

Hospital Employee Health®

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Two guides point to life after OSHA's ergo rule

While the Occupational Health and Safety Administration has been stalled on ergonomics, two new guides have emerged that can help hospitals implement a successful program. The Veterans Health Administration's guide on *Safe Patient Handling and Movement* provides detailed information on how to match ergonomic equipment to patient needs, how to analyze risks, and how to monitor the success of a program. A related article highlights the settlement between OSHA and nursing home chain Beverly Enterprises, which produced a guide for long-term care. cover

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VA steps in to fill void with ergonomics strategy

Guide matches ergo need with solutions

Even as U.S. senators pressured the Occupational Safety and Health Administration (OSHA) to act on ergonomics, two new models emerged for implementing ergonomics programs. They offer to fill a void left by the demise of ergonomics regulation and provide a possible basis for voluntary health care guidelines.

As of March, a year after Congress rescinded the ergonomics standard, OSHA still had not announced its new approach to ergonomics. Sen. Edward M. Kennedy (D-MA), chairman of the Senate labor committee, and two other leading Democrats from the Senate, Tom Harkin of Iowa and Paul Wellstone of Minnesota, asked OSHA for information related to its ergonomics efforts. In the House, four Democrats urged President George Bush to issue a new standard. Many observers expect the agency to rely on voluntary guidelines and education rather than creating a new regulation.

It's not yet clear whether OSHA will create industry-specific guidelines. But the health care industry already can benefit from two new guides that provide a tailored approach to reducing patient handling injuries.

The Veterans Health Administration published its guide on *Safe Patient Handling and Movement*, a document that provides detailed information on how to match ergonomic equipment to patient needs, how to analyze risks, and how to monitor the success of a program.

Meanwhile, the lengthy settlement between OSHA and Beverly Enterprises of Fort Smith, AK, produced a basic guide that could be adapted at

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Vaccine shortages to end by summer

Hospitals should set up contingency plans for vaccine shortages, even though the current shortages should end by this summer, says Larry Pickering, MD, FAAP, senior advisor to the director of the National Immunization Program. Shortages occurred this year in numerous vaccines, including varicella, combined measles, mumps and rubella, pneumococcal, diphtheria, tetanus, and pertussis. There were spot shortages of hepatitis B vaccine. Several agencies, including the General Accounting Office and the Institute of Medicine, are studying the shortages and considering what measures could prevent them in the future 55

HCW stress leads to lower job loyalty

Stress and work overload have eroded employees' commitment to their jobs, according to the Healthcare @Work survey by Aon Consulting of Miami. The health care sector scored lower than the national average for all employers in every major category of the survey. Thirty-five percent also said they believe their organization is not doing enough to create an environment 'free from fear, intimidation, or harassment' 56

Comment period extended for proposed TB rule

Responding to a request by several health care organizations, OSHA has extended its comment period on the proposed tuberculosis rule until May 24 to allow more time for review of new risk-assessment information. OSHA also is accepting comments on the Institute of Medicine report that evaluated the draft standard. 57

What do you want to know about hospital employee health?

A new National Exposure at Work survey, conducted by NIOSH, will focus specifically on the health care sector. For the first time, surveyors may speak to frontline workers as well as management. NIOSH held two meetings with stakeholders to decide how to structure the surveys 59

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other long-term care facilities. It also contains information that could be useful to hospitals building a patient care ergonomics program. (See related article, p. 51.)

"I don't think any of us know what OSHA's going to do, but we do know that we need to do something about the serious problem of musculoskeletal disorders (MSDs) among health care workers," says **Guy Fragala**, PhD, PE, CSP, a leading ergonomics expert and director of environmental health and safety at the University of Massachusetts Medical Center in Worcester.

"These guides will help transfer a lot of the knowledge as to how to implement an effective ergonomics program," he says.

The Veterans Affairs' (VA) step-by-step approach guides hospitals as they assess ergonomic needs and match patient-handling criteria to lifting aids. "There have been ergonomic analyses done in patient handling and movement, but there has never been a guideline such as this," says **Mary Matz**, MSPH, project manager of the Safe Patient Handling and Movement Research Project at the VA Patient Safety Center of Inquiry in Tampa, FL.

The guide helps hospitals focus their resources on the most injury-prone tasks. But Matz also notes that getting input from employees is an essential component. "We asked nursing staff and nurse managers, 'What do you see as your biggest problem?' We took that into account in determining ergonomic controls appropriate for each patient care unit," she says.

Start with high-risk units

Under the now-defunct OSHA standard, hospitals would have been required to respond to musculoskeletal injuries as they occurred. But the VA's Patient Safety Center of Inquiry in Tampa came up with a proactive approach. It based its analysis of the risk of injury on extensive research conducted by ergonomic experts, as well as surveys of its own staff and a review of MSD injuries.

