

Hospital Employee Health

In this issue: JCAHO Update for Infection Control

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CDC: Few hospitals have complete team of smallpox responders

Focus now on regional or post-event response

Fewer than half of the nation's acute care hospitals have vaccinated even a single employee against smallpox, and only 235 have vaccinated a response team of at least 25 employees, the Centers for Disease Control and Prevention has reported. That means hospitals will need to consider other mechanisms to ensure bioterrorism preparedness, CDC experts said.

"Regional hospital teams may have to be formed to ensure that there are enough vaccinated persons to manage an outbreak," **Raymond Strikas**, MD, director of Smallpox Preparedness and Response Activity for CDC's National Immunization Program, told a federal advisory panel in June.

When CDC launched the smallpox vaccination program, federal officials hoped to vaccinate as many as 500,000 health care workers. Only about 24,000 hospital workers have received the vaccine. Another 11,700 public health workers have been vaccinated. Vaccinations are concentrated in a handful of states, including Florida, Texas, Tennessee, Ohio, California, Nebraska, and Minnesota.

By June, the program had virtually halted, with about 100 vaccinations taking place per week around the nation, Strikas said.

Hospitals should evaluate their preparedness and look at other options, says **Walter Orenstein**, MD, director of the National Immunization Program. "If you could increase the number of people on response teams, that would be ideal," he says.

If hospitals don't have a vaccinated response team, they should work with local health departments to ensure vaccine would be readily available if a smallpox outbreak occurs, he says. They also should determine how they would transport a smallpox patient to a hospital that has a response team, he says.

"Each hospital needs to be prepared to deal with [a potential outbreak]," Orenstein says. "The goal was to have a staff that could provide care 24/7 to cases that came in."

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Lacking that capacity, "we'll work with what we have," he says. "This has always been a voluntary program. We have never mandated it. People have to weigh the risks and benefits for themselves."

Meanwhile, the future of the smallpox vaccination program is unclear. CDC asked states to submit a plan for vaccinating first responders, such as law enforcement officers, by July 1. The agency will review the plans and respond by Aug. 1. The state of Florida already has begun vaccinating first responders. (See *HEH*, July 2003, p. 89.)

In June, the Advisory Committee on Immunization Practices (ACIP) recommended keeping the target group limited to hospital and public health workers, without expansion. An Institute of Medicine panel also called for a pause in vaccinations to allow for evaluation.

"The official CDC guidance is that if states want to, they can go forward," says Orenstein.

In a press briefing, CDC director **Julie L. Gerberding**, MD, said ACIP recommendations have "a very strong persuasive impact on decisions that we make." But she added that bioterrorism preparedness has national security as well as public health implications, and that smallpox vaccinations would continue.

"This is a situation [where] we are balancing the public health issues and the safety and indications for vaccination with a homeland security issue and our need to make sure that we truly can prepare our nation in the event of a smallpox attack," she said. "It's very tempting to conclude that somehow the smallpox risk has miraculously evaporated, and that's just simply not true."

The small vaccination response has made it more difficult for CDC to analyze the risk of adverse events among civilian vaccinees. For example, the CDC had planned to survey 10,000 health care workers at 10 and 21 days after vaccination. Instead, just 735 workers were surveyed.

DoD screens for contraindications

Better information on vaccine-related events has been collected by the Department of Defense, which vaccinated about 455,000 military and health care personnel. Those vaccinees typically were younger than the health care worker population and more likely to be primary vaccinees.

One conclusion: Screening for contraindications appears to have been a success. Several of the serious adverse events previously associated with the vaccine, such as eczema vaccinatum, were not reported in any vaccinee.

The most common serious adverse event was actually one not expected at the start of the vaccination program. There were 22 civilian and 46 military cases of reported myo/pericarditis. All have recovered.

The cardiac screening that began in March would only have prevented a portion of those cases. Among the civilian vaccinees that developed myo/pericarditis, 41% had no cardiac risk factors, and none had three or more risk factors, the CDC reported. The current screening rules out individuals with a diagnosed heart condition or three or more cardiac risk factors.

Yet the smallpox vaccine appears not to be the culprit in ischemic cardiac events that followed vaccination. Two civilian health care workers died of heart attacks within days after vaccination, and

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Editorial Questions

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three other vaccinees suffered heart attacks. Those rates are within the range of expected events, according to **Juliette Morgan**, MD, of the CDC's Smallpox Vaccination Adverse Events Monitoring Activity.

One military vaccinee who died of a heart attack was a 55-year-old smoker with a pre-existing heart condition and no myocarditis. "At this stage, we attribute zero deaths to the smallpox vaccine," says **John Grabenstein**, RPh, PhD, deputy director of clinical operations for the Military Vaccine Agency in Falls Church, VA.

A review of the vaccination program also found that:

- Twenty-six health care worker vaccinees and 28 contacts of vaccinees had contraindications that were identified after vaccination. No breakdown was available on those cases, but at least eight involved women who did not know they were pregnant when they were vaccinated or who became pregnant within a month of vaccination. In the military program, 125 were pregnant before or within a month after vaccination, and 10 HIV-infected people were vaccinated. They had a normal vaccine reaction with no adverse events. There have been no cases of fetal vaccinia.

- There were no needlesticks associated with the bifurcated needle used to administer the vaccine. However, CDC officials said they are investigating the use of a safety-engineered device.

- No cases of transmission occurred between vaccinated health care workers and patients. Based on the military experience, "the greatest risk [of contact transmission] is to people you share your bed with," Grabenstein says. ■

N95 mask may provide less protection than believed

Some say face seal leakage as high as 20%

As cases of severe acute respiratory syndrome (SARS) decline worldwide, questions remain about one of the major tools for protecting health care workers: Just how effective is the N95 filtering facepiece respirator?

Some respiratory protection experts are calling for a lower rating, or "assigned protection factor" (APF), for the N95 to reflect the leakage of air around the face seal. The N95 actually allows as much as 20% leakage, not the 10% reflected in its

current rating, the experts say. After evaluating studies of the filtered facemasks and other respirators, the U.S. Occupational Safety and Health Administration recently proposed keeping the APFs at their current level.¹

"A 5 is more appropriate for a filtering facepiece," says **Roy McKay**, PhD, director of the occupational pulmonology services program at the University of Cincinnati College of Medicine and a respiratory protection expert. "Because of the real-life experience [of workers using the respirators], I feel the value of 10 is not justified."

