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JCAHO halts enforcement of recent needle alert

Alerts to be reviewed, limiting impact on scores

Surveyors from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) will not score hospitals on their compliance with *Sentinel Event Alerts*, including a recent alert on needle safety.

The temporary moratorium will give the Joint Commission time to review all *Sentinel Event Alerts* and determine which ones should impact scoring, says **Richard J. Croteau**, MD, executive director for strategic initiatives at the Oakbrook Terrace, IL-based accrediting agency.

Surveyors still will ask about needle safety in the context of JCAHO standards, Croteau says. "The current expectation on our part is that organizations will be in compliance going forward with those recommendations that were published in that alert, but we're not going to be scoring. We won't be enforcing [compliance]," he says.

"If surveyors determine that the organization has not paid attention to recommendations in the *Sentinel Event Alert*, they will then look at the standards that are relevant to that topic and then evaluate if the organization is in compliance with the standard," Croteau says.

How this action will affect the surveyors' focus on needle safety is unclear. Noting that the Joint Commission requires compliance with "applicable laws and regulations," the *Sentinel Event Alert* published in September informed hospitals that surveyors would assess organizational compliance with the Needlestick Prevention and Safety Act. **(See *Hospital Employee Health*, March 2001, p. 27.)** The moratorium was to be published in the

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Also in this issue

COMING IN FUTURE ISSUES

- Chao to announce new approach for ergonomics
- Would your needle safety program pass an OSHA inspection?
- NIOSH focuses on stress and the HCW
- Why some states are banning latex gloves for food handlers
- Solving the mystery of Aplisol reactions

January issue of *Joint Commission Perspectives.*

The federal law directed the Occupational Safety and Health Administration (OSHA) to revise its bloodborne pathogen standard to require employers to use needle safety devices. They also must involve frontline employees in the selection of devices and maintain a needlestick log. **(For more information on the law and standard, see *HEH,* December 2001, p. 138.)**

As the alert noted, several other standards could be interpreted to require compliance with needle safety, including governance, management, environment of care and prevention, and control of infection.

Hospitals worried about compliance burden

However, the Joint Commission surveyors are not surrogate OSHA inspectors, Croteau stressed. "We're surveying for compliance with our standards. That's it."

Advocates for worker safety had welcomed the agency's September *Sentinel Event Alert* on needlestick prevention and expected the action to have broad impact. After all, few hospitals ever see an OSHA inspector, while surveyors visit accredited facilities every three years.

They expressed shock and disappointment at the Joint Commission action.

"We were very hopeful with the publication of the *Sentinel Event Alert*," says **Susan Wilburn**, RN, MPH, senior specialist for occupational safety and health for the American Nurses Association (ANA) in Washington, DC. The Joint Commission has a much greater influence on hospitals than OSHA, she says.

The ANA had hoped to work with the Joint Commission on other alerts that would address worker safety, Wilburn says. "We want more [protection], not less."

"It is a vivid illustration of the conflict inherent when we cede oversight authority for the quality and safety of the health care environment to a private industry funded and controlled group to perform what is essentially a government and public health function," says **Bill Borwegen**, MPH, occupational health and safety director of the Service Employees International Union in Washington, DC.

The alerts presented new compliance issues for hospitals. "There were some concerns raised about the number of *Sentinel Event Alerts* that had been published and are continuing to be published, roughly once a month — the amount we

were asking organizations to respond to and the burden that might represent on resources," says Croteau. "There also were questions raised about the evidence base or expert consensus that was backing up the alerts."

The Joint Commission will convene an expert panel to review all *Sentinel Event Alerts*. "We will select a finite number of specific evidence-based, cost-effective recommendations that we feel organizations should respond to. We'll go ahead and survey [on] those," he says.

While there isn't a timeline that indicates when surveyors will begin assessing compliance with the alerts, Croteau says he expects the activities to resume in 2002.

Meanwhile, he stresses that the Joint Commission never intended for *Sentinel Event Alerts* to be new standards or regulations. "Our whole accreditation process is as much consultation as it is compliance. It's an improvement process, not a regulatory process."

Even when surveyors include the alerts in their assessments and scoring, they will not expect rigid compliance, Croteau says.

"We want [organizations] to be aware of what's in the alert and consider it, and either follow the recommendations that are there or some other reasonable alternative. They can decide to do something different, as long as it's reasonable," he says.

"We feel it's important not to be too directive with organizations as to how to do things because that would in effect stifle innovation. We want them to figure out better ways to do things," he explains. ■

Should you vaccinate HCWs against smallpox?

CDC expert: You'll have 3-4 days after exposure

Imagine a patient who comes to the emergency department (ED) with a rash, pustules, high fever, and delirium. Lab tests show this isn't a bad case of chickenpox; it's smallpox. Everyone who came into close contact with the patient — including ED staff — now is at risk for contracting the disease.

That potential scenario has led some to advocate widespread vaccination of health care workers. But those workers could be protected with vaccination within three or four days of exposure, says **Bill Jarvis**, MD, associate director for program development at the Atlanta-based Centers for Disease Control and Prevention's (CDC) Division of Healthcare Quality Promotion.

"You have time to be vaccinated and respond before you get smallpox," he says, adding that smallpox isn't as contagious as chickenpox.

The Interim Smallpox Response Plan and Guideline (www.cdc.gov/nip/diseases/smallpox) calls for a contact-based approach to vaccination after a smallpox case has been confirmed. According to the guidelines, which are still in draft form, priority for vaccination would include "[people] involved in the direct medical care, public health evaluation, or transportation of confirmed or suspected smallpox patients," and "other [people] who have a high likelihood of exposure to infectious materials [such as personnel responsible for hospital waste disposal and disinfection]."

Hospitals should focus their resources on other aspects of preparedness, such as building disaster response teams and determining who would be activated to respond to a bioterrorism event, Jarvis says. **(See related article, p. 7.)** "They should not focus as much on vaccination as on preparedness," he says.

Can we stockpile enough doses?

CDC is developing a federal action plan for smallpox, which includes the stockpiling of some 300 million doses of vaccine — enough to cover the entire population.

Some people may need to be vaccinated preemptively, such as a special SWAT team at CDC that would respond to first reports of suspected smallpox, Jarvis says. Hospitals should identify the staff most likely to come into contact with smallpox, such as infectious disease specialists and ED staff. They would be the first to receive a vaccine, if it is recommended, he says.

"You don't want to vaccinate a bunch of people who, should an emergency occur, wouldn't have any contact," he says.

Public health experts are concerned about the potential severe side effects related to the vaccine — including rare but possibly fatal encephalitis.

"The main reason why smallpox vaccine was stopped was that the risk-benefit equation had tipped," says Jarvis. "There were more adverse events than there were smallpox cases."

Those who received the smallpox vaccine

before widespread vaccination was halted in 1972 are not protected against contracting the disease, but their risk of mortality is lower, Jarvis says.

