairman.

Attacking the problem from both the patient and provider angle fits the "wide net" approach many see as the only solution to the problem.

"It's going to take a comprehensive approach," says **Nicole Thompson**, PhD, MS, lead author of the CDC study and an epidemiologist in the division of viral hepatitis. "It's not going to be one thing that is going to prevent these outbreaks from occurring. There is a need for better and more enhanced hepatitis surveillance and case investigation. There needs to be improved professional oversight, better licensing and more

uniform regulations over these facilities."

In addition to the aforementioned groups, the education campaign is funded by multiple partners, including the Accreditation Association for Ambulatory Health Care, American Association of Nurse Anesthetists, Ambulatory Surgery Foundation, Association for Professionals in Infection Control and Epidemiology Inc., BD (Becton Dickinson & Co.), Nebraska Medical Association (NMA) and the Nevada State Medical Association (NSMA).

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## CDC mulling hep B shots in nursing homes

In light of continuing outbreaks of hepatitis in ambulatory and long-term care, the Centers for Disease Control and Prevention is considering recommending hepatitis B virus vaccination for diabetic residents of nursing homes.

Though such a move still would leave residents vulnerable to hepatitis C virus — for which there is no vaccine — immunizing residents for HBV could help minimize the impact of two converging trends: the graying of America and continuing outbreaks of bloodborne infections in nursing homes and ambulatory care settings.

"It potentially could be a recipe for disaster as more and more people receive their care in long-term settings," says **Nicole Thompson**, PhD, MS, an epidemiologist in the division of viral hepatitis told *Hospital Infection Control & Prevention*.

Thompson is the lead author of a recently published CDC report that concluded, "preventing HBV infections among residents of long-term care facilities is of particular importance and urgency, as the number of persons in the United States 65 years of age or older is expected to double to more than 70 million by 2030."<sup>1</sup>

Outbreak investigations in long-term care settings have repeatedly demonstrated person-to-person transmission of HBV infection, including many deaths, as a consequence of inappropriate

blood glucose monitoring practices, the CDC noted. "Predominately in the U.S., we have seen hepatitis B virus transmission as a result of poor practices during blood glucose monitoring," Thompson says. "That type of transmission itself is a red flag for overall general poor infection control practices. Currently, [we are] evaluating the use of HBV vaccine in these elderly populations as an intervention, but we must also recognize that by vaccinating for HBV, we will not prevent the transmission of other bloodborne infections that may be associated with these poor infection control practices. So, perhaps in conjunction with HBV vaccine, we must improve [infection prevention] in these settings."

During blood glucose monitoring, such equipment as fingerstick devices and glucometers, or the hands and gloves of health care personnel, can become contaminated with blood, the CDC warns. Therefore, careful attention to long-standing recommendations against the sharing of fingerstick devices, specific guidance for blood glucose monitoring procedures in long-term care, and related aspects of Standard Precautions (for example, reusable patient care equipment and devices or instruments) is needed. "In addition, ongoing outbreak activity supports consideration for augmenting hepatitis B vaccination recommendations to include diabetic long-term care residents," the CDC noted.

Some epidemiologists think the CDC should go further and recommend universal HBV vaccination — and not just in long-term care. "Personally, I actually think we should have universal HBV vaccination," says **Marion Kainer**, MD, MPH, FRACP, medical epidemiologist and director of the hospital infections and antimicrobial resistance program at the Tennessee Department of Health in Nashville. "If we did it for everybody, we could just about wipe it out."

Several outbreaks of HBV infection among residents in long-term care facilities have been linked to shared devices and other breaks in infection control practices related to blood glucose monitoring.<sup>2</sup> The devices are used to check blood glucose levels as a routine component of diabetes care. Because outbreaks of HBV infections have been associated with glucose monitoring, the CDC has long recommended that fingerstick devices be restricted to individual use.

In one nursing home outbreak, the spring-loaded barrel of a fingerstick device was used for multiple patients. In an assisted living center, nursing staff members routinely administered

fingersticks without wearing gloves or performing hand hygiene between patients, and spring-loaded fingerstick devices also were occasionally shared. The causes of some other outbreaks are less clear, particularly one where HBV was transmitted despite the correct use of single-use fingerstick devices and insulin medication vials that were dedicated for individual patient use. However, HBV can persist in the environment and on inadequately disinfected equipment. Moreover, HBV-infected patients may lack clinical symptoms while their viral titers steadily increase, making each individual blood exposure more likely to result in transmission.

To prevent patient-to-patient transmission of infections through cross-contamination, health care providers should avoid carrying supplies from resident to resident and avoid sharing devices, including glucometers, among residents, the CDC recommends. The outbreaks also underscore the need for education, training, adherence to standard precautions, and specific infection control recommendations targeting diabetes care procedures in long-term care settings.