The debate has implications for hospital respiratory protection programs and the selection of respirators to protect against highly infectious diseases, such as SARS. An APF indicates how much of the contaminated air is filtered by the respirator. With an APF of five, there is five times less contaminant inside the respirator than in the surrounding air.

Conduct respirator fit tests annually

The APF is influenced by real-life work conditions. Inadequate fit testing and training diminish the quality of respiratory protection at many hospitals, McKay says. "The need for fit-testing of respirators isn't universally accepted by many hospital employees or administrations," McKay says.

Hospitals should conduct annual fit tests, even if the respirators are used only for TB, McKay asserts. OSHA set up a respiratory protection standard for TB (1910.139) that was intended to be temporary while the agency drafted a tuberculosis standard. That proposed standard has since been withdrawn.

"As it stands now, TB is the only agent that has respiratory protection practices different from every other chemical and biological agent," he says. "That really makes very little sense."

Workers cannot tell how effective the face seal is by simply checking it visually or manually, he says. "There are many cases where a person puts on a respirator and it appears to fit, yet when we do quantitative fit-testing, it does not," says McKay, who conducts fit-testing training seminars and consults with hospitals. "If someone like myself, who has vast fit-testing experience, is unable to visually identify respirators that do and don't fit, there's no way that other people with less experience would be able to do that."

APFs are commonly used at industrial work sites, where exposure levels are measured and

only respirators with adequate characteristics are allowed. But hospitals also rely on the APF to ensure the proper level of protection for health care workers exposed to highly infectious agents.

Mark Nicas, PhD, MPH, CIC, adjunct associate professor of environmental health sciences at the University of California-Berkeley School of Public Health, analyzed seven studies on the filtering facepieces and provided consultation to OSHA. "The data were very variable. We concluded an assigned protection factor of 5 rather than 10 was a better value," he says.

Different masks rated differently

That view was confirmed by a committee accredited by the American National Standards Institute and sponsored by the American Industrial Hygiene Association. The panel of industry representatives and respiratory protection experts proposed setting the APF for filtering facepieces at 5.

"They're not all the same," says **Howard Cohen**, PhD, CIH, associate professor of occupational safety and health at the University of New Haven (CT) and chair of the ANSI Z88.2 committee that considered the standard. "As a group, we gave them a 5. If we were allowed to rate them individually, we would have come up with some 10s."

In its *Federal Register* notice, OSHA cites another review of studies of filtering facepieces that indicated the respirators should have an APF of 10.

"OSHA is aware of discussions within the respirator community indicating some sentiment for setting APFs for filtering facepiece respirators at 5, and for setting an APF of 10 for other half-mask air-purifying respirators," the agency stated in the *Federal Register* notice. "Based upon OSHA's reviews, OSHA cannot differentiate between the performance of the two types of respirators, and OSHA finds compelling evidence from the large number of observed data points to support proposing an APF of 10 for both of these classes of respirators."

OSHA requested comment on its methodologies and conclusions. In its explanation, OSHA also noted that proper fit is critical to achieving the higher protection factor.

For hospitals, that means investing in several brands so as to provide the best fit for the largest number of employees, says McKay. Cost should not be the overriding criterion, he stresses.

Respirator Facts and Myths

1. OSHA requires fit-testing for all tight-fitting respirators, including single-use filtering facepieces (i.e., N95s), when required to be worn. [FACT]

2. The sweetener fit test method (saccharin) is accepted as a validated fit test method, without the need to determine the wearer's level of sensitivity to the sweetener first. [MYTH]

3. Fit-testing with hand-held banana oil ampules is an OSHA-accepted (i.e., validated) method for fit-testing respirators. [MYTH]

4. Fit-testing with amyl acetate (banana oil) using validated techniques, such as those recommended by ANSI, requires testing to be performed in at least two rooms that have separate ventilation systems. [FACT]

5. OSHA, ANSI, and NIOSH recommend fit-testing for ALL tight-fitting respirators, including positive-pressure respirators such as SCBAs, airline, PAPRs, etc., when required to be worn. [FACT]

Source: Roy McKay, PhD, director of the occupational pulmonology services program at the University of Cincinnati College of Medicine.

"When I do fit-testing in hospital employees, [I'm] just not going to find one particular make and model that's going to fit everybody. People have unique facial features, and people need different respirators," he says.

"If a program administrator correctly identifies which respirators fit a large percentage of the population, you may be able to capture your entire work force in two or three different models," he says.

Cohen recommends conducting quantitative fit-testing using an N100 of the same style as the N95. That would ensure the maximum performance from this type of respirator, he says. "I think doing quantitative fit-testing is well within the scope and capability of hospitals," he says.

Filtering facepiece respirators have come under scrutiny in hospital outbreaks of SARS in Canada. Toronto hospitals used N95-type respirators that were not certified by the National Institute for Occupational Health, a branch of CDC. Hospitals did not routinely conduct fit-testing of employees.

In one difficult intubation of a SARS patient, six health care workers who were in the room and wearing protective gear later developed SARS

symptoms.² Interestingly, the health care worker who intubated the patient “was never really recognized as having any symptoms. He was only in there for the intubation, and he wore two masks, one over the other,” says **Clifford McDonald**, MD, a SARS investigator from CDC. “He may have just been very careful and didn’t get any inoculum. But when we questioned him, he did say he thought he maybe had one or two days of cough afterward, but very briefly. [It] lasted one or two days [and he] never documented a fever.

“He would be a very important person to get a serology from later on,” noted McDonald. “Maybe this can all be traced back to an inoculum, and if you get a low enough inoculum you’ll get immunity and very minimal symptoms. Beyond that, it’s all speculation.”

During high-risk procedures, such as intubation, the N95 may not be adequate, says Nicas. “In my personal opinion I don’t think the filtering facepieces are protective enough, especially in procedures that are going to produce a lot of aerosolized fluid,” he says.