"If you've been vaccinated in the past, you probably do have some residual immunity," he says.

The response to the anthrax, recent outbreaks, and after the World Trade Center attack should reassure hospital workers that adequate supplies can be provided quickly, Jarvis says.

"We're there within eight to 12 hours of the event," he says.

Meanwhile, hospitals should urge health care workers to receive the influenza and varicella (chickenpox) vaccines. "In the current state of concern about bioterrorism agents, varicella is going to be a nightmare to deal with," Jarvis says. Some cases of chickenpox may be confused with smallpox, he says. ■

JCAHO surveyors focus on preparedness

New wording calls for coordination of planning

Amid this new reality of bioterrorism, the Joint Commission on Accreditation of Healthcare Organizations announced it will be taking a closer look at compliance with a year-old emergency management standard.

The Oakbrook Terrace, IL-based organization also added a section to the standard requiring hospitals to coordinate their emergency management with other health care facilities and community organizations.

Joining the survey in 2003

Compliance with that portion will be a part of survey scoring beginning in January 2003. The rest of the standard, EC 1.4, became effective on Jan. 1, 2001. **(For more on the emergency management standard, see *Hospital Employee Health*, November 2001, p. 121.)**

While the Joint Commission standard requires a review of emergency management plans once a year, hospitals should be rethinking their plans in light of the Sept. 11 attack and the anthrax attacks.

"If an organization didn't begin to re-examine its plan immediately, [it] may find [itself] being caught short," says **Robert Wise**, MD, vice president of the division of research standards for the Joint Commission.

Wise termed the new provisions for coordination "a big step forward in making it clear that an attack of the magnitude that's being threatened [by terrorists involves] not every organization preparing individually, but really moving toward a community coordinated response."

In its December *Perspectives*, which is available online (www.jcaho.org), the Joint Commission said surveyors will look for evidence that hospitals have assessed their risks and established contingency plans. **(See insert in this issue.)**

A more likely threat

Certainly, all hospitals now should include bioterrorism in their hazard vulnerability analysis as a potential emergency scenario. Wise points out that, as seen in the anthrax mail contamination, bioterrorism would not be limited to major cities.

"Now the possibility of a terrorist attack, including a biological attack, has to be seriously considered," Wise says. "What's changed is that the threat has now moved from a 'possible' to a 'much more likely'."

The Joint Commission will expect hospitals to have established contact with local emergency management and public health agencies, fire and police departments, among others.

"One of the things we're asking is that the organizations . . . have their plan coordinated with the response of the community," he says. "If you're the only organization that's planning for a chemical attack, it's no response. You have to figure out how you're going to coordinate your response with other responders in the environment."

The Joint Commission reviewed the response of New York City hospitals in the aftermath of the World Trade Center attack. "They did an incredible job," he says.

One step they took as a part of their emergency management: The hospitals moved patients to long-term care facilities to make room for victims. That highlights the need for hospitals to work with other health care facilities in the community as a part of a coordinated response.

"This attack is certainly a wake-up call to new kinds of emergencies communities may face," says Wise. "A properly put together emergency management plan will assist them in all types of events." ■

OSHA provides 'anthrax matrix' to guide employers

Most workplaces are in the safe 'green zone'

The Occupational Safety and Health Administration (OSHA) issued an "anthrax matrix" to guide employers in how to respond to the risk of anthrax exposure.

Finding your zone

OSHA says that employers should determine whether their workplace falls in the green zone, where anthrax contamination is unlikely; the yellow zone, where such contamination is possible; or the red zone, where authorities have indicated anthrax spore contamination has been found or is strongly suspected.

"Based on information currently available, contamination with anthrax spores and exposure to the bacterium are unlikely in the vast majority of American workplaces, represented by the green zone," OSHA says.

Green-zone employers should establish procedures for the safe handling of mail and packages. "Employers may wish to consider providing nitrile or vinyl gloves to employees who request them," OSHA says.

In the yellow zone, OSHA advises employers to take additional measures such as training workers on anthrax and its symptoms, and limiting the number of people who might be exposed to airborne particles near mail-sorting machinery. Personal protective equipment (PPE), including gloves and respirators, are voluntary.

In the red zone, employers must comply with OSHA's Hazardous Waste Operations and Emergency Response Standard, including providing PPE.

"[T]he level of protection chosen, and the PPE used should be proportional to the risk anticipated for the task workers will do," the matrix states.

(Editor's note: For more information on the anthrax matrix, see the OSHA web site: www.osha.gov/bioterrorism/anthrax/matrix/index.html.) ■

OSHA delays enforcement of record-keeping rule

Employers have 120 days before citations begin

Enforcement of the new record-keeping rule has been delayed for 120 days as part of a settlement between the Occupational Safety and Health Administration (OSHA) and the National Association of Manufacturers.

OSHA will offer compliance assistance and will not issue citations during that period, "provided employers strive to meet their record-keeping obligations and agree to make corrections necessary to bring their records into compliance," the agency announced.

The settlement also emphasizes that employers have the authority to determine whether an injury is work-related. A compliance directive that details how the regulation will be interpreted by inspectors is due shortly.

"The relationship between the workplace and the injury must be discernible in order for an employer to record it," says **Baruch Fellner**, a Washington, DC lawyer who represents the manufacturers' association.

"Clearly that is an appropriate interpretation of the regulation, which could have been read to require employers to record anything and everything unless the injury was related exclusively to nonwork-related [causes]," she says.

The National Association of Manufacturers filed suit against OSHA in March, targeting several provisions of the record-keeping standard. In settling the suit, OSHA agreed to clarify several issues:

- **Work-relatedness.**

OSHA advises that "a case is work-related if, and only if, a work event or exposure is a discernible cause of the injury or illness, or of a significant aggravation to a pre-existing condition and none of the rule's exceptions to work-relatedness applies."

The employer decides whether work-related events or exposures caused or contributed to an injury or illness or whether they aggravated a pre-existing condition. If a citation is issued, the burden of proof would be on OSHA to prove that the injury or illness was work-related and should have been recorded.

- **Restricted work.**

"The rule continues OSHA's existing policy that an employer need not record, as a restricted work case, a case in which the following three

conditions are present: An employee experiences minor musculoskeletal discomfort. A health care professional determines that the employee is fully able to perform his or her job functions. The employer assigns a work restriction to that employee to prevent a more serious condition from developing," the agency says.

• **Reporting.**

When an employee reports an injury or illness, it is not necessarily recordable on the OSHA log. "The employer must first decide whether an injury or illness has occurred. If the employer is uncertain, he or she may refer the employee to a physician or other health care professional for evaluation," OSHA says.

• **Oxygen administration.**

"An employer must record a case in which oxygen is administered to an employee who has been exposed to a substance and exhibits symptoms of an injury or illness. However, if oxygen is administered purely as a precautionary measure where no symptoms have been exhibited, the case is not recordable," according to OSHA. ■

FDA to consider banning conventional needles

Labeling, restrictions are other options

The Food and Drug Administration (FDA) will consider restrictions on conventional needle devices, including the possibility of removing some devices from the market.