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## **Communications breakdown**

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Another major aspect of the problem is that health departments are not contacted in a timely fashion. In an outbreak at a Mississippi nursing home during November and December of 2003, the index case turned out to be a fatal infection. The first patient with recognized symptoms of HBV infection had received serologic testing for viral hepatitis infection in June 2003 as part of a hospital emergency department evaluation for abdominal pain, the CDC reported. Although the patient was found to have a positive test for HBV and the finding was noted in the patient's chart, the nursing home did not contact the state health department or initiate an internal investigation. Subsequently, the patient died. In December 2003, after a second patient with acute HBV infection had died and a third with acute HBV infection was reported, serologic testing was performed on specimens from all 158 residents. Test results were available for 160 residents, including the two decedents; 15 (9%) had acute HBV infection, one was chronically infected, 15 (9%) were immune, and 129 (81%) were susceptible, the CDC reported. Percutaneous and other possible exposures among residents were evaluated.

Among 38 residents who routinely received fingersticks for glucose monitoring, 14 had acute HBV infection, compared with one of 106 residents who did not receive fingersticks. The outbreak investigations identified residents with diabetes who received fingersticks from nursing staff members as often as four times per day, according to their physician's routine orders, despite having consistently normal glucose levels. In such settings, schedules for fingerstick blood sampling of individual patients should be reviewed regularly to reduce the number of percutaneous procedures to the minimum necessary for appropriate medical management, the CDC recommends.

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## Toxic staph strain may be emerging

*Patients die rapidly with incredibly high fevers*

The recently reported rapid deaths of two patients infected with a new highly toxic staph strain suggests the deadly pathogen is emerging in the community and certainly will pose a threat to hospitals, a researcher tells *Hospital Infection Control & Prevention*.

"This is clearly newly emergent," says **Patrick M. Schlievert**, PhD, a *Staphylococcus aureus* researcher at the University of Minnesota Medical School in Minneapolis. "I have tested 6,000 *Staph aureus* strains, and none of them came from patients with this kind of an illness. I think it is just going to continue to spread. There is no question in my mind that this really severe syndrome is going to be continually increasing. The organism has almost certainly got a foothold and it is spreading around."

Schlievert and colleagues reported two cases

of extreme pyrexia associated with *S. aureus* infection that they believe represents a new syndrome most likely related to changes in pyrogenic toxin superantigens.<sup>1</sup> Both causative organisms in the fatal infections produced a deletion mutant form of toxic shock syndrome toxin-1 (TST1) and variant enterotoxin C.

"This variant of TST1 is getting into the central nervous system, affecting the hypothalamus, causing this massive fever that is basically what is killing the person," he hypothesizes. "They have the profile of a community-acquired organism, but you can imagine when these people come into a hospital, they could easily spread this."

Both patients had documented temperatures of 108°F and unexpectedly rapid deaths. "It is really, really unusual for anybody with a staph infection to get 108-plus fever," Schlievert tells *HIC*. "That is just unheard of. What we found associated with this was a variant form of toxic shock syndrome toxin. I do think the organism has changed. We are trying to figure out what is going on with it, but as with any *Staph aureus*, the potential for spread is enormous."

In both cases, the staph strain was a USA300, which is widely circulating as a community problem and increasingly spreading in hospitals. However, one infection was methicillin-resistant, and the other was methicillin-susceptible. The "deletion mutant" toxic trait could be transferred to other staph strains in much the same way that elements of drug resistance and other genetic traits move between and among bacterial species, he explains. "These are variable genetic traits that are moving around, there is no question about it," Schlievert says. "The toxins are on a pathogenicity island — an island of virulence — that is transferable. It is a mobile DNA element."

While certainly of major concern, it is too early to conclude that this toxic staph strain will widely emerge, cautions **William Schaffner**, MD, chairman of the department of preventive medicine at Vanderbilt University Medical Center in Nashville, TN.

"It's an extraordinary clinical syndrome, and [the researchers] provide a molecular reason for the profound illness in these two patients," he says. "However, there is no evidence yet that it is spreading around. We certainly ought to be on the alert for it, look for patients that have this syndrome, collect the organisms, and send them in for testing. But the question remains: Is it spreading? We don't know the answer to that. It might be, and that's kind of a

frightening prospect, but I'm not ready to say yet that [it is going to broadly emerge]."