Hospitals should identify their highest-risk units and give them priority for resources, equipment, and training, says **Audrey Nelson**, PhD, RN, FAAN, center director.

"It's very important to identify high-risk units. This is a mistake many people make. They have a small budget, and they try to spread it too thin," she says. "By focusing on your highest-risk units, it allows you to prioritize your time and resources."

Rehab and spinal injury units are examples of

high-risk areas. But other factors may contribute to injury risk. For example, patients with unpredictable or combative behavior or with cognitive impairments can unwittingly contribute to staff injuries. Frequent twisting or turning or repositioning patients without proper aids can lead to injuries.

"Not all high-risk tasks are lifts or transfers," Nelson says. "People get that in their mind in the beginning, and they neglect other tasks that may have [contributed to long-term stress]."

Assess tasks, patient criteria

Purchasing the right kind of equipment is a first step. But how do you make sure employees use the equipment when it's needed? The VA guide provides patient assessment criteria and algorithms to help health care workers identify the injury-prone tasks and the patients' needs for transfer assistance.

"You want to match the patients' needs to the solution you're using," Fragala says. "Different units may have different solutions for different tasks."

Hospitals can begin by classifying patients according to their level of dependency and ability to bear weight. A patient who can partially assist is defined as someone who needs no more than 50% physical assistance of a nurse while performing the transfer. A dependent patient needs more than 50% assistance or is unpredictable in the amount of assistance offered.

The assessment also must take into account medical conditions and other factors. For example, a post-surgical patient may not be able to tolerate a sling.

"You have two basic classifications of lift: The full-body sling lift and the stand-assist lift, Fragala explains, one of the authors of the VA guide. "The criteria for matching those lifts to a patient are dependency level and weight-bearing capability. Someone who is totally dependent with no weight-bearing capability would require a full-sling lift. If someone has some weight-bearing capability, then the stand-assist lift can be used."

There may be reasons why patients could not use a lift. "Are they likely to have problems with their skin? Can they not bend certain joints? In that case, you may need to manually transfer them from a bed to a stretcher," Fragala says. "To aid such transfers, you would look at these powered lateral-assist devices or friction-reducing lateral-assist devices."

The patient-handling guide offers algorithms to help health care workers make choices about the best ergonomics equipment. **(See assessment criteria and sample algorithm, inserted in this issue.)**

Monitor impact of ergo program

Once the program has been implemented, its effectiveness should be monitored. The VA guide offers formulas for determining the cost impact of patient-handling injuries. "It's important to set realistic goals for your patient care ergonomics program," Nelson says.

Borrowing an idea from the Department of Defense, the VA began conducting "After Action Reviews," enabling staff to gather in teams to discuss the root cause of injuries, or even of a near miss.

The reviews are designed specifically for front-line staff, Matz notes. "If there are recommendations that need to be made, the supervisor needs to be made aware of them. But they are not involved in the initial brainstorming and recommendation-making process."

"It's empowering staff. It's giving them responsibility for their own safety," she says.

(Editor's note: The VHA's Safe Patient Handling and Movement guide is available on-line: www.patientsafetycenter.com/products.htm.) ■

Will Beverly settlement guide OSHA approach?

Collaboration produces good outcome, expert says

The settlement between the Occupational Safety and Health Administration (OSHA) and Beverly Enterprises of Fort Smith, AK, the nation's largest nursing home chain, could be a model for a cooperative approach to ergonomics, asserts leading ergonomics expert **Guy Fragala**, PhD, PE, CSP, director of environmental health and safety at the University of Massachusetts Medical Center in Worcester.

"This demonstrates an approach to an ergonomics program that's acceptable to OSHA and acceptable to the health care industry," explains Fragala, who helped author the guide that became part of the settlement.

OSHA had cited five nursing homes in Pennsylvania under the "General Duty Clause" for failing to protect workers from patient-handling hazards. Beverly contested the citations in a case that languished in appeals for 10 years. Beverly eventually decided to resolve the litigation and did not acknowledge wrongdoing as part of the settlement.

However, Beverly did agree to buy mechanical lifts, lift walkers, two-handled transfer belts, and friction-reducing devices at each of 275 facilities under federal OSHA jurisdiction to conform to the guidelines in the guide. Each facility also will designate and train a manager to oversee compliance with the program.

A Beverly spokesman noted that the company had already launched a major ergonomics initiative at all of its 475 facilities.

"Ten years ago, the industry may not have bought into the concept of an ergonomics management program for patient handling that involved lifting aids, equipment and devices, and a program to make it work," Fragala says. "Over time, the industry has realized this is the direction to go in. We need to come up with new ways to assist patients in facilities."