While an outright ban is unlikely — it has happened only once before in FDA history — the agency will consider design criteria, new labeling, and other actions that could impact the marketing of sharps devices.

The Service Employees International Union (SEIU) and Public Citizen, a consumer advocacy group, petitioned the FDA last year to ban blood collection devices without safety features, glass capillary tubes, and IV infusion equipment that doesn't use needleless technology.

While the agency rejected the petition, **Linda S. Kahan**, deputy director, said the FDA would publish an advance notice of proposed rulemaking to gather information on possible actions, including a ban.

The FDA announcement is a tentative but favorable step for the SEIU and Public Citizen, which contend that FDA action should follow naturally from a federal law that mandates the use of needle safety devices.

The Needlestick Safety and Prevention Act, which became law in 2000, mandated that the Occupational Safety and Health Administration (OSHA) rewrite its rules and require employers to use safety-engineered devices.

"Basically, the FDA is giving employers tacit approval to violate the OSHA standard" by allowing conventional devices to remain on the market, says **Bill Borwegen**, MPH, SEIU's occupational health and safety director. "It's a great example of government noncooperation."

The FDA asserts that it has worked closely with OSHA. In fact, the OSHA standard still allows the use of conventional devices if medical professionals determine that, for a particular procedure and patient care needs, a safety engineered device would not be acceptable.

"There's flexibility in the interpretation of the law," says **Timothy Ulatowski**, ME, director of the division of dental, infection control, and general hospital devices in the office of device evaluation at FDA's Center for Devices and Radiologic Health.

"The law speaks of using available devices," he says. "The uses are evaluated at the specific site and under the specific conditions of use."

Previous petitions rejected outright

"If Congress, in its wisdom, wanted FDA to take action also with regard to [needle devices], they had the opportunity to do so. But they did not," he adds.

Still, the FDA now is at least willing to listen to arguments about restrictions on conventional devices. In the past, similar petitions have been rejected outright by the agency. In her letter, Kahan noted, "the FDA may undertake some of the actions you requested in your petition or [take] other appropriate actions."

The agency will host a public meeting to gather input from employers, employees, and other concerned parties. The FDA will review and possibly revise its needlestick safety alert and guidance document.

However, it's unclear whether the FDA actually could ban conventional needle devices, Ulatowski says. The Federal Food, Drug, and Cosmetic Act states that a device can be banned if it presents "an unreasonable and substantial risk of illness and

injury." But the law also allows manufacturers to market devices that are "substantially equivalent" to those already available.

"If you're substantially equivalent to a product that's legally on the market then you can market your product," he says. "We're talking about products that have been out there for many, many years."

The FDA seems inclined to leave the enforcement of safer needles in the workplace to OSHA.

"FDA believes that the OSHA rule, when fully implemented, could reduce needlestick injuries significantly," Kahan said in her letter.

"It may be premature to take additional federal regulatory measures to control the use of these kinds of devices without first evaluating the effect of the amended OSHA rule on injury rates." ■

Precautions help hospitals brace for bioterrorism

Hospitals have the tools to protect HCWs

If more horrific scourges such as smallpox or plague emerge in another attack of bioterrorism, hospitals have the ultimate tools to prevent transmission — if health care workers use them. More vigilant use of infection control (IC) precautions will be a legacy of the anthrax attack, employee health experts predict.

"The improvements in infection control for the last 20 to 30 years have prepared us well for smallpox," says **Bill Jarvis**, MD, associate director for program development at the Centers for Disease Control and Prevention's (CDC) Division of Healthcare Quality Promotion.

As hospitals mobilized in the wake of the anthrax attack, they stressed the basics, such as hand washing and gloving, and reassessed their tuberculosis controls, which would be needed to cope with more contagious bioterrorism diseases**.** **(See box on TB controls, p. 9.)**

"I don't think things are ever going to go back to the way they were," says **Robyn Gershon**, MHS, DrPH, associate professor at the Mailman School of Public Health at Columbia University in New York City. She notes that clinicians now will consider a host of rare diseases when assessing patients.

The shift in thinking could be as fundamental as the decade-old emphasis on preventing blood-borne pathogen exposures, she explains.

"Awareness just increases our concept of safety," says Gershon, who is assisting in the bioterrorism training of thousands of physicians in New York City.

"When we knew about HIV and how it was transmitted, it was a great motivator. As we gain knowledge [about bioterrorism agents], it can only help to make us more aware, more careful, more alert," she says.

Hospital responds to anthrax traces

That awareness is not just hypothetical for Memorial Sloan Kettering Cancer Center in New York City. The hospital's human resources staff and other administrative employees worked in an office building shared with Gov. George Pataki, where authorities announced possible traces of anthrax were found. (The finding never was confirmed.)

The mysterious death of a hospital worker at Manhattan Eye, and Ear and Throat Hospital from inhalation anthrax heightened the employees' fears.

Memorial Sloan Kettering opened an on-site clinic to evaluate any concerned employees who developed cold or flu symptoms. Meanwhile, infection control manager **Janet Eagan**, RN, MPH, CIC, and her staff began a program of education. Within days, they had spoken to 1,500 of the hospital's 7,000 employees. Infectious disease physicians met individually with employees who handle mail and those who worked at the Pataki site.

"We've tried use a proactive approach in educating workers about good hand washing, good skin care, the value of short, clean nails. [I tell them], 'To get any infection, you have to have a break in the skin. Keep your hands soft and supple,'" she says. "These are very general infection control principals they can use to protect themselves."

Get aggressive with IC precautions

At Kishwaukee Community Hospital in Dekalb, IL, **Christina Jones**, RNC, CEN, MSHSA, director of emergency services, wanted to become knowledgeable about bioterrorism agents.

Last year, she planned to attend a seminar on "Weapons of Mass Destruction" in December of 2000, only to find it canceled due to lack of interest.

The seminar was rescheduled for September 12,

TB programs also help to protect against smallpox

The threat of bioterrorism placed a new emphasis on tuberculosis control just as the nation threatened to slip once again into complacency over declining cases of TB.

While there is no direct correlation between TB and bioterrorism, many of the protective mechanisms used to isolate patients and protect other patients and health care workers would apply to contagious bioterrorism agents.

"TB has really prepared us well to deal with smallpox and plague," says **Bill Jarvis**, MD, associate director for program development at the Centers for Disease Control and Prevention's Division of Healthcare Quality Promotion. "The issues you would have [with TB] would be exactly the same as what you'd have for smallpox."

In the recent anthrax outbreak, employee health professionals began fit-testing hospital mail handlers with N95 respirators — an unanticipated use of TB controls.