### Case descriptions

Clinical and epidemiological highlights of the two fatal infections include:

- **Patient 1** was a previously healthy 39-year-old woman who presented to an outside hospital with back, hip, and abdominal pain, which had been gradually worsening over the prior week. Fever, nausea, and vomiting had begun in the 24–48 h before presentation. Upon questioning, the patient and family related a history of a recent fall and heavy use of ibuprofen for pain. Her temperature was 37°C (98.2°F), her pulse was 120 beats/min, her respiration rate was 20 breaths/min, her systolic blood pressure was 135 mm Hg, and her oxygen saturation was 99% on room air. The patient was admitted to the intensive care unit, and she began receiving intravenous fluids, vancomycin, and ceftriaxone.

The patient remained hemodynamically stable except for some sinus tachycardia, which was treated with intravenous metoprolol. Her oxygen requirements increased, and she required intubation and mechanical ventilation 11 h after admission. Her temperature increased steadily after hospital admission. Despite having received acetaminophen, methylprednisolone, and application of a cooling blanket, her temperature increased to 41°C (106.5°F), determined rectally, 13 hours after admission. Because she received succinylcholine during intubation earlier in the day, dantrolene was administered without effect. Subsequently, she became completely obtunded, and her systolic blood pressure rapidly decreased to 90 mm Hg and then to 60 mm Hg. The cardiac resuscitation team was called, and unsuccessful resuscitative measures were undertaken. A peak temperature of 42.2°C (108°F) was recorded prior to death, which occurred 14 h after admission. The patient's peak temperature may have been higher but was not recorded. Two blood cultures revealed methicillin-resistant *S. aureus* with intermediate susceptibility to fluoroquinolones and resistance to erythromycin.

- **Patient 2** was a 68-year-old man who presented to the emergency department with shortness of breath, which had been worsening over the prior 48 h. He had an extensive history of tobacco use but had quit seven years previously. He had received a diagnosis of chronic obstructive pulmonary disease (COPD) and was using inhalers. His temperature was

37.8°C (100°F), his pulse was 154 beats/min, his respiration rate was 45 breaths/min, his systolic blood pressure was 162 mm Hg, and he had initial oxygen saturation of 89% on room air. He appeared dyspneic and had intermittent wheezing, with rales and decreased breath sounds in the left lower lung fields. Tests for influenza A and B antigens yielded negative results. Initial chest radiography revealed extensive infiltrates in the left lower lobe. CT angiography revealed extensive infiltrates involving the entire left lung, but no pulmonary emboli. Levofloxacin, vancomycin, and methylprednisolone were administered.

The patient was then admitted to the intensive care unit with a diagnosis of severe community-acquired pneumonia and COPD exacerbation. Shortly after admission, he required intubation and mechanical ventilation. He developed hypotension, which initially responded to norepinephrine and intravenous fluids. Treatment with vancomycin and levofloxacin was discontinued, and linezolid, ceftriaxone, and drotrecogin were commenced. His hypotension progressively worsened. Vasopressors and, subsequently, phenylephrine were added. Despite continuation of methylprednisolone treatment, administration of acetaminophen, and application of a cooling blanket, the patient's temperature increased to 40°C (104°F), peaking at 42.3°C (108.3°F), determined rectally, 19 h after admission. Shortly thereafter, he became acutely hypotensive, with pulseless electrical activity, and the cardiac resuscitation team was called. Resuscitative efforts were initially successful. However, the patient again became hypotensive, and despite maximal vasopressor support, further resuscitative efforts were unsuccessful; the patient died 20 h after hospital admission. Tracheal aspirate culture yielded heavy growth of methicillin-susceptible *S. aureus*, with intermediate susceptibility to fluoroquinolones; whereas, the results of cultures of blood samples obtained at the time of admission remained negative.

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1. Aristides P. Assimacopoulos AP, Strandberg KL, et al. Extreme pyrexia and rapid death due to *Staphylococcus aureus* infection: Analysis of 2 cases. *Clin Infect Dis* 2009; 48:612-614. ■



## ABSTRACT & COMMENTARY

# A lab strategy to detect prosthetic joint infections

By Robert Muder, MD, Hospital Epidemiologist, Pittsburgh VA Medical Center.

**Synopsis:** Increasing the incubation time of tissue specimen culture from seven to 14 days increases the rate of culture positivity by one-third.

**Source:** Schäfer P et al. **Prolonged bacterial culture to identify late periprosthetic joint infection: A promising strategy.** *Clin Infect Dis* 2008; 47:1,403-1,409.