The lifting guide uses the existing patient classification system to determine ergonomic needs. For example, "totally dependent patients," who are given a rating of 4, would need a full-sling mechanical lift. "Extensive assistance patients," with a rating of 3, would use the mechanical lifts but could be candidates for a stand-assist lift, based on their weight-bearing capabilities. Combative or mentally impaired residents would require the same lifts but might need more caregivers to help them, the guide states.

"This method works very well for the long-term care industry," he says. "For hospitals and acute care, we might look at similar systems."

OSHA's ergonomic standard was written for general industry. It required employers to respond to musculoskeletal injuries with ergonomic interventions. However, if OSHA were to develop industry-specific guidelines, the Beverly guide may provide a foundation.

The guide states, "The key to your successful lift program is the correct assessment of residents for the [lifts]; clear and consistent communications regarding the need for assistive devices for individual residents; and the skillful use and familiarity of the lift by your associates."

It provides checklists to measure caregiver knowledge of the lifts and key questions to use

to select the best equipment. "To make this work, there are two key elements," Fragala says. "You need the engineering controls, the redesigned methods of lifting. And you need a program to make this work in the facility."

Fragala says he hopes OSHA and health care facilities can work in a collaborative fashion. "If the industry recognizes this is a good direction to go in, we may see further progress [in reducing injuries]." ■

NIOSH finds toxin levels low from surgical smoke

Particles may cause irritation for OR nurses

An investigation of surgical smoke at three hospitals by the National Institute for Occupational Safety and Health (NIOSH) failed to find levels of toxic substances above the currently recommended limits.

One of the three hospitals recorded levels of particulate matter that may lead to closer examination of ventilation systems in the day surgery unit. However, none of the levels of compounds or particulates detected exceeded permissible exposure limits (PEL) set by the Occupational Safety and Health Administration (OSHA) or recommended exposure limits set by NIOSH.

"None of what we found would have surpassed the eight-hour level that's represented by the PEL, even if [the operating room (OR) staff] had been spending back-to-back hours within an [OR] for any of the procedures we found," says **Bradley King**, MPH, an industrial hygienist in NIOSH's Hazard Evaluation and Technical Assistance branch.

Although the levels would not be characterized as a health hazard based on current limits, they still could cause irritation in some individuals, King notes. The industrial hygiene sampling was part of a preliminary report. Results of medical surveys and ventilation analysis will be included with the final health hazard report to be released later this summer.

NIOSH researchers are conducting health hazard evaluations at Carolinas Medical Center in Charlotte, NC; Morton Plant Hospital in Dunedin, FL; and Inova Fairfax Hospital in Falls Church, VA. In two cases, the request for a health hazard

evaluation came from employees. At Morton Plant, management officials had asked for NIOSH assistance.

The Association of periOperative Registered Nurses (AORN) in Denver asked OR nurses to contact NIOSH with their concerns about the smoke, and the current investigation stems from those complaints.

A spokeswoman for AORN declined to comment on the surgical smoke data, noting that the findings were preliminary and that other information would be included in the final report.

The evaluations may produce the most detailed information yet about the actual exposure of OR personnel to dangerous compounds in smoke from electrocautery. Surgeons, nurses, OR technicians, and anesthesiologists wore sampling devices. NIOSH researchers also surveyed OR staff for symptoms that might be associated with exposure to surgical smoke, and they examined the hospitals' ventilation systems.

"We were looking for compounds that previously had been detected in surgical smoke," King says.

When human tissue burns, either in electro-surgery or laser procedures, cells burst and tiny particles become airborne in a noxious plume. OR nurses have reported suffering from nausea, abdominal cramps, and respiratory problems after hours of breathing the surgical smoke.

In 1998, NIOSH issued a "hazard alert" recommending the evacuation of surgical smoke. It stated that: "Research studies have confirmed that this smoke plume can contain toxic gases and vapors such as benzene, hydrogen cyanide, and formaldehyde, bioaerosols, dead and live cellular material (including blood fragments), and viruses. At high concentrations, the smoke causes ocular and upper respiratory tract irritation in health care personnel, and creates visual problems for the surgeon. The smoke has unpleasant odors and has been shown to have mutagenic potential."¹

Still, research on the smoke and its health effects has been limited, and the information on surgical smoke has been considered largely anecdotal. In July 2000, OSHA shelved a "technical information bulletin" on surgical smoke, saying the agency needed more evidence of a link between the smoke and ailments that afflict OR staff.

In monitoring, NIOSH found formaldehyde, acetaldehyde, and toluene. However, King notes that those compounds could have come from

other sources in the OR. He adds that levels of those compounds were found even in surgical procedures in which an electrocautery device was not used.