"Those people who have a good TB program are much more ready to adapt to a program to handle other biologic agents," says **Larry Lindesmith**, MD, FACOEM, FCCP, medical director of employee health and safety and an occupational and pulmonary physician at Gundersen Lutheran Medical Center in La Crosse, WI.

For example, the use of N95 respirators requires not just fit-testing, but education and training as well. Employees with beards may not be able to obtain a tight fit and may need another type of respirator.

The TB protections must be adapted to fit the bioterrorism model. He notes that N95s were designed for short-term use during episodes of patient care, not for an eight-hour shift of mail handlers.

"They are intended to be used for [30 minutes] at a time," Lindesmith says. "The ideal suggestion would be [for employees to] wear them for half an hour and take a five-minute break." In drafting his hospital's bioterrorism plan, he evaluated the configuration of the TB isolation rooms. "Out of our isolation rooms listed in our TB plan, certain ones are acceptable for these other things that may occur." For example, in dealing with an organism that can be spread through airborne contact, such as smallpox, the ideal isolation room would have an anteroom that caregivers would enter before entering the patient's room, Lindesmith says.

In treating victims of bioterrorism, air released to the outside should receive HEPA filtration, he says. "With TB, there's no absolute requirement that the exhausted air to the outside be filtered."

Surveillance is critical to TB control, as it is in bioterrorism preparedness. In his book *Timebomb* (New York City: McGraw Hill; 2001), **Lee B. Reichman**, MD, MPH, executive director of the National Tuberculosis Center at the University of Medicine and Dentistry of New Jersey in Newark, relates a frightening tale of how multidrug-resistant tuberculosis is spreading globally.

Spawned by inadequate treatment in Russian prisons, the drug-resistant TB could become a deadly, international epidemic, he says. "One of the things that all this hysteria [about bioterrorism] is bringing to us is an increase in interest in funding of public health. You need to have public health considered a defense program rather than a social program." ■

2001. Jones, director of emergency services, and Cindy Graves, the EMS system coordinator for KCH, attended the day-long course and became certified as Weapons of Mass Destruction trainers.

Their strongest message to ED staff: Be vigilant in use of standard precautions. "[The course instructors] stressed the use of our personal protective equipment [PPE] processes," she says. "We've got to be more aggressive about using PPE when it's appropriate and hand-washing technique."

Studies have shown that physicians and health care workers follow appropriate hand-washing procedures in only 25% to 75% of all patient encounters.[1] (See article on hand hygiene guidelines on p.x.)-

At Kishwaukee, a regular program of observation and feedback raised hand-washing rates to about 80%, says **Shelly Johnson**, RN, employee health nurse. Information shared by Jones in bioterrorism education sessions may raise that even higher.

She gives this example from her Weapons of Mass Destruction course: An outbreak of ebola in Zaire in 1995 sickened 296 people, with a death rate of 92%. Some 32% of the victims were health care workers.

After implementing standard precautions, the number of cases occurring among the staff dropped to zero, Jones relates from her course materials.

"Many of the bioterrorism agents they're using

(Continued on page 10)

Bioterrorism and Infection Control: How to protect HCWs

Most bioterrorism agents, such as anthrax, are not transmitted from person to person and simply require the use of standard precautions when caring for victims, the Centers for Disease Control and Prevention (CDC) in Atlanta advises. However, some possible agents (notably smallpox and the plague) require a higher level of protection. Here are the recommendations, as published in the *Bioterrorism Readiness Plan: A Template for Healthcare Facilities* (www.cdc.gov/ncidod/hip/Bio/bio.htm), which was prepared by CDC and the Association of Professionals in Infection Control and Epidemiology in Washington, DC.

All patients in health care facilities, including symptomatic patients with suspected or confirmed bioterrorism-related illnesses, should be managed using standard precautions. Standard precautions are designed to reduce transmission from both recognized and unrecognized sources of infection in health care facilities, and are recommended for all patients receiving care, regardless of their diagnosis or presumed infection status.

Standard precautions prevent direct contact with all body fluids (including blood), secretions, excretions, nonintact skin (including rashes), and mucous membranes. Standard precautions routinely practiced by health care providers include:

- ✔**Hand washing.** Hands are washed after touching blood, body fluids, excretions, secretions, or items contaminated with such body fluids, even when gloves are worn. Hands are washed immediately after gloves are removed, between patient contacts, and as appropriate to avoid transfer of microorganisms to other patients and the environment. Either plain or antimicrobial soaps may be used according to facility policy.
- ✔**Gloves.** Clean, nonsterile gloves are worn when touching blood, body fluids, excretions, secretions, or items contaminated with such body fluids. Clean gloves are put on just before touching mucous membranes and nonintact skin. Gloves are changed between tasks and between procedures on the same patient if contact occurs with contaminated material. Hands are washed promptly after removing gloves and before leaving a patient care area.
- ✔**Masks/eye protection or face shields.** A mask and eye protection (or face shield) are worn to protect mucous membranes of the eyes, nose, and mouth while performing procedures and patient care activities that may cause splashes of blood, body fluids, excretions, or secretions.
- ✔**Gowns.** A gown is worn to protect skin and prevent soiling of clothing during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, excretions, or secretions. Selection of gowns and gown materials should be suitable for the activity and amount of body fluid likely to be encountered. Soiled gowns are removed promptly and hands are washed to avoid transfer of microorganisms to other patients and environments.

For pneumonic plague, droplet precautions should be used in addition to standard precautions.

- ✔Droplet precautions are used for patients known or suspected to be infected with microorganisms transmitted by large particle droplets, generally larger than 5 µ in size, that can be generated by the infected patient during coughing, sneezing, talking, or during respiratory-care procedures.
- ✔Droplet precautions require health care providers and others to wear a surgical-type mask when within 3 feet of the infected patient. Based on local policy, some health care facilities require a mask be worn to enter the room of a patient on droplet precautions.
- ✔Droplet precautions should be maintained until patient has completed 72 hours of antimicrobial therapy.

For patients with suspected or confirmed smallpox, both airborne and contact precautions should be used in addition to standard precautions.

- ✔Airborne precautions are used for patients known or suspected to be infected with microorganisms transmitted by airborne droplet nuclei (small particle residue, 5 µ or smaller in size) of evaporated droplets containing microorganisms that can remain suspended in air and can be widely dispersed by air currents.
- ✔Airborne precautions require health care providers and others to wear respiratory protection when entering the patient room. (Appropriate respiratory protection is based on facility selection policy; must meet the minimal NIOSH standard for particulate respirators, N95).
- ✔Contact precautions are used for patients known or suspected to be infected or colonized with epidemiologically important organisms that can be transmitted by direct contact with the patient or indirect contact with potentially contaminated surfaces in the patient's care area.
- ✔Contact precautions require health care providers and others to:
  - — Wear clean gloves upon entry into patient room.
  - — Wear gown for all patient contact and for all contact with the patient's environment. Based on local policy, some health care facilities require a gown be worn to enter the room of a patient on contact precautions. Gown must be removed before leaving the patient's room.
  - — Wash hands using an antimicrobial agent.

now are things that are not easily identified," she says. "Many of the presenting symptoms look like flu. If you don't take [standard] precautions early on, you can be exposed to something that turns out to be very bad.

"You have to be aggressive about protecting yourself," she says. "You don't know which patient could be infected."

In New York City, the possibility of further bioterrorism attacks is an ever-present reality, as alerts periodically disrupt the daily routine. In a 10-day period, Gershon says she was evacuated from the subway system four times. One day, her normal 40-minute commute turned into a two-hour ordeal. No anthrax was found in those events. But as health care workers encounter the threat in their daily lives, they bring their heightened awareness into the workplace.

If the experience with HIV is a guide, health care workers will respond positively to as protections are developed, such as new vaccines or redesigned masks, Gershon says.

"We rise to the occasion. I guess we have to rise to this one. This is definitely a new challenge," she says.

Reference

1. Pittet D, Mourouga P, Perneger TV. Compliance with handwashing in a teaching hospital. *Ann Intern Med* 1999; 130:126-130. ■

Hospitals don't have enough safety devices

Regulations may keep devices from nurses

Lack of government regulation in some key areas is keeping safer devices from nurses, an on-line survey by the American Nurses Association (ANA) suggests.

Fewer than half of the 4,826 respondents reported having access to lifting and transfer devices. Some 60% said their facilities continue to use latex powdered gloves, which have been associated with greater sensitization to latex proteins.

Yet only 18% said they still don't have safe needle devices for injections, IV insertions, or phlebotomy. That is the only one of the three areas that is covered by federal legislation and regulation, notes **Karen Worthington**, MS, RN, COHN-S, occupational safety and health specialist at the ANA in Washington, DC.

"What this seems to bear out is that without regulation and enforcement, health care facilities may not be taking the initiatives as seriously as they need to be made to protect nurses," she says.

CE questions

1. What concerns prompted the Joint Commission on Accreditation of Healthcare Organizations to declare a moratorium on scoring hospitals based on compliance with *Sentinel Event Alerts*?
   A. The alerts placed a burden on hospital resources.
   B. The alerts were not fairly enforced.
   C. The alerts were overshadowing JCAHO standards.
   D. The alerts were too confusing and open to interpretation.

2. OSHA delayed enforcement of the new record-keeping rule as part of a settlement of a lawsuit by the National Association of Manufacturers. The settlement also clarified that:
   A. All injuries or illnesses reported by employees as work-related must be recorded.
   B. Medical professionals must make the determination about whether or not an injury or illness is work-related.
   C. The employer decides whether work-related events or exposures caused or contributed to an injury or illness or whether they aggravated a pre-existing condition.
   D. The definition of work-relatedness varies depending on the type of injury or illness that occurred.

3. What devices did the Service Employees International Union and Public Citizen, a consumer advocacy group, petition the FDA to ban?
   A. Syringes that have been shown to splatter blood
   B. Reusable blood tube holders
   C. Blood collection devices without safety features, glass capillary tubes, and IV infusion equipment that doesn't use needleless technology
   D. Devices that don't meet minimum safety criteria

4. How soon after exposure to smallpox should health care workers or others receive a vaccine in order to prevent transmission?
   A. 24 hours
   B. 48 hours
   C. three to four days
   D. The vaccine can't prevent transmission after exposure.

The result is injured and stressed out workers who may ultimately leave nursing, Worthington says. For example, 83% of respondents said they continue working despite experiencing back pain. More than 70% cited the acute and chronic effects of stress and overwork as one of their top three health and safety concerns.

Although the survey isn't a representative sample of nurses around the country, the demographics of respondents closely match the National Sample Survey of Registered Nurses, conducted by the Health Resources and Services Administration, Worthington says.

About 70% of the respondents have worked in nursing for more than 10 years; 53% work in acute care hospitals.

In many ways, the survey confirms the hazards that have received increased attention over

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the past few years.

After stress and overwork, nurses were most concerned about suffering from a disabling back injury and contracting HIV or hepatitis from a needlestick injury.

Those concerns impact both the retention of nurses and quality of care, respondents indicated. Some 31% of nurses said health and safety concerns would influence "to a great extent" their decision to continue in the field.

About a third said "unsafe working conditions interfere with [the] ability to deliver safe, high quality nursing care" to a great or a moderate extent. About a third of respondents (38%) said their employers were not keeping them adequately informed about dangerous or unhealthy conditions they may be exposed to at work.

Strive to improve working conditions

"The message to nursing leaders of this country was absolutely include strategies for improving health and safety [in the] consideration of all working conditions," says Worthington. "This is an integral part of what nurses are looking at when they consider working at your health care facility."

The survey validates the need to continue working to reduce certain risks, agrees **Elise Handelman**, RN, MEd, director of the office of occupational health nursing at the Occupational Safety and Health Administration (OSHA).

For example, 17% of nurses reported having been physically assaulted in the past year. OSHA recently held a workshop on workplace violence in psychiatric hospitals as part of an outreach program to encourage facilities to address this issue, Handelman says. **(See *HEH,* October 2001, p. 109.)**

Should back pain be expected?

The high percentage of nurses working with back pain indicates they are at risk of cumulative trauma that could lead to serious injuries, she notes. "Nurses have for years been told [back strain] is part of the job. It is so widespread people almost don't comment on it until it gets to the point where it's incapacitating. We're trying to change that perspective and let them know it doesn't have to be part of the job. There are ways to design out the risk."

The survey also shows nurses are willing to adapt to using safer devices, Handelman notes. Some 92% said they use needle safety devices whenever possible. "Obviously, it's clear the workers are willing to support these kind of design changes and use them when provided."

[Editor's note: OSHA's office of occupational health nursing provides technical support to employee health departments around the country. They can be reached at (202) 693-2120.] ■

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. ■

What the survey process expects of your organization: questions to ask yourself

Excerpt from Joint Commission Perspectives

ASSESSING YOUR EMERGENCY MANAGEMENT PLAN ON SITE

The modified 2001 environment of care (EC) standards for emergency management planning have not changed fundamentally, but the events of Sept. 11, 2001, have necessitated a greater focus on this planning and an increased flexibility and applicability of the emergency management plan. EC standards continue to require hospital, ambulatory care, behavioral health care, home care, and long-term care organizations to design, implement, and test a plan that ensures the organization is prepared to respond to a disaster. Although the current climate does not require organizations to start from scratch with a new emergency plan, organizations need to look closely at their plan, as will surveyors, to ensure that it applies to a variety of disasters on many different scales and that it considers all-important elements of emergency management. During various functional interviews in an accreditation survey, Joint Commission on Accreditation of Healthcare Organizations surveyors assess how an organization plans, designs, implements, and improves its emergency management plan; how that plan applies to a variety of possible events; and whether staff at all levels has been trained in their roles and responsibilities in the plan. The surveyors look to see that your plan addresses all key aspects related to emergency management.

