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## Infection rate disclosure battle in PA may foretell struggle in other states

*State mandates reporting rates of four key infections*

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In a battle that is expected to unfold in an increasing number of states, infection control professionals in Pennsylvania are facing a demand for public disclosure of infection rates.

Epidemiologists long have stressed that infection data that are not risk adjusted — or otherwise taken out of epidemiologic context — actually could make good hospitals look worse than poor ones. In that regard, ICPs in Pennsylvania have been fighting to ensure the state program will result in meaningful, comparative data.

“Basically, what ICPs are trying to do is come up with something that is valid,” says **Sharon Krystofiak**, MS, MT(ASCP), CIC, infection control manager at Mercy Hospital in Pittsburgh. “If you are going to do something, do it right. The data that they need are something that would be useful for comparison. I don’t think anybody has argued that it is not the right thing to do. Everybody is just saying that they have to be comparative data with some kind of risk stratification.”

Though some fear such efforts create disincentives to aggressively pursue and report all infections, sensational press exposés and consumer advocates emboldened by the patient safety movement are fueling the demand for public disclosure. Similar efforts are under way in other states. For example, a bill has been introduced in Missouri (the Hospital Infection Control Act of 2004) that would require reporting of infections and establishes inspection and enforcement measures in that state.

In addition, the Consumers Union, publishers of *Consumer Reports*, has set up a web site: [www.stophospitalinfections.org](http://www.stophospitalinfections.org). Citing Centers for Disease Control and Prevention estimates of 90,000 deaths and costs of \$5 billion each year, the group emphasizes, “You and I still can’t see information about infection rates and other key measures of quality. Consumers Union is working to ensure we all have access to the information we need to choose a good hospital and avoid a bad one.” The group encourages consumers to contact federal regulators and tell them to “report infection rates

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from every hospital so we can effectively choose among hospitals, and so hospitals will have the strongest possible incentive to improve." (See related story, p. 43.)

## **Pennsylvania an early indicator**

As the controversy plays out in various states, Pennsylvania will be an early indicator of how such systems will be contested and implemented.

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Editor: **Gary Evans**, (706) 742-2515.

Vice President/Group Publisher: **Brenda Mooney**, (404) 262-5403, ([brenda.mooney@thomson.com](mailto:brenda.mooney@thomson.com)).

Editorial Group Head: **Coles McKagen**, (404) 262-5420, ([coles.mckagen@thomson.com](mailto:coles.mckagen@thomson.com)).

Senior Production Editor: **Ann Duncan**.

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### **Editorial Questions**

For questions or comments, call **Gary Evans** at (706) 742-2515.

The situation there began late last year when the Pennsylvania Health Care Cost Containment Council (PHC) adopted new reporting requirements for nosocomial infections.

"We were supposed to start collecting, basically, housewide surveillance," Krystofiak says. "It really was a huge undertaking."

One of the immediate problems noted by the infection control community was that the state only was requesting numerator data — a raw number of how many, for example, bloodstream infections occurred at a given hospital.

"Those are not good comparable data when you have hospitals with 20 beds and hospitals with a thousand beds," she says. "We are an inner-city hospital, take care of a lot of the uninsured population, have a level trauma center and a burn unit. We would have been having a direct comparison with a 50-bed hospital out in the middle of the state. So it wouldn't be something that would be helpful."

In a campaign led by the state chapter of the Association for Professionals in Infection Control and Epidemiology (APIC), Pennsylvania ICPs have been urged to write letters expressing concern about the scope, process, and the cost of collecting the data. A letter from the state APIC chapter cited the lack "of clinical input from infection control professionals on how to undertake data collection, specific procedures to assure uniform data collections across facilities, and a reasonable time frame for implementation to allow for appropriate training and changes to information technology that will support data collections. In addition, reports generated by this process may be misleading to the public."

The Hospital & Healthsystem Association of Pennsylvania (HAP) state hospital association also stepped into the fray, arguing that requirements be limited to nosocomial infections that represent the highest risk to patients and result in highest costs.

HAP urged the council to work with clinicians to define the data collection methodology and develop clinically credible public reports that will be useful to the public, purchasers, and clinicians. As a result of the efforts, the state council amended its original plans, paring down a mandate for reports of 14 infections to these key four: surgical site infections, central line-associated bloodstream infections, ventilator-associated pneumonia, and catheter-associated urinary tract infections.

Hospitals also will be granted time extensions as needed beyond the original June 30,

2004, deadline for submission of data.

"We are encouraged that PHC's action will enable a phase-in of data collection and reporting processes," **Carolyn Scanlan**, HAP president said in a statement after the action. "We are working collaboratively with the PHC, state agencies, and the legislature to assure nosocomial infection data collection and reporting with a mutual goal of improving patient safety and quality of care."

The state council has not clarified how the data eventually will be made public, but consumer advocacy groups are keeping the pressure on for full disclosure for comparative purposes.

"While the proposal decided by the council is a step forward, hospitals should be required to report infection rates for all areas of the hospital, not just for certain patients or certain units, and to make this information available to the public," says **Ami Gadhia**, assistant legislative counsel for the Consumers Union. "[That] will allow hospitals to see how they stack up to others in the state and will move hospitals to be accountable if their infection rates are high."

Though hospitals in the state successfully pared down the original mandate to something more streamlined and valid, health care providers have taken some media bashing concerning the "dirty little secret" of nosocomial infections and clinicians who can't be bothered to wash their hands, Krystofiak points out. "For some of our staff, particularly the nurses working 12-hour shift, they wash their hands 100 times a day," she says. "They are doing everything humanly possible to prevent this. But unfortunately, people come in with bacteria on their skin and bodies; we do things to make them better that put them at risk."

### **Landmark voluntary effort in same state**

Indeed, there is some irony in the fact that even as the debate emerged over releasing infection rates — ostensibly as a quality improvement measure — Krystofiak and ICPs at 41 other Pittsburgh area hospitals were already involved in a nationally recognized patient safety effort. The lofty goal of zero nosocomial infections is a centerpiece initiative by the Pittsburgh Regional Healthcare Initiative (PHRI), a consortium of health care institutions, purchasers, and insurers.

"So people are already doing this on their own," she says. "It's not that hospitals want to end up with infections. It costs us more, and it is not good for patient care or patient relationships."

While the PHRI espouses the zero infection goal,

there are concessions to reality while striving to reach the "theoretical limit," says **Naida Grunden**, director of communications for the initiative.

"Infections are very tricky," she adds. "You don't get clean patients. We hear this all of the time. The patient may have an infected or contaminated wound when they walk in. But what we are talking about is things people can get behind. With a central line infection, is zero possible? How close can we get to zero? If the best hospital in the country has four a year, can we get three or two? We refer to it as the theoretical limit. Why wouldn't we strive for that?"

This position is not unlike the argument by CDC director Julie Gerberding, MD, MPH, that clinicians should not settle for a benchmark range of infections, but strive to protect the "N of one" — the individual patient whose life is threatened.

## **Consumer group urges public to demand data**

*Here's a sample letter to feds on infection data*

The Consumers Union, publishers of *Consumer Reports*, is urging people to write their government representatives and demand open records on hospital infection rates. (Go to: [www.stophospitalinfections.org](http://www.stophospitalinfections.org).) "Tell federal regulators that you want them to collect and report infection rates from every hospital so we can effectively choose among hospitals, and so hospitals will have the strongest possible incentive to improve," the group states. Here is the text of the sample letter on the issue that consumers are urged use:

"Thank you for taking steps to improve access to information about hospital quality. However, I was surprised to learn that you do not collect hospital-acquired infection information from every hospital. I believe this kind of information is an important measure of quality, and I want to know if my local hospital is providing good quality care. I was disturbed to learn that one in 20 patients acquire an infection during their hospital stay and that the CDC says about 90,000 people die each year from hospital infections. In 2003, the Institute of Medicine recommended significantly reducing hospital-acquired infection as a top priority for improving the quality of care provided by hospitals.

"I urge you to collect and publish hospital-acquired infection rates as part of your national quality initiative. If this information were available about every hospital, it would help me and others make more informed health care choices and would encourage all hospitals to improve." ■

The PHRI has not taken an official advocacy position for or against the release of infection rate data in the state.

"We favor a nonpunitive approach," Grunden says. "We favor people's right to know and people's right to protect themselves from infection."

While ICPs are key players in the PHRI, she says the consortium realizes it must preach to someone other than the choir to enact change.

"We are expanding [our message] to physicians, clinicians, and other leaders in the hospital," Grunden adds. "If you are putting the collective burden on one person, instead of deputizing everyone in the entire organization, you are doing it wrong. The ICP is there to be the champion, the knowledge base, and the obstacle remover. They are not there to be the enforcer or the cop for every single employee. Once these ideals pervade an institution — once everyone along the work pathway has the same idea in mind — change comes pretty quickly." ■

## The new normal: Infection threats keep on coming

*'Complacency is the enemy of health protection'*

Crisis response mode and rapidly emerging infections are the new normal for a public health system that has to expect new threats as part of the daily job, warned **Julie Gerberding**, MD, MPH, director of the Centers for Disease Control and Prevention (CDC).

Recounting the plethora of plagues that have beset the country over the last few years — anthrax attacks, West Nile virus, severe acute respiratory syndrome (SARS), and monkeypox — Gerberding said expect more of the same.

"It's been a very extraordinary period for infectious diseases and emerging problems," she told some 1,700 attendees recently in Atlanta at the annual Conference on Emerging Infectious Diseases. "There are so many times that we look on this period and think, 'Please, could we get back to the good old days?' My message today is that the good old days are gone. This is the new normal."

SARS, for example, presumably began with an occupational infection — the physician who was the index case in the outbreak among travelers at a Hong Kong hotel. As the newly infected

departed to the various corners of the world, the disease emerged globally "virtually overnight," she said. "This pattern of global problems becoming local and local problems very quickly becoming global has been repeated over and over again the past several years," Gerberding added.

Similarly, we now know that prairie dogs are particularly vulnerable to monkeypox and very efficient amplifiers of the disease from other zoonotic sources to humans. As that outbreak last year showed, "a problem that seems to be remote over in one part of the world suddenly becomes a problem in our backyard," she said. "We are really all contending with infection threats wherever they emerge. We are living in an incredibly small world."

### ***Complacency the major challenge***

Delivering the keynote address at the conference, Gerberding outlined five challenges to meeting the threat of emerging infections. The greatest threat is complacency, a lapse from the new normal into old ways of thinking, she explained. To deal with internal complacency the CDC is continuously re-examining its mission under a program called the Futures Initiative.

The program is designed in part to enable the CDC to be as effective as it can be in the critical lull period after one threat dies down and before the next wave rises. Looking at a sparsely dotted map of smallpox immunizations in the United States, Gerberding acknowledged the obvious. "It is very difficult for people to sustain the belief that there is a smallpox threat. We don't know how big the threat is, but I can tell you right now it is not zero."

States that went through the controversial immunization program have found subsequent benefits in the relationships and clinical partnerships formed. "When I visited Pennsylvania this year at the height of the hepatitis A virus outbreak at a restaurant, the first thing the health offices spontaneously said was, 'Thank goodness we have been working on the smallpox plan because we could deliver the hepatitis A vaccine to people over a weekend. We were prepared to do that.'"

The inevitability of another influenza pandemic is certainly a tonic against complacency. As flu threats arise and dissipate every few years, experts have continually warned that the much discussed scenario will happen eventually — an antigenic shift resulting in a highly infectious strain with the distinct possibility of no immediate vaccine.

"Who in their right mind would imagine that this is not going to happen," she said. "These viruses are constantly evolving. How many times do we have to see a pandemic before we come to grips with the fact that that's what this virus does. Our tendency to not believe it until we see it is a profound interference in our capacity to truly be prepared. I am so pleased with the steps that are being taken to accept the threat of influenza and get busy on how we are finally going to [accomplish] pandemic influenza preparedness. Complacency is the enemy of health protection."

### **Four other challenges**

Gerberding outlined four other major challenges posed by emerging infections, which are summarized as follows:

- **Cognition:** "By cognition, I mean threat detection and the scientific capability to identify the nature of the threat and to initiate the appropriate evidence-based response," she said. A key to recognizing emerging threats is the astute clinician that alerts authorities of the first cases or an unusual cluster. Such was the case when a clinician in Vietnam saw that SARS had a high attack rate among health care workers treating infected patients, a finding that confirmed the severity of the outbreak and prompted the CDC to activate its emergency response center. "In my work as a hospital epidemiologist, never did I see a disease that had an attack rate among health care workers of 56%," Gerberding said. "It's not so much the ability to detect a new problem. It is also connecting the dots — recognizing that a problem in the animal kingdom could be very easily be a problem in human health."

- **Containment:** Once an emerging infection has been recognized, it must be contained through isolation of infected patients and quarantine of those exposed but not yet ill. The personal and social disruption implied by "quarantine" makes it a powerful public health word. "I remember at CDC we worried for quite a while about when we would begin to use the 'quarantine' word in our communications," Gerberding said. "But what we have been able to accomplish now is bringing the word out into the open as one of two major platforms for containment. This is a very old-fashioned way of containing threats, but it works." As SARS showed, delayed patient isolation can easily translate into secondary cases. "This is common sense, but it does illustrate how

quickly isolation must proceed if it is going to be successful," she says.

During the SARS outbreak last year, 2.7 million airline passengers were alerted about the disease "not because we at that time appreciated that airlines per se were a threat, but because that was how people were returning from parts of the [world] where transmission was ongoing," she said. However, investigators have since determined that transmission actually occurred on airplanes as SARS patients left stricken areas. (**See Journal Review, p. 49.**) "It certainly increases the challenge of containment when we have to not only [advise them] to seek medical attention when they return, but we have to be concerned about containment and isolation while they are in route," Gerberding continued.