"Another concern was particulate production in the smoke," King says. "We used some direct reading instruments that produced information and recorded it minute by minute to see if there were any peaks of particles in the room that could be dangerous, and what was the size of the particulates."

In two hospitals, the smallest particles — those 7.5 μ or smaller that could lodge in the deepest regions of the respiratory tract — were not present at a substantial level, and overall peaks of particulate matter didn't necessarily correlate with the use of the electrocautery device.

In one hospital, a day surgery suite recorded larger background concentrations of particulate matter. One mastectomy case produced a spike in particulate matter immediately after the device was used; a comparable mastectomy case in which the surgeon preferred using a scalpel showed no appreciable particulate matter.

Those findings will be considered in the analysis of ventilation, King notes.

Nurses welcome NIOSH's help

The health hazard evaluations provide information that hasn't previously been available about real-life exposures. "We felt it was important to get personal samples," King says.

"That gives us an indication of what the personal exposures are. There hadn't been a lot of that [research] done in the past. The compounds that have been reported to be produced could be potentially harmful. But we didn't know what the levels of exposures might be," he says.

Nursing advocates were pleased when NIOSH responded to the complaints and began the evaluations. "This is long overdue," says **Kay Ball**, RN, MSA, CNOR, FAAN, a perioperative educator and consultant based in Columbus, OH. "Nurses have to breathe this day in and day out, and nothing is being done."

Ultimately, the nurses want OSHA to require hospitals to evacuate the smoke. The NIOSH research could be a step toward future OSHA action. "Every time surgical smoke is created, we [should] evacuate it," Ball says. "We've been looking for OSHA to get involved for years."

King notes that the health hazard evaluations won't be the definitive information on surgical

smoke. "We're probably not answering every question that can be asked about surgical smoke," he says.

Reference

1. National Institute for Occupational Safety and Health. *Control of Smoke from Laser/Electric Surgical Procedures*. DHHS (NIOSH) Publication No. 96-128. Washington, DC; 1998. Web site: www.cdc.gov/niosh/hc11.html. ■

CDC urges caution for lab work with meningococcus

14 new cases found in labs, half of them fatal

Hospital laboratories are stepping up precautions for lab workers who handle meningococcal samples in the wake of two deaths in Michigan and Alabama.

Although the risk of death from handling *Neisseria meningitidis* isolates remains low, the Centers for Disease Control and Prevention (CDC) in Atlanta cautioned laboratory workers of this occupational hazard.¹

An investigation into the deaths led CDC researchers to discover 14 previously unreported cases worldwide in the past 15 years. Six of those cases occurred in the United States between 1996 and 2001.

The fatality rate was high; lab workers died in half of the cases that researchers determined were probably laboratory-acquired meningococcal disease.

The higher-than-expected death rate "might reflect underreporting of mild cases or might be a result of the highly virulent strains and high concentration of organisms encountered in the laboratory setting," the researchers state.

While the CDC has not changed its recommendations that *N. meningitidis* isolates be handled as a Biosafety Level 2, "strong consideration should be made to do all manipulations of this organism in a biosafety cabinet," says **Jim Sejvar**, MD, epidemiologist in the CDC's meningitis and special pathogens branch.

"If [a safety cabinet] is not available or not able to be used, the organism should be transferred to a facility that does [have one]," he says. Vaccination should be considered as an "adjunctive measure,"

Sejvar says. The vaccine is effective against serogroups A, C, Y, and W-135. "It doesn't provide any protection against serogroup B, which was in fact represented in half of the U.S. cases that we saw," he says.

Lab workers followed CDC guidelines

Concerns about laboratory-acquired meningococcal disease arose in 2000 with the reports from Alabama and Michigan. Both involved experienced laboratory workers who were known for their careful technique. And in both cases, CDC testing confirmed that the strain was the same as the patient sample.

In the Alabama case, a 12-year-old girl came to a Huntsville hospital complaining of nausea, cough, headache, and high fever. She had some decreased alertness, and a physician ordered a lumbar puncture to test for meningitis.

The day after the hospital lab had taken the samples and cultured them, a laboratory worker came in to perform some additional tasks of subculturing, which he did in the containment hood, and removing additional blood samples for Gram stains — done outside a hood.

When the lab worker developed fever and joint aches three days later, it wasn't immediately identified as possible meningitis. The next day, his symptoms of nausea, pain, lethargy, and weakness escalated and his body temperature dropped. He died within hours of coming to the hospital's emergency department (ED).

The lab worker had followed recommended practices in handling the sample, notes state epidemiologist **J.P. Lofgren**, MD.