QUESTIONS TO ASK YOURSELF

The rest of this article presents some probing questions to help you assess your emergency management plan in a new light, organized by the point in a survey in which the issue may arise. Some questions may not apply in all health care settings.

Leadership. This interview addresses, among other topics, the collaboration of senior leaders in planning, designing, implementing, and improving the emergency management plan. All leaders need to work together to create, support, and communicate an emergency management plan that meets the changing circumstances and needs of the organization and its community. The following questions will help you determine if leaders have been successful in this endeavor:

- ✔ How have leaders determined the scope and resources for your emergency management plan (that is, hazards vulnerability analysis [HVA], command structure, and community integration) and implementing the plan? (LD.1.1.1)
- ✔ How have leaders planned to rapidly expand clinical and nonclinical staff in the event of a disaster? (consultation under EC.1.4)
- ✔ Who is involved in the HVA? Is the emergency management plan flexible enough to allow response to a variety of disasters? To what types of disasters is your plan capable of responding? (EC.1.4)
- ✔ What is your command structure? How have staff members been oriented in their roles and responsibilities within this structure? How does your internal command structure integrate into the community's structure? (EC.1.4)
- ✔ How will critical supplies (such as medical supplies, water, pharmaceuticals, ventilators, and so forth) be obtained and allocated? (EC.1.4, EC.2.4)

Unit visits. Surveyors visit various care units in the organization to determine whether staff understand the emergency management plan and applies it to the activities of that unit. During visits to care units, surveyors ask staff how they are involved in planning, designing, and implementing the emergency management plan.

- ✔ What education have you received about recognizing hazards identified in the emergency management plan? (EC.2.4)
- ✔ What type of orientation, training, and education have you received about your roles and responsibilities in the emergency management plan? What types of emergencies were addressed in the education? (HR.4, HR.4.2, EC.2.4)
- ✔ Has a command center been identified to coordinate community response? (HR.4, HR.4.2, EC.1.4)
- ✔ Does the unit participate in emergency-preparedness drills regularly? What was your role in the most recent drill? (EC.2.9.1)

Clinical leadership. This interview addresses the role of clinical leadership (for example, nursing or medical staff leaders), including their participation in planning, designing, implementing, and improving the emergency

management plan. Involving clinical staff in implementing the emergency management plan is key because they directly affect the safety and care of patients through the plan's use.

- ✔ How is clinical leadership involved in developing the emergency management plan, including the command structure and its specific roles? Who from the clinical staff was involved in its development? (EC.1.4)
- ✔ What was the clinical staff's contributions to the development of the emergency management plan, including command structure? Who from the clinical staff is included in the command structure? (EC.1.4)
- ✔ How has the clinical staff planned to rapidly expand the number of physicians and other licensed independent practitioners (LIPs) in the event of a disaster? Has clinical leadership considered how it will quickly credential volunteer physicians and other LIPs? (consultation under MS.5.14.4, EC.1.4)
- ✔ How are clinical staff members trained in emergency management? (HR.4, HR.4.2, EC.1.4)
- ✔ What education is provided to clinical staff to recognize symptoms of and/or manage hazards or treat conditions identified in the emergency management plan? When was the training conducted? Who attended? (HR.4, HR.4.2, EC.2.4)
- ✔ What type of orientation and education is provided to clinical staff about their roles and responsibilities in the plan? (HR.4, HR.4.2, EC.2.4)

Environment of care interview. During this interview, surveyors address how the emergency management plan is integrated with other EC-related functions. The most intensive assessment of an organization's emergency management plan occurs at this time.

- ✔ Does your plan address the four phases of emergency management planning: mitigation, preparedness, response, and recovery? How does it address them? (EC.1.4)
- ✔ Does an HVA exist? Is it consistent with the community analysis? How was the HVA used to develop the emergency management plan? (EC.1.4)
- ✔ Can you provide evidence that the HVA is shared with the key leaders/staff and the emergency management program committee (if one exists) and that they are knowledgeable about its content? (EC.1.4)
- ✔ How are the hazards identified in the HVA linked to mitigation, preparedness, response, and recovery activities? (EC.1.4)
- ✔ Are there clearly defined staff roles for external emergencies? How does your emergency response plan address your organization's mission in terms of its role in community disaster response? (EC.1.4)
- ✔ Are there clearly defined staff roles for internal emergencies? Does your response plan identify the expected roles that community response agencies/organizations will assume? (EC.1.4)
- ✔ Does your plan identify key response agencies or institutions in the community with which your organization will interact during a disaster (such as police and fire departments, public health agencies, laboratories, other hospitals, and the National Disaster Medical System)? (EC.1.4)
- ✔ Does your plan list whom to contact specifically within each community response agency and institution (including telephone numbers, e-mail addresses, and so forth) and the process for updating this information? (EC.1.4)
- ✔ Does your plan identify how to contact each community response agency or institution during a disaster (such as through the use of two-way radio, cell phones, and so forth)? (EC.1.4)
- ✔ Does your plan identify a command center where community response will be coordinated? (EC.1.4)
- ✔ What are the details regarding your evacuation/alternative care site? (EC.1.4)
- ✔ Does your plan describe processes to identify an alternative care site and how it will be used? (EC.1.4)
- ✔ Does your plan describe how a reporting or command structure is to be used during a disaster? (EC.1.4)
- ✔ Does your plan include a command structure consistent with that used by the local community? Have you reviewed the community's emergency management plan? (EC.1.4)
- ✔ During an incident, can your organization quickly identify whether someone is an employee, a visitor, or a patient? (EC.1.4)
- ✔ How will you identify certain individuals in charge of managing the incident? (EC.1.4)
- ✔ Can you provide evidence that your external emergency management plan has been implemented in the past 12 months? (EC.2.9.1)
- ✔ Has your organization participated with community response agencies' or institutions' occurrences or drills as described in your emergency management plan? Was the drill in which you "actively participated" led by your organization or the community? (EC.2.9.1)
- ✔ Have you verified that the contact individual (for both participating and nonparticipating community response agencies/institutions) and the method for communicating with that individual during a disaster specifically identified in your plan is current? (EC.1.4, EC.2.4, note to EC.2.9.1)

Source: Joint Commission on Accreditation of Healthcare Organizations. *Joint Commission Perspectives* 2001; 21:(12)6. Reprinted with permission.

BIOTERRORISM WATCH

Preparing for and responding to biological, chemical and nuclear disasters

Flu or anthrax? First inhalational cases yield clues for clinicians to make the critical call

Use case history, blood work, X-rays, rapid tests

There is a postal worker in your emergency department (ED) with flulike symptoms.

That once insignificant observation about occupation and illness now triggers a detailed algorithm created by the Centers for Disease Control and Prevention (CDC) in Atlanta. **(See algorithm, p. 2.)** Is it flu or inhalational anthrax? Whether a realistic question or not, it is what many of your incoming patients may be asking — particularly if another wave of anthrax scares coincides with a nasty influenza season. Many of the initial symptoms are similar, but investigators dealing with the first inhalational anthrax cases have gleaned out key indicators that will help clinicians make the call.