Accurate microbiologic diagnosis of prosthetic joint infection (PJI) is problematic. Infecting organisms reside in a biofilm, and standard culture techniques appear to have suboptimal sensitivity. Schäfer et al studied 284 patients with suspected late (> 2 months after implantation) PJI. They took 10 tissue samples at exploration and submitted five for culture and five for histologic examination. Specimen were inoculated onto trypticase soy agar with 5% sheep blood, chocolate agar, MacConkey II agar, and brain heart infusion broth for aerobic culture. Anaerobic culture was performed using Schaedler agar with sheep blood and Schaedler broth. All cultures were incubated for 14 days. They defined a positive result as two different specimens positive for phenotypically identical organisms, or one specimen with growth plus a positive histologic result. This was defined as greater than five polymorphonuclear leukocytes in at least 10 high-power fields.

A total of 110 specimens (39%) were classified as representing infection. Forty-seven cases were classified as contaminants; that is, a single positive culture without histologic evidence of inflammation. At seven days, only 74% of

samples from infected patients had positive cultures. *Enterobacteriaceae*, *staphylococci*, *streptococci*, *enterococci* were most often detected before day seven. *Propionibacterium*, other gram-positive bacilli, and *Peptostreptococcus* typically grew within days seven and 13 (86%); 79/92 of the cases with two or more positive cultures also were positive by histologic criteria.

### Commentary

Differentiating PJI from aseptic joint failure is often difficult for a number of reasons. The symptoms of PJI and aseptic failure overlap to a considerable degree. Microbiologic diagnosis is hampered by the fact that in late PJI, the organisms typically reside in a biofilm in which they are often metabolically inactive and present in relatively low number. A number of studies suggest that routine culture techniques are relatively insensitive in yielding a microbiologic diagnosis. These have suggested that the diagnostic yield can be increased by various means, including sonication of the removed implant<sup>1</sup> or amplification of 16s bacterial ribosomal rRNA<sup>2</sup>; these techniques may be impractical in many clinical laboratories. Further, there is no universally agreed-upon "gold standard" for the diagnosis of PJI, so the optimal method remains uncertain.

The study by Schäfer et al does not completely resolve this controversy. However, their study has several things to recommend it. The technique is

### CNE/CME instructions

Physicians and nurses participate in this CE/CME program by reading the issue, using the provided references for further research, and studying the questions. Participants should select what they believe to be the correct answers, then refer to answer key to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. After completing the semester's activity, you must complete the evaluation form that will be provided and return it in the reply envelope to receive a credit letter. ■

### COMING IN FUTURE MONTHS

■ Stimulus bill: IP blues or bonus?

■ A model state ed program for IP in ambulatory care

■ Infection rate disclosure laws going national?

■ A closer look at the shortage of IPs

■ Joint Commission patient safety goals: How are you doing?

straightforward and readily adoptable by clinical laboratories with minimal increase in cost, material, and effort. The correlation between culture results and histologic evidence, while not 100%, is encouraging. As we don't yet have a practical, precise, and universally agreed-upon definition of PJI, the strategy reported by Schäfer et al definitely shows promise.

## References

1. Trampuz, et al. Sonication of removed hip and knee prostheses for diagnosis of infection. *N Engl J Med* 2007; 357:654-663.
2. Tunney MM, et al. Detection of prosthetic hip infection at revision arthroplasty by immunofluorescence microscopy and PCR amplification of the bacterial 16S rRNA. *J Clin Microbiol* 1999;37:3,281-3,290. ■

## Go beyond the numbers to boost sharps safety

*ECRI provides self-assessment questionnaire*

How do you know if your needlestick prevention program is working? A decrease in injuries is a good barometer — but sometimes that could reflect a lack of reporting rather than an improvement in safety.

The ECRI Institute in Plymouth Meeting, PA, has developed a self-assessment questionnaire that enables infection preventionists and employee health professionals to gauge the effectiveness of their sharps safety program. The questionnaire is available on the nonprofit

## CNE/CME objectives

After reading each issue of *Hospital Infection Control & Prevention*, the infection control professional will be able to do the following:

- identify the particular clinical, legal, or educational issue related to epidemiology;
- describe how the issue affects nurses, hospitals, or the health care industry in general;
- cite solutions to the problems associated with those issues, based on guidelines from the federal Centers for Disease Control and Prevention or other authorities, and/or based on independent recommendations from clinicians at individual institutions. ■

organization's web site at [www.ecri.org/Documents/PSA/May%202008/Sharps\\_Injuries.pdf](http://www.ecri.org/Documents/PSA/May%202008/Sharps_Injuries.pdf).

"There is often that gap between what the organization has put into place and expects to be done and what actually is done and the knowledge that is retained," says **Paul Anderson**, director of risk management publications at ECRI.

The 16-page questionnaire encompasses device evaluation and selection, the exposure control plan, education and training, and other issues. It emphasizes the need to continue monitoring the sharps safety program, with questions such as: Is each protective device

## CNE/CME questions

If you have any questions about the testing method, please contact customer service at (800) 688-2421.