McKay notes that going to a higher filtration — an N99, for example — will not address the issue because the same rate of leakage will occur around the face seal. “If one recognizes a need for a higher level of protection, you go to a more protective respirator,” he says.

In June, the Ontario Ministry of Health and Long-term Care issued a directive to acute care hospitals requiring a powered air-purifying respirator or other full-face respiratory protection to be worn along with an N95 during high-risk procedures such as intubation.

The Ontario Nurses Association also has demanded fit-testing for all nurses who wear respirators and has urged the Ministry of Labour to ensure that hospitals are providing fit-testing. At North York General Hospital, one nurse refused to work because her mask did not fit properly.

[Editor’s note: For more information about respiratory protection workshops, contact Roy McKay at (513) 558-1234 or www.drmmkay.com.]

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Monkeypox underscores infection risk to HCWs

Spread can occur before disease is recognized

Reports of possible hospital transmission of monkeypox once again highlight the risk of newly emerging infectious diseases for health care workers and the need for vigilant infection control and swift identification of cases.

In June, Wisconsin reported two possible cases of monkeypox in health care workers but then noted that the details of the cases indicated that they were actually not linked to the outbreak. Monkeypox is in the same family of viruses as smallpox, but it is not as easily transmitted and is less likely to be fatal.¹

Nonetheless, public health officials urged health care workers to wear gloves, gowns, masks, and goggles when treating patients with known or suspected monkeypox. They emphasized the importance of hand hygiene to prevent spread from lesions or contaminated clothing and surfaces.

Those recommendations came as experts from the Centers for Disease Control and Prevention continued to investigate hospital-based outbreaks of severe acute respiratory syndrome (SARS) in Toronto and to evaluate the effectiveness of protective gear. (See related story, p. 103.) CDC experts also suggest that surface contamination and hand hygiene may play an important role in SARS spread.

One lesson learned from both events: Health care workers should view unusual symptoms with a high index of suspicion.

“We try to work as fast as we can to identify unusual diseases and try to put in place the precautions we can,” says **Bruce Cunha**, RN, MS, manager of employee health and safety at the Marshfield (WI) Clinic, which treated the first case of monkeypox.

Missed diagnoses can put both health care workers and other patients at risk. In Toronto, SARS-like symptoms in five members of a family went undetected until late May, triggering a new outbreak. About a dozen nurses developed SARS symptoms from that case.

Beth Israel Medical Center-Kings Highway Division in Brooklyn, NY, recently reported an outbreak of scabies that affected nurses, physicians, and staff in housekeeping, engineering,

and physical therapy. Two patients had been admitted to the emergency department with skin rashes that were not immediately recognized as scabies.²

CDC: Smallpox vaccine effective protection

The first monkeypox case — a three-year-old girl who had been bitten by a prairie dog — was actually diagnosed fairly quickly at Marshfield Clinic. Physicians knew they were looking at a possible case of animal-to-human transmission. They considered cellulitis and ruled out plague and tularemia. The clinic then identified the monkeypox virus by electron microscopy.

The medical assistant who took the child's vital signs and held her on her lap did not use infection control precautions. Weeks later, she developed a headache, backache, chills, muscle weakness, and diarrhea, and her boyfriend developed similar symptoms. "It does not seem to represent a case of monkeypox," says Wisconsin state epidemiologist **Jeffrey Davis, MD**.

Laboratory tests showed no anti-orthopoxvirus immune reactivity or monkeypox-specific DNA signatures, though testing was continuing, the CDC reported.³

CDC has recommended that health care workers and others who have unprotected exposure to monkeypox patients or sick animals receive the smallpox vaccine. Health care workers who have unprotected exposure should undergo active surveillance for symptoms, including taking their temperature twice a day for 21 days, the CDC said. "Prior to reporting for duty each day, the health care worker should be interviewed regarding symptoms and have their temperature measured by employee health or other designee."⁴

Health care workers with protected exposure also should take their temperature at least twice daily and be on the alert for symptoms, the CDC recommendations state.

By late June, 79 cases of suspected monkeypox had been reported in Wisconsin, Indiana, Illinois, Missouri, and Ohio; 31 were confirmed through laboratory tests, and tests were pending on the others. The common symptoms: a papular rash, fever, cough or shortness of breath, swollen lymph glands, and sore throat. Most patients did not become seriously ill, although one child suffered from severe encephalitis, the CDC reported.

The CDC and U.S. Department of Agriculture investigators discovered that Gambian giant rats from Ghana were housed with prairie dogs in

Illinois. An African shipment of about 800 exotic mammals, including the Gambian rats that were imported into Texas, was the likely source of monkeypox, they concluded. The CDC and the Food and Drug Administration have prohibited the importation and sale of prairie dogs and six rodents from Africa. Some infected prairie dogs may have been sold at "swap meets" in Indiana, Illinois, Ohio, and Wisconsin, and records aren't available to identify all the buyers, the CDC reported.

"One prairie dog has been associated with more than half the cases in our state, surely a supershedder if ever there was one," remarked Davis.

Globalization brings new diseases

The emergence of new diseases seems to be on the rise, as the nation copes with West Nile virus, SARS, and monkeypox. In part, that's because bioterrorism preparedness has heightened our ability to detect outbreaks, CDC deputy director **David Fleming, MD**, said in a briefing. But he also noted, "We are living in a world that's increasingly globalized. We can expect this to become more frequent rather than less."

Sometimes the microbe that threatens health care workers is known but uncommon. At Beth Israel Medical Center-Kings Highway Division, a delay in recognizing scabies in two patients led to an outbreak among health care workers. About 240 health care workers were referred to employee health, where they received prophylactic treatment. Twenty-seven reported an itchy rash, and eight cases were confirmed as scabies.

The first case, a cancer patient, came into the emergency department in respiratory distress. Physicians diagnosed her rash as a fungal infection because she was immunocompromised from chemotherapy. It was actually Norwegian scabies.

In the second case, a nursing home patient had a small rash on his arm that began to spread to his chest, arms, and groin.

