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Inside: 2002 Salary Survey

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OSHA needle safety citations hit record high

Agency sends message: It's not optional!

Hospitals have received more citations for failure to use safer sharps devices in the past year than they have since the bloodborne pathogens standard was first issued in 1989, according to data from the U.S. Occupational Safety and Health Administration (OSHA).

The message is clear. OSHA inspectors are focusing on needle safety, and so should you.

"It should tell anybody regulated by us that we are definitely citing this, we are looking for [compliance with the bloodborne pathogens standard]."

CE testing process simplified

Beginning this semester, *Hospital Employee Health* is simplifying its continuing education program by no longer requiring you to return a test form. Instead of completing a Scantron form as you have in the past, all you will need to do is complete a CE evaluation, which will be enclosed in your December issue. Upon receipt of your evaluation, your CE certificate will be mailed to you. It's that simple.

CE questions will continue to be included in every issue. Answers to those questions will be printed in the issue as well, giving you the opportunity to reinforce the learning activity by immediately reviewing any missed questions. This process has been shown to be an effective adult education method and fits well with our commitment to provide you with quality continuing education activities that are designed to meet your needs. If you have any questions about this process, please call our customer service department at (800) 688-2421. ■

COMING IN FUTURE ISSUES

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- Slips and falls: More costly, and preventable, than you think
- How one hospital dramatically reduced violent attacks
- Improving compliance with post-exposure prophylaxis

says **Melody Sands**, MS, director of OSHA's office of health compliance assistance. "The knowledge [level] of compliance officers is raised, and they are paying attention to this."

The new provisions in the revised bloodborne pathogen standard became effective April 18, 2001, but OSHA delayed enforcement action until July 2001. As of May 2002, the agency had issued 1,876 citations to hospitals with penalties totaling about $1.3 million. Only 369, or 20%, were generated from inspections related to a complaint.

OSHA issued 142 citations for failure to use engineering and work practice controls — including safer devices. By contrast, in a 16-month period after the 1999 compliance directive on bloodborne pathogens was released, OSHA issued a total of 144 citations to hospitals related to the standard; just 18 of those involved lack of engineering controls or safer devices.

Janine Jagger, PhD, MPH, director of the International Health Care Worker Safety Center at the University of Virginia in Charlottesville and a driving force behind tougher standards for needle safety, says she's impressed with OSHA's compliance efforts. "OSHA has really taken this issue seriously," she says.

Jane Perry, editor of the center's publication, *Advances in Exposure Prevention*, notes that OSHA has communicated clearly, "[that] safety devices are *not* optional. The increase in citations backs up that message and gives it real teeth," she says.

"And it's definitely having an impact. There has been a shift in perspective among those responsible for converting to safety in health care facilities: fewer complaints about cost and other hurdles, and more acceptance that this is a task that has to be accomplished. There's no other choice. Now they're trying to figure out the best way to get it done."

OSHA's tough enforcement approach is necessary to ensure that facilities buy the safer devices, obtain employee input, and provide proper training, says **Katherine West**, MSEd, CIC, an infection control consultant based in Manassas, VA.

"As I've traveled around the country, I haven't seen, in many respects, that it's been given the priority it deserves," she says. "Many hospitals aren't following the mandate."

"OSHA's taking it seriously, and rightfully so," West says. "We've identified where risk is, and we know what we have to do to reduce it."

Needle safety has been in the national spotlight since 2000 when Congress passed the Needlestick Safety and Prevention Act. The law directed OSHA

Special needlestick CD offer for *HEH* subscribers

Recent program details JCAHO compliance tips

How did workers donning fanny packs ensure needle safety compliance with inspectors from the Occupational Safety and Health Administration (OSHA)? If you missed the live presentation last fall of our needle safety audio conference, **Needle Safety Mandate: What you must know before OSHA inspectors come calling**, don't worry. Here's a special opportunity for *Hospital Employee Health* subscribers to order the CD version of this essential compliance program for just $99. Also, each listener can earn up to one hour of continuing education credit by returning the CE evaluation form mailed with the order.

Hear this novel approach and many other "real-world" solutions described by a California infection control professional who has been facing down OSHA inspectors for more than two years. With the Joint Commission on Accreditation of Healthcare Organizations saying it will enforce the same requirements, the insightful grass-roots guidance and clear explanation of all the requirements in this audio conference can ensure full compliance at your facility.

California was the first state to face this issue several years ago. Tales of actual OSHA inspections — giving precise details of what was regarded as compliant or what drew a citation — are revealed by **Cynthia Fine**, RN, MSN, CIC, infection control practitioner at John Muir Medical Center in Walnut Creek, CA.

Our expert faculty also includes veteran OSHA observer **Katherine West**, BSN, MSEd, CIC, an infection control consultant with Infection Control/ Emerging Concepts Inc. in Manassas, VA. West provides a straightforward, practical explanation of what the federal changes require of facilities.

To order this important audio conference CD, call our customer service department at (800) 688-2421 and refer to this effort code: **61641**. ■

to revise its standard to require employers to update exposure control plans annually and consider new technologies. They must involve frontline workers in the evaluation of products and maintain a detailed sharps injury log.

OSHA didn't direct its educational efforts just at employers. Inspectors received extensive training, and each regional office has a bloodborne pathogens coordinator to provide assistance.

"Compliance officers are told, 'This is an important document; you need to be aware of it,'" Sands says.

The stepped-up enforcement has put some hospitals on edge, as employee health professionals worry about how an OSHA inspector will regard their efforts to find suitable devices. Documentation is critical, says **Amber Hogan**, MPH, an industrial hygienist in OSHA's office of compliance assistance. But how hospitals choose to document their process is up to them, she says.

"Because of the performance-oriented nature of the standard, the employee has a lot of leeway in how [to] document something like device review," she says.

"[For example], they can reference in the exposure control plan minutes of the meeting in which they discussed these devices." OSHA will not dictate which safety device a facility should use, Hogan stresses. "It's completely up to an employer and their employees to decide what device is best for them."

What if none of the devices are deemed acceptable? **Cindy Fine**, RN, MSN, CIC, infection control practitioner at John Muir Medical Center in Walnut Creek, CA, who has consulted with hospitals on needle safety, notes that some dialysis clinics have rejected the available devices. "I talked to a couple of facilities that had tried some of the devices," she says. "They all require two hands to activate or discontinue the device. One had a loop that kept pulling the venous access out."

According to the OSHA compliance directive, "Employers must implement the safer medical devices that are appropriate, commercially available, and effective." But facilities may have a tough time making the case that there is no adequate device if dialysis clinics down the street are using them effectively, Fine notes.

Employers shouldn't hesitate calling their regional OSHA office to ask for clarification on such issues, Hogan says. Each office has a regional bloodborne pathogen coordinator who is an expert on the standard, and a phone call won't trigger an OSHA inspection, she says. "There's just a lot of room for interpretation. If people want good, balanced information, all they have to do is ask us. Each state has a free consultation program. They can get assistance for free."

Here are some major issues that arose from inspections and citations, Hogan and Sands say:

• **Make sure you update your exposure control plan annually.** The exposure control plan is the

‘It was like being handed a death sentence,’ nurse says

Needlestick leaves nurse with anguish of HCV

It was a swift, sudden movement, so quick that no one could imagine it one day would bring so much anguish. **Chris Jordan**, RNC, was drawing blood from a newborn in the neonatal intensive care unit when she suffered a needlestick.

This tiny baby had been born healthy, but while breast-feeding him in bed, his mother had fallen asleep and accidentally suffocated him. He was brain dead but was being kept alive while the mother struggled to cope with the reality of his death. In those few days, the baby received blood products to keep him alive.

“The mother came into the room, unbeknownst to me. She walked behind me and tapped me on the shoulder,” recalls Jordan, 51, who lives in Corona, CA. “It startled me, and I turned and ended up sticking myself.”

Jordan had completed the blood collection and was about to put the butterfly device into a disposal container when she was stuck. With current safety technology, the needle would have been sheathed, retracted, or blunted, says Jordan.

Still a pediatric intensive care nurse, Jordan tells her story to underscore the importance of safer needle devices. She is not just a statistic; she is a casualty. “If I had a safety needle, my chance of getting stuck would have been 80% less,” she said at a recent teleconference sponsored by the National Association of Pediatric Nurse Practitioners in Cherry Hill, NJ.

Jordan has been stuck only three times in her 10 years at a large teaching hospital. For many of those years, no test was available for hepatitis C. In 1996, Jordan received baseline testing when she was stuck while caring for a baby who was known to be positive for both hepatitis B and C. The baseline test showed she was already infected with HCV. She distinctly remembered the two other needlesticks she had incurred (and reported), and although she can’t prove it, she believes the brain-dead infant was the one that infected her.

The news that she tested positive for HCV was devastating. “I remember that day very clearly,” she says. “It was like being handed a death sentence. I was told I had this antibody in my blood system. I drove home in tears that day.

“I’m a single parent, and I have two children. All I could think about was, ‘What if I can’t work? Who’s going to take care of my kids?’”

Jordan sank into a serious depression, but managed to keep on working as a pediatric nurse. She declined treatment with ribavirin and interferon, fearing the side effects. “I started reading the literature and found the most success with treatment is when you first seroconvert to hepatitis C,” she says.

Jordan has other nursing friends who contracted HCV from needlesticks. One is on a liver transplant list, the other is undergoing his third round of treatment. Although she feels lucky that her symptoms haven’t been as severe, she says, “this whole thing has taken a toll.”

“I get very, very tired some days. Other days I feel fine,” she says. “The days I’m tired, I find I can’t work regular 12-hour shifts consecutively. I have to work every other day or every third day.

In speaking about her experience, she hopes to make a difference in preventing needlesticks. She looks to the future, hoping to maintain her health. She has remarried, and now has a granddaughter. She wonders, “Will I get to see her grow up?” ■

area that elicited the most citations, and it is one of the most easily observable items. “One of the first things [compliance officers] ask for is the written program,” Hogan says. “That is something compliance officers are going to see upfront, on the first day of the inspection. They will be able to tell if it is updated annually because of the date of the document.”

In the past year, OSHA issued 165 citations for failure to have a written exposure control plan and 170 citations for failure to update the exposure control plan annually. The agency issued another 25 citations for failing to reflect changes in technology in the exposure control plan and failure to document annual consideration and implementation of safer devices.

You might start with a template for an exposure control plan, such as the one provided on the OSHA web site (www.osha.gov/OshDoc/Directive_pdf/CPL_2-2_69_APPD.pdf). However, it won’t be adequate unless it is customized for your facility and updated at least annually, Hogan says. “You find these blanket exposure control plans that are simply not good enough,” she says.

• **Include a true representation of frontline health care workers in evaluation and selection of devices.** If your hospital is part of a corporate chain, the selection decisions can’t be made solely at the corporate office, Hogan says. “They really need to have a representative sample of employees from the different departments that are using the devices [and] from the different geographic

regions." If the sample of health care workers is representative, the hospitals can use a centralized selection process. "They can do that as long as input from the facilities is included and as long as there is some feedback from the facilities," she says.

OSHA inspectors interview employees to find out if they had input into the selection of devices and whether they had adequate training. Again, that is an easy way for inspectors to check for compliance.

"It's pretty hard to make it up if you haven't had any input," Sands says.

• **Keep up with changes in technology.** OSHA issued 25 citations last year for failing to reflect changes in technology in the exposure control plan and failure to document annual consideration and implementation of safer devices. The safety device market is in flux, with new devices emerging that may be easier to use and thus more acceptable to health care workers. Employers are required to consider the new technology and to document that in the exposure control plan.

Thanks to additional training, OSHA inspectors are becoming knowledgeable about the changes in the safety device features.

"We're having hands-on experience with new devices," Sands says. "The awareness of compliance officers should again be raised up a little more, which should allow them to make informed decisions when they look at devices."

Hogan predicts that as the technology and information improve, hospitals and health care workers increasingly will accept safety devices as a basic part of the work environment. "It just kind of has to marinate itself in the professional world as a standard of good, safe care," she says. ■

Preventing sticks: Safety devices aren't enough

Training, safety climate also reduce injuries

The data aren't out yet on how many needlesticks are being prevented through safer devices. But researchers already know one thing: Devices are only one part of the solution. Employees and administrators are the other part.

Proper training and a commitment to safe practices are essential to a successful needlestick prevention program, occupational health experts say.

Robyn Gershon, MHS, DrPH, associate professor at the Mailman School of Public Health at Columbia University in New York City, is testing an innovative, computer-based training program that presents employees with simulations based on actual needlestick scenarios.

"These simulations make it real. They *are* real," she says. "You have to make decisions along the same path as the person who had the [needlestick] experience."

This training won't replace the annual bloodborne pathogen inservice or the specialized training in using specific devices. But it will help employees overcome negative attitudes toward switching to safety devices and bad habits, such as recapping or failure to use hands-free passing in the operating room.

"This is really [intended] to change the paradigm, to change the thought process," she says, noting that the program will include Internet chat rooms and a toll-free number for employees who have questions. It also will provide continuing education units.

The program currently is being tested with 5,000 nurses, including a comparison group who will receive traditional bloodborne pathogen training. The study will use questionnaires to measure employee knowledge, perceptions, attitudes, behavioral intentions, current safety practices, and recent past history of exposures before the training and at three and six months afterward. If the program proves to be an effective educational tool, it will become widely available.

Even after implementing safer devices, employee health professionals will continue to seek ways to reduce needlesticks, Gershon says. "This is a way to help facilitate the reduction of risk one step further," she says.

Meanwhile, **Marion Gillen**, RN, MPH, PhD, assistant professor at the University of California School of Nursing, is still compiling five years of data to determine the impact of that state's needle safety law, the first in the nation. The project includes data from two years before the effective date of new regulations. Gillen and colleagues also conducted site visits to 79 of California's 400 hospitals.

"In general, we found that people are making really good progress," says Gillen, who expects to have results from the study by the end of the year. "There are certain things that I think people had trouble with and didn't understand.

"If the standard [states that] in the sharps injury log that you have to collect data on these

10 points, some facilities didn't really understand that they really had to get all 10. So they didn't have all of the information."

Gillen is also collecting information on nurses' perception of the hospital's overall safety climate. She expects to find a relationship between the safety climate and needlesticks, as Gershon has in previous research.

"We've looked at the compliance issues before, and we found safety climate was the single most important factor," says Gershon. ■

Washington state takes aim at ergo hazards

Rule moves forward despite opposition

Even as the U.S. Occupational Safety and Health Administration (OSHA) backs away from ergonomics regulation, Washington state is moving forward as a model for tougher action. A new rule that becomes effective this month will require employers to identify "caution zone jobs" and to reduce the hazards of musculoskeletal disorder injuries.

Lifting 75 pounds or more once a day qualifies as a "caution zone job." That means hospitals must analyze and reduce the hazards of jobs that involve patient transfer. **(See sample worksheet, inserted in this issue.)**

"The standard requires that employers reduce exposure to the hazard below the hazardous level or to the degree that it's economically or physically feasible to do that," explains **Michael Silverstein**, MD, assistant director for industrial safety and health at the Washington State Department of Labor and Industries (L&I) in Olympia.

So far, the Washington rule has stood up to political pressure to quash it. After a review by a Blue Ribbon Panel on Ergonomics, Washington Gov. Gary Locke directed the state L&I to stay on course with implementation, but to delay enforcement for two years. A business coalition that includes the Washington State Hospital Association has filed suit, seeking to overturn the rule.

As of July 1, employers in the state's highest risk industries, including nursing homes, must begin identifying hazards and providing education to employees about ergonomics. Hospitals must meet those requirements beginning July 1, 2003. By July 2004, they must reduce the hazards. However, fines and citations for failure to comply won't be issued until two years later.

"Even the largest hospitals have several more years before there would be a possibility for a citation or a fine. There is plenty of time for those programs to be fine-tuned," Silverstein says.

Yet hospitals that are struggling financially may not be able to afford to buy all the lifting devices on the timeline expected by L&I, contends **Beverly Simmons**, executive director of the hospital association's workers compensation program in Seattle.

"We believe in those [ergonomic] principles and we're acting upon them," Simmons says. "[But] we feel that until hospitals are appropriately compensated [in reimbursement], it's going to be very difficult for any sort of compliance to happen unless it's voluntary."

However, Silverstein counters that voluntary programs are ineffective.

"I think employers are going to find it pretty confusing under the program the federal government has announced," he says.

"The agency is saying no one is required to meet those [voluntary] guidelines. On the other hand, they will be issuing citations under the general duty clause," Silverstein.

"If I'm not responsible for following these specific guidelines, what does it mean to be responsible for maintaining a workplace that is free of recognized hazards?" he says. "It's kind of a guessing game. The agency is not telling them ahead of time what they could be cited for."

MSDs cost more than $410 million

L&I began work on an ergonomics rule in 1998, in response to the grim statistics of musculoskeletal disorder (MSD) injuries. More than 52,000 workers' compensation claims each year involve MSDs, making it the largest category of injuries and illnesses affecting Washington workers. The department estimated that the total annual direct cost of MSDs exceeds $410 million.

Yet in a department-sponsored survey, 60% of employers reported they had taken no steps to reduce work-related MSD (WMSD) hazards. The department adopted the rule in May 2000.

"L&I estimates that the ergonomics rule will prevent 40% of work-related MSD injuries and 50% of work-related MSD costs once all the elements of the rule are fully effective," the department reported, though adding the caveat, "These

are average figures and actual reductions will vary by workplace and by industry."

The department identified the top 12 industries with the highest incidence of WMSD injuries. Nursing homes made the list; hospitals fell in the second-highest category. The implementation of the rule requires the top 12 industries to comply a year earlier than other employers, and it gives small employers — those with fewer than 50 employees — extra time.

The department also developed demonstration projects and assistance programs. But employers can decide how to set up their ergonomics programs and reduce hazards.

"We've tried to strike a balance between being specific enough so that employers know when they have to do something and when they're finished, and being flexible, so employers don't face one-size-fits-all obligations," Silverstein says.

The rule passed muster with the Blue Ribbon Panel of experts, which concluded that the rule, its enforcement directive, and procedures "provide a foundation for fair and consistent enforcement." The panel also stated that "the rule itself is clearly written, and together with the educational materials, enforcement policies, and procedures, is understandable."

That is a vastly more positive outlook than the reaction to the failed OSHA standard, which was rescinded by an act of Congress. A National Academy of Sciences panel reviewed the scientific literature and concluded that ergonomic interventions would reduce the risk of work-related MSDs. But several provisions of the OSHA standard, including pay and benefit guarantees, sparked controversy, even from those who otherwise supported ergonomics regulation.

L&I also hopes to smooth the transition to enforcement by supporting demonstration projects, providing educational assistance, and conducting test inspections.

"By the time we actually do real inspections, we're going to have a very well-trained group of inspectors," Silverstein says. "Both the business and labor communities are going to have a very good idea of what to expect. I'm very concerned that we conduct ourselves in a fair and consistent manner."

Those efforts will not be enough to make the ergonomics regulation a fair one, a business coalition asserts. More than 230 business organizations, companies, and individuals joined together to form Washington Employers Concerned About Regulating Ergonomics (WE CARE).

The coalition asserts that the regulation is not based on sound science and that the department's cost-benefit analysis is flawed.

The Washington State Hospital Association, which sponsors a zero-lift program, doesn't question the benefit of ergonomic intervention. But following the standard will require more resources than the labor department acknowledges, Simmons says.

Many hospitals can't afford to hire consultants to help with implementation and don't have available staff to dedicate to the project, she notes.

"We believe industries should be taking a hard look at this and implementing what they can in ergonomics," Simmons says. "[Hospitals] can do it bit by bit, but they can't do it all at once."

(*Editor's note: For more information, see the Washington Department of Labor and Industries ergonomics web site at http://www.lni.wa.gov/wisha/ergo/default.htm.)* ■

Are you keeping up with the changing work force?

Language, literacy gaps may affect training

As hospitals hire growing numbers of foreign-born workers, employee health professionals are facing an unprecedented challenge to adapt health and safety training.

The proportion of Hispanic workers in the U.S. work force is expected to increase by more than one-third by 2008, and the number of Asian workers will rise by about 40%, according to the Bureau of Labor Statistics. Overall, about one in 10 Americans was born in a foreign country, according to a recent U.S. Census report.

While some workers, such as Filipino nurses, are well-educated and highly proficient in English, low-wage foreign-born employees may struggle with literacy even in their native language. The bottom line: Employers must make sure employees understand the health and safety training, not just that they receive it, employee health experts stress.

That may include providing written materials in the employees' native language, using an interpreter during training sessions, and considering

cultural and literacy issues, says **Sherry Baron**, MD, MPH, medical officer and co-team leader of special populations at risk for the National Institute of Occupational Safety and Health (NIOSH) in the Cincinnati division office.

"No matter if the employees' first language is English or not, you must have training that they can understand," emphasizes **Sandra Elias**, RN, OHN, occupational health and workers' compensation consultant at St. Jude Heritage Occupational and Environmental Health Services in Fullerton, CA.

Courtesy masks lack of comprehension

New employees may be so agreeable that they nod politely when asked if they understand the information in a training session, but the consequences of that gentle evasion can be significant.

Piedmont Hospital in Atlanta hired a group of young men from Sudan who had been dubbed "The Lost Boys" because of their traumatic experiences after their villages had been destroyed. The men had high school education, and some even had attended college. While they speak English, "some of them understand better than others," says **Joyce Geddie**, RN, former manager of the hospital's employee health clinic. Their native language was an unusual African dialect that was not available from translation services.

As new employees in environmental services, they received the standard orientation as well as specific training in bloodborne pathogens. They acted as if they understood everything, even nodding during the training session, Geddie says.

But when one employee was observed pushing down on the trash with a gloved hand, Geddie realized the training would have to be repeated, this time with feedback focused on determining whether the employees understood.

"You need to be prepared for all the extra [things] you need to do," she says. Piedmont also has a large Hispanic work force and has conducted some training in Spanish. The Material Data Safety Sheets also are in Spanish, she says.

New web sites offer Spanish versions

As hospitals and other employers recognize the importance of training geared toward immigrant workers, more resources are becoming available.

The U.S. Occupational Safety and Health Administration (OSHA) announced efforts to improve safety for Hispanic workers and launched a Spanish-language web site. Employees now can file OSHA complaints in Spanish.

The NIOSH division office in Morgantown, WV, just launched a Spanish-language web site with links to other health and safety information in Spanish. The web site includes about 25 NIOSH documents that have been translated into Spanish, as well as some documents from OSHA. **(For more information, see editor's note, p. 81.)**

"It was really in response to a large demand from employers and from our own discussions with people in industry and labor. There was a big need for [material in the] Spanish language," says **Marie Haring Sweeney**, PhD, chief of the document development branch in the education and information division.

The Centers for Disease Control and Prevention (CDC) in Atlanta has published Vaccine Information Statements (VISs) for DTaP, hepatitis B, and pneumococcal conjugate vaccines in 12 languages, and has information on hepatitis A, B, and C in Spanish and Turkish. The CDC also has developed a Spanish-language web site.

Meanwhile, employers sometimes hire translators for specific orientation materials. "When I do training — I am not bilingual — I have translated the forms into Spanish," says Elias.

She sometimes works with a translator as she conducts a session. Even if the employees seem to have good English skills, it may be helpful for them to have printed material in their native language, she says.

If you have workers who actually are employed by an outside contractor, such as food services or security personnel, you are not absolved from responsibility to make sure they were properly trained, Elias notes.

"I'd ask for their training documentation and an outline of their training," she says. "I'd also watch and see what they're doing."

Language isn't the only barrier that can affect comprehension of training material. Sometimes cultural differences may affect how employees interpret policies.

"Trainers may take for granted information about disease or disease causation, but it may be very different in another culture," Baron says.

In one case, researchers observed that farm workers weren't washing their hands after working in the fields. After some discussion with workers, they learned that the workers mistakenly believed that they could get arthritis or other conditions from washing with cold water.

Low-wage earners who are recent immigrants also may have lower literacy levels, Baron says. Training methods should take that into account, she says.

"Some training methods that may be more participatory, involving the use of lots of drawings and explanations and activities, probably work well for everybody, but [they work] particularly well for individuals who come from backgrounds where they're not as attuned to reading documents," Baron points out.

It may seem like a new burden to provide foreign-language materials or training. But keep in mind that foreign workers usually represent a growing segment of the community served by the hospital, she says.

"You'll be hiring people as part of an ever-increasing size of some ethnic community."

(Editor's note: The Spanish-version OSHA web site is at www.osha.gov, and the NIOSH web site is available at www.cdc.gov/spanish/niosh. The Spanish version CDC site is at www.cdc.gov/spanish/default.htm. Information on AIDS/HIV is available in Spanish at www.natip.org and www.aidsinfonet.org/infored.html.) ■

Early HCV treatment safe and effective

Sulkowski MS, Ray SC, and Thomas DL. **Needlestick transmission of hepatitis C.** *JAMA* 2002; 287:2,406-2,413.

Hepatitis C presents the greatest risk of blood-borne-pathogen transmission from needlesticks. The authors, physicians at Johns Hopkins School of Medicine in Baltimore, note that "HCV transmission following a single needlestick accident occurs approximately 10 times more often than HIV transmission, the chances of being exposed to an HCV-infected person are roughly five times greater than of being exposed to an HIV-infected person, and there are no approved methods of preventing HCV infection after an exposure.

Thus, HCV infection remains an important occupational threat to health care workers."

Unfortunately, there is no accepted post-exposure prophylaxis for HCV. Even the benefits of early treatment of acute HCV infection have been debated.

"Since 15% to 20% of patients with acute HCV infection spontaneously clear viremia, a case can be made to restrict therapy to persons who still have HCV RNA in their blood after six months, thus sparing some health care workers the potentially adverse effects of [interferon]."

The authors related the case of a 29-year-old medical intern who sustained a needlestick while treating a source patient who was known to be infected with both HIV and HCV. The needlestick occurred when the intern was trying to reinsert an IV catheter.

"I would not have called it a deep wound, maybe 2 mm to 3 mm, but it bled spontaneously," the intern said. "I knew that the patient was hepatitis C- and HIV-positive, so I washed the finger and immediately called the Needle Stick Hotline. Within 45 minutes I had started taking zidovudine, lamivudine, and nelfinavir."

Further testing showed that the source patient had a low-HIV viral load, making transmission unlikely. Thirteen days after the exposure, the intern developed a rash and a fever. HCV RNA testing at two weeks post-exposure revealed an acute infection.

"It remains unclear whether his transient rash and asthenia were due to the HCV infection, another virus, or the PEP medications," the authors note.

Virological testing continued every two to four weeks, and after eight months of sustained viremia, the intern decided to begin treatment with PEG-interferon and ribavirin, the article said.

"Within a few hours after that first injection, it felt like instant influenza," the intern related. "I had fever, myalgia, headache, and fatigue, despite taking [nonsteroidal anti-inflammatory drugs] and drinking more fluids than usual. I felt horrible. I ended up sleeping for the better part of a day after the treatment, and over the next several days the symptoms subsided. I felt almost back to normal after five to six days."

Over time, the symptoms began to subside more quickly after treatment, the intern said. But other concerns arose. The intern began losing weight, losing hair, and suffering from depression. With medication, the depression eased.

"After 10 weeks of treatment, and again six months following completion of a six-month course, qualitative testing revealed no detectable HCV RNA. Therefore, the patient has had a sustained virological response," the authors said.

The authors stopped short of recommending anti-viral treatment for acute HCV infection following a needlestick exposure.

"The optimal treatment strategy and regimen to prevent chronic HCV infection after occupational exposure is not clear; however, treatment during acute infection appears to be safe and effective," they stated.

"The high prevalence of HCV in hospitalized patients and the questions about management of occupational exposure underscore the importance of being vigilant for acute infection and of promptly referring patients with acute HCV infection to experienced clinicians who can provide updated counseling and treatment to health care workers who acquire HCV infection," the authors said.

The authors also noted that the risk of transmission of HCV relates to the HCV RNA levels in the source patient. The risk is also greater with exposure to hollow-bore needles, they said.

"Most occupational HCV transmission follows breaks in the skin, especially those made by hollow-bore needles that are removed from a patient with a high HCV RNA level and then inadvertently injected into subcutaneous tissues," they reported. ■

CE questions

The CE testing procedures have been changed. For more information, see box on cover.

1. In the first year of enforcement of the revised bloodborne pathogen standard, which deficiency was the source of the greatest number of OSHA citations?
   A. failure to have an updated exposure control plan
   B. failure to train employees appropriately
   C. failure to keep a sharps injury log
   D. failure to implement engineering controls

2. According to the new Washington state ergonomics rule, what must employers do if they identify a "caution zone" job?
   A. Eliminate the job.
   B. Redesign the job so that no hazard exists.
   C. Eliminate the hazard to the extent feasible.
   D. Educate employees about the hazards of the job.

3. What should hospitals consider when conducting training for foreign-born workers, particularly in low-skill jobs, according to **Sherry Baron**, MD, MPH, medical officer and co-team leader of special populations at risk for the National Institute of Occupational Safety and Health in Cincinnati?
   A. cultural differences and literacy levels
   B. prior safety practices
   C. attitudes toward safety
   D. learning styles

4. According to an article in the *Journal of the American Medical Association*, which of the following presents the greatest occupational risk to health care workers from needlesticks?
   A. human immunodeficiency virus (HIV)
   B. hepatitis B virus
   C. hepatitis C virus
   D. All three pose equal risk.

Answers: 1. A; 2. C; 3. A; 4. C

OSHA seeks expert panel on ergonomics

The U.S. Occupational Safety and Health Administration (OSHA) announced the creation of a National Advisory Committee on Ergonomics with as many as 15 members who will advise assistant labor secretary John L. Henshaw.

The committee will address the research-oriented questions outlined in the agency's recent ergonomics strategy, including:

- information related to various industry or task-specific guidelines;
- identification of gaps in the existing research on ergonomics and the application of ergonomic principles to the workplace;
- current and projected research needs and efforts;
- methods of providing outreach and assistance that will communicate the value of ergonomics to employers and employees;

• ways to increase communication among stakeholders on the issue of ergonomics.

The agency asked for nominations of "a broad range of individuals," including those with scientific or medical expertise or "others who have knowledge or experience concerning the issues to be examined by the committee."

The committee will have a two-year term. Nominations by mail, e-mail, or fax were due by June 17. E-mail: http://ecoments.osha.gov.

"I expect the committee to be a valuable resource in helping OSHA accelerate the decline of these types of injuries," Henshaw said in a statement. "Helping identify gaps in existing research is an important part of the work of this committee."

[Editor's note: For more information, contact Bonnie Friedman, OSHA, Office of Public Affairs, Room N-3647, U.S. Department of Labor, 200 Constitution Ave. N.W., Washington, DC 20210. Telephone: (202) 693-1999.] ■

You can reduce violent attacks in hospitals

In a new brochure on workplace violence in hospitals, the National Institute for Occupational Health and Safety (NIOSH) outlines steps employers and employees can take to reduce violent events.

NIOSH notes that many violent events result from agitated patients or family members who feel "frustrated, vulnerable, and out of control."

Assaults in hospitals occur at a rate of 8.3 assaults per 10,000 workers, compared to two per 10,000 for nonfatal assaults for all private-sector industries, according to Bureau of Labor Statistics data.

NIOSH offers these tips to prevent violence:

Watch for signals that may be associated with impending violence:

- verbally expressed anger and frustration;
- body language such as threatening gestures;
- signs of drug or alcohol use;
- presence of a weapon.

Maintain behavior that helps diffuse anger:

- Present a calm, caring attitude.
- Don't match the threats.
- Don't give orders.
- Acknowledge the person's feelings (for example, "I know you are frustrated").
- Avoid any behavior that may be interpreted as

Correction: Tubersol contains latex rubber stopper

Due to incorrect information that was provided by the manufacturer, we incorrectly reported in the March issue of *Hospital Employee Health* that the tuberculosis screening reagent Tubersol uses latex-free packaging.

In fact, Tubersol does use a latex stopper. We regret the error. The Food and Drug Administration requires labeling of products containing latex or latex packaging. ■

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aggressive (for example, moving rapidly, getting too close, touching, or speaking loudly).

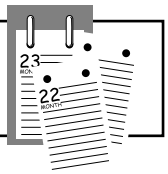
Be alert:

- Evaluate each situation for potential violence when you enter a room or begin to relate to a patient or visitor.
- Be vigilant throughout the encounter.
- Don't isolate yourself with a potentially violent person.
- Always keep an open path for exiting. Don't let the potentially violent person stand between you and the door.

Take these steps if you can't defuse the situation quickly:

- Remove yourself from the situation.
- Call security for help.
- Report any violent incidents to management staff. ■

CALENDAR



• **Association of Professionals in Infection Control — Virginia** — Sept. 18-20, Fairfax, VA. "Focus on the future: Where do we go from here?" Annual educational conference highlighting emerging trends in infection control and new regulatory standards. Contact Dorothy Seibert, Fauquier Hospital, 500 Hospital Drive, Warrenton, VA 20186. Telephone: (540) 341-0826. Fax: (540) 349-5506. E-mail: seibertd@fauquierhospital.org.

• **Association of Occupational Health Professionals in Healthcare** — Oct. 17-19, St. Louis. Meet me in St. Louis: Unlock the Gateway to Success, annual conference highlighting occupational health success stories. For more information, contact AOHP, 500 Commonwealth Drive, Warrendale, PA 15086. Telephone: (800) 362-4347. Fax: (724) 772-8349. Web site: www.aohp.org/aohp/. ■

CE objectives

After reading each issue of *Hospital Employee Health*, the nurse will be able to do the following:

• identify particular clinical, administrative, or regulatory issues related to the care of hospital employees;

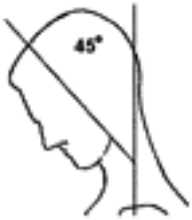
• describe how those issues affect health care workers, hospitals, or the health care industry in general;

• 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. ■

WMSD Hazard Sample Worksheet

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

For each "caution zone job" find any physical risk factors that apply. Reading across the page, determine if all of the conditions are present in the work activities. If they are, a WMSD hazard exists and must be reduced below the hazard level or to the degree technologically and economically feasible (see WAC 296-62-05130(4), specific performance approach).

Awkward Posture				Check (✓) here if this is a WMSD hazard
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	
Shoulders	Working with the hand(s) above the head or the elbow(s) above the shoulder(s)	More than 4 hours total per day		❑
	Repetitively raising the hand(s) above the head or the elbow(s) above the shoulder(s) more than once per minute	More than 4 hours total per day		❑
Neck	Working with the neck bent more than 45º (without support or the ability to vary posture)	More than 4 hours total per day		❑
Back	Working with the back bent forward more than 30º (without support, or the ability to vary posture)	More than 4 hours total per day		❑
	Working with the back bent forward more than 45º (without support or the ability to vary posture)	More than 2 hours total per day		❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

Awkward Posture (continued)				Check (✓) here if this is a WMSD hazard
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	
Knees	Squatting	More than 4 hours total per day		❑
	Kneeling	More than 4 hours total per day		❑ ❑

Source: Washington State Department of Labor and Industries, Olympia.

AMERICAN HEALTH CONSULTANTS®

BIOTERRORISM WATCH

Preparing for and responding to biological, chemical and nuclear disasters

INSIDE

JULY/AUGUST 2002

VOL. 1, NO. 1 (pages 1-8)

CDC weighs vaccinating now or waiting until first smallpox attack

Would you take smallpox vaccine? A pox on both your choices

If smallpox vaccine were made available by the government, would you bare your arm for that tattoo of skin pricks with the little pitchfork needle, hoping that the live cowpox virus entering your bloodstream would do you more good than harm?