In the Michigan case, a longtime laboratory worker with the state Department of Community Health in Lansing was working with ear fluid from a 19-year-old Michigan State University student who had died of toxic shock syndrome. The ear fluid contained meningococcus, although the young woman did not have any symptoms of meningococcal infection.

Two days after working with the sample, the lab worker developed symptoms. The next day, she went to the ED with labored breathing and died hours later.

Biosafety Level 2 guidelines state that lab workers should wear gloves and lab coats and should use a biological safety cabinet when "mechanical manipulations that have high aerosol potential are performed." Workers who have a blood exposure should receive chemoprophylaxis with penicillin,

and those with mucosal exposure should be treated with rifampin, according to the CDC.²

But just what types of procedures should be performed in a safety cabinet is somewhat unclear, Sejvar acknowledges. "Clearly, further research is needed to determine what the specific risk factors are," he says.

After the death, the Michigan Department of Community Health began treating meningococcus as a Level 3 organism, requiring lab work to occur under a biological containment hood with an air filter. Lab workers also were immunized. Alabama continues to follow current CDC guidelines.

Nationally, hospitals and public health laboratories encounter about 3,000 isolates of *N. meningitidis* each year. Since the clinical samples and isolates are handled by an average of three microbiologists in a laboratory investigation, CDC estimates that 9,000 microbiologists are exposed per year.

"The risk [of laboratory-acquired meningococcal disease] is still low," Sejvar says. "But as far as an occupational risk, laboratorians certainly seem to be much more at risk than people in general."

CDC is asking hospitals and laboratories to report any suspected cases of lab-acquired meningococcal disease through the state health department to CDC at (404) 639-3158.

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1. Lofgren J, Whitley B, Johnson D, et al. Laboratory-acquired meningococcal disease — United States, 2000. *MMWR* 2002; 51:141-144.
2. Takata KK, Hinton BG, Werner SB, et al. Epidemiologic notes and reports: Laboratory-acquired meningococemia — California and Massachusetts. *MMWR* 1991; 40:46-47, 55. ■

Most vaccine shortages to end by summer, says CDC

Hospitals still should plan for the worst

Although new vaccine supplies are expected to alleviate shortages by this summer, hospitals are being urged to develop contingency plans to handle future problems.

Hospitals should identify priorities for immunization, making sure that health care workers who work with the highest-risk patients have received their recommended vaccines, says **Larry**

Pickering, MD, FAAP, senior advisor to the director of the National Immunization Program at the Centers for Disease Control and Prevention (CDC) in Atlanta.

Those plans would indicate who should receive the vaccine in the case of a moderate shortage, and who would receive the available doses in the case of a severe shortage, he says.

The shortage of the influenza vaccine in fall of 2000 was a harbinger for more widespread problems with vaccine supply. Last year, manufacturing difficulties led to a delay in the distribution of the flu vaccine.

Meanwhile, stricter regulation of the manufacturing process by the Food and Drug Administration forced vaccine makers to make improvements that delayed production. Fewer manufacturers are producing vaccines; in some cases, there is only one manufacturer.

"When you only have one manufacturer of a vaccine, that can wreak havoc when something happens to the manufacturer," Pickering says.

Shortages occurred this year in numerous vaccines, including: varicella; combined measles, mumps, and rubella; pneumococcal; diphtheria, tetanus, and pertussis; and tetanus. Shortages of hepatitis B vaccine have been localized, Pickering says. Several agencies, including the General Accounting Office and the Institute of Medicine, are studying the shortages and considering what measures could prevent them in the future.

"It's multifactorial," he says. "There are all sorts of problems. There are lots of things we need to fix."

Amid the shortage, interim recommendations from the Advisory Committee on Immunizations Practices (ACIP) still emphasized the importance of immunizing health care workers. For example, although the CDC advisory panel recommended delaying the varicella vaccine for children ages 12-18 months, health care workers were still in the highest priority category for receiving the vaccine.

CDC officials say they hope the new focus on vaccines ultimately will lead to better supply and more widespread immunization.

Manufacturers have already begun making the influenza vaccine for the next season. The 90 million doses will represent a substantial increase in supply. "The hope is that all the manufacturing problems have been solved and we will get it out on time," Pickering says.

(Editor's note: CDC is providing weekly updates of vaccine supply at www.cdc.gov/nip.) ■

Workers ready to leave over stress, high workload

Loyalty disappears on work survey

Health care workers gave their employers a “wake-up call” in a recent survey of employee attitudes, as they revealed that work stress has diminished their commitment to their employers and their careers.

About one in five respondents said they don’t intend to stay at their current jobs for the next several years. One-third said they would leave for a slight increase in pay.

As an industry, health care scored lower than the national average for all employers in every major category of the Healthcare @Work survey,¹ conducted by The Loyalty Institute of Aon Consulting in Miami and sponsored by the American Society for Healthcare Human Resources Administration in Chicago, a membership organization of the American Hospital Association (AHA).

The survey results were presented at the American Occupational Health Conference in Chicago in April, a conference of the Atlanta-based American Association of Occupational Health Nurses (AAOHN).

The work force shortage is both a cause and an effect of the discontent shown on the survey, notes **Erin H. Wilkins**, senior consultant and director of the Healthcare @Work study. The health care work force has endured downsizing and restructuring, as well as the impact of declining enrollment in nursing programs. The average age of nurses is rising nationwide as fewer young recruits enter the field.

“Doing more with less obviously places a greater amount of stress on employees in health care than in other industries,” she says.

“The impact to the organization of the extreme stress is a less-committed work force, a less-productive work force,” Wilkins says. “If people are so stressed out on a daily basis, they are going to be tired at work, sick, or they’re going to leave.”

Aon surveyed 3,433 health care employees in 2001 to determine their views on workplace practices and their commitment to their organizations. Concerns were greatest in the area of stress and workload. Some 56% of respondents said their employer didn’t meet their expectations for creating a stress-free environment or providing an adequate staff load.

Those results add to growing evidence of problems in the health care work force. More than one in seven hospitals reported a severe shortage of nurses — RN vacancies of more than 20% — in a study conducted by First Consulting Group of Long Beach, CA, for the AHA and other health care organizations.²

“I think it’s very important for organizations to take a step back and look at themselves,” Wilkins says. “Other than money, what can we do to attract and motivate and retain the work force we need to be successful?”

From its data, Aon creates a “Performance Pyramid,” with safety and security at the bottom and work-life harmony at the top. The bottom level needs must be met before highest-level needs can be fully addressed, Wilkins says. Work/life harmony actually scored well, largely because health care workers reported a sense of teamwork. Some 83% of respondents said the willingness of their co-workers to help each other in times of high workload met or exceeded their expectations.

What Makes Workers Want to Stay on the Job?

The consequences of labor problems often show up in employee health: streams of new employees who need to be trained and oriented; injured workers who were on a short-staffed unit; and stress-related symptoms that lead to absenteeism.

According to the Healthcare @Work survey by The Loyalty Institute of Aon Consulting in Miami, seven key factors lead to greater commitment on the part of employees:

1. The quality of management and supervision in place at the organization.
2. The satisfaction employees receive from the work they do every day.
3. The organization’s effort to build a sense of spirit and pride.
4. The organization’s effort to create a stress-free environment.
5. The opportunities for personal growth provided by doing the job.
6. The adequacy of staff load in the organization.
7. The organization’s effort to provide pay and benefits that meet expectations.

Source: The Loyalty Institute of Aon Consulting, Miami. Web site: www.aon.com.

However, 43% of health care workers said their employers failed to meet their expectations for safety and security. Those concerns focus more on psychological issues than physical safety, Wilkins says. For example, 35% of RNs and technical employees said they believe their organization was not doing enough to create an environment "free from fear, intimidation, or harassment."

That includes feelings employees may have about how they are treated by patients, as well as management, physicians, and co-workers, Wilkins notes.

What can employee health professionals do to help employees relieve stress and to improve their work environment?

Employee health professionals detect physical symptoms of stress and can discuss health and productivity issues with human resources managers, says **Deborah V. DiBenedetto**, MBA, RN, COHN-S/CM, ABDA, an occupational health consultant based in Yonkers, NY, and president of the AAOHN. "People will show up for blood pressure checks, headaches, minor complaints, without ever addressing the real issues. It's a missed opportunity," she says.

Employee assistance programs can offer support for stressed-out employees, adds **MaryAnn Gruden**, MSN, CRNP, NP-C, COHN-S/CM, employee health nurse practitioner with Western Pennsylvania Hospital in Pittsburgh. "Employee health can be an advocate for the employee. We can direct them to get some help, whether their stress is work-based or home-based."

Employee health professionals also should look for signs that work stress is contributing to injuries, notes Gruden, who is also executive president of the Association of Occupational Health Professionals in Healthcare. "Where are their injuries occurring? Are they occurring on a shift where employees have worked 12 hours or have been required to work overtime? Certainly, you want to look at the root cause [of injuries], but you also have to look at other factors." Understanding the link between stress, workload, and injuries may help convince administration to address staffing issues, she notes.

Hospitals that respond to these common concerns may benefit in recruitment and retention, Wilkins says.

"I'm not surprised either that there's decreased commitment to the employer [among a significant number of health care workers]," Gruden says. "People are looking for someplace where it's better."

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2. First Consulting Group. *The Healthcare Workforce Shortage and Its Implications for America's Hospitals*. Long Beach, CA; 2001. Web site: <http://www.aha.org/workforce/resources/Content/FcgWorkforceReport.pdf>. ■

OSHA extends new comment period on TB

APIC, others asked for more time to respond

The U.S. Occupational Safety and Health Administration (OSHA) has extended its comment period on the proposed tuberculosis rule until May 24 to allow more time for review of new risk assessment information.

OSHA had reopened the record to solicit comment on the agency's final risk assessment and the Institute of Medicine's (IOM) report, *Tuberculosis in the Workplace*. An IOM panel had endorsed the concept of a TB standard to set minimum protections for health care workers, but had criticized the agency's estimates of the tuberculosis threat.

The panel also said the proposed standard fails

Changes are coming for *Bioterrorism Watch*

We hope you have enjoyed receiving complimentary issues of *Bioterrorism Watch* with your subscription to *Hospital Employee Health*.

Beginning in July, *Bioterrorism Watch* will become an eight-page bimonthly newsletter, which will offer both CE and CME credits. The six yearly issues combined will offer six hours of CE and CME. As a subscriber to *HEH*, you will continue to receive the publication free, but now on a bimonthly basis.

If you have any questions about your subscription, please call our customer service department at (800) 688-2421 or visit us online at www.ahcpub.com. ■

to provide enough flexibility to hospitals at low-risk for handling TB patients.

When OSHA opened the TB docket, it also released two evaluations of its risk assessment by experts in TB epidemiology and risk assessment.

The Association for Professionals in Infection Control and Epidemiology (APIC), the American Health Care Association, and the American Society for Microbiology had requested more time to review the lengthy documents.

"Two months might have been enough for us to respond, but we also wanted our members to be apprised and be able to respond on their own," says **Jennifer Thomas**, director of governmental affairs for APIC in Washington, DC. "It's quite complex, and we do want lots of input."

APIC has long opposed the tuberculosis standard as creating an unnecessary burden on hospitals. The new comment period allows OSHA to accept comments based on the IOM report, and Thomas says she hopes concerns will be raised that will influence the agency to make changes.

"OSHA had vastly overestimated the risk to health care workers," Thomas says. "We've always contended that the risk for disease is no greater than the general population. The risk for exposure is probably greater, but there are protections in place."

However, advocates for health care workers termed the extended comment period an unnecessary delay, and they called on OSHA to move forward with the standard.

"We got into the problem of greater exposure to TB in the early '90s because we weren't vigilant," says **Karen Worthington**, MS, RN, COHN-S, occupational safety and health specialist for the American Nurses Association in Washington, DC. "We need to continue vigilance because globally TB is still one of the biggest health problems in the world."

Worthington says the standard is "reasonable and flexible," and she notes that it could help hospitals with bioterrorism preparedness. "A TB standard would put into place many training programs, respiratory protection programs, and patient identification programs that we need to have in place to even think about other potent airborne infectious agents," she says.

[Editor's note: OSHA asks those who want to submit written comments to send two copies, postmarked no later than May 24, 2002 to: Docket Office, Docket H-371, Room N-2625, Occupational Safety and Health Administration, U.S. Department of Labor,

CE questions

Save your monthly issues with the CE questions in order to take the two semester tests in the June and December issues. A Scantron sheet will be inserted in those issues, but the questions will not be repeated.

17. According to Audrey Nelson, PhD, RN, FAAN, director of the VA's Patient Safety Center of Inquiry at the James A. Haley VA Hospital in Tampa, what are some factors that influence lifts besides the dependency level of the patient?
 - A. unpredictable or combative behavior in the patient
 - B. the weight of the caregiver performing the lift
 - C. the length of hospitalization of the patient
 - D. the type of sling used in the lift
18. What compounds did NIOSH find in personal sampling monitoring of OR staff exposed to surgical smoke at three hospitals?
 - A. benzene, hydrogen cyanide, formaldehyde.
 - B. aerosolized HIV, acrolein
 - C. formaldehyde, acetaldehyde, and toluene
 - D. no identifiable compounds
19. According to CDC epidemiologist Jim Sejvar, MD, vaccination of lab workers against *Neisseria meningitidis* is only recommended as an adjunctive measure because:
 - A. The vaccine is only 70% effective.
 - B. Lab workers do not have sufficient exposure to the virus.
 - C. The vaccine is experimental.
 - D. The vaccine is not effective against serogroup B.
20. According to a survey by Aon Consulting in Miami, what is the main cause of declining loyalty among health care workers?
 - A. inadequate pay
 - B. frequent restructuring
 - C. stress and high workload
 - D. dissatisfaction with management

200 Constitution Ave., N.W., Washington, DC 20210. Comments of 10 pages or fewer may be faxed to (202) 693-1648. (If faxed, the original and one copy of all comments must be sent to the Docket Office as soon as possible).

Comments may also be submitted electronically to <http://ecomments.osha.gov>. Information such as studies and journal articles cannot be attached to electronic submissions and must be submitted in duplicate to the mailing address. Attachments must clearly identify the respondent's electronic submission by name, date and subject.

The entire TB rulemaking record, including the peer reviewers' reports, OSHA's draft final risk assessment, and the IOM report, is available for review and copying at OSHA's Docket Office at (202) 693-2350. ■

NIOSH begins work on occupational health survey

Survey may tap attitudes, gather benchmarks

An upcoming National Exposure at Work survey may go beyond the usual questions about physical hazards and gauge attitudes about the health care "safety climate."

At two "stakeholders" meetings held by the National Institute for Occupational Safety and Health (NIOSH), participants said they would like more than just statistical information on the use of ergonomics equipment and sharps safety devices, says **James M. Boiano**, MS, CIH, project manager and chief of the hazard section in NIOSH's Division of Surveillance, Hazard Evaluations and Field Studies.

For example, the survey might seek to determine how often ergonomic equipment is used and why workers fail to use it. The survey would include identical questions posed to workers and management, perhaps about the facility's safety climate.

"There might be an on-site component to the survey as well [with visits to hospitals and other health care facilities]," Boiano says. "That was done in our previous hazard surveys. We know that would be a fairly expensive component, but we're not ruling that out."

Advocates for health care workers are looking forward to a survey that is tailored to the health care sector and includes worker input, says **Karen Worthington**, MS, RN, COHN-S, occupational safety and health specialist for the American Nurses Association in Washington, DC.

"In the past, they focused heavily on chemical hazards. They didn't include worker interviews or worker input," she says. "From health care

worker unions' perspective, it's important to look at broader groups of hazards."

The survey will influence NIOSH's research priorities. But Worthington also notes that it could have broader implications. "We'll be able to use that data to identify how well health care facilities are doing voluntarily with programs to protect workers or complying with existing regulations. The quantitative assessment of [safety programs] will help everyone understand what real priorities there are. It may help [the Occupational Safety and Health Administration] conduct enforcement that's more effective against real hazards."

The stakeholder meetings were well attended in Baltimore and Seattle, with representatives of labor, hospitals, and academia. Ergonomics experts presented information on methods for preventing musculoskeletal disorder (MSD) injuries, the most common lost-work injury in

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Editorial Questions

For questions or comments call **Michele Marill** at (404) 636-6021.

THOMSON
AMERICAN HEALTH
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health care. Attendees broke into small groups to discuss their information needs related to stress, violence, chemical hazards, and biologic hazards.

NIOSH conducted National Exposure at Work surveys in the early 1970s and 1980s, with a single survey that was used for all workplaces. This time, distinct surveys will be developed for different types of employers. Health care is the first area of focus.

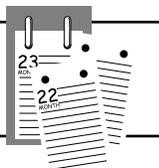
"By approaching this sector by sector, we thought we could get more specific information that would be more valuable [to employers]," Boiano says. NIOSH expects to begin conducting pilot tests of a survey this summer. The survey would probably be conducted in 2003, she says.

"The biggest challenge will be for NIOSH to take all the input and decide what to include in the survey," he says. "We need to go after what we feel are the most important issues, the issues that will have the most impact."

By focusing on health care alone, hospitals may finally get some national occupational health data that can be used for benchmarking, says **MaryAnn Gruden**, MSN, CRNP, NP-C, COHN-S/CM, employee health nurse practitioner with Western Pennsylvania Hospital in Pittsburgh and executive president of the Association of Occupational Health Professionals in Healthcare.

"There's not a lot of good data out there," she says. "If we had national data, I think it would really help a lot of clinicians who are trying to promote safety programs or injury reduction programs in their facilities." ■

CALENDAR



• **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 information, contact AOHP, 500 Commonwealth Drive, Warrendale, PA 15086. Telephone: (800) 362-4347. Fax: (724) 772-8349. Web site: www.aohp.org/aohp/. ■

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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. ■

Patient Assessment, Care Planning & Algorithms for Safe Patient Handling and Movement

Purpose of Patient Assessment Criteria

The following patient assessment criteria will assist health care staff in considering critical patient characteristics that affect decisions for selecting the safest equipment and techniques for patient handling and movement tasks. Health care staff members have become accustomed to using whatever limited lifting aids are available, rather than carefully matching equipment to specific patient characteristics. It is expected that careful use of this assessment and planning tