



# HOSPITAL INFECTION CONTROL®



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## INSIDE

- **Why Y2K?** A multibillion-dollar problem that began as a cost-savings measure . . . 58
- **Senate Y2K findings:** Hospital management in a 'catch-up' game . . . . . 60
- **Insidious outbreak:** Deadly Group A strep strain traced to asymptomatic carriers . . 62
- **CDC strep guidance:** ICPs must move quickly to prevent subsequent cases . . . . . 64
- **Global view:** International infection control consensus on antibiotic resistance. . . . 65
- **Ground zero:** ICU infections with antibiotic-resistant bugs continue to increase . . . . . 66
- **Nosocomial flu:** Non-immunized workers fuel long-term care outbreak . . . . . 69
- **HIV infection update:** Provider-to-patient transmission exceedingly rare; occupational infections underestimated . . 70

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## Don't let ripple effect of Y2K bug catch your department off guard

*Senate finds health care system may be unprepared for computer glitch*

Even infection control departments with fully updated office computers and software should be wary of a rippling effect if the so-called Y2K "millennium bug" adulterates data or disrupts services in less prepared hospital departments or connected facilities. Such downstream disruptions may be the primary impact for many ICPs, who have become increasingly reliant on computer-driven surveillance, laboratory and patient information.

"The main problem for ICPs is not their own house, but all the other people that they rely on. ICPs rely on the rest of the hospital for information," says **Joe Harr**, MBA, director of information technology at the Association for Professionals in Infection Control and Epidemiology (APIC) in Washington, DC.

A recent U.S. Senate report singled out health care as the most unprepared of the major economic sectors to deal with the infamous computer glitch. While not specifically addressing infection control, the report outlines potential problems and disruptions that could affect ICPs increasingly dependent on computer data to perform their jobs. The impact on ICPs will vary depending on the level of individual facility and program preparedness, including data dependence on other health care networks or systems that may be suspect, experts advise *Hospital Infection Control*.

The problem is essentially that old two-digit software dating systems in many computers may not discern between the year 2000 and the year 1900 on Jan. 1 of next year. (See box, p. 58.) That could set off potential equipment failures in computers and biomedical devices, creating a domino effect throughout interconnected systems, the Senate report warns. Y2K problems may lock up a computer or microprocessor, cause obviously incorrect dates or other data, or could "produce invalid data that will not be detected until much later, forcing users to correct a range of accumulated errors while searching for the source of the problem," according to the Senate report. (See report highlights, p. 60.)

## Y2K cost savings will prove expensive

The Y2K computer bug — which current estimates indicate will cost from \$600 billion to \$1.6 trillion to correct worldwide — was born out of a desire to save money.

In the early 1960s, computer memory was very expensive, and there was a strong economic incentive to minimize the amount of memory needed to store a program and its data, according to a recent U.S. Senate report.<sup>1</sup> To save money and memory, programmers represented four-digit years with only two digits, meaning 1968 or 1974 would be stored and processed as 68 and 74, respectively. The number 19 in the year was implied, much as personal checks once had the number 19 preprinted on the dateline. Consequently, computers could not correctly calculate the difference between a year in the

20th century and a year in the 21st century. For example, the time between July 1, 1998, and July 1, 2005 is 7 years. However, a computer with a Y2K problem could calculate an answer of either 93 years or -7 years, depending on the specific program. Calculations that used either of those results would be in error and may themselves cause subsequent problems.

Early computer programmers thought their successors would correct the problem, but the human tendency to take the path of least resistance and avoid a complex and expensive change allowed the problem to brew into today's high-priced crisis, the report noted.

### Reference

1. United States Senate Special Committee on the Year 2000 Technology Problem. "Investigating the Impact of the Year 2000 Problem." March 2, 1999. Web site: <http://www.senate.gov/~y2k/> ■

In addition to ensuring related departments like clinical laboratories will be Y2K-compliant, ICPs should check that such critical business tools as cell phones and pagers are going to function when they report to work on Monday, Jan. 3, 2000, Harr reminds. As a general approach to the Y2K issue, many hospitals are sending out letters to their vendors asking them to provide certification they are year 2000-compliant, he adds.

### *Some hospitals taking 'blanket approach'*

"We've gotten quite a few of them because we happen to be on vendor lists for quite a few hospitals," Harr says. "That kind of worries me, because that tells me they are just sort of taking a blanket approach. If they were taking a look at the vendor and what the vendor supplies, they would figure out that what APIC supplies is not Y2K-dependent."

Indeed, the Senate report found that many hospitals are relying solely on producers of medical devices to certify their Y2K compliance. "Based on known inaccuracies of some producers' compliance certification, this could be a serious mistake," the report states. The committee emphasized that the health care industry "lags significantly in its Y2K preparations compared to other key economic sectors, and because of limited resources and lack of awareness, rural and

inner-city hospitals have particularly high Y2K risk exposure."

The report says the health care industry trails other sectors in handling the Y2K problem in terms of managerial attention, technical resources available, financial resources committed, and remediation monitoring. Moreover, even though the pharmaceutical segment is among the most prepared sectors in health care, companies that rely on overseas suppliers may face disruptions. Some 80% of the basic ingredients used for drug products come from other countries, the report notes.

### *Y2K problem 'could seriously impact care'*

"I don't believe the health care industry's lack of preparedness will necessarily mean loss of life, but it could seriously impact care for millions of Americans dependent on prescription drugs and regular medical treatments to stay healthy," says Sen. **Robert F. Bennett** (R-UT), chairman of the special committee, which issued the report on March 2, 1999.

The Senate report drives home the immediacy of the problem and underscores the need for ICPs to assess their own programs and seek answers from information specialists at their facilities about interconnected databases, notes **Patti Grant**, RN, BSN, CIC, infection control

professional at RHD Memorial Medical Center and Trinity Medical Center, both in Dallas.

"If you haven't already been approached, you need to immediately call," Grant says. "Almost every aspect of my surveillance is computer-generated in one form or another. With patient data systems, I think all of us — even if we don't realize it — are getting some form of computerized report."

Grant has been actively involved in Y2K compliance efforts at both hospitals, particularly because she sometimes needs computer access to information at one hospital while working at the other. Personal computers (PCs) at the facilities were checked for Y2K compliance more than a year ago, but a few months ago she found that a software program used to collect surgical site infection data at both hospitals was not year 2000-compliant, Grant says.

"Two months ago, they upgraded the system, and consequently I am five weeks behind at both hospitals because there has been a large learning curve," she says. "But we still have time to address these [issues] and be proactive, and not do everything after Dec. 31, 1999."

Beyond the desktop PC and biomedical devices, the Senate report also warns that Y2K problems could disrupt basic utilities in hospitals that use microprocessor controls to control air handling systems, power, and water.

"It would be back to the days of Florence Nightingale if any of that malfunctioned," says Grant, who reviewed the Senate findings for *HIC*. "As an infection control professional, you may want to get with your director of plant operations, for example, and ask if everything is year 2000-compatible. Don't take things for granted."

### ***Between panic and complacency***

The consensus message from both the Senate report and from those looking specifically at the Y2K implications for infection control appears to be that the situation warrants neither panic nor complacency.

"The effects of Y2K, although potentially serious, are probably going to be for infection control a very rare event," says **Robert Garcia**, MT, CIC, assistant director of infection control at Brookdale University Hospital and Medical Center in Brooklyn, NY. "Overall, the problems that may occur would probably be inconveniences, but not disasters in the majority of cases."

Of those ICPs who have computers, many may have older hardware and software that may not be Y2K-compliant, Garcia notes. That may mean problems if databases or other programs used for infection control records are date-sensitive.

"Most infection control departments have some records of this nature," says Garcia, who reviewed the Senate report for *HIC* with Marvin Shuldman, director of biomedical engineering at Brookdale. For example, sterilization equipment that generates dated reports may fail to apply correct dates.

"These printouts are used as a record of correct processing and are therefore permanent records used for regulatory review," Garcia says.

Lab computers may be affected, but Garcia does not expect any major problems with testing systems and monitoring of patients' results.

"I would not anticipate [problems] since the systems are designed by major national companies who would have been looking for Y2K abnormalities for a long time," he says. "Medical record systems may be one area where there may be problems. Hospitals usually do not replace these systems very often and therefore may be [using] versions created prior to envisioning year 2000 problems. These records are often accessed by infection control."

### ***'You can't ignore it if you handle dates'***

Indeed, one approach for ICPs trying to assess the impact of Y2K problems on their programs is to determine what dated medical data they frequently access, advises **Tracy Gustafson**, MD, a health care computer software consultant with Epistat Systems Inc. in Richardson, TX.

"[ICPs] can expect to be affected pretty quickly if any of the systems they collect data from are not Y2K-compliant," he says. "It's not life or death like some computers in the hospitals that control biomedical devices. Those are certainly on a higher order of risk, but still it would be naive for infection control people to say, 'It is not my problem; I don't have to worry about it.' It's everybody's problem, and you can't ignore it if you handle dates. And they do."

The dates that often are critical to ICPs include the admission date of the patient, procedure dates that involve any surgery, the date

*(Continued on page 61)*

## Senate Y2K panel finds health care lagging

The health care industry lags significantly in its Y2K preparations compared to other key economic sectors, with rural and inner-city hospitals and physician offices among the most vulnerable areas, a U.S. Senate committee has concluded.<sup>1</sup>

Looking at all sectors of the economy, the Senate committee judged that the United States "will not experience any nationwide social or economic collapse as the result of Y2K computer problems, but some disruptions will occur, and that in some cases Y2K disruptions may be significant. The international situation may be even more tumultuous."

The report says the health care industry lags behind other industries in dealing with the Y2K problem in managerial attention, technical resources available, financial resources committed, and remediation monitoring. Of prime concern are embedded microprocessors in biomedical devices. The devices are used in a wide variety of diagnostic test equipment (e.g., blood chemistry analyzers, MRI, X-ray) and inpatient and outpatient therapies (e.g., radiation).

"These devices are the Trojan horses in the health care industry's compliance," the report states. "Users are often unaware or unknowledgeable about the impact of the microprocessors inside these sophisticated machines. For example, surgical suite machines such as a \$40,000 blood gas analyzer could close down operating rooms if they cannot function on Jan. 1, 2000."

The health care industry currently relies on manufacturers' Y2K compliance data reports to determine whether the device will function appropriately when the date changes. In many cases, manufacturers have been unable or unwilling to comment on their product's ability to function after the millennium change, the report states. As a result of the committee hearings, device manufacturers began providing compliance data to the Food and Drug Administration for publication on its Internet Web site at <http://www.fda.gov/>.

"Perhaps the most disturbing Y2K revelation to the Committee was the disclosure of the domino effect of Y2K failure," the Senate report states. "It can occur in both the use of biomedical devices and in Medicare payments. If one biomedical device malfunctions, it can potentially shut down an operating room. Or even worse, one device can

pass erroneous data onto other devices creating adverse patient conditions. In other words, Y2K mistakes can reverberate throughout the health care system."

Other key excerpts from the report are summarized as follows:

**Rural and inner-city hospitals:** Rural and inner-city hospitals have unique Y2K problems. First, because these types of hospitals tend to have limited financing, the expensive discovery, renovation, and testing process is beyond their means. Second, these institutions do not have access to the highly skilled personnel needed to achieve Y2K compliance. Third, these hospitals are more likely to have older medical equipment, which may be disproportionately subject to Y2K problems. On the plus side, some low-tech equipment may not have any Y2K exposure. On the other hand, older versions of bill payment software are more likely to be noncompliant.

**Large hospitals:** Large hospitals are dedicating considerable resources towards correcting the Y2K problem. They have all the usual Y2K problems of health care plus building management concerns. They have to provide water and power, heating, ventilating and air conditioning, plus maintain elevators and security systems. Large hospitals also must address Y2K problems in biomedical devices and patient data systems. All of the above must function in harmony for patients to be protected adequately. Hospital management is playing a catch-up game.

**Doctors' offices:** Because the nation's nearly 800,000 doctors work out of thousands of separate offices, detailed data on the extent of the Y2K problem in this area are unavailable. Medical offices are expected to have all the Y2K problems similar to hospitals on a smaller scale but without comparable access to technical and financial resources. Because diagnostic testing depends upon biomedical devices, potential problems may exist. Patient data systems are not widely used in doctors' offices today, but electronic health claims billing systems are nearly universal for Medicare. If doctors have to return to paper billing because of Y2K failures, insurance companies and Medicare would be hard-pressed to accommodate the resulting volume of health claims.

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1. United States Senate Special Committee on the Year 2000 Technology Problem. "Investigating the Impact of the Year 2000 Problem." March 2, 1999. Web site: <http://www.senate.gov/~y2k/> ■

an infection was reported, culture dates from laboratory computers, and follow-up dates postdischarge to see if an infection occurred, he says. Also important to ICPs are dates that relate to placement of medical devices like central lines and ventilators, particularly if those dates are used to calculate infection rates by device-days.

"Those are the dates they use regularly and have to be correct for them to do their job," he says. "Most of those, it turns out, are kept on other systems. They need to check with the systems that they collect data from. In most hospitals, that is limited to admissions, surgery, and the lab. If they are convinced that those three systems are completely up to date, then the only thing they have to worry about is their own software they are using for infection control."

### ***Older custom-designed systems pose risk***

At particular risk for Y2K woes are hospitals that are using custom-designed data collection systems developed specifically for their facility more than five years ago, he says.

"Those are the ones I think are really at some risk [because] those systems are very likely to have been written at a time when nobody was worried about Y2K," Gustafson says. "I think it is fair to say [those ICPs] are sitting on a time bomb. You won't be able to run reports; you want be able to trust the reports you do run."

Another problem that may surface in infection control departments is use of old "hand-me-down" computers, he says.

"They get a lot of old computers; people pass them down and they get handed off to infection control," he says. "If you have a computer that is over five years old, it is probably not Y2K-compliant itself."

There are software upgrades available to fix Y2K problems, but the best option for ICPs who find their office equipment is outdated may be to lobby for a new computer, he adds. That may be preferable to getting on the list for an in-house software upgrade, particularly because many departments will be reporting computer concerns as the year wanes and the scramble ensues for 11th-hour corrections, he warns.

"You can pretty much predict the second half of this year is going to be taken up with putting out fires," Gustafson says. "Infection control doesn't have a fire [in the sense] that it will cause the hospital to shut down. But it could have a

serious impact on [ICPs], and they need to take care of themselves."

For example, back up all program data files to ensure all your valuable information is archived, he advises, noting that it may be wise to start a separate data set for the year 2000. Similarly, ICPs may want to heighten suspicion of data collected from other systems as the year change nears and for a few months thereafter.

"It has been a great advance and a big convenience over the last 10 years that networks have grown, but the price of that is a lot of computers depend on getting data from another computer in a certain way or format," he says. "We're having to pay that price now with Y2K."

### ***Reference***

1. United States Senate Special Committee on the Year 2000 Technology Problem. "Investigating the Impact of the Year 2000 Problem." March 2, 1999. Web site: <http://www.senate.gov/~y2k/> ■

## **AHC offers health care Y2K reference resource**

American Health Consultants has published the *Hospital Manager's Y2K Crisis Manual*, a compilation of resources for non-technical hospital managers. This 150-page reference manual includes information in nontechnical language on the problems your facility will face, the potential fixes, and the possible consequences, including:

- Will your computers and software work in 2000?
- What does Y2K mean for patient care?
- What will happen to your medical devices?
- How can you make sure your vendors are Y2K-compliant?
- Are you at legal risk due to Y2K?
- Are you prepared if Y2K delays HCFA payments?

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# ICPs must move quickly when Group A strep strikes

## *Outbreaks linked to asymptomatic HCW*

Two days before Christmas in 1996, a previously healthy 28-year-old woman underwent a parathyroidectomy at a hospital in California. Six days later, she was dead. Such is the sudden severity of invasive infection with Group A streptococcus (GAS), which in this case was linked to an asymptomatic surgeon who performed the procedure.

Two other surgical patients were infected in the outbreak, including a previously healthy 56-year-old woman who underwent a subtotal thyroidectomy performed by the same surgeon and assistant on Dec. 30, the Centers for Disease Control and Prevention reports.<sup>1</sup> Discharged Dec. 31, the second patient was found dead in her home later that day. A third patient, a previously healthy 57-year-old woman who also underwent a subtotal thyroidectomy, was routinely discharged the day after her Dec. 30 procedure by the same surgical team. On Jan. 1, 1997, she sought care at the emergency department and was admitted to the ICU in shock, with respiratory failure and renal impairment. It would take a full month of hospitalization before she recovered enough to be discharged. All three patients were infected with the same GAS strain, which caused streptococcal toxic shock syndrome.

The outbreak underscores that infection control professionals must act quickly when strep strikes if subsequent nosocomial cases are to be prevented. At the same time, the CDC also reported a markedly different nosocomial strep outbreak in Maryland in which cases were undetected in part because they were spaced out over more than one year. In light of the outbreaks, the CDC issued updated guidelines that essentially expand upon previous recommendations and underscore the importance of prompt investigations. (See guidelines, p. 64.)

Immediate steps after identification of the first strep case include looking for other infected patients and culturing the health care workers involved with the index case to search for an asymptomatic carrier, says **Sharon Balter**, MD, a medical epidemiologist in the CDC respiratory diseases branch.

“In California, it is possible that is an example of actually doing a fairly rapid investigation,” she says. “It was over an eight-day period with Christmas and New Year’s [included]. Clearly, if they hadn’t done what they did, it is possible there would have been more deaths. The message that we were trying to get across is that doing [a rapid investigation] can prevent more cases.”

A review of microbiology records at the California hospital — which was not named by the CDC — revealed no episodes of postoperative GAS infection during the six months before the outbreak. The CDC found that “surgeon A” was the only health care worker who had contact in the operating room with all three patients. Nasopharyngeal, throat, rectal, and vaginal cultures were obtained from the 41 staff members who worked in the operating room and the pre- or postoperative areas on the days of surgery for the patients. All cultures were negative except for a throat culture from an orderly that grew GAS of a different strain from the patients. Surgeon A received self-initiated penicillin on Jan. 2, before adequate cultures were obtained. The CDC did not describe that aspect of the case in any detail, but Balter says the surgeon likely acted to protect subsequent patients and other contacts.

## *Culture first, antibiotics second*

“I think that most health care workers are horrified by the idea that they could be transmitting something,” she says. “We would recommend that you should culture first and then do antibiotics. It is really a quick thing to do the culturing. Again, part of why we put this out is to give physicians, infection control practitioners, and others working in hospitals some kind of guidance. The advantage of culturing first is that then you have an answer. It would be extraordinarily rare to find two carriers.”

Still, given the virulence of the strain, both surgeon A and assisting surgeon B were restricted from patient care until each had completed a 10-day course of penicillin and rifampin. Throat cultures from surgeon A’s household contacts were negative. No further postoperative GAS infections occurred.

The patient exposures presumably occurred during the surgical procedures, but no breaches in infection control or sterile techniques were reported or detected in observing subsequent procedures by surgeon A, Balter adds. Indeed, vaginal and rectal carriers of strep have been

shown to shed the pathogen into the air even if fully gowned and gloved, she notes. In one case, a health care worker who stocked OR carts — but never actually participated in procedures — caused a series of mysterious strep infections until investigators found she was shedding the organism from the scalp.<sup>2</sup>

“So there clearly is some airborne transmission of this disease even if you are properly gowned and gloved, and even if you are only a rectal or vaginal carrier,” Balter says. “It is extremely rare — there are fewer than 20 reports of this that I could find in the literature.”

There is little that could have been done to prevent the California outbreak, given the asymptomatic state of carriage and strep’s ability to slip through infection control precautions, adds **Allison McGeer**, MD, director of infection control at Mount Sinai and Princess Margaret Hospitals in Toronto, and a clinical researcher with the Ontario Group A Streptococcal Group.

“This is not a setting in which the surgeon could be blamed,” she tells *HIC*. “There is nothing you could control. With Group A strep, you can get into trouble even if your usual infection control practices are excellent.”

Indeed, it is not uncommon for subsequent patients to already be infected by the time the first case is identified, she adds.

“It’s just possible that if [they] moved instantly, and people weren’t on holiday, and surgeons and other people happened to be [available], then you might in that circumstance have prevented the second and third cases,” she says. “But it would have been really tough.”

Though the CDC recommends screening known carriers for one year after an outbreak, any additional attempt to routinely screen groups of health care workers for strep would be fruitless, McGeer says.

“The only common-sense thing that health care workers sometimes [forget] is that if you have a strep throat, you shouldn’t be working until you have been on antibiotics 24 hours,” she says. “But beyond that, Group A strep is everywhere, and there is no way of predicting when you are going to pick it up or who is going to become a carrier. Even short-term carriage of Group A strep in adults is rare. In most cases when we have looked at health care workers, the colonization rate at any one point in time has been 1% or less, and that is not permanent carriage. So the frequency with which people become carriers of Group A strep for more than a few days is really low.”

In contrast to the sudden onset of the California outbreak, strep infections due to an asymptomatic health care worker also can occur sporadically in a pattern that is difficult to recognize. Such was the case with the aforementioned outbreak at a Maryland hospital, where seven patients were infected with postpartum GAS infections from July 1996 to August 1997, the CDC reports.

“That is a prolonged period of time for seven patients,” McGeer notes. “This highlights the need to recognize that two cases three months apart may not be separate cases. With Group A strep, you need to keep your eyes and ears open.”

In the Maryland investigation, an infection was defined as GAS isolated from any nonpharyngeal site in a patient whose symptoms began more than 12 hours after admission to hospital A between January 1996 and September 1997. A review of the hospital’s microbiology records for all nonpharyngitis GAS cultures during the study period identified two additional postpartum cases. No cases were identified on other wards. Of the nine case patients, seven had endometritis. Two of those had sepsis, and one developed hypotension and required admission to the intensive care unit. One patient developed postcesarean delivery wound infection, and another had a urinary tract infection. No patients died.

Exposure to one health care worker — whose job title the CDC did not identify — was strongly associated with infection in a case control study. Overall, swab specimens were collected and cultured from the throat, rectum, vagina, and skin of 198 workers who worked on the labor and delivery or postpartum wards during the outbreak period.

### ***Mass culturing sometimes is necessary***

“In Maryland, because it had gone on so long, there was clearly a need to act fast and you had to culture a lot of people,” Balter says. “That is not necessarily the ideal way to do it — to go in and mass-culture 200 people in a week. But when something has gone on a while, there is pressure to do that.”

Three health care workers had positive cultures, but only a rectal isolate from the health care worker implicated in the case control study was identical to the strain from one of the patients. The health care worker’s wife, who was asymptomatic, had positive rectal and vaginal cultures for the same strain. The two were treated with oral vancomycin and rifampin. Surveillance cultures of the

health care worker have remained negative, and the hospital has had no additional cases.

In dealing with such an outbreak, it is important to establish some prospective surveillance if the full range of cases is to be identified, Balter adds.

“In many cases, postpartum patients with fever are not cultured; they are just given antibiotics,” she says. “If you do that, you will miss a lot of cases. So alert the physicians that they really need to culture febrile patients and alert the labs to notify you immediately if there are additional cases.”

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1. Centers for Disease Control and Prevention. Nosocomial group A streptococcal infections associated with asymptomatic health-care workers — Maryland and California, 1997. *MMWR* 1999; 48:163-166.

2. Mastro TD, Farley TA, Elliot JA, et al. An outbreak of surgical-wound infections due to group A *Streptococcus* carried on the scalp. *N Engl J Med* 1990; 323:968-972. ■

## Strep guidelines emphasize rapid action, surveillance

In recently reporting two nosocomial outbreaks of Group A streptococcus (GAS), the Centers for Disease and Prevention issued information and prevention measures, which are summarized as follows:

GAS, a common cause of pharyngitis and uncomplicated skin and soft-tissue infections, can cause serious invasive infections, including necrotizing fasciitis, streptococcal toxic-shock syndrome, and death.<sup>1</sup> The CDC estimates that 10,000 cases of invasive disease occur annually in the United States, causing about 1,000 deaths. Most cases are community-acquired, but nosocomial outbreaks do occur and warrant prompt investigation. Since 1965, at least 15 postoperative or postpartum GAS outbreaks attributed to asymptomatic carriage in health care workers (HCWs) have been reported.<sup>2</sup> GAS is an unusual cause of surgical site or postpartum infections. The bacterium is isolated from less than 1% of surgical-site infections and 3% of infections after vaginal delivery.<sup>3</sup> The most common site of asymptomatic carriage among HCWs is the anus, but vaginal, skin, and pharyngeal carriage

have been implicated.<sup>4-9</sup> Carriers can shed the organism into the immediate environment despite proper gowning and gloving. The mode of transmission is presumed to be airborne. Surgical and obstetric patients are particularly vulnerable to infection because broken cutaneous or mucosal barriers facilitate invasive infection after exposure.

**Preventive measures:** To prevent additional nosocomial GAS infections, enhanced surveillance and limited epidemiologic investigation are warranted following one episode of nosocomial GAS infection on a surgical or obstetric ward. After identification of a patient with postoperative or postpartum GAS, medical and laboratory records should be reviewed to identify other infections, and isolates from infected patients should be stored and surveillance heightened to identify additional episodes. When an episode of postoperative or postpartum GAS is identified, limited HCW screening should be undertaken. Most nosocomial transmission is traced to carriers involved in direct patient care. For a postpartum GAS-infected patient, screening should include all HCWs present at the delivery and those who performed vaginal examinations before delivery. For a postoperative GAS-infected patient, screening should include all HCWs present in the operating room during the procedure and those who changed dressings on open wounds. Screening of HCWs should include culture of the nares, throat, vagina, rectum, and skin. HCWs may return to work pending culture results.

**Antimicrobials:** Any HCW who is culture-positive for GAS should refrain from patient care for the first 24 hours of antimicrobial treatment. The regimen should be tailored to the carriage site; previous reports have indicated anal carriage may be difficult to eradicate. For example, appropriate treatment for a positive rectal culture may be vancomycin 250 mg orally four times a day and rifampin 600 mg orally twice a day for 10 days. For a positive throat, vaginal, or skin culture, appropriate treatment may be penicillin 500 mg four times a day for 10 days with rifampin 600 mg orally twice a day for the last four days of the 10-day course. If surveillance identifies additional patients or HCWs with positive cultures for GAS, the isolates should be typed by emm, serologic, or other molecular methods to identify the strain. When the isolates are the same and a carrier has not been identified, screening should be expanded to include HCWs who had less direct patient care. CDC also recommends obtaining cultures from

household contacts of implicated carriers to identify and treat potential reservoirs for reinfection. Because carriage may recur, implicated carriers should be monitored with periodic surveillance cultures for one year after treatment.

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## Global consensus taking shape on drug resistance

### *International recommendations expected this year*

With antibiotic resistance increasingly a global problem, infection control professionals from around the world recently convened in Toronto to try to hammer out consensus strategies to prevent nosocomial infections with drug-impervious pathogens. As a result, the first international infection control recommendations on the issue are expected to be issued in the coming months, participants advise *Hospital Infection Control*.

Comparing infection control approaches at the Global Consensus Conference on March 19-21, 1999, were clinicians and other invited “delegates” from such nations as Canada, the United Kingdom, Australia, Hong Kong, Chile, and Denmark. Plans call for the recommendations to be published later this year in the *American Journal of Infection Control*, the *Canadian Journal of Infection Control*, and the United Kingdom’s *Journal of Hospital Infection*.

“Antimicrobial resistance is a global problem, and there is often inconsistency in how we approach it in different areas,” says **Karen Green, RN, CIC**, conference delegate and infection control nurse at Mount Sinai Hospital in Toronto. “The goal was to try and look at a reasonable set of recommendations that could be agreed upon by people providing care in different areas of the world and in many different settings.”

The consensus document based on the conference proceedings is intended to guide health care policy, research, and practice in both public and private sectors. Participants declined to comment on the specific nature of the impending recommendations, but topics in workshop sessions included barrier precautions, patient isolation, screening, skin cleansing antiseptics, and decontamination and disinfection of environment and equipment.

### *Discussions reveal differences*

“For the first time, a group of [ICPs] from different countries sat down together,” says **Carla Alvarado, MS, CIC**, conference delegate and director of the occupational health and safety department at the University of Wisconsin Hospital and Clinics. “It was a wonderful learning experience, because even though you read the publications from the other countries, [when] you are sitting down and discussing the issues together, you see the differences in how you do things.”

For example, different global practices were discussed in the workshop on decontamination and environmental disinfection, an important issue because pathogens like vancomycin-resistant enterococci have been shown to contaminate hospital environments even after infected or colonized patients have been discharged.

“One of the subtleties that I found most interesting was that the United Kingdom does not use a combined disinfectant/detergent, which is a very standard item in U.S. health care,” Alvarado

tells *HIC*. “They use detergent in the general cleaning and they add a disinfectant when required, whereas we use a broad-based combination disinfectant/detergent product for most cleaning in health care facilities. It’s important to know what the other countries’ practices are, because you are here today; you are in England tomorrow.”

Indeed, resistant pathogens like *Staphylococcus aureus* with intermediate resistant to vancomycin — which was first documented in Japan — are mentioned prominently in the CDC’s recently updated emerging infections plan.<sup>1</sup> In the plan, the CDC warns that “because of the ease and frequency of modern travel, it is no longer possible to protect the health of U.S. citizens without addressing infectious disease problems that are occurring elsewhere in the world.”

### ***MRSA declines in Denmark’s ICUs***

By the same token, taking a global view may provide needed insights for clinicians in the United States, where the CDC recently reported a continuing increase in drug-resistant pathogens in sentinel intensive care units. (See related story, at right.)

For example, **Dominique Monnet**, DPharm, PhD, a conference delegate from Denmark, said adoption of strict antibiotic controls there has resulted in an overall decrease in the prevalence of methicillin-resistant *S. aureus*. Cultural differences may account for some of the success, he adds.

“It seems that the changes that we implement can be thoughtfully carried out because our health care staff is not overtaxed when it comes to workload,” he told conference attendees. “They have time to pay close attention to details that contribute to prevention when caring for patients. . . . Reinforced infection control efforts and more judicious use of antibiotics has led to a marked decrease in and maintained control of resistance.”

In addition, **Jose Cruz**, DSc, a regional advisor for the Pan American Health Organization, highlighted the global nature of resistance in the consensus conference keynote.

According to Cruz, major factors contributing to the problem of antibiotic resistance include the high prevalence of infectious disease; inadequate pharmaceutical storage conditions and lack of regimen compliance; the failure to implement basic hygienic practices, such as hand washing; and the overuse of antibiotics.

“In Latin America, antibiotics are freely available and are commonly administered to treat

viral infections,” he told attendees. “This is a prime example of antibiotic misuse, since we know that antibiotics are only effective in treating bacterial infections, not those caused by viruses.”

More emphasis also needs to be given to decreasing the use of invasive medical devices, added **Julie Gerberding**, MD, MPH, director of the CDC hospital infections program.

“The utilization of catheters, for example, is something we need to be thinking about,” she told conference delegates. “Minimizing to the extent possible the number of lines going into our patients will reduce the likelihood of their developing an infection.”

### **Reference**

1. Centers for Disease Control and Prevention. Preventing emerging infectious diseases: A strategy for the 21st century. Overview of the updated CDC plan. *MMWR* 1998; 47(No. RR-15):1-14. ■

## **CDC: Antibiotic-resistant bugs on rise in ICUs**

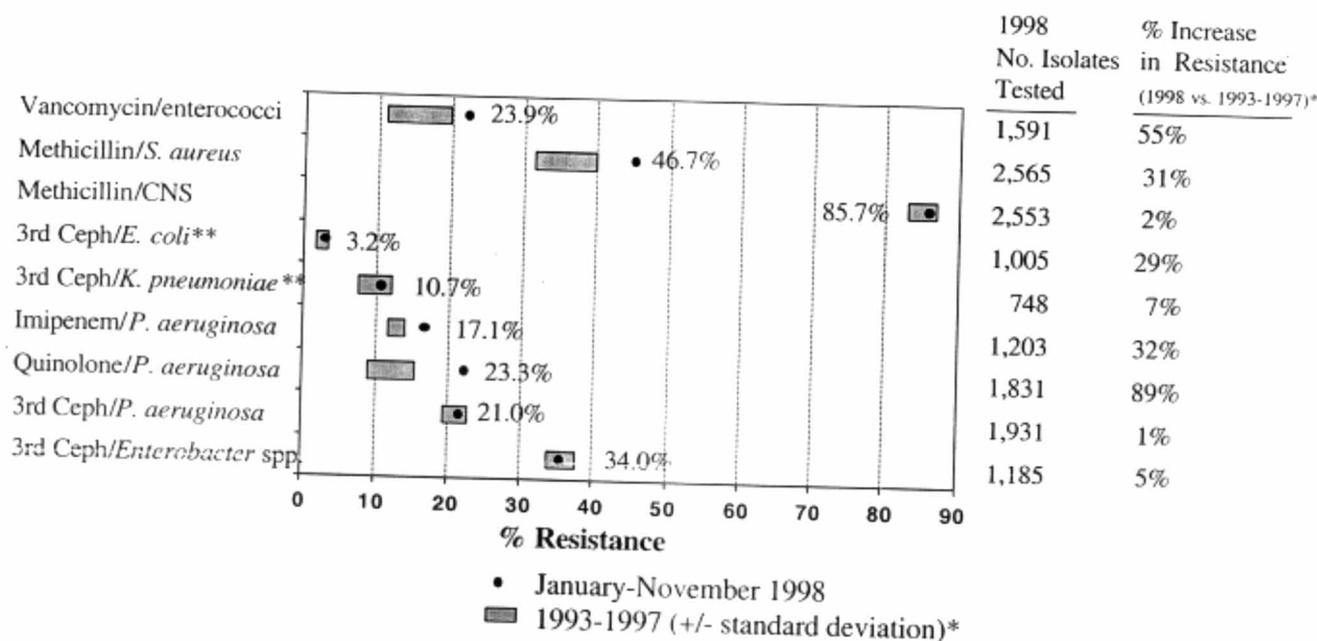
### ***MRSA, VRE continue to climb in sentinel ICUs***