9. The Centers for Disease Control and Prevention reports that in 2006, national viral hepatitis surveillance data revealed that 50% of patients with acute hepatitis C virus (HCV) and hepatitis B virus (HBV) were reported without accompanying risk factor data.
  - True
  - False
10. To better determine how many people may be infected during health care treatment, the CDC recommends:
  - better viral hepatitis surveillance and case investigation.
  - health care provider education and training.
  - professional oversight, licensing, and public awareness.
  - All of the above
11. In light of continuing outbreaks in ambulatory and long-term care, the CDC is considering recommending which vaccination for diabetic residents of nursing homes?
  - Hepatitis B virus
  - Shingles
  - Hepatitis C virus
  - All of the above
12. Researchers reported two cases of extreme pyrexia associated with *Staphylococcus aureus* infection that they believe represents a new syndrome. Which of the following were among the striking features of the cases?
  - Temperatures of 108°F
  - Unexpectedly rapid deaths
  - Both infecting organisms produced a deletion mutant form of toxic shock syndrome toxin-1
  - All of the above

regularly assessed to ensure that it is being used effectively? Does this assessment include whether the protective device minimizes or eliminates the risk of a sharps injury to the user and others before, during, and after use?

The assessment also addresses work practices, including whether employees know how to use the devices properly and how to report any malfunctions or complaints. "A good way to answer these questions is to go out and ask health care workers," says Anderson.

ECRI designed the self-assessment to be used with a sharps safety training program. The instrument can be daunting, so Anderson suggests focusing on one portion at a time.

ECRI has conducted lab-based analyses of sharps devices, which are published in *Consumers' Reports*-style guides. But the most important factor in sharps safety is the buy-in of the frontline users, says **Raylene Ballard**, MS, MT(ASCP), senior project officer with the ECRI Health Devices Group. ■

## CNE/CME answers

9. A; 10. D; 11. A; 12. D.

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## Turning point: Critical care nurse becomes IP

*'We can do better than this.'*

With more than 25 years experience as a critical care nurse, **Barbara Jordan**, RN, MSN, CCRN, could read the bleak signs and symptoms of the patient before her like a map to a destination she had been before.

"She was that disaster ICU patient that I had taken care of all my career," she recalls.

This patient was her mother.

"She went in for a standard surgical procedure," Jordan says. "She had some complications and contracted *C. diff*. She had MRSA — she got it all. She had the virulent form for *C. diff*, but unfortunately, it was not recognized right away. There was no litigation or anything like that. My father would not do that, but [the infections] certainly contributed to her death."

In the aftermath of loss, Jordan had a thought that drove her to make a difference in the health care system where she had long labored: "We can do better than this." She left her career as a critical care nursing manager to become an infection preventionist.

"I am a spiritual person," Jordan says. "When this happened, I thought, 'Was this a sign from God that I should be doing different with my life?' It was funny how everything fell into place when this [IP] position came open back in my hometown of Pittsburgh. I hadn't worked here since I graduated nursing school."

She landed the job, and today is clinical director of infection control and regulatory compliance at the University of Pittsburgh Medical Center (UPMS) St. Margaret. Some three years into her new field, Jordan is another newbie who took a distinctly personal path to the profession. Though she still faces the standard — unending?



**Barbara Jordan**

— learning curve, she came into a strong team propelled by both her emotional fire and a wealth of nursing experience that had included some infection control work.

"I came into a role that was very well established by a person who retired," Jordan recalls. "I was a critical care manager most of my career in various parts of the country. I had seen it from the care provider's side and from management, but not so much from the epidemiological side. But I was always part of the infection control committee, because when you are the critical care manager, you get involved in everything."

Even with an extensive background in critical care nursing and management, Jordan confessed that she was not completely undaunted by the new tasks. Still, her management background served her well in relying on a team approach to problem solving. "I may not have all the infection control knowledge — and I'm not going to profess to have it," Jordan says. That's why I have [IP colleagues] — they are the experts. I am more the leadership and guidance. I try to remove any barriers and work with others. We have such a collaborative team environment at St. Margaret's."

Though Jordan didn't say as much, those last days with her mother may have had some impact on a key area of emphasis: bringing the patient into the infection prevention process. Ongoing efforts at the hospital include using The Joint Commission's Speak Up campaign, which encourages patients to ask caregivers if they have washed their hands or should wear gloves. There are similarly themed posters in patient rooms and a patient handbook that underscores a necessary "partnership" with their caregivers.