That's what it may come down to: individual choice. Because whatever the Centers for Disease Control and Prevention (CDC) recommends about the controversial smallpox vaccine, it certainly will be voluntary (at least for nonmilitary personnel). The CDC recently called together a working group of clinicians and experts in Atlanta to solicit advice and opinion about possibly immunizing people with vaccinia (cowpox) against variola (smallpox), one of the more dreaded potential weapons of bioterrorism. The group will forward its analysis of a set of options — without making a consensus recommendation — to the CDC's Advisory Committee on Immunization Practices. That committee and the CDC will hold a series of meetings in the coming months and decide whether to resurrect voluntary smallpox immunization programs in the United States. **(See options, p. 3.)**

The disfiguring infectious disease that killed millions worldwide for ages was eradicated case by case decades ago in one of the greatest public health achievements of all time. The last smallpox immunization programs in the United States were disbanded in 1972. The last known stores of smallpox virus in the world are officially in Russia and the

Welcome to the new *Bioterrorism Watch!*

Welcome to our expanded, bimonthly publication, *Bioterrorism Watch*, your source for cutting-edge information on bioterrorism and the health care delivery system. In this issue, we feature a special report on smallpox, as public health officials seriously weigh whether to hazard the vaccine risks or hold off until the first attack. ■

United States, but the increasingly broad consensus is that the dreaded pox could be in the hands of rogue nations and/or terrorist groups. It is known that smallpox was developed as a weapon in the sweeping bioweapons program in the former Soviet Union. With a new vaccine under production and dilution studies showing that existing vaccine supplies can be greatly expanded, mass immunizations are a possibility again.

In that regard, some of the consultants at the meeting called for action, urging the CDC to recommend voluntary immunizations for health care workers and the public. Others cautioned about a host of potential side effects and the fact that there are some 300,000 people in the United States who do not know they are HIV-positive. Vaccinating them and other immune-compromised people could lead to one of the worst complications of cowpox: fatal, progressive vaccinia. **(See related story on adverse vaccine reactions, p. 4.)** In addition, a Food and Drug Administration (FDA) official at the meeting warned the CDC that widespread use of the live virus vaccine could imperil the blood supply because those immunized must wait one year before donating blood.

"Currently in the country, there are about 13 million blood donations donated by 9 million blood donors," said **Allan Williams**, PhD, director of the FDA division of blood application. "The current industry standard for a blood donor vaccinated with live virus is a one-year deferral. That's very conservative, but [it is] really unknown what duration of viremia may be associated with vaccinia immunization. If large scale vaccination were considered, a fairly large number of blood donors would be deferred and this could potentially create shortage problems in what is really a very fragile blood supply."

The margin is so thin that cutting the blood supply by 10% could result in serious morbidity and mortality in blood-product recipients, Williams said. Before large-scale immunizations are undertaken, he said it might be necessary to first recruit and vaccinate a large group of repeat, dedicated blood donors.

David Liebershach, one of the CDC advisors and the state director for the Alaska division of emergency services, made it clear he would not be lining up for voluntary immunization for any reason.

"I don't want smallpox vaccination," he told the work group. "I have a 12-year-old child and a 5-year-old child, and I don't want them vaccinated pre-attack. That's speaking from one person from a state where the [likelihood of attack] is probably pretty low. And if it does occur, it is cold and dry up there and your population is about one [person] per square mile density, so the face-to-face contact would be minimized quite a bit."

Again, individual choice is the key. Having been immunized as a child and later in life after joining the Peace Corps, **William Bicknell**, MD, PhD, professor of international health at Boston University, made one of the more compelling arguments for voluntary mass immunization.[1]

"The primary argument is that it should be up to the people to decide, with appropriate guidelines," he told *Bioterrorism Watch*. "Don't immunize [pre-attack] little babies and people with organ transplants and AIDS. But otherwise, let's say, 'Here's what we know about the vaccine; here is what we know about the risk: Make your choice.'"

While risk groups should be screened out, there are also some 157 million people in the United States who were immunized as children, he notes. Whether they have any immunity left is an open question, but they are much less likely than first-time vaccinees to have any adverse reaction to the vaccine, Bicknell argues.

"If you look at the people who already have been vaccinated, the complications are much lower of all types and there are virtually no deaths in that group," he said. "Then if you eliminate [immunizing] people under 5, that cuts about half the deaths and half the complications. Suddenly, you have almost no complications. It's much less dangerous than driving to work in the morning."

The CDC's current draft smallpox plan hinges on "ring" vaccination, which requires rapid mobilization of vaccine to immunize the first reported smallpox cases and their contacts. The ring approach was used to successfully eradicate

(Continued on page 4)

COMING IN FUTURE MONTHS

- Lessons of Chernobyl
- Treating patients exposed to radiation
- CDC smallpox vaccine recommendations
- Bioterrorism field kits
- Diagnosing the exotic agent

CDC mulls smallpox vaccination scenarios

Questions and options on a difficult decision

The smallpox working group at the recent meeting held by the Centers for Disease Control and Prevention (CDC) reviewed a series of issues and questions in a draft document on smallpox vaccination options. Highlights of the document are summarized as follows:

Background

If vaccination were provided pre-event, the rate of adverse events likely would be much lower as vaccination could be deferred for people who have contraindications. People who are immunocompromised because of cancer or its therapy, who have known HIV infection, or who are receiving immunosuppressive therapy can be identified readily and vaccination deferred.

People who are unaware that they are infected with HIV may be identified by questions regarding risk factors and serological testing. A history of eczema may be difficult to obtain because the prevalence is highest among infants and decreases rapidly during the preschool years; however, risk of severe reaction in an adult with a history of eczema only as an infant is likely lower than for other at-risk groups.

Deferring vaccination for household contacts of people at high risk and instructing vaccines regarding care of the vaccination site would decrease the risk of adverse reactions in contacts. Estimates of the rate of severe adverse reactions to smallpox vaccination are subject to substantial uncertainty.

Other, unpublished estimates have ranged from about < 40 to > 200 reactions per million vaccine doses administered. Population denominators for some high-risk conditions (e.g., eczema) are imprecise and the risk of severe reactions among people with the current range of immunocompromising conditions may differ from the risk experienced during the past.

Question 1. With no known cases of smallpox worldwide, should routine smallpox vaccination be re-introduced into the United States? That is, should there be any change in the current recommendation for not vaccinating people in the general population unless a smallpox bioterrorism event has occurred?

Option 1. There should be no changes in the current recommendation.

Option 2. Continue current recommendations for not vaccinating in the general population in the absence of a smallpox bioterrorist attack, but allow permissive or voluntary use of the vaccine for people in the general population who desire to be vaccinated despite the recommendation.

Option 3. There is no positive or negative recommendation. The committee is neutral but recommends that vaccine be available for individual choice.

Option 4. Routine vaccination is recommended, but there is a provision to opt out of taking the vaccine.

Question 2. Are there other occupational groups at the federal, state, or local level who should be vaccinated in a pre-attack setting in order to enhance preparedness?

Option 1. At the present time, there should be no vaccination of additional people at the state or local level. That is, the current recommendations as outlined in the Advisory Committee on Immunization Practices statement on the use of vaccinia vaccine published in June 2001 remain valid.

Option 2. Vaccination would be done from the smallest number of personnel to the largest number of personnel, and thought of as being done in an additive fashion. One needs to consider the likelihood of being exposed to smallpox, the importance of the occupation in dealing with smallpox, and the risk of vaccination to the individual.

Potential groups for immunization:

- pre-designated public health and medical personnel (including emergency department staff) who would be called upon to care for and treat smallpox patients in designated facilities;
- smallpox-response teams at the federal, state, and local levels who would be called upon to investigate smallpox cases, and contain outbreaks;
- selected first responders who would play a critical role in the control of an outbreak of smallpox;
- pre-designated personnel to maintain essential services;
- all health personnel;
- other first responders;
- others.

Option 3. State and local public health authorities are given a fixed amount of vaccine, and they determine who should be vaccinated within their state for preparedness and response enhancement.