The hospital now has a heightened awareness and a greater suspicion for unusual symptoms, says infection control practitioner **Alexis Raimondi, MS, C, CIC**. If someone comes into the emergency department with a rash, clinicians conduct an assessment, and if necessary, call in a dermatologist and increase infection control precautions. For example, health care

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workers exposed to the patient would wear long-sleeved gowns in addition to gloves.

"One of the nurses in the emergency room that took care of this [scabies] patient was itching and developed this rash on her arm," she says. "You could actually see where the glove line stopped. Above the glove line, she was developing little red pimples."

Getting a detailed history from patients is essential, says Raimondi. A history of potential exposure has been a key aspect of the case definition for SARS and monkeypox.

Raimondi also has focused on education about infection control, including the basics, such as hand hygiene. Several months after the outbreak of scabies, the hospital ruled out SARS in two patients. The episodes have created a greater vigilance for infection control practices.

"A lot of the staff are carrying the [alcohol-based] gels with them," says Raimondi. "You see them washing their hands more frequently."

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Is hand hygiene the key to the SARS puzzle?

Surface contamination plays role in spread

Surface contamination may be an important method of transmission of the virus that causes severe acute respiratory syndrome (SARS), according to investigations by the Centers for Disease Control and Prevention in Atlanta.

When investigators swabbed surfaces at two hospitals in Toronto, they found virus particles on the bed table and bathroom door handle in one patient's room, on a TV remote control in another patient's room, and on the door handle on the nurse's station medication refrigerator, reports **Matthew Arduino**, MS, DrPH, chief of the CDC's Applied and Environmental Microbiology Section.

However, those positive tests don't necessarily mean there was "any infectious presence," he notes.

The pattern of SARS transmission has puzzled investigators. For example, a physician staying at Hong Kong's Hotel Metropole on the ninth floor is believed to be the index case that infected hotel guests on other floors. However, his wife, who was sharing the room with him, never became ill. Neither did any hotel workers.

In Toronto, a 96-year-old patient became ill with SARS in early April, apparently from a nurse

who worked on the same floor and who did not know she had SARS. She was not involved in the patient's care. He was transferred to the fourth floor orthopedic ward, where he infected almost a dozen nurses, according to news reports. Three patients on the seventh-floor psychiatric ward also became ill with SARS symptoms.¹

"We have more questions than we have answers now," says Arduino. But he says fomite transmission, or surface contamination, is likely to be a major component, which makes hand hygiene an important control measure.

Industrial hygienists from the National Institute of Occupational Safety and Health and the Canadian worker safety agency are investigating the most recent outbreaks. That approach is critical to preventing future transmission, says **Gabor Lantos**, MD, PEng, MBA, president of Occupational Health Management Services in Toronto.

"There are all these variables that need to be looked at in a systematic fashion," says Lantos. "This needs an industrial hygiene/occupational safety approach."

For example, hospitals need to provide training to health care workers on the proper removal of personal protective equipment, he says. "The respirator should be the last item coming off. The gowns are contaminated, the gloves are contaminated. If you take off your mask first, you're whipping off everything and breathing it in," he says.

The proper order in which to remove personal protective equipment, says Lantos, is as follows:

- Remove head covering, gowns, and booties.
- Take off gloves.
- Remove mask and wash your hands.

"You've got to come up with a program that's workable," he says.

Although hospital transmission has been a major aspect of the SARS epidemic, it has afflicted few workers among housekeeping staff.

"There were at least three health care workers in Vietnam whose only job was to clean a SARS patients' room," says **Linda Chiarello**, RN, MS, of the CDC's Division of Healthcare Quality Promotion. The patient was there for part of the time the cleaning took place, she says.

In Canada, one patient care assistant (PCA) contracted SARS. In addition to cleaning rooms, PCAs deliver medication to patients and assist with transport. In Taiwan, a hospital laundry worker and a desk clerk developed SARS.

In the United States, there have been no hospital outbreaks and only one case of a health care worker with probable SARS. Of 74 probable SARS cases, only eight have been confirmed through laboratory tests.

High degree of containment required

"I think the most important thing is for us to keep being vigilant," says **Dan Jernigan**, MD, a CDC medical epidemiologist involved in the SARS investigation.

SARS cases have declined, and the World Health Organization has removed advisories cautioning against non-essential travel for all affected areas. In late June, the WHO reported 8,461 cases of SARS worldwide, with 804 deaths.

The CDC will remain alert for signs of new transmission, CDC director **Julie L. Gerberding** said in a press briefing.

"It is clear that the common theme of most of the outbreak situations we have encountered has been a spread from affected patients to the health care workers and then into the community," she said. "And we have recognized now twice in Canada that a very high degree of containment is required to protect people."

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Nasal flu vaccine is something to sniff at

New vaccine may increase vaccination rates

Health care workers soon will be able to receive their influenza vaccines with a couple of sniffs instead of a shot in the arm.

FluMist, an intranasal vaccine approved by the Food and Drug Administration in June, is being touted as a mechanism to increase vaccination rates nationally, including rates among health care workers.

Health care workers are a high-priority influenza vaccination group because of the risk of transmitting the disease to patients at high risk for complications. Yet just 38% of health care workers receive the influenza vaccine, according to the 2000 National Health Interview Study.

"FluMist has the potential to really expand our capability to deliver influenza vaccine," says **William Schaffner**, MD, chairman of the department of preventive medicine at the Vanderbilt University School of Medicine in Nashville, TN, where one of the clinical trials was held. "I think the acceptability will go up."

FluMist uses a live, attenuated virus, and studies show the virus can be detected in the nasopharynx for several days after vaccination. Because there are no data on the risk of transmitting influenza through the nasal vaccine, the Advisory Committee on Immunization Practices, a CDC advisory panel, stated that the inactivated (traditional) vaccine is "preferred for vaccinating household members, health care workers, and others who have close contact with immunosuppressed individuals."

If patients were exposed to the virus from the nasal vaccine, it would be a weakened version. "It's not going to be as bad an event as an immunocompromised person getting vaccinated with the real flu," Schaffner notes.

Cost expected to be much higher

The biggest barrier to the new vaccine will be price, which is expected to be double or triple the cost of the current vaccine. Schaffner notes that some costs will be eliminated because the nasal spray will not require syringes and needles and will be simpler to administer.