"We are partners," she emphasizes. "They can help us by holding us to our standards. We know the right thing to do — but we don't always do it. People are in a hurry; they don't wash their hands, and then infection spreads. It is so simple, yet it is so hard to get people to do it. It is an obligation to our patients to do the right thing." ■

### Nominate a Newbie!

Do you know someone relatively new to infection prevention that would be a good candidate for one of our IP Newbie profiles? Drop us a line and tell us why you think their story may be of interest to *HIC* readers. Send nominations to [gary.evans@ahcmedia.com](mailto:gary.evans@ahcmedia.com).

## Grief to grace: Loss of son drives mother's message

*'If health care isn't personal — what is?'*

It is no small sign of hard-earned wisdom that the mother who has lost a loved one to a health care-associated infection (HAI) doesn't want to be cast in angry hues, decrying the failure of a health system that took her 27-year-old son Josh along with some 100,000 other patients felled by infection in 2006.

"It's not about blame; about who caused this," says **Victoria Nahum**, who co-founded the Safe Care Campaign ([www.safecarecampaign.org](http://www.safecarecampaign.org)) after the death of her son. "It's about the good part of health care — saving people's lives. People do things for their reasons. You can throw numbers and statistics and data at them all day long; but if it doesn't strike a chord within them to make them want to change their own behavior, then really it's worthless."

Nahum is trying to strike that chord. In moving from grief to a kind of grace, she has become a compelling speaker at infection control and health care quality meetings, adding a much-needed humanity to all the benchmarks and numbers that typically obscure the true cost of HAIs. "We wanted to put a real face on what an infection really is," she says. "It really is a person, and it really is a family dealing with the loss of a family member. What [health care workers] tell me is that it reminds them of the original reason that they got into health care to begin with."

Josh Nahum broke his femur and fractured his skull in a skydiving accident in 2006, which he initially recovered from before developed an infection during rehabilitation. A lumbar puncture revealed bacteria — *Enterobacter aerogenes*



**Victoria Nahum**

— in his cerebral spinal fluid. Within just a few hours of being diagnosed, the infection caused so much pressure on his brain that it pushed part of it into his spinal column, damaging his spinal cord and ending his ability to breathe on his own, she explains.

### ***'These are not isolated incidents'***

"A week after Josh had died, my husband was inconsolable," she recalls. "He would sit on the couch, looking down, and hardly even talk. I knew that we had to go through a grieving process — there was a lot of quiet in our house. My reaction, other than a lot of tears, was to help my husband and find out what happened."

Strangely enough, the Nahums had other family members infected in different hospitals during the months preceding the fatal infection. Including Josh, the infections involved three different hospitals in three different states. "That's when I realized that these are not isolated incidents," she says. "These kinds of infections had to be happening everywhere at a huge rate in order to affect my family that way. It's not just one hospital; it was happening with good physicians and good care."

Researching the issue, Nahum decided to focus her campaign — her painful message — on one critical theme: hand hygiene. She urges health care workers to perform a simple, "life-saving act": Wash their hands before touching patients. As IPs are well aware, it is estimated that this cardinal principle of infection prevention is practiced appropriately less than half the time during patient encounters.

"If I don't do anything else, just me banging that hand hygiene drum potentially will save 40% of the people who might get sick and die," she says.

Having gone through such a grueling personal journey serves as evidence that true change is inner work. "Every time when we think about a behavior change, whether it's stopping smoking cigarettes or getting on a health regimen — that can never come from without," says Nahum, who lives in Atlanta. "It always has to begin inside of ourselves. That's what I think the message is [to health care workers]. They are personalizing what this really means and thinking, 'What if it happens to my family?' If health care isn't personal — what is?" ■



# The Joint Commission Update for Infection Control

*News you can use to stay in compliance*

## Bye, bye UTIs: Joint Commission and CMS putting heat on, but this mission is possible

*How one hospital slashed infection rates and saved a cool \$115,000*

The Joint Commission and other national infection prevention groups made a point to include catheter-related urinary tract infections (CA-UTIs) — traditionally considered a relatively benign adverse event — in a recently issued compendium targeting the major health care-associated infections (HAIs).<sup>1</sup> Moreover, The Joint Commission announced that the condensed, actionable recommendations on UTIs and the other infections may become required as accreditation standards by 2010. (*See Hospital Infection Control & Prevention*, November 2008, cover.)

But the real game changer on UTI prevention came a bit earlier when the Centers for Medicare & Medicaid Services (CMS) announced effective October 2008 that it would halt payment on additional costs generated by UTIs and two other infections (mediastinitis, catheter-related vascular infections). With both The Joint Commission and CMS now focusing on prevention of UTIs — an infection once considered such a low priority that it has been dubbed the “Rodney Dangerfield” of HAIs — what type of approach does the infection preventionist need to accomplish this task?