"It is important to take a careful history from the [patients] when they present," says **Julie Gerberding**, MD, acting deputy director of CDC's National Center for Infectious Diseases. "If the [patients are] mail handlers in a professional environment — where they're dealing with large amounts of mail that is not their own — then the index of suspicion should be raised and more testing should be done to be sure there aren't additional clues to suggest that it is not a common viral infection."

Using the first 10 cases of inhalational anthrax as a baseline patient profile, the CDC reports that the median age of the patients was 56 years (range: 43-73 years), and seven were men.[1]

The incubation period from the time of exposure to onset of symptoms when known (seven cases) was seven days (range: five to 11 days).

The initial illness in the patients included fever (nine) and / or sweats / chills (six). Severe fatigue or malaise was present in eight, and minimal or nonproductive cough in nine. One had blood-tinged sputum. Eight patients reported chest discomfort or pleuritic pain. Abdominal pain or nausea or vomiting occurred in five, and five reported chest heaviness. Other symptoms included shortness of breath (seven), headache (five), myalgias (four), and sore throat (two). The mortality rate was 40% for the 10 patients, much lower than historical data indicated. Indeed, one of the critical reasons to recognize inhalational anthrax early is that it is far more treatable than originally thought.

The CDC gathered comparative data on the symptoms and signs of anthrax and influenza, finding, for example, that only 20% of the anthrax patients reported sore throat.[2] Flu sufferers report a sore throat in 64% to 84% of cases. Likewise, 80% of the anthrax cases reported symptoms of nausea and vomiting. That symptom is reported in only 12% of flu cases. Shortness of breath appears to be another key distinguishing symptom, affecting 80% of the anthrax patients but seen in only 6% of flu patients.

"One of the other clues that we are noticing is that the patients with inhalation anthrax actually do not have nasal congestion or a runny nose,"

(Continued on page 3)

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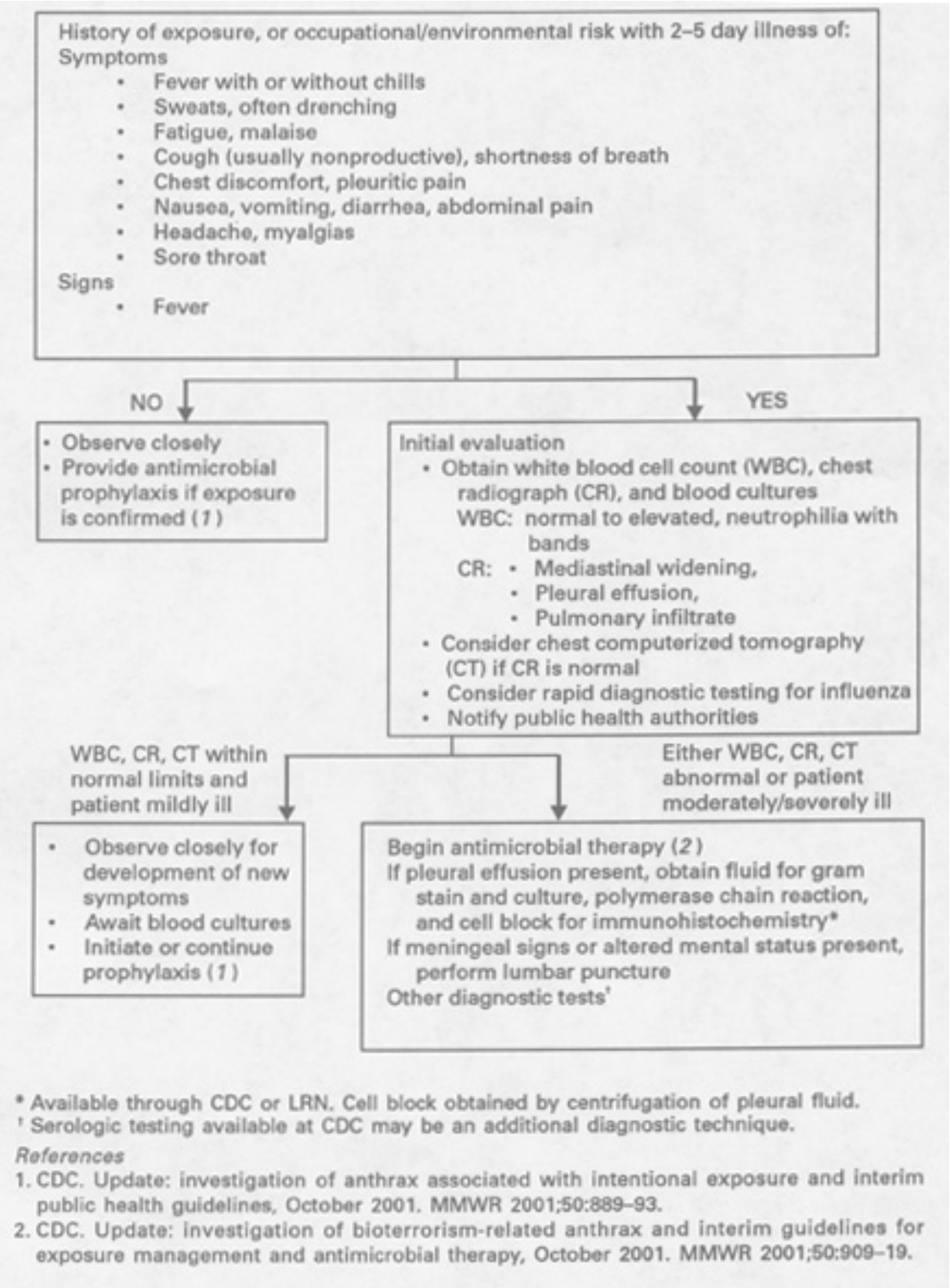
Clinical Evaluation of People with Possible Inhalational Anthrax



Source: Centers for Disease Control and Prevention. Update: Investigation of bioterrorism-related anthrax and interim guidelines for clinical evaluation of persons with possible anthrax. *MMWR* 2001; 50:945.

Gerberding says. "They don't have the symptoms of an upper-respiratory tract infection. They have a more systemic chest presentation, and that may be another distinguishing characteristic."

Another finding on initial blood work is that none of the inhalational anthrax patients had a low white blood cell count (WBC) or lymphocytosis when initially evaluated. Given that, CDC officials note that future suspect cases with low WBC counts may have viral infections such as influenza. Chest X-rays were abnormal in all patients, but in two an initial reading was interpreted as within normal limits. Mediastinal changes including mediastinal widening were noted in all eight patients who had CT scans. Mediastinal widening may be subtle, and careful review of the chest radiograph by a radiologist may be necessary, the CDC advises.