- **Countermeasures:** "By countermeasures, I mean the vaccines, the antimicrobials the products use to mitigate the human consequences," she said. These agents must be available, delivered in a timely fashion, and be effective and safe. At one point during the anthrax attacks, for example, 30,000 people were advised to at least start antibiotics. "It wouldn't take too much imagination to think about scaling up the nature of that threat so that we really would be in a position where it would be necessary to deliver antimicrobial therapy or vaccine to hundreds of thousands of people potentially exposed to anthrax in a very short period of time. This was a wake-up call."

Even with nonpandemic seasonal flu strains, the creation of annual vaccine is a fairly dramatic race against time. "We may know the strain that is most likely to be present in the next year's flu outbreak sometime in February and March, and we have only really a four-month window to get that strain into reassortment, seed vaccine and get it into production, test the potency, and get it packaged and distributed in time to vaccinate people," she added. "It's sobering to recognize how far we have to go to have complete countermeasure protection for all of the threats we know about, let alone the threats that are yet to emerge."

- **Communication:** To be an effective risk communicator, you need to be first with the information, right with the information, and credible so people trust your message, she said. "It is not always possible to do those three things simultaneously, so you have to make some real hard choices about which ones you're going to prioritize," Gerberding said. "At CDC, we have made the conscious decision that we are going to tell the truth and that our credibility is the most

important component of communication. The lesson for me personally is that whenever there is a problem I try to think, who are the people who will need this information?" ■

## JCAHO looking for hand hygiene compliance

*Staff workers may be interviewed*

ICPs be advised: Surveyors for the Joint Commission on Accreditation of Healthcare Organizations are asking health care workers whether they understand the new hand hygiene guidelines and are looking for signs of compliance.

"Compliance will be surveyed through interviews with caregiver staff and direct observation," the Joint Commission stated in information posted on its web site. "Caregivers should know what is expected of them with regard to hand hygiene and should practice it consistently. It is expected that noncompliance will be quite low, so that any pattern of noncompliance, i.e., more than a sporadic miss, will be scored as noncompliance."

As part of its 2004 patient safety goal to reduce nosocomial infections, the Joint Commission is looking for compliance with the hand hygiene guidelines by the Centers for Disease Control and Prevention (CDC). The CDC has abandoned its traditional emphasis on sinks and soaps in favor of new guidelines based on the European model of using alcohol-based hand rubs. As part of those guidelines, the CDC urges clinicians to monitor health care workers' adherence with recommended hand hygiene practices and provide personnel with information regarding their performance. The Joint Commission posted the following answers to commonly asked questions to help ICPs comply with the measures and pass JCAHO inspections:

**Q.** Where can I find the current CDC hand hygiene guidelines?

**A.** The full report is available at [www.cdc.gov/handhygiene/](http://www.cdc.gov/handhygiene/). The report is extremely detailed and well documented. The specific recommendations referred to in the patient safety are on pages 31 to 34 of the report.

**Q.** Does JCAHO require implementation of all the recommendations in the CDC hand hygiene guidelines?

**A.** Each of the CDC hand hygiene guidelines is

categorized on the basis of the strength of evidence supporting the recommendation. All "category I" recommendations (including categories IA, IB, and IC) must be implemented. Category II recommendations should be considered for implementation but are not required for accreditation purposes.

**Q.** What do these categories mean?

**A.** Category IA recommendations are strongly supported by well-designed experimental, clinical, or epidemiological studies; category IB recommendations are supported by certain experimental, clinical, or epidemiological studies and a strong theoretical rationale; category IC recommendations are required by regulation; category II recommendations are supported by suggestive clinical or epidemiological studies or theoretical rationale. The CDC also includes among its recommendations several unresolved issues for which it makes no recommendation.

**Q.** The CDC guidelines say that health care personnel should not wear artificial nails and should keep natural nails less than ¼ inch long if they care for patients at high risk of acquiring infections (e.g. patients in intensive care units or in transplant units). Will JCAHO actually be requiring this?

**A.** The artificial nails recommendation is a category IA recommendation, so it will be required for those individuals providing direct care to high-risk patients. However, the ¼ inch nail tips recommendation is category II, so should be *considered* for implementation but will not be required.

**Q.** Do we have to use alcohol-based hand cleaners?

**A.** Accredited organizations are required to provide health care workers with a readily accessible alcohol-based hand-rub product. However, use of an alcohol-based hand-rub cleaner by any individual health care worker is not required. The guidelines describe when this type of cleaner may be used instead of soap and water. If you choose not to use it, then soap and water should be used instead.