Data from Centers for Disease Control and Prevention sentinel hospitals reveal a “concerning and continuing increase” in antibiotic-resistant nosocomial infections in intensive care units, according to a recent CDC surveillance analysis.<sup>1</sup>

Posted on the Internet, the surveillance report summarizes the rates of antimicrobial resistance among selected pathogens identified from ICU patients with nosocomial infections in the CDC National Nosocomial Infections Surveillance (NNIS) system. The CDC compared the percentage increase in resistant rates for the period of January-November 1998 with the average rate of resistance for each pathogen over the previous five years (1993-1997). The highest percentage increases in resistance for 1998 vs. 1993-1997 were for vancomycin-resistant enterococci (55%), methicillin-resistant *Staphylococcus aureus* (31%), and quinolone resistance in *Pseudomonas aeruginosa* (89%). (See chart, p. 67.)

The pathogens were selected for their public health importance or because they are known to be common causes of nosocomial infections (i.e.,

## Selected antimicrobial-resistant pathogens associated with nosocomial infections in intensive care unit patients, comparison of resistant rates from January-November 1998, with 1993-1997



Note: CNS=coagulase-negative staphylococci, 3rd Ceph = resistance to 3rd generation cephalosporins (either ceftriaxone, cefotaxime, or ceftazidime), quinolone=resistance to either ciprofloxacin or ofloxacin.

\* Percentage (%) increase in resistance rate of current year (January-November 1998) compared to mean rate of resistance over previous 5 years (1993 through 1997):  $[(1998 \text{ rate} - \text{previous 5 year mean rate}) / \text{previous 5 year mean rate}] * 100$ .

\*\* "Resistance" for *E. coli* or *K. pneumoniae* is actually the rate of non-susceptibility of these organisms to the 3rd Ceph group.

Description of methods and results for new antimicrobial resistance surveillance report -NNIS.

This new surveillance report summarizes the rates of antimicrobial resistance among pathogens identified from ICU patients with nosocomial infections. The chart summarizes several important points for the more common pathogens reported to NNIS. First, we provide the pooled mean rate of resistance for January-November 1998. Second, we graph this rate next to the average rate of resistance ( $\pm 1$  standard deviation) over the previous 5 years, for each pathogen. Finally, we calculate the percentage increase in the resistance rate in 1998 compared to the previous 5 years. These data display the concerning and continuing increase in antimicrobial resistance in U.S. hospitals. However, these data are not risk-adjusted and comparisons of these rates between hospitals should be made with caution.

Source: Centers for Disease Control and Prevention, Atlanta.

VRE, MRSA), explains **Scott Fridkin, MD**, medical epidemiologist for nosocomial infection surveillance activity in the CDC hospital infections program. The CDC released the analysis in part to respond to frequent inquiries about national antibiotic resistance rates.

"It is really an attempt to coordinate our response to the public and to the infection control community on resistance," he says. "It is the best possible comparable rates we can come up with because we are focusing on a specific patient population. It is not a representative sample of all of the patients in the U.S."

The combination of prudent use of antibiotics and infection control measures with drug-resistant

infections has been much emphasized in guidelines and studies over the last few years, but Fridkin says one cannot simply conclude the measures are not working based on the NNIS data. The analysis did not attempt to factor in the level and variety of infection control guidelines and antibiotic controls used in the NNIS hospitals and ICUs.

"What it does say, though, is that in this patient population — the ICU patient — the problem of resistance is continuing despite some warnings and revised recommendations," he says.

Similarly, the data are not risk-adjusted, and should be used with caution in interfacility comparisons, the CDC reminds. However, infection

control professionals can make “a reasonable comparison” in looking at the CDC rates of resistance and those found in their own ICUs, Fridkin notes. Plans call for an update of the analysis every six months, so increases and declines in antibiotic-resistant infections can be tracked on an ongoing basis. In some cases, the level of overall resistance is so high that simply holding the status quo will be little cause for celebration. For example, while methicillin resistance in coagulase-negative staphylococci increased only 2% in 1998 compared with the prior five-year average, a striking 85.7% of the 2,553 isolates causing infections were resistant. In comparison, *P. aeruginosa* infections resistant to third-generation cephalosporins also increased only marginally (1%) in the two comparative periods, but a much lower percentage (21%) of the 1,931 isolates were resistant.

“Are we going in the right or wrong direction?” Fridkin says. “For all of these, they are still moving up. That is the point you can take away.”

## Reference

1. Centers for Disease Control and Prevention. Selected antimicrobial resistant pathogens associated with nosocomial infections in intensive care unit patients, comparison of resistant rates from January-November 1998 with 1993-1997. National Nosocomial Infections Surveillance System. Web site: [www.cdc.gov/ncidod/hip/NNIS/AR\\_Surv1198.htm](http://www.cdc.gov/ncidod/hip/NNIS/AR_Surv1198.htm) ■



## Hand washing may suffer in understaffed settings

**Sources:** Pittet D, Mourouga P, Perneger TV, et al. **Compliance with hand washing in a teaching hospital.** *Ann Intern Med* 1999; 130:126-130; Boyce JM. Editorial. *Ann Intern Med* 1999; 130:153-155.