Complementing the CDC's effort, are the observations of the few clinicians who have actually seen inhalational anthrax cases come into their hospital systems. Two inhalational anthrax cases, both of which survived, were admitted to the Inova Healthcare System in Fairfax, VA (near Washington, DC).

"Clinically, I think the history of the people who presented here is useful," says **Allan J. Morrison Jr.**, MD, MSc, FACP, health care epidemiologist for the Inova system. "They stutter-stepped toward their pulmonary symptoms. That had some mild symptoms and then they were sort of 'meta-stable.' They were not relentlessly progressing. Then they progressed with symptoms more aggressively. Whereas with influenza — in our experience — once you start to get sick, it just keeps on progressing with very high fevers, chills, muscle aches, and pains. As a consequence, we feel there should be a good way to differentiate the two."

Since anthrax is a realistic concern in the Washington, DC, area, what about the aforementioned scenario of symptomatic postal workers in the ED?

"We would take a very aggressive history, not only of occupation but physically where they have been," Morrison says. "If they are symptomatic and have been in or work around a 'hot zone' — a location from which anthrax has either been cultured environmentally or patients have come from there — we will err on the side of being very aggressive about working up anthrax. By that I mean chest X-rays, chemistry profile, [etc.]"

In addition, the hospital system pushed early flu vaccination programs for staff and the surrounding community. "We want to move toward herd immunity," he says. "We are also working with our local hospitals to make sure that they have access to the rapid influenza tests. So for diagnosis — for obvious reasons — it is very helpful to make that distinction early."

One such rapid test is ZstatFlu (ZymeTX Inc., Oklahoma City), which the company claims can yield a diagnosis of influenza A or B some 20 minutes after a throat swab. The test detects neuraminidase, an influenza viral enzyme. However, Gerberding cautions clinicians not to rely solely on such tests. Rather, they should use the results of tests in combination with the patient history and clinical presentation, she says.

"So it is a constellation of history, clinical findings, and laboratory tests," she says. "Hopefully, when we get these all together, we'll be able to at least reduce the anxiety among some people and help clinicians diagnose those patients who really do require the antibiotic treatment. What we don't want to have happen is for everybody coming in with the flu to get an antibiotic because that undermines a whole other set of public health issues relating to antimicrobial resistance and proper management of influenza."

Even the vaccinated can still have flu

Complicating the issue is the fact that the flu vaccine efficacy can vary annually, but is usually 70% to 90% protective, says **Keiji Fukuda**, MD, a medical epidemiologist in the CDC influenza branch. Thus, depending on how well the vaccine matches the circulating strain, a certain portion of flu patients will tell clinicians they have been immunized. But in addition to vaccine breakthrough infections, there is a plethora of other viral and respiratory pathogens that will be creating similar symptoms, he says. In a somewhat sobering reminder — given that at this writing, the total anthrax cases remained in the double digits — Fukuda notes that a typical flu season will send 114,000 people to the hospital and 20,000 to their graves.

"There has been an awful lot of attention on the [anthrax] cases, but the bottom line is that there have been few cases, and these cases generally have occurred in a limited number of communities within a limited number of groups," he says. "And so the epidemiologic message is that anthrax really has not been diagnosed in most parts of the country, whereas we expect to see millions and millions of flu cases all over the place."

If facilities are faced with an onslaught of patients with respiratory illness there are several measures they can take, he notes. Those include:

- Reduce or eliminate elective surgery.
- Relax staff-to-patient ratios within the limits of your licensing agency.
- Emphasize immunizing staff so more staff are available.
- Identify ways to bring in extra staff to help out with the patients.
- Set up walk-in flu clinics to triage the patients.

Reference

1. Centers for Disease Control and Prevention. Update: Investigation of bioterrorism-related anthrax and interim guidelines for clinical evaluation of persons with possible anthrax. *MMWR* 2001; 50:941-948.

2. Centers for Disease Control and Prevention. Consideration for distinguishing influenza-like illness from inhalational anthrax. *MMWR* 2001; 50:984-986. ■

CDC moving quickly on smallpox front

Immunizations, training, vaccine dilution studied

Though officially stating it has no knowledge of any impending use of smallpox as a bioweapon, the Centers for Disease Control and Prevention (CDC) is scrambling with conspicuous speed to be ready for just such an event.

CDC workers from a variety of specialties are not only receiving smallpox vaccinations, they are being trained to give them to others using the old bifurcated needle scarification technique. And, even as creation of a new vaccine is fast-tracked, researchers are trying to determine if the current stockpile of 15.4 million doses can be expanded fivefold by simply diluting the vaccine.

Based on such actions, it is fair to say the agency is at least highly suspicious that the known stocks of smallpox virus are not safely ensconced in their official repositories in Russia and the United States.

"CDC is putting together a number of teams, which will probably total [more than] 100 employees, that could be quickly dispatched in a moment's notice to assist state and local health departments and frontline clinicians investigate suspect cases of smallpox," **Tom Skinner**, a spokesman for the CDC, tells *Bioterrorism Watch.*

"They are Epidemic Intelligence Service (EIS) officers, laboratorians, and others. Part of this includes vaccinating them against smallpox," he explains.

But while confirming that the CDC teams are being trained to administer the vaccine, Skinner would not specify who would be vaccinated following a smallpox bioterror event. "We have a smallpox readiness plan," he says. "Issues around vaccination are covered in that plan. That plan is being finalized. It is considered an operational plan. If we have a case tomorrow, it could be implemented. It covers who should be vaccinated and when."

The general consensus among bioterrorism experts is that those exposed would be vaccinated because the vaccine can prevent infection and possibly death even if given several days out. Likewise, health care workers and their family members would want vaccine if they were expected to care for the infected. Some aspect of quarantine would no doubt come into play because, unlike anthrax, it will be critical to separate the first smallpox cases and their contacts from the susceptible population.

Another aspect of CDC preparations includes the smallpox vaccine dilution study, which is being headed up by **Sharon E. Frey**, MD, associate professor of infectious diseases and immunology at Saint Louis University School of Medicine.

The vaccine, known as Dryvax, is no longer produced, but there are 15.4 million doses left. Frey and colleagues are looking at dilution studies that could maintain vaccine efficacy while increasing the available stock by millions of doses. In a study last year, Frey tried a one to 10 vaccine dilution, which would create a stockpile of more than 150 million doses. However, the resulting vaccine had only a 70% effective rate.

"The undiluted vaccine has about a 95% take rate," she tells *BW*. "It is not perfect, but we would like to be as close to that as we could be."

The new study will include a one to five dilution, which should show greater efficacy while increasing the stockpile to more than 75 million doses.

"We are looking at a 'take' rate for the vaccine, in other words how many people actually develop a typical lesion and whether they have a strong neutralizing antibody response to the vaccine," Frey says. "We know that the vaccine is still good. We actually titered the vaccine and it is very similar to its original titer," she adds. ■