**Q.** Isn't the alcohol-based hand sanitizing gel flammable? Should we be concerned about a fire hazard?

**A.** The typical alcohol gel and foam dispensers used in the health care setting are of such limited size and volume that their contribution to the hazard of acceleration of fire development or fire spread in most situations is small. In a recent survey of 800 facilities reporting a cumulative 1,430 years of hand-rub use, no fires

attributable to or involving a hand-rub dispenser were reported. However, the 2000 edition of the National Fire Protection Association (NFPA) 101 Life Safety Code prohibits the installation of alcohol-based hand sanitizing gel dispensers in egress corridors. JCAHO recommends that organizations install these dispensers just inside each patient's room (and whichever other rooms the organization deems necessary), or just outside the room if this is not an egress corridor. Studies have shown significantly better compliance when the dispensers are located just outside the room (when permissible) rather than just inside. Do not install them in egress corridors, above heat/ignition sources, electrical outlets, or light switches. Note that local or state fire code requirements may differ from the national codes, therefore, you should determine and follow the requirements for your particular locale.

- Q. Where can I get more information about the fire safety issues?
- A. A number of organizations including the National Association of State Fire Marshals, the American Society of Healthcare Engineering, and the Association for Professionals in Infection Control and Epidemiology have published interim guidance documents for the placement of dispensers and control of bulk storage of alcohol-based hand cleaners. These are subject to revision as more data become available. ■



## Strategies to prevent catheter-related BSIs

*Use antibiotic-coated catheters on high-risk patients*

**Synopsis:** Many questions continue to circle around the use of central venous catheter (CVC) devices. What are the demographics of their use and the practices of their insertion? How dangerous are they? What location in the hospital is CVC use most prevalent? What are ways to limit infection? Are there special considerations to treat

infections, including bloodstream infections (BSI), resulting from the use of CVCs?

**Sources:** Braun BI, et al. **Preventing central venous catheter-associated primary bloodstream infections: Characteristics of practices among hospitals participating in the evaluation of processes and indicators in infection control (EPIC) study.** *Infect Control Hosp Epidemiol* 2003; 24:926-935.

Climo M, et al. **Prevalence of the use of central venous access devices within and outside of the intensive care unit: Results of a survey among hospitals in the prevention epicenter program of the Centers for Disease Control and Prevention.** *Infect Control Hosp Epidemiol* 2003; 24:942-945.

Kim SH, et al. **Outcomes of Hickman catheter salvage in neutropenic cancer patients with *Staphylococcus aureus* bacteremia.** *Infect Control Hosp Epidemiol* 2003; 24:897-904.

Alonso-Echanove J, et al. **Effect of nurse staffing and antimicrobial-impregnated central venous catheters on the risk of bloodstream infections in the intensive care unit.** *Infect Control Hosp Epidemiol* 2003; 24:916-925.

The December issue of *Infection Control and Hospital Epidemiology* has four articles addressing these issues, which are discussed below. Barbara Braun, who works for the Joint Commission on Accreditation of Healthcare Organizations, assembled epidemiologists from the study group known as EPIC (Evaluation of Processes and Indicators in Infection Control). They, in turn, contacted those hospitals that had members in the Society for Healthcare Epidemiology of America. The goal of this study was to uncover the methodology of CVC insertion and practices to limit primary BSIs related to CVCs. Novel methods were used to capture the exact characteristics of the insertion of the CVC in 54 hospitals that completed the CVC survey; 41 were from the United States.

There were 3,320 CVC insertions available for study, an average of 58 per hospital enrolled. There was wide variation in characteristics of insertion. Most insertions (91%) were nontunneled devices.

About 20% of patients had a follow-up CVC inserted in the original insertion site. Most CVCs were placed by physicians, but their experience with insertion varied widely (i.e., the number of years the clinician had inserted CVCs ranged from 0 to 39). Mask and gown barriers were used for most insertions. Up to 25% of CVCs were impregnated with an antibiotic or antiseptic. The mean time required for insertion was 10 minutes. In 8.2% of insertions, physicians had difficulties, mostly related to problems inserting the CVC at multiple

sites. In almost 4% of insertions, a supply item was not available.

Hospital policies also were quite variable in dealing with prevention of BSI. Only 49% of hospital committees met seven or more times per year. Before the study, less than a quarter of hospitals were collecting BSI data. Just more than half of the hospitals convened an immediate investigation if there was a substantial excess of bacteremias. More than 80% of hospitals had no IV team. Use of needleless systems for insertion occurred in about half of the episodes.