First, dare we say, give the UTI the respect it warrants in terms of patient safety. If nothing else, for sheer numbers. UTIs are the most common hospital-acquired infection, and 80% of those infections are attributable to an indwelling urethral catheter.<sup>2</sup> Twelve to 16% of hospital inpatients will have a urinary catheter at some time during their hospital stay. Urinary tract infection is the most important adverse outcome of urinary catheter use, with bacteremia and even sepsis occurring in a small proportion of infected patients. Morbidity attributable to any single episode of catheterization is limited,

but the high frequency of catheter use in hospitalized patients means that the cumulative burden of CA-UTIs is immense. Complications include patient discomfort, prolonged length of stay, increased cost, and spikes in patient morbidity and even mortality.

Yet surprisingly, a study published last year found that urinary catheters — a well-established risk of infection if not removed as soon as possible — are not even monitored at a large number of hospitals.<sup>3</sup> In a particularly striking finding, one-third of hospitals surveyed did not even conduct any type of UTI surveillance. However, among the two-thirds of the hospitals that do UTI surveillance — a proportion expected to rise sharply under CMS and Joint Commission prodding — is the University of Pittsburgh Medical Center (UPMC) St. Margaret. Noticing an increase in CA-UTIs in 2006 — well before the CMS mandate — UPMS St. Margaret’s infection prevention team began developing a comprehensive UTI prevention program that continues to produce some striking results.

“We had one [recent] month where we only had one catheter-associated UTI,” says **Barbara Jordan**, RN, MSN, CCRN, clinical director of infection control and regulatory compliance. “We double-checked everything and it was true. Now, we have not maintained that level of one, but we are still doing a really good job of keeping the rates down.”

It is estimated UTIs cost from \$1,000 to \$4,000 depending upon the symptoms, infecting pathogen (i.e., drug-resistant vs. susceptible), antibiotic therapy, and additional length of stay.<sup>4</sup> The prevention program at St. Margaret decreased the number of CA-UTIs from 113 in 2006 to 67 in 2007, a decrease

*(Continued on page 3)*

# **UPMC St. Margaret**

## **Urinary Catheter Management Observation Tool**

- 1. When a patient is being transported via stretcher, where is the urinary drainage bag?**

**On the bed/stretcher**  
 **On patient's abdomen**  
 **Secured to stretcher below the level of the bladder**  
 **Other** \_\_\_\_\_

- 2. Is the catheter secured to the patient's leg?**

\_\_\_\_\_  
**If so, how is catheter secured?** \_\_\_\_\_

- 3. If you are able to observe an insertion, was insertion performed using aseptic technique? Any breaks in technique? Explain:**

\_\_\_\_\_  
**Insertion was performed by RN** \_\_\_\_\_ **LPN** \_\_\_\_\_ **PCT** \_\_\_\_\_

- 4. Were urine specimens collected from the sampling port of the catheter tubing using aseptic technique? \_\_\_\_\_**

\_\_\_\_\_  
**Performed by RN** \_\_\_\_\_ **LPN** \_\_\_\_\_ **PCT** \_\_\_\_\_

- 5. Was the sample sent to the lab ASAP? \_\_\_\_\_**

- 6. Were gloves used by staff emptying urinary drainage bags?**

\_\_\_\_\_  
**Were gloves changed consistently between patients?** \_\_\_\_\_

- 7. Were hands sanitized with foam, or washed with soap and water (must for C.Diff patients) before and after removing gloves? \_\_\_\_\_**

- 8. According to your professional opinion, how many patients on your unit, today, have an unnecessary indwelling urinary catheter? \_\_\_\_\_**

## UPMC St. Margaret Emergency Department Indications for Urinary (Foley) Catheter Insertion

Patient name: \_\_\_\_\_ MRN: \_\_\_\_\_  
Gender: M F Age: \_\_\_\_\_  
Diagnosis: \_\_\_\_\_

Please indicate the reason for inserting a urinary catheter for this patient.  
All indications require a physician's order in eRecord:

- 1. Urinary retention (i.e. Obstruction, neurogenic bladder).
- 2. Alteration in blood pressure or volume status requiring continuous, accurate urine volume measurement (i.e. Critically ill patient, CHF).
- 3. Preoperative catheter insertion for patients going directly to the OR.
- 4. Continuous bladder irrigation for uncontrolled hematuria.
- 5. Other\* (Please print clearly!): \_\_\_\_\_

**\*Note:** If the reason for inserting a urinary catheter is not listed above, a Foley may not be indicated for this patient. According to the CDC your patient's risk of acquiring an infection in the hospital substantially increases when a urinary catheter is inserted.