"If you can reduce the impact of flu, you will save money in the end because you won't be

transmitting flu to your patients,” notes **Paul M. Mendelman**, MD, vice president for clinical development at MedImmune in Mountain View, CA, which developed the vaccine. MedImmune will market the vaccine in conjunction with Wyeth Pharmaceuticals.

FluMist comes with some other caveats. The FDA approved its use in healthy children and adolescents ages 5 to 17 and healthy adults ages 18 to 49. Its efficacy has not been established for adults ages 50 to 64, and in clinical trials it was associated with an increase in asthma events for children under the age of five.

It should not be used by people who have asthma or reactive airway disease, an immune deficiency, chronic medical conditions, or by pregnant women. Common adverse events included runny nose/nasal congestion, cough, headache, sore throat, muscle aches, and fever.

Simply changing the method of administering the vaccine won't necessarily alter the behavior of health care workers, says **Jane Siegel**, MD, professor of pediatrics at the University of Texas Southwestern Medical Center in Dallas and a member of the Healthcare Infection Control Practices Advisory Committee.

“I think getting rid of the needle isn't going to solve the problem,” she says.

Caution is appropriate with a new vaccine, says Schaffner. But he predicts that, over time, the nasal version will enable the vaccination of a much wider population. “There will be a lot of intense surveillance,” he says. “We hope we gain confidence in the vaccine.”

(Editor's note: More information on FluMist is available at www.medimmune.com.) ■

Antineoplastic drug exposure raises concern

NIOSH study to test workers, environment

Health care workers may continue to be exposed to dangerous antineoplastic drugs, even if they follow recommended precautions for handling the drugs.¹ That finding from recent studies has prompted the National Institute for Occupational Safety and Health to launch a study of antineoplastic drug exposure and its health effects.

The study will be the first in the United States to both measure environmental exposure and conduct health assessments of employees. It will involve at least three hospitals and about 100 nurses, nursing assistants, pharmacists, and pharmacy technicians. NIOSH is collaborating with the University of Maryland in Baltimore, the University of North Carolina in Chapel Hill, and the M.D. Anderson Cancer Center in Houston.

“We are going to be looking at endpoints, including trying to actually measure specific marker drugs in employees [in their urine and/or blood],” says **Melissa McDiarmid**, MD, MPH, director of the occupational health program and professor in the School of Medicine at the University of Maryland. “We're going to do a very solid environmental exposure assessment, measuring all kinds of environmental sampling at the same time we are studying the workers. That's going to give us a snapshot of where we are now.”

Later this year, NIOSH is expected to release a hazard alert on antineoplastic drugs, urging hospitals to use caution and follow OSHA guidelines for handling the drugs.² Ultimately, this study and others like it could lead to changes in recommended practices.

Antineoplastics more widely used

“Hopefully we will be able to make recommendations to each [study] facility about where they might be able to minimize exposure,” says **D. Gayle DeBord**, PhD, chief of the bio-monitoring and health assessment branch in the division of applied research and technology at the National Institute for Occupational Safety and Health in Cincinnati.

The study is particularly important because the use of antineoplastic agents has become much more widespread, notes DeBord.

“We have more cancer patients now than we've had in the past, and the use of chemotherapy is going up,” she says. “A lot of these antineoplastic drugs are being used for non-cancer treatment, as well, such as for rheumatoid arthritis. Not only do we have oncology nurses who are at risk, [but the drugs] are also being administered in some areas by other nurses who may not be as well-trained.”

On oncology units, nurses joke wryly about getting their “maintenance dose” of the dangerous drugs. “There's this awareness, this level of

knowledge about it. And they've turned it into a sort of dark humor," says McDiarmid.

Oncology nurses may, in fact, be getting a low-level daily exposure. **Thomas Connor**, PhD, senior service fellow at NIOSH in Cincinnati and former associate professor of environmental and occupational health at the University of Texas School of Public Health in Houston, measured surface contamination in six U.S. and Canadian cancer centers.

"We found drugs everywhere we looked in the pharmacy and the treatment areas," he says. "There are a number of studies in the literature that have confirmed this in the United States and Europe. [The hospitals] were using all the recommended procedures and equipment and personal protective equipment."

Connor even found contamination in the hallways, possibly endangering people who were not even aware of the presence of toxic chemicals. Connor's conclusion: "People outside the actual preparation and administration areas have the potential to be exposed."

Housekeeping staff also may be at risk, says DeBord. Antineoplastic drugs can be eliminated through urine, and urine-soaked linens and contaminated surfaces in a patient's room could lead to inadvertent exposure, she says.

Health care workers also need to know that standard gloves do not provide sufficient protection against antineoplastic agents, says Connor. ASTM International, a standard-setting body in West Conshohocken, PA, is finalizing new standards for chemotherapeutic gloves.

Drugs linked to reproductive events

DeBord and Connor will be looking for markers for antineoplastic drugs in the urine of pharmacists and nurses in the upcoming NIOSH study. Some participants will provide a daily urine sample for 45 days, and women will provide information on their menstrual cycles. All participants also will provide blood samples and will answer questionnaires about their medical history, work history, and work practices.

Exposure to antineoplastic drugs has been linked to reproductive problems, including miscarriage and spontaneous abortion, and they are known carcinogens.

It may be that workers are only being exposed to very low concentrations of these drugs, but the exposures are repetitive, notes McDiarmid.

"In what other work environment do we allow

just a little bit [of a hazardous substance] to be around?" she says. "Some of these have a toxic profile similar to benzene, yet we don't allow a little bit of exposure to benzene."

References

1. Connor TH, Anderson RW, Sessink PJM, et al. Surface contamination with antineoplastic agents in six cancer treatment centers in the United States and Canada. *Am J Health-Syst Pharm* 1999; 56:1427-32.
2. U.S. Department of Labor. Controlling occupational exposure to hazardous drugs. *OSHA Technical Manual* 1999; OSHA Instruction TED 1-0.15. ■

More hospitals subject to 'wall-to-wall' inspections

OSHA plans to target high-hazard injuries

As many as 170 hospitals could be subject to wall-to-wall inspections this year under the U.S. Occupational Safety and Health Administration's targeted inspection program.

The program became somewhat broader this year as OSHA considered both lost time from work, which includes days of restricted activity, and days away from work.

Based on a 2002 survey of 95,000 employers in high-hazard industries, OSHA has identified 28 hospitals that will receive the comprehensive inspections. Those targeted employers had at least 14 lost-time injuries for every 100 full-time employees (FTEs) in 2001, or nine injuries with days away from work per 100 FTEs in 2001.

Another 142 hospitals are on a secondary list, which means they may be subject to the targeted inspections after inspectors from OSHA area offices visit the sites with the highest injury rates. Those on the secondary list have a lost worktime rate of eight injuries per 100 FTEs or a rate of four days away from work per 100 FTEs. The national average for all industry is 2.8 days of lost work time per 100 FTEs and 1.7 days away from work per 100 FTEs.

Hospitals with low injury rates are not entirely off the hook. OSHA also announced that it will randomly visit 200 workplaces among high-hazard industries "for the purpose of reviewing the actual degree of compliance with OSHA requirements."

OSHA's targeted inspections apply only to states under federal OSHA jurisdiction. However, state plan states are required to have a similar targeted inspection program for high-hazard industries. Nursing homes are not included in this program because they already are subject to inspections under the National Emphasis Program.

To calculate your lost work time rate, add columns H and I on the OSHA 300 log to determine your injuries involving days away from work, restricted work activity, or job transfer. Multiply that number by 200,000, which is the base number of hours worked by 100 full-time employees. Divide the result by the total number of hours worked by all your employees.

In future years, OSHA will use days away from work, which is column H. ■

Close call: CDC has a direct line for clinicians

Hot line answers smallpox, SARS questions

Bioterrorism has changed the way the Centers for Disease Control and Prevention communicates with clinicians — for the better.

The CDC has created a range of resources for clinicians, ranging from webcasts and e-mail updates to targeted web sites. The agency started creating the resources last year as a way to provide more information about bioterrorism and smallpox vaccination. “[The Clinician Information Line] was initially set up to deal with clinicians who had questions about smallpox disease or the smallpox vaccine and also to help them get access to VIG [to treat severe adverse events],” says **Dan Baden**, MD, lead for the clinician communication team in the CDC's Office of Communications. “If

CE questions

5. According to Walter Orenstein, MD, director of the National Immunization Program, hospitals that don't have vaccinated health care workers to form a smallpox response team should:
 - A. report this deficiency to CDC
 - B. work with local public health departments on other preparedness plans
 - C. tell employees vaccination is mandatory
 - D. store smallpox vaccine on site
6. Some respiratory protection experts say the N95 mask should have an assigned protection factor of 5. That means:
 - A. there could be as much as 20% leakage around the face seal of the mask
 - B. there could be as much 5% leakage around the face seal of the mask
 - C. the mask can be worn for five hours
 - D. the masks are more protective than many people believe
7. What is the relationship between monkeypox and smallpox?
 - A. They are caused by the same virus.
 - B. One occurs only in animals, and the other occurs only in humans.
 - C. Monkeypox cannot be prevented by a vaccine, as smallpox can.
 - D. They are caused by similar viruses, but smallpox causes more severe illness in humans.
8. According to a study by Thomas Connor, PhD, senior service fellow at NIOSH in Cincinnati, health care workers may be at risk even when hospitals follow guidelines for handling antineoplastic drugs, because:
 - A. the drugs are aerosolized
 - B. health care workers suffer needlesticks from treated patients
 - C. tests show the drugs still exist on surfaces, potentially exposing health care workers
 - D. not enough is known about the drugs' toxicity

Answer Key: 5. B; 6. A; 7. D; 8. C

COMING IN FUTURE MONTHS

■ An ergonomics approach that protects nonclinical employees from musculoskeletal disorders

■ Thinking outside the (needle) box: Tips on reducing needlestick injuries

■ CDC to issue new tuberculosis guidelines

■ It's flu season — are your employees vaccinated?

■ Keeping up with career trends in employee health

they have a patient with an adverse event, this is a portal for them to get access to CDC's experts.

That has now been expanded to include SARS."

Nurses respond to the information line 24/7, with answers to general questions about smallpox and smallpox vaccination. If consultation is required, the nurses will provide a response within 72 hours. In an emergency situation — if a provider thinks he or she may have a patient with smallpox, for example — the provider is connected to a CDC expert immediately, Baden says.

More than 33,000 clinicians have signed up with the CDC's clinician registry to receive periodic e-mail updates. The CDC also has developed partnerships with 67 clinician organizations and conducts phone conferences with representatives at least once a month. The American College of Occupational and Environmental Medicine, the Association of Occupational Health Professionals in Healthcare, and the American Association of Occupational Health Nurses are all part of that network.

The CDC will continue to refine its clinician resources and will regularly offer on-line or web-cast training programs, says Baden. The resources could be targeted toward new public health issues as needed, he adds.

"We want to find out what clinicians identify as their own needs and address those needs directly," he says.

[Editor's note: The telephone number for the CDC Clinician Information Line for smallpox vaccination or SARS information is (877) 554-4625. To register for e-mail updates from the CDC, go to www.bt.cdc.gov/clinregistry/index.asp.] ■

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- cite practical solutions to problems associated with the issue, based on overall expert guidelines from the Centers for Disease Control and Prevention, the National Institute for Occupational Safety and Health, the U.S. Occupational Safety and Health Administration, or other authorities, or based on independent recommendations from clinicians at individual institutions. ■

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JCAHO Update for Infection Control

News you can use to stay in compliance

Joint Commission's request for fatal infection data may yield little meaningful prevention information

Infection control breaches will not be easy to document

Infection control professionals attempting to comply with accreditors and do a root-cause analysis of fatal nosocomial infections must set narrow patient definitions and work closely with their quality improvement colleagues if any meaningful prevention data are to come out of the controversial initiative, an ICP warned.

One problem is that even the most in-depth analysis of a patient's care may not reveal a minor breach in infection control, which is all it takes in some cases to reverse the course of recovery.

"A lot of infection control practices aren't charted in the [patient's] chart," said **Teresa Garrison**, RN, MSN, CIC, CNLCP, an ICP with BJC Healthcare System in St. Louis. "So you are not going to see charted [for example] that the patient's central line dressing change was loose, and instead of changing it the nurse just taped it up a little bit better. So all of the things that put patients at risk actually aren't in the chart. I am still not convinced that doing a root-cause analysis is going to yield us much information on infection prevention."

Earlier this year, the Joint Commission on Accreditation of Healthcare Organizations issued a Sentinel Event Alert stating: "Manage as sentinel events all identified cases of death and major permanent loss of function attributed to a nosocomial infection (i.e., except for the infection, the patient would probably not have died or suffered loss of function)."¹ The Joint Commission cited the Centers for Disease Control and Prevention's (CDC) definition of a nosocomial infection as: "a localized or systemic

condition: 1) that results from adverse reaction to the presence of an infectious agent(s) or its toxin(s), and 2) that was not present or incubating at the time of admission to the hospital." Infections that lead to patient deaths or permanent loss of function should be regarded as sentinel events and subjected to a root-cause analysis with the idea of preventing such infections in the future.

Review 'unexpected' deaths

Although such reporting is voluntary, Joint Commission surveyors may ask ICPs whether they have done anything with regard to the Sentinel Event Alert, said Garrison, who spoke recently in San Antonio at the annual meeting of the Association for Professionals in Infection Control and Epidemiology (APIC). She described a possible approach to the Joint Commission's request that has been undertaken as a pilot program in one of the BJC hospitals. One of the first data elements ICPs looked at was "unexpected" patient deaths, which were already being tracked by hospital case managers.

"They already have a definition for unexpected deaths, and it is very, very narrow," she said. "I would suggest that when you look at this for your hospital, you create something just as narrow. So, for example, a patient coming in by ambulance that is a trauma, CPR in progress, doesn't make the definition. Any patient in the hospital who has had a change in his code status and is now a 'do not resuscitate' doesn't make the definition. What you are left with is truly fairly

healthy people who are coming in for something and then they really are dying.”

From that group, ICPs may be able to find some patients who died as a result of a nosocomial infection, but conducting the root-cause analysis will not necessarily fully explain the event.

“We wrote into the plan that we would review patients with unexpected death, and if they had a nosocomial infection, we would collaborate with performance improvement and risk management to decide at that point whether we are going to do a root-cause analysis,” she says. “We also put into the plan that we were going to review resources needed for all of these root-cause analyses and also look at the yield of information in terms of infection prevention.”

Tips on what surveyors are looking for

In a presentation titled “Tips From the Troops,” Garrison told APIC attendees what fellow ICPs are actually reporting after their Joint Commission inspections. Thus, she was able to advise ICPs on many of the questions surveyors are asking about the 2003 standards, which will continue into 2004 with very little change (**See standards, p. 101.**)

“The Joint Commission has become much more sophisticated in the way they look at our data and the questions they are asking us,” she said. “This year, I have heard a lot of focus on baseline. ‘What is your historic baseline? What are you doing about it?’ And then stability. They have really been asking, for the first time, ‘Are you sustaining the gain?’ They are excited when you are able to drop a rate and make an improvement, but what they really want from you now is that you sustain that improvement and keep it going over a long period of time.”

In the same vein, stopping an outbreak will certainly be viewed favorably, but surveyors may go a step further and ask the ICP what was learned from the experience.

“Although they love how you found the outbreak, controlled it, and improved things over time, their main questions this year have been, ‘What have you learned about the process that you used to complete the investigation?’” Garrison said. “So if you learned something from your process that you would do differently the next time you have an outbreak, be sure to be able to describe that. Also, the trick here is to make sure you have implemented that revision

in your [program policies].”

Overall, the Joint Commission requires that infection control programs reduce the risk of acquiring and transmitting infections among and between patients, staff, and visitors. To find evidence that such efforts are in place, they will look for the ICP to use five active verbs: identifying, analyzing, preventing, controlling, and reporting. “They are going to look at those, not only in the document review that you provide and in your interview, but they also are going to look for evidence of those activities from other staff members at the hospital when they are touring patient care areas,” Garrison said.

To begin with, have a written program description that includes the infection control goals you are working under for the current year, she advised. “Your annual goals need to be measurable, realistic, and coordinated with the organization’s performance improvement [plans]. The Joint Commission loves this closed feedback loop, so you need to be sure you can tie what you are doing back to the organization’s overall performance improvement plan.”

Indeed, the Joint Commission will be looking for evidence of communication and interaction with other programs as part of its emphasis on multidisciplinary care. “The Joint Commission wants a multidisciplinary approach, and I think it fits us very well,” she said. “What is so great about infection control is that we are everywhere and we get to go everywhere. We are constantly working across departmental lines, so to be sure to include that in your surveillance plan.”

Show clear link to occupational health

ICPs should have a statement of program oversight that clarifies their supervisor and the link between the program and hospital administration.

“You also need a statement on infection control authority,” she said. “Do you have the authority to close down a ward to new admissions if it is experiencing an outbreak? If you don’t have that authority, who has it? Be sure to include that statement in your program description.”

In outlining your program, be sure to show a clear link with occupational health, an area of increasing interest to the Joint Commission, she emphasized. “The Joint Commission is continuously looking for [infection control] collaboration with occupational health.”

(Continued on page 102)

JCAHO posts 2004 infection standards

(Editor's note: The Joint Commission has posted "pre-publication" infection control standards for 2004 on its web site. After much discussion, the standards appear largely unchanged from 2003. Highlights are summarized as follows:)

Surveillance, Prevention, and Control of Infection

Overview: The goal of the surveillance, prevention, and control of infection function is to identify and reduce risks of acquiring and transmitting infections among and between patients, staff, physicians and other licensed independent practitioners, contract service workers, volunteers, students, and visitors. Surveillance, prevention, and control of infection covers a broad range of processes and activities, both in direct patient care and in patient care support, that are coordinated and carried out by the hospital. This function links with external organization support systems to reduce the risk of infection from the environment, including food and water sources.

Standards

IC.1.10 The organization uses a coordinated process to reduce the risks of nosocomial infections in patients and health care workers.

Elements of Performance

(1) The hospital's infection control process is based on sound epidemiologic principles and evidence-based information on reducing nosocomial infection.

(2) The infection control program is appropriate to the following:

- The hospital's geographic location
- The volume of patient encounters
- The patient populations served
- The hospital's clinical focus
- The number of staff.

(3) The hospital's infection control program addresses issues defined by the hospital as epidemiologically important.

(4) The hospital connects its infection control program with the local health department to ensure appropriate follow-up and control of infection.

IC.1.20 The infection control process is managed by one or more qualified individuals.

Elements of Performance

(1) One or more individuals qualified through education, training, experience, and certification or licensure oversee the infection control process.

IC.2.10 Case findings and identification of demographically important nosocomial infections provide surveillance data.

Elements of Performance

(1) Surveillance activities are appropriate to the organization's demographics and services.

(2) Collection of surveillance data on nosocomial infections is ongoing.

(3) Surveillance activities include data collected by staff health services.

IC.3.10 When appropriate, the hospital reports information about infections both internally and to public health agencies.

Elements of Performance

The hospital reports information about infections both internally and to public health agencies as required by law and regulation and hospital policy.

IC.4.10 The hospital takes action to prevent or reduce the risk of nosocomial infections in patients, staff, and visitors.

Elements of Performance

(1) The organization implements strategies to reduce the risks and prevent transmission of nosocomial infections in patients, staff, and those who come into the organization.

(2) The strategies are consistent with current scientific knowledge, accepted practice guidelines, and applicable law and regulation.

(3) The mechanisms address the infection issues that are epidemiologically important to the hospital.

IC.5.10 The hospital takes action to control outbreaks of nosocomial infections when they are identified.

Elements of Performance

The organization implements strategies to control outbreaks of nosocomial infections.

IC.6.10 The hospital's infection control process is designed to lower the risks and to improve the rates or trends of epidemiologically significant infections.

Elements of Performance

(1) The nosocomial infection risk-reduction process acts to lower the risks of and to improve the trends in or rates of epidemiologically significant infections.

(2) The organization considers endemic rates (presence or occurrence of infections with geographic area) and epidemic rates (outbreak of infection in area or group) when analyzing data.

(3) Infection control findings are used to inform organization-wide performance improvement processes.

(4) Appropriate action is taken to decrease infection rates or trends.

IC.6.20 Management systems support the infection control process.

Elements of Performance for IC.6.20

(1) Management systems, including staff and data systems, support the hospital's infection control objectives.

(2) Data are used to improve infection control processes.

IC.6.30 The infection control process includes at least one activity aimed at preventing transmission of epidemiologically significant infections between patients and staff.

Element of Performance for IC.6.30

At least one activity has been implemented to intervene in the potential transmission of infection between patients and staff.

By the same token, the Joint Commission is looking closely at hospital staffing patterns, and surveyors may want to know whether infection control has sufficient manpower. "You need to have some rationale for the staffing that you have in your department," Garrison said. "And you need to be able to explain the rationale for that. This can be controversial, especially in your interview when [the Joint Commission surveyor] is asking you about your staffing, and your CEO is sitting right there at the table with you."

If you are using a formula, like the CDC's national nosocomial infection surveillance system's 1.5 FTEs for the first 100 beds, explain that to the Joint Commission, she said.

"You need to have some statement about how you determine whether your staffing is adequate or not," she said. "Then have a staffing plan that addresses staffing variances. I doubt that many of us get any more ICPs when census goes up or when there is an outbreak. You need a statement that shows that these are fixed positions, but what are you going to do when you have an outbreak? How are you going to be able to handle the staffing and your daily workload?"

The Joint Commission requires that ICPs do case finding and identification of demographically important nosocomial infections via surveillance.

"The tip here is to describe your surveillance," Garrison said. "Is it targeted or total house? The Joint Commission does not ban total-house surveillance, so if you have a good rationale for that, they're not going to say you can't do it. But whatever your surveillance [approach], it needs to encompass the patient care that is provided in your facility and to cover occupational health services."

But creating a paper trail of surveillance data will not mean much if workers on the floor don't know which bugs are causing problems in the hospital.

"How have you acted on your surveillance findings?" Garrison said. "When they tour patient care areas, they are asking staff nurses, 'What kind of infections do you see on your unit? And what are you, the staff nurse, doing to reduce infections on your unit?'"

Reference

1. Joint Commission on Accreditation of Healthcare Organizations. Infection control-related sentinel events. *Sentinel Event Alert* 2003;28. ■

JCAHO urges passage of patient safety regs

Law to ensure confidential reporting of errors

National patient safety legislation that would encourage the confidential reporting of medical errors is critically needed in today's health care system, urged **Dennis O'Leary**, MD, president of the Joint Commission on Accreditation of Healthcare Organizations in Oakbrook Terrace, IL.

"Thousands and thousands of errors remain hidden today, and each of those is a lost opportunity for education and change," O'Leary said in recent testimony before Congress. "Federal confidentiality protections for reported adverse events, near misses, and their underlying causes are inextricably linked to the efforts to create cultures of safety inside health care organizations."

Such protective legislation would allow sharing of information and mutual problem-solving, he said. The House recently passed H.R.663, the Patient Safety and Quality Improvement Act. The bill awaits consideration by the Senate.

"We are very hopeful that this is the year in which this critical piece of legislation will actually be enacted," O'Leary testified June 11, 2003, before the Senate Committee on Governmental Affairs.

If approved, the legislation will prevent subpoena of error-related information from health care organizations and practitioners, shielding providers from liability so medical errors can be analyzed and reduced throughout the medical system.

"[This bill] contains explicit language to clearly preserve that protection when the information is shared with an accrediting body for purposes of improving patient safety and health care quality," he said.

That could mean, for example, infection control professionals could report fatal or life-impairing nosocomial infections to the Joint Commission without fear of institutional liability. The Joint Commission makes considerable efforts to protect the confidentiality of its Sentinel Event Database, but many feel that only federal legislation can provide the protection to open up a national discussion of medical errors.

O'Leary also suggested that lawmakers establish performance incentives for achieving safety objectives through adoption of the Joint Commission's annual national patient safety goals. ■