Pittet and co-authors attempted to identify predictors of noncompliance with hand washing during routine patient care in a 1,300-bed teaching hospital in Geneva, Switzerland. They examined the activities of 520 nurses, 158 physicians, 166

nursing assistants, and 199 other types of health care workers caring for 964 (70%) of the beds in December 1994. Five trained observers noted the number of opportunities for hand washing that presented themselves after each patient contact; between care of a dirty body site and a clean one; after contact with body fluid; before and after care of an intravenous site, a wound, the respiratory and urinary tract, as well as after glove removal; and after any activity involving indirect patient contact or hospital maintenance. They also noted how often hands were actually cleansed. The hospital guidelines recommended that hands be washed with soap and water or be disinfected before and after patient contact. They also should be washed after removing gloves and after contact with a potential reservoir of microorganisms such as body fluids and substances, mucous membranes, broken skin, or inanimate objects that are likely to be contaminated.

Average compliance was only 48% of the 2,834 observed opportunities for hand washing, with physicians being least compliant (30%) and nurses being most compliant (52%). Compliance was better on weekends (59%) than during weekdays (46%) and worst in intensive care units (36%), with medical and surgical wards being 47%-52% compliant. Similarly, hands were least likely to be cleansed after procedures involving a high risk of contamination (38%) than after other procedures (49%-52%) and when the intensity of patient care was high (37% for more than 60 opportunities for hand washing compared with 58% for less than 20 opportunities). Pittet et al concluded that the moderate compliance with hand washing might be explained by the intensity of care, suggesting that understaffing may lower the quality of patient care. In an accompanying editorial, Boyce called for expanded study of the possible role of alcohol-based, bedside hand rinses and gels, which could reduce the time required for hand washing and make it more feasible for caregivers with high workloads to wash their hands more frequently.

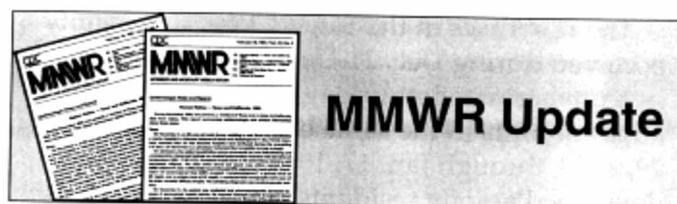
*Comment by J. Peter Donnelly, PhD, clinical microbiologist, University Hospital Nijmegen, the Netherlands.*

With nosocomial infections complicating as many as one in 10 hospital admissions, the problem is not negligible. Since the days of Ignaz Semmelweis, the medical community has been confronted with the simple truth: “clean hands = fewer infections.” Why then did only half of the

health care workers follow this simple rule? The answer may well lie in the fact that they are all too busy. This is almost certainly true for those nurses who have to care for patients' clean and dirty body sites and are most likely to wash hands once they have finished rather than in between each and every step in the patient's care. Pittet et al point out that it takes eight to 10 seconds to wash the hands and might take one minute to go from the patient to the sink, wash their hands, and return to their patient. Nearly half of the observed opportunities to wash hands occurred when patient care was at high intensity (21 to 40 hand washing opportunities per hour), occupying a prohibitively large amount of the working hour. This is reinforced by the better compliance observed on weekends when hospitals run a less intensive service and the extremely poor compliance seen during the care of critically ill patients, thus confirming the perception that health care workers are often too busy to wash their hands as recommended.

### **An organizational issue**

There is a relationship between the intensity of patient care and noncompliance with hand hygiene recommendations, meaning hand washing is not only a matter for the individual but also for the organization. Reducing workloads would, therefore, seem a necessary part of the solution to the problem of failure to wash the hands. In an accompanying editorial, Boyce emphasized that hospital administrators should strive to create an organizational atmosphere in which adherence to recommended hand hygiene practices is considered an integral part of providing high-quality care. Strangely, Boyce did not mention improving staff/patient ratios, not even for nurses who are perceived to be the most likely to cross-infect patients because of the nature of their contact with patients. Rather, he suggested that a record of adherence to hand hygiene recommendations should form a part of the annual personnel evaluation. Clearly, it is intolerable that hand washing is still neglected to almost the same extent as it was in Semmelweis' day, and it is time for hospitals to get serious about improving hand hygiene. But if there really is not enough time to comply with hand hygiene, it is hard to see a solution while there continues to be a drive toward maximizing productivity by employing fewer people to care for more patients in a shorter period of time. ■



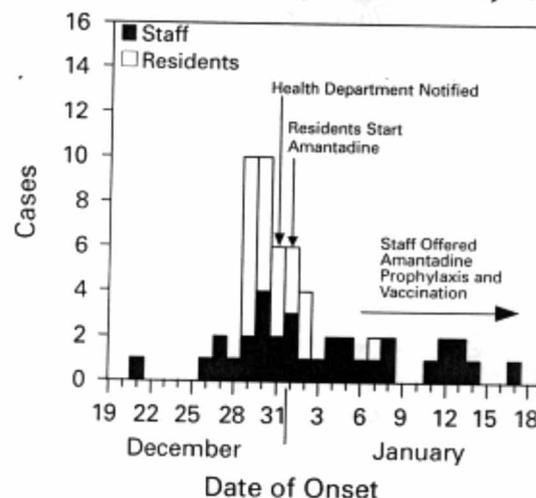
## **Non-immunized nurses spark deadly flu outbreak**

*Importance of HCW vaccination emphasized*

An outbreak of influenza A in a long-term care facility that resulted in two deaths and three hospitalizations was sparked by flu infections in unvaccinated health care workers, the Centers for Disease Control and Prevention reports.

Because influenza infections can be severe in debilitated populations and because vaccine effectiveness is lower among residents (30%-40%) than in healthy adults (70%-90%), the CDC recommends that health care workers and others caring for high-risk patients receive influenza vaccine annually. Health care workers and family members should be educated about the potentially serious consequences of influenza illness for high-risk people and the need to limit contact with these people. When health care workers and family members are ill, they should avoid contact with high-risk people.

**Influenza-like illness among residents and staff of a long-term care facility — Santa Clara County, CA, Dec. 19, 1998-Jan. 18, 1999**



Source: Centers for Disease Control and Prevention. Update: Influenza activity — United States, 1998-1999 season. *MMWR* 1999; 48:177-181.

The first cases in the Santa Clara, CA, facility occurred during Dec. 21-Dec. 28, 1998, among five unvaccinated nurses who worked in two adjacent units in the same building. From Dec. 29, 1998, through Jan. 17, 1999, additional cases developed among residents and staff from those two units. Overall, 34 (11%) of 309 staff members and 25 (13%) of 192 residents were infected. Three residents were hospitalized and two died, including one who was not vaccinated because of a history of egg allergy.