(Editor's note: The CDC options assume that there is a clear understanding of the risks; vaccines take appropriate care of their vaccine site; the product is available for use; there is sufficient vaccine immune globulin *available; there is sufficient security; vaccines must be used under investigational new drug procedures until mid-2003; and there is appropriate screening for contraindications.)* ■

Vaccine reactions and the use of immune globulin

Most deaths from encephalitis, progressive vaccinia

According to materials distributed at the smallpox working group meeting recently held by the Centers for Disease Control and Prevention (CDC), reactions to smallpox vaccine range from mild to moderate to severe. **(See charts, pp. 5 and 6.)**

Details about these reactions include:

Historically, people being vaccinated for the first time (primary vaccinees) experienced adverse reactions at higher rates (>/ 10x) than those being revaccinated; rates are higher in infants than in older children or adults.

Inadvertent inoculation at other sites is the most frequent vaccine complication, accounting for nearly half of all complications of primary vaccination and revaccination. Most lesions heal without therapy; vaccine immune globulin (VIG) may be useful for cases of ocular implantation.

Progressive vaccinia, a potentially fatal complication of vaccination, has occurred almost exclusively among immunocompromised people.

Approximately 15% to 25% of vaccinees who develop post-vaccinal encephalitis die, and 25% have permanent neurological sequelae.

Most deaths caused by vaccination are the result of post-vaccinal encephalitis or progressive vaccinia: approximately one death/million primary vaccinations and 0.25 deaths/million revaccinations.

Approximately 5% to 20% of vaccine adverse events occur in the contacts of vaccine recipients. Inadvertent inoculation is the most frequent adverse event occurring in contacts of vaccines (60%). In the 1963 and 1968 national surveys, approximately 20% of VIG recipients were contacts; most frequently with eczema vaccinatum. Eczema vaccinatum can be more severe in contacts than in actual vaccine recipients.

Based on the data from the 1963 and 1968 state and national surveys, it appears that at least 10 times more mild adverse events (including mild eczema vaccinatum, generalized vaccinia, and inadvertent inoculation) occur than events that need VIG.

Generalized vaccinia, vaccinia necrosum, eczema vaccinatum, and some accidental implantation can be treated with VIG. CDC has developed estimates of the frequency of adverse events requiring VIG therapy as a basis for establishing a stockpile.

In addition, vaccination would result in — 0.5 to one death per million persons vaccinated — primarily from post-vaccinal encephalitis, which cannot be treated with VIG. ■

smallpox from the world, but the demographics of the disease are strikingly different today because most people in the world are susceptible. The ring concept was effective when many people already were immune due to vaccination or past infection. "There were growing levels of immunity in the population," Bicknell said.

"They were working in remote areas with small numbers. Ring vaccination is great for that, but not if you have a malicious exposure," he explained.

While there have been various scenarios about how such an attack would occur, some have dismissed the likelihood of self-inoculated terrorists moving about the country to infect the populace. That is because smallpox is not infective in its incubation period and presumably terrorists with onset of fever and pustules would be noticeably ill and incapable of much widespread movement.

However, Bicknell warns that there is a "pre-eruptive period" as the incubation phase wanes when the self-inoculated terrorist could be infective without obviously having smallpox. Even as disease progresses, he adds, "If you are motivated, you can feel pretty terrible and move around." Moreover, a mass smallpox immunization in Yugoslavia in the 1970s began with an atypical index case that had no rash, he reminds.[2]

Indeed, given the possibility of a well-organized release of smallpox over a broad area, the CDC immediately should begin immunizing first responders and medical personnel, advised **Steven Christianson**, DO, MM, medical director of the Visiting Nurse Service of New York City. "If an attack is credible, it will possibly come in multiple areas and multiple sites within those areas," he said. "It will be designed to overwhelm the public heath system and the medical system. Our perspective is that voluntary vaccination of first responders and medical people should be encouraged even while the vaccine is still unlicensed."

However, Christianson recommended against routine mass immunizations of the public due to adverse effects and deaths. One recent study estimated that vaccinating people ages 1 to 65 years would result in 4,600 serious adverse events and 285 deaths.[3]

But if there is an attack and mass public immunization has not been done, will emergency departments (EDs) be overwhelmed? They are practically overwhelmed right now, pointed out **Thomas Terndrup**, MD, who represented the American

College of Emergency Physicians at the meeting.

"If you expect the emergency departments in America to supply [surge] capacity you are seriously mistaken," he said. "Our emergency departments are already operating to capacity. On Sept. 10th, the day before the World Trade Center bombings, there was an article outlining this in *Time* magazine. We continue to see significant increases in patient visits to the emergency departments. The CDC estimates that in 2002, something like 108 million visits will be made to emergency departments."

Though Terndrup left it to the CDC to decide who to immunize, he underscored the chaotic impact a smallpox release would have on emergency workers and departments.

"Think about an outbreak of smallpox and what would happen to emergency services and those emergency responders out there picking people up off the street," he said. "This is the only source of federally mandated care. Any patient for any reason that shows up at a hospital in America that has an operating ED [must be treated] by federal law." There are some 9 million first responders when you add ED clinicians, paramedics, police, and firefighters, he said.

"Should first responders be immunized?" Terndrup said. "I don't have any answers."

Whatever policy is adopted, the CDC better have answers for the AIDS community, cautioned **John Bartlett**, MD, HIV expert, and clinician at Johns Hopkins University School of Medicine in Baltimore. "The AIDS community is a very cohesive group," he said. "It's loud and well-organized. Whatever is decided, [you] need to work with that group and get buy-in. If the decision here is that we ought to give people the vaccine, and there is not buy-in from the AIDS care community, it is not going to happen."

There are about 900,000 people living with HIV infection in the United States, and about one-third of them do not know they are infected, he said. HIV patients are contraindicated for live vaccines, and that should probably remain the rule for smallpox as well, he said. Bartlett cited a case in the literature of an HIV-positive patient who died of progressive

Rates of Reported Complications Associated with Vaccinia Vaccination (Cases/Million Vaccinations)*

Age (yrs) and status	Inadvertent Inoculation	Generalized Vaccinia	Eczema Vaccinatum	Progressive Vaccinia	Post-vaccinal Encephalitis	Total†
Primary						
<1	507.0	394.4	14.1	_§	42.3	**1549.3**
1-4	577.3	233.4	44.2	3.2	9.5	**1261.8**
5-19	371.2	139.7	34.9	_	8.7	**855.9**
>/20	606.1	212.1	30.3	_	_	**1515.2**
Overall Rates	**529.2**	**241.5**	**38.5**	**1.5**	**12.3**	**1253.8**
Revaccination						
<1	_	_	_	_	_	_
1-4	109.1	_	_	_	_	**200.0**
5-19	47.7	9.9	2.0	_	_	**85.5**
>/20	25.0	9.1	4.5	6.8	4.5	**113.6**
Overall Rates	**42.1**	**9.0**	**3.0**	**3.0**	**2.0**	**108.2**

* Adapted from Lane JM, Ruben FL, Neff JM, Millar JD. Complications of smallpox vaccination, 1968: Results of 10 statewide surveys. *J Infect Dis* 1970; 122:303-9.

† Rates of overall complications by age group include complications not provided in this table, including severe local reactions, bacterial superinfection of the vaccination site, and erythema multiforme.

§ No instances of this complication were identifed during the 1968 10-state survey.

Source: Centers for Disease Control and Prevention, Smallpox Work Group, Atlanta.

vaccinia after being immunized for smallpox.[4] But trying to screen out people who are HIV-infected as part of a smallpox immunization program could open up a legal quagmire of testing and confidentiality issues.