One interesting measure of hospital BSI surveillance was the ratio of blood cultures performed per 100 patient-days; the average in this study was 10. Hospitals in the study had an average of 2.2 individuals used for infection surveillance, and these workers spent an average of 13 hours in intensive care unit (ICU) surveillance. Almost all the hospitals had an epidemiologist. To answer the question regarding the hospital location of patients with CVCs, Michael Climo, MD, an associate professor at the Medical College of Virginia in Richmond, and a group of prominent hospital epidemiologists performed a one-day prevalence study at six medical centers. The centers participated in the Prevention Epicenter Program of the CDC. During the day's study, medical personnel visually examined all the patients hospitalized in their respective academic centers.

Patients in emergency departments, outpatient areas, and psychiatry, obstetric, and ophthalmology wards were excluded from the study.

Four classes of catheter were studied: tunneled CVCs; nontunneled CVCs; peripherally inserted central catheters (PICCS); and totally implantable devices that were Portacaths by name (Deltec Inc., St. Paul, MN). Subclavian, jugular, femoral, or PICCs all were considered for the study. Chi square tests were applied for statistical significance.

Nearly 2,500 patients were enrolled, and 29% had CVCs. Rate of use averaged 55.4% in ICU patients and 24.4% in non-ICU patients, but the absolute number of patients outside the ICU was more than twice that for those patients in the ICU.

The most common access sites were subclavian (55%), jugular (22%), and femoral (6%), with the jugular and femoral sites being more frequently used inside the ICU than outside ( $P < .001$  for both). The sites in more than 80% of CVCs in ward patients were either subclavian or PICCs. The most common type of catheter was nontunneled CVC (46%) and then tunneled CVC (23%). In the ICU, as expected, most catheters (74%)

were nontunneled CVCs.

Separately, Alonso-Echanove, with colleagues from the CDC, performed a study called DISC (Detailed ICU Surveillance Component), a prospective, observational, multicenter cohort study of BSIs associated with CVCs in eight ICUs.

A total of 4,535 patients who used 8,593 CVCs were studied. A total of 293 organisms were isolated: Gram-positive cocci accounted for 73% (coagulase-negative staphylococci, 44.5%), gram-negative bacteria for 17%, and fungi for 10%. There were 28 variables analyzed as risk factors. Those variables that were significantly associated with BSI were TPN with a nonimpregnated CVC, no antibiotics for 48 hours post-insertion, unarousable patients, care by a float nurse, and a patient age of 45-55 years. Only 7.4% of CVCs were PICC lines, but those had a 74% lower risk of BSI. All the impregnated CVCs used chlorhexidine and silver sulfadiazine.

In a more limited study, Kim and colleagues from Seoul National University sought to determine the rate of salvage of Hickman catheters associated with *Staphylococcus aureus* bacteremia in neutropenic cancer patients. The study covered 1998-2002 and involved 32 episodes in 29 patients. Vancomycin was not used routinely for empiric therapy. Empiric antibiotic therapy of the staphylococemic episode was considered appropriate or inappropriate.

Overall mortality was 69%, and that due to *S. aureus* was 38%. MRSA infections had a higher mortality rate ( $P = 0.04$ ). Salvage was attempted in 24 of the patients (75%). Only 12 patients received appropriate empiric antistaphylococcal therapy, but the difference in salvage between appropriate (58%) and inappropriate (42%) empiric treatments was not significant.

Of seven cases with persistent *S. aureus* bacteremia in the face of specific antistaphylococcal therapy, four Hickman catheters were not removed. Three of the four died with staphylococcal bacteremia. For patients in whom salvage was attempted, the overall success rate was 50% (12 of 24), more often in those patients with subsequent negative blood cultures (11 of 17). There was a trend toward a worse outcome in those patients with extraluminal infection and negative subsequent blood cultures.

**Comment by Joseph F. John Jr., MD, Chief, Medical Subspecialty Services, Ralph H. Johnson Veterans Administration Medical Center, Charleston, SC.**

There are several cogent findings from these studies. First, use of CVCs does differ with regard to hospital location. Hospital policies for CVC use may be quite variable. Infections feature gram-positive cocci much more than other bacteria and fungi, and coagulase-negative staphylococci are the current bane. A major risk factor for infections remains the concomitant use of total parenteral nutrition. Antibiotic impregnated CVCs reduce the risk of infection, and their use seems to be increasing. Finally, there may be some room for salvage when *S. aureus* is the bloodstream pathogen, but when there is persistent staphylococcal bacteremia, the CVC should be removed. Climo's multicenter group found that central catheters very commonly are used outside the ICU, suggesting new guidelines for surveillance outside the ICU are needed.