Residents in the facility are assigned to different buildings according to the level of care required. The most debilitated residents, most of whom are bedridden and require complete care, resided in the building where the outbreak began. During the fall, residents in all four buildings received influenza vaccination unless contraindicated. Of the 1,200 staff members offered vaccine, only some 200 (17%) were vaccinated at the facility, though some may have been vaccinated by outside providers. Forty-nine of the 50 residents in the two initially affected units had been vaccinated before the outbreak, compared with 12 (26%) of the 47 staff members in those units. Outbreak-control measures included cohorting ill residents under droplet precautions and administering amantadine for prophylaxis and treatments. Unvaccinated staff were offered amantadine prophylaxis and influenza vaccine. Ill staff were discouraged from coming to work, and ill visitors were asked to postpone their visits. Influenza outbreaks can occur among highly vaccinated long-term care populations even in years when the vaccine is well-matched to circulating virus strains, the CDC noted.

Long-term care facilities should conduct surveillance to identify clusters of respiratory illness and should alert state or local health departments when clusters are identified. Early detection of influenza outbreaks and timely initiation of control measures, such as cohorting of ill residents, use of droplet precautions, and use of antiviral medications for prophylaxis or treatment can limit the

spread of disease. Amantadine and rimantadine are 70% to 90% effective in preventing influenza A infections and can reduce severity and duration of symptoms from influenza A when administered within 48 hours of onset. However, these medications are not effective against influenza type B viruses. Chronic care facilities should know which laboratories in their area perform rapid influenza A testing and should develop a plan to rapidly detect influenza A outbreaks and to administer antiviral medications if influenza is detected.

## Reference

- Centers for Disease Control and Prevention. Update: Influenza activity — United States, 1998-1999 season. *MMWR* 1999; 48:177-181. ■



## JOURNAL REVIEWS

Gerberding J. **Provider-to-Patient HIV transmission: How to keep it exceedingly rare.** Editorial. *Ann Intern Med* 1999; 30:64-65.

Providers can transmit HIV to a patient during invasive procedures, but the probability of transmission is below the threshold of detection by even very intensive surveillance methods. In short, provider-to-patient HIV transmission is exceedingly rare in the United States, the author notes. She reviews the current status of this controversial issue in light of the recently reported case of provider-to-patient transmission in France and the 1990 dental transmission cases in the United States.

"The HIV epidemic has been raging for more than 20 years, and this formidable pathogen has infected millions of people," the author concludes. "It is reassuring that only two infected health care providers have been linked to patient infections. Rational prevention policies will further reduce

## COMING IN FUTURE MONTHS

■ Full coverage of the Society for Healthcare Epidemiology of America conference

■ The next wave: Behavior modification to improve IC compliance

■ A look at the first international guidelines on IC and antibiotic resistance

■ Whether VISA or GISA, will superbug be future bug?

■ Reprocessing disposables: Is it safe?

this very small risk. Such policies can not only protect patients from infection but also protect their health care providers from unwarranted discrimination.”

Such prevention approaches include the following elements:

- ***Injury prevention is the best strategy for preventing intraoperative HIV transmission among surgical personnel and their patients.***

Surgery may not ever be completely free of risk, but it certainly can be much safer than was imagined even a decade ago. In many operating rooms, better hand protection; improved equipment design; and safer techniques for handling instruments, manipulating sutures, and closing wounds are now standard. Blunted suture needles also are gaining acceptance for many procedures.

- ***Intraoperative percutaneous blood exposures should be reported and managed in the same manner as other occupational exposures.***

Some surgeons derive a false sense of security from the absence of documented occupational HIV infections attributable to suture needle injuries. Even though suture needle punctures probably transmit less blood than do hollow-bore needles, a low-volume exposure can contain blood with a very high titer of infectious HIV. Prompt reporting ensures access to appropriate exposure risk assessment, postexposure prophylactic antiretroviral treatment, and source patient testing for HIV and other bloodborne pathogens that affect follow-up care. Moreover, unreported exposures can result in undiagnosed infections and subsequent transmission to others.

- ***Surgeons and other health care providers who sustain frequent blood exposures should know their HIV status.***

As was seen with the surgeon in the French case, failure to seek HIV testing can have dire consequences. Routine periodic testing may be a practical approach to ascertaining the HIV status of providers with frequent blood exposures, but it does not obviate the need for reporting discrete percutaneous exposures.

- ***Patient exposures to blood should be managed in the same manner as occupational exposures to blood.***

When an intraoperative injury occurs, the accident should be reviewed to determine whether the patient was exposed to the injured provider's blood. Mechanisms associated with such "recontacts" include passing the contaminated needle back through the patient's tissue or sustaining an injury from bone or hardware imbedded in the

patient. If recontact is probable, the provider should be tested for HIV; hepatitis C virus; and, if he or she is not known to be immune, hepatitis B virus, so the patient can receive appropriate follow-up care.

Ippolito G, Puro V, Heptonstall J, et al. **Occupational Human Immunodeficiency Virus infection in health care workers: Worldwide cases through September 1997.** *Clin Infect Dis* 1999; 365-383.

All health care workers, regardless of job category or the health care setting in which they work, face a low but real risk of occupational infection from HIV exposure, the authors warn.

To characterize exposures resulting in HIV transmission, they reviewed available data on occupational cases reported worldwide, identifying 94

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documented and 170 possible cases. The majority of documented infections occurred in nurses or clinical laboratory workers (66 of 94, 70.2%); after contact with infected blood (84 of 94, 89.4%); from a patient with AIDS (40 of 52, 76.5%); by percutaneous exposure (83 of 94, 88.3%); and during a procedure involving the placement of a device in an artery or vein (43 of 63, 68%).

High-exposure job categories (e.g., midwives and surgeons) represent the majority of possible cases. Transmission occurred through splashes, cuts, and skin contaminations, and in some cases despite postexposure prophylaxis with zidovudine.

"Health care workers could benefit if these data were incorporated in educational programs designed to prevent occupational bloodborne infections," the authors concluded.

Known cases are almost certainly under-reported because fewer than 5% of documented cases were reported from African countries, and there was a striking absence of reports of occupationally acquired infection from countries in the Indian subcontinent and Southeast Asia.

Infections most often occur following puncture injuries from blood-filled, hollow-bore needles but also have been caused by cuts from solid objects and contamination of non-intact skin or mucous membranes by at-risk biological substances. Adherence to universal precautions, modifications in procedural techniques, and improvements in the designs of sharp medical instruments are critical prevention measures for creating a safer workplace. ■

## CDC closes books on PEP registry

The HIV postexposure prophylaxis (PEP) registry has stopped enrolling new health care workers as of Dec. 31, 1998, the Centers for Disease Control and Prevention recently announced.

The original goals and objectives of the program have been met, and the registry appeared redundant of other ongoing surveillance programs, the CDC noted. Follow-up of enrolled health care workers will be completed. The registry was established in October 1996 as a prospective surveillance project to monitor adverse events associated with PEP after occupational HIV exposures. ■

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- 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. ■