**Please save all forms in the Infection Control Department file provided at each charting station.**

Source: UPMC St. Margaret, Pittsburgh.

of 46 infections. That resulted in an estimated annual savings of \$115,000 if you price out the average UTI at \$2,500. Now that preventing UTIs is a prime directive from both the CMS and The Joint Commission, Jordan's program can certainly guide other IPs in adopting similar strategies.

The keys to the program include:

- **improving** insertion technique and catheter management through mandatory education of staff;
- **utilizing** electronic health record technology;
- **reducing** urinary (Foley) catheter usage and decreasing urinary catheter device days (dwell time);
- **implementing** improved catheter product technology (i.e., silver alloy, hydrogel-coated catheters).

But before we get to the nuts and bolts of the UTI prevention plan designed by Jordan and infection prevention colleagues such as Susan DiNucci, RN,

BSN, it is worth noting the core values that drive the program and similar efforts at the medical center.

"My philosophy and the philosophy of St. Margaret, the CEO and the board are, 'Yes we do have to meet these regulatory needs but we have to do what's right for the patient,'" Jordan says. "Keep the patient centric and you're going to do the right thing. Of course, this really helps with CMS in reducing these infections, but I don't know that we are going to totally eliminate them. But through this initiative, we have reduced our CA-UTIs."

One of the basic tools used in the program is an observation form to assess urinary catheter management, which is used to assess both appropriate placement and handling. (See form, p. 2.)

"We observed how the catheters were being managed and actual insertions of catheters," she

says. "Then we tried to figure out how can we reduce the days that they're in. We attacked that first. We provided education to the staff on proper care of patients with urinary catheters, then we focused on reducing the dwell time."

Indeed, it is well established in the literature that the sooner you can get an unnecessary urinary catheter out of a patient, the less likely they are to develop an infection. "We're fortunate to have electronic health records so we were able to capture what patients had catheters in," Jordan says. "This report would print out every day on the nursing unit, and we had a report in infection control. The charge nurse would take that and talk with the physicians and see about getting the catheters out."

As part of the tracking process, daily assessment of urinary catheter necessity involves identifying one of the following criteria for insertion and assessment for insertion and retention of the catheter. "If the physician insists on keeping it in, then that's fine — it is documented," she says. If one of the following does not apply, the physician must be notified regarding a possible order to discontinue the catheter:

- bladder irrigation;
- close monitoring of urine output in critically ill patient;
- Comfort Measures Only care;
- nonurologic surgery less than 24 hours ago;
- Stage III or IV sacral/perineal pressure ulcer;
- surgical/trauma indications in perineal area;
- urinary retention;
- urologic surgery.

## **Hi-yo silver!**

A vital component of the center's program was housewide implementation of silver-coated catheters, which have been shown to reduce UTIs. The silver coating's antimicrobial properties help prevent biofilm formation and adhesion of microbes on the catheter. However, cost analysis revealed the silver devices were roughly twice as much as a conventional catheter. The argument was successfully made that prevented infections would pay for the more expensive devices, Jordan notes.

"We opted to go housewide with those rather than restricting the specific patient populations," she explains. "For example, we know there are surgical patients that will just have a urinary catheter in overnight. We could have said they can just set up a regular catheter, but we wanted to make this as simple as possible."

With the program up and running, Jordan looked

for key target areas to reduce placement of unnecessary catheters. The emergency department was a prime target. "We created insertion criteria for the emergency department because we saw that nurses were putting catheters in based on no science really. It was just a past practice." (**See ED catheter insertion form, p. 3.**) The criteria were established in consultation with the ED clinicians and then an ongoing education process began.

"We made it as easy as possible and got the ED nurses to teach this form to the urinary catheter insertion trainees," Jordan says. "The nurses use it and [we] pick them up every month and review them. Again, with a lot of staff education, we are reducing the insertion of catheters. Our next step — and we just had discussions this past week — is [to include] the OR. We have opportunities there to reduce usage of urinary catheters."

Surprisingly enough, some patients want urinary catheters — and may resist removal — to avoid the pain and hassle of moving about to urinate. "It's hard when your patients are hurting after surgery to make them get up and things like that, but again we have to look at when we can transition them to using an alternative means — a urinal or a condom cath," she says. "That's where the necessity criteria come in, but if we can avoid putting them in [in the first place] all the better. That has worked with the emergency department and we are exploring that with ambulatory surgery and our pre-op areas."

Ongoing education and specific feedback to health care workers are necessary to keep the program effective and robust. "We break it down by inpatient unit," Jordan says. "So if they can see we had three CA-UTIs in our surgical unit, [they ask] what's going on? It's the staff that are taking care of the patients that make the difference. We have developed a culture here where we are going to seek out opportunities for improvement."

## **References**

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