The study by Braun and associates is, in fact, the most provocative since it highlights the lack of assumption of leadership by some hospitals with regard to policies for these important devices. There is a disconnect between the findings that almost all (96.4%) hospital committees discussed the issue of BSIs, but only about half initiated an investigation if there was an increased frequency. Only 19% of the hospitals had IV teams to manage the CVCs in the study ICU, and only 38% used needleless systems for insertion. This variation in the control and monitoring of CVC, thus, is a national issue that hospitals desperately need to address. Their attention should be directed to structural factors such as catheter characteristics and hospital demographics; to process-of-care factors like the skill of operators and monitoring of outcomes; and to patient factors like severity of illness and urgency of insertion.

Only catheters coated with chlorhexidine and silver sulfadiazine were examined in the Alonso-Echanove study, but the number studied was substantial — 1,775 of the 8,593 CVCs studied. The impregnated CVCs had a 43% lower rate of infection than nonimpregnated CVCs. The reduction in infection was most pronounced in patients on TPN, so perhaps there is at work a catheter/microbial interaction such as those influencing biofilm deposition.

It was encouraging that the effect of the impregnated CVC was not dependent on the duration of use. Clearly, we are going to hear more about antibiotic-impregnated catheters and the role they may be playing in high-risk patients.

The further finding that PICC lines reduced the risk of infection by 74% when compared to nonimpregnated CVC is a very important aspect of this

large, multicenter study. A broader use of PICCs may require additional resources for placement, but the extra time and price may be worth it.

All of us clinicians increasingly are faced with those patients with *S. aureus* bacteremia associated with an indwelling CVC. The work of Kim, et al. from Seoul in neutropenic cancer patients with *S. aureus* bacteremia may not be totally analogous to those patients in Western hospitals, but I suspect their outcomes are similar to studies here. The rate of salvage, 50%, is about what a lot of ID practitioners would have guessed, but now here are the data.

Taken together, these four studies emphasize the importance CVCs have assumed in modern medicine. They are relatively safe devices, but their very vascular access make them more potentially dangerous than other medical devices. We can generalize from these studies to make the following recommendations:

- CVCs should be placed by experienced operators and monitored rigorously by experienced nurses.
- Hospitals should regularly collect and review data on BSIs, particularly those associated with CVCs.
- PICC lines are preferable to jugular and subclavian lines.
- Attempts should be made to reduce staphylococcal colonization of CVCs.
- Antibiotic-impregnated catheters should be used for patients at high risk of infection. ■



## JOURNAL REVIEW

### At least 23 may have acquired SARS in flight

*Five SARS deaths linked to air travel*

Olsen SJ, Chang HL, Vheung T, et al. **Transmission of the severe acute respiratory syndrome (SARS) on aircraft.** *N Engl J Med* 2003; 349:2,416-2,422.

Transmission of SARS people appears to have occurred on at least one aircraft after infected people flew during the symptomatic phase of illness last year, the authors reported.

March 15, 2003, a Boeing 737 carrying 120 people

(112 passengers, six flight attendants, and two pilots) flew for three hours from Hong Kong to Beijing. One of the passengers was a symptomatic 72-year-old man in whom fever had developed on March 11. He was hospitalized on arrival in Beijing, where he was given a diagnosis of atypical pneumonia and died on March 20. Among the 22 patients/passengers who subsequently developed SARS, the date of onset of illness ranged from March 17 to March 23, a mean of four days after the flight. A total of five died as a result of their illness (three from Hong Kong, one from China, and one from Singapore).

The authors interviewed passengers and crew members at least 10 days after they had taken one of three flights that transported a patient or patients with SARS. All index patients met the criteria of the World Health Organization (WHO) for a probable case of SARS, and index or secondary cases were confirmed to be positive for SARS-CoV on reverse-transcriptase polymerase chain reaction or serologic testing.

Overall, a total of 304 of 681 passengers on the three flights (45%) were interviewed directly; 16 had laboratory-confirmed SARS, two had illness that met the WHO definition of a probable case of SARS and were interviewed, four were reported to have probable cases of SARS but were not interviewed, and one had a suspected case of SARS. The infection in these 23 patients was subsequently transmitted to at least 13 others — two died of SARS.

“We believe that the most plausible explanation for the development of SARS in the passengers and crew members [on the 737] is that they were infected while on board the aircraft, although other explanations are possible,” the authors concluded. “. . . However, the clustering of the dates of onset of illness around four days after the flight is in keeping with the expected incubation period for SARS and points to the day of the flight as a likely time of transmission. Furthermore, we identified no alternative exposures before or after the flight through our interviews with the ill passengers.”

The authors emphasized that the passengers who became infected were clustered in the few rows directly in front of or behind the ill passenger,

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rather than being randomly distributed throughout the aircraft. That is consistent with the pattern described in other cases in which a respiratory pathogen was transmitted on board an aircraft and lends further plausibility to the theory that transmission occurred during the flight.<sup>1,2</sup>

The risk to passengers was greatest if they were seated in the same row as the index patient or within three rows in front of him. The greater concentration of people who became infected in front of the index patient than behind him may point to the role of coughing in transmission, causing a combination of aerosol and small-droplet spread. Fomites also may have played a role, so hand hygiene strategies could be a prevention tool.

The risk of transmission of an infectious agent on an aircraft can vary widely, with variables including the duration of the flight, the stage of illness, the type of air-ventilation system in use, the size of the aircraft, and the number of infected

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people on board. In addition, so-called "super-spreaders" may transmit the virus to large numbers of their contacts.

"Aircraft ventilation systems are believed to be highly efficient at keeping the air free of pathogens, which they do by exchanging the air in passenger cabins every three to four minutes and passing the circulated air through high-efficiency particulate-arresting (HEPA) filters designed to filter out all particles larger than 0.3  $\mu\text{m}$  by 1  $\mu\text{m}$ ." the authors noted. "[However], the fact that only 45 % of the passengers were interviewed despite intensive investigation by three health departments over the course of two months highlights the difficulties faced by such investigations and raises the possibility that more transmission occurred than was recognized."

## References

1. Kenyon TA, Valway SE, Ihle WW, et al. Transmission of multidrug-resistant *Mycobacterium tuberculosis* during a long airplane flight. *N Engl J Med* 1996; 334:933-938.
2. Moser MR, Bender TR, Margolis HS, et al. An outbreak of influenza aboard a commercial airliner. *Am J Epidemiol* 1979; 110:1-6. ■

## Don't miss program on JCAHO's new IC standards

*New 2005 standards, hand hygiene, doing RCAs*

The Joint Commission on Accreditation of Healthcare Organizations has taken an unprecedented interest in improving infection control in the nation's hospitals. In addition to making the reduction of nosocomial infections a national patient safety goal, the Joint Commission is pre-paring to roll out prescriptive new infection control standards for 2005.

Learn about these important new developments by calling into our April 22, 2004, (1:30-2:30 EST) audio conference: **Meeting the Accreditation Challenge: The Joint Commission's New Requirements for Infection Control.**

When the proposed 2005 standards were unveiled at an overflow meeting late last year in Chicago, **Dennis O'Leary, MD**, president of the Joint Commission, threw down the proverbial gauntlet. "There are some people who quickly scanning the revised standards have concluded that they are really nothing more than old wine in new bottles. However, if you are an accredited

## CE/CME questions

13. One of the immediate problems noted by the infection control community in Pennsylvania was that the state only was requesting which type of infection rate data?  
A. denominator  
B. numerator  
C. patients whose infection resulted in death  
D. A and B
14. Officials in Pennsylvania amended the original request for data on 14 infections, requiring hospital submit rates for which of the following:  
A. surgical-site infections  
B. central line-associated bloodstream infections  
C. ventilator-associated pneumonia  
D. catheter-associated urinary tract infections  
E. all of the above
15. According to Julie Gerberding, MD, which of the following words was the CDC worried about adding to its containment policies for emerging infections?  
A. isolation  
B. directly observed therapy  
C. quarantine  
D. all of the above
16. Each of the CDC hand hygiene guidelines is categorized on the basis of the strength of evidence supporting the recommendation. According to the Joint Commission, all "category I" recommendations must be implemented. Which recommendations may be "considered" for implementation?  
A. Category II  
B. IB  
C. IC  
D. B and C

## CE/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 certificate of completion. ■

organization, that would be a really grave miscalculation. These standards bell the cat. They put leaders of health care organizations on notice and on point. If things go south for any reason, . . . [there is] no opportunity or permission to defuse the responsibility.”

In addition to the 2005 standards, the faculty will discuss the challenge of meeting the Joint Commission’s patient safety goal of reducing infections, including the expectations of hand hygiene compliance and investigating deadly or serious infections through root-cause analysis.

Hear firsthand insights from **Robert Wise, MD**, JCAHO vice president for standards. He will be joined by veteran hospital epidemiologist **William Scheckler, MD**, of St. Mary’s Medical Center in Madison, WI. A member of the Joint Commission’s infection control advisory committee, Scheckler will describe the real-world challenges of meeting the new mandates.

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## CE/CME answers

13. B      14. E      15. C      16. A

## CE/CME objectives

After reading each issue of *Hospital Infection Control*, 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. ■



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