Complicating the issue further is the possibility that the HIV-infected person may be a health care worker or one of the other groups recommended for immunization. While the vaccine poses a possible danger to the HIV-infected, how would they fare in a smallpox attack?

"What might happen if somebody with HIV gets smallpox?" Bartlett said. "I don't think any of us know. It might be universally lethal." Co-infection with tuberculosis for example, speeds the progression of HIV, he said. In a worst-case scenario, where vaccinating the HIV infected was considered necessary, there would still be a question of whether they could mount an immune response, he added.

"A number of vaccines have been tested on individuals with HIV infection, and they show that the cleave point for response and non-response . . . risk and no risk is a CD4 count in adults of about 200," Bartlett said. "Below 200, there will probably not be an immune response."

Comparable populations exist of other immune compromised groups, including organ transplants and those under chemotherapy treatment for cancer, meaning vaccinia immune globulin must be available in sufficient quantities.

If the choice is to immunize, a massive education effort will be necessary to influence physician attitudes and explain the reasoning of the program, said **Glen Nowak**, PhD, CDC, associate direction for health communications in the CDC national immunization program.

A series of public focus groups and interviews with physicians revealed current attitudes on the smallpox situation, he said.

"We found that many — again the younger ones more than the older physicians — thought that ring vaccination was a counter-intuitive strategy," Nowak said. "[Their thinking was] if we do vaccinate we should try to vaccinate as many people as

VIG Doses Needed by Population Vaccinated Post-Event at a Rate of 80 per Million

Population vaccinated	VIG doses need for vaccinees	VIG doses needed for contacts	Total VIG doses needed
3,000	0	0	0
30,000	2	0	2
300,000	19	5	24
3,000,000	192	48	240
30,000,000	1,920	480	2,400
300,000,000	19,200	4,800	24,000

Source: Centers for Disease Control and Prevention, Smallpox Work Group, Atlanta.

CE/CME questions

Please save your bimonthly issues with the CE questions in order to take the two semester tests in the May/June and November/December issues. A Scantron sheet will be inserted in those issues, but the questions will not be repeated.

1. Some medical consultants and advisors cautioned about a host of potential side effects from smallpox vaccine, which could be particularly hazardous to the 300,000 people in the United States who do not know they have:
   A. hepatitis C virus
   B. tuberculosis
   C. HIV
   D. variola

2. William Bicknell, MD, PhD, argued that which group of people are much less likely than first-time smallpox vaccinees to have any adverse reaction:
   A. dairy workers
   B. those who have been previously vaccinated for smallpox
   C. those already immunized with other live vaccines
   D. all of the above

3. Progressive vaccinia, a potentially fatal complication of smallpox vaccination, has occurred almost exclusively among:
   A. immunocompromised people
   B. women
   C. those infected in sub-Sahara Africa during the 1960s
   D. those vaccinated under poor sanitary conditions

4. The American Hospital Association stated that the Centers for Disease Control and Prevention's smallpox response plan could substantially increase confusion or promote misinformation at a time when implementation of standard procedures would be critical.
   A. true
   B. false

possible rather than as few people."

It was also evident that the anthrax experience has engendered skepticism regarding containment strategies. "Many of these physicians said that during the anthrax experience recommendations were changing on a frequent basis," Nowak said. "What was true on Monday may not have been true on Wednesday. So they wanted to know how could we know that the current medical and public health assumptions regarding ring vaccination are valid today?"

Likewise, the ring vaccination approach is not something you want to explain one on one to patients besieging an ED in the wake of a smallpox attack.

"There was still was some confusion [among the public] about what ring vaccination was," he said. "It is a difficult concept to explain to the public. They tend to view vaccination in terms of broad or mass vaccination. The public also raised some questions about whether such a policy — because it was selective in nature — would limit access among minority groups or groups with [low socioeconomic status] if there was an outbreak. They saw ring vaccination as a selective vaccination strategy."

In additional findings of the project, physicians expressed concern about their personal liability if they were asked to give the smallpox vaccine. They also felt they did not know enough to discuss the risk and benefits of vaccination with their patients, he added. If there is a recommendation to immunize physicians, they are going to want a lot more information on the rationale behind such a move, he said.

"From the physicians and the public, basically, the message was if there was an outbreak, they would prefer broad, rapid access to smallpox vaccine," Nowak said. "Most of [the physicians] wanted to know why should they be vaccinated [pre-attack]? You couldn't just put them in a group and say get vaccinated. They wanted to know why."

Indeed, risk — some specific probabilities that smallpox will be used as a weapon — was the great unknown that held sway over every scenario at the meetings. Some are sufficiently convinced that the risk is real if only because the CDC has already immunized some of its own staff and is now considering reintroducing a potentially dangerous vaccine for a disease that has been vanquished in the wild.

"One of my colleagues thinks I am a complete nut case on this," Bicknell told *Bioterrorism Watch.* "He says, 'It will never happen.' His assessment of the risk of attack is different than mine. His is infinitesimal; mine is low, but real. Therein lies the difference."

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AHA strongly questions CDC smallpox plan

Agency inconsistent with other standards

The Centers for Disease Control and Prevention's (CDC) smallpox response plan is not consistent with its existing standards and those set by other authoritative groups, the American Hospital Association (AHA) warns.

"Some of the recommendations could substantially increase confusion or promote misinformation at a time when implementation of standard procedures would be critical," the AHA stated in comments to the CDC.

The CDC released the *Interim Smallpox Response Plan and Guidelines* as a working document subject to comment and revision.

Dated March 8, 2002, the comments sent to the CDC by the AHA and the other aforementioned hospital groups included the following points:

The current version of the plan's recommendations appears to draw heavily from experiences from outbreaks in Europe in the early 1970s. However, review of primary references that described these outbreaks reveals physical facility and ventilation designs that differ dramatically from contemporary U.S. health care facilities. Descriptions of the smallpox outbreak investigations, particularly the numerous reports concerning the outbreak at the Meschede hospital in Germany, reveal that the air supply was shared and ventilation was accomplished by opening windows and doors.

By contrast, U.S. hospitals today require the use of more effective procedures, such as airborne infection isolation rooms (AIIRs) that supply negative air pressure at 6-12 air changes/hour. According to current standards, exhaust from AIIRs is either direct to the outside or, if recirculated, passed initially through HEPA (high efficiency particulate air) filters. This design is deemed effective for tuberculosis and chickenpox, and therefore, also likely effective for the less hardy smallpox virus.

The [CDC] recommendations call for the use of buildings *other than* hospitals for "contagious patients, such as nursing homes and hotels." Yet hospitals are the only buildings *likely* to have negative pressure rooms with 100% exhausted air (or recirculated air through HEPA filters). Further, the complexity of equipment needed to care for critically ill persons is also unlikely to be readily available in a facility that does not provide health care.

The plan should not limit recommendations regarding medical waste treatment to incineration and/or autoclaving. Instead, CDC should consider other methods of waste disposal that reflects newer technologies and alternatives to managing medical waste in a manner that is consistent with local, state and federal regulations.

We do not believe fogging the facility with formaldehyde as a means of "disinfecting the facility," as described in the draft plan, is warranted based on the known mode of transmission and evidence demonstrating susceptibility of related orthopox viruses to a broad range of chemical disinfectants applied to surfaces. ■

CE objectives

After reading each issue of *Bioterrorism Watch*, the infection control professional will be able to do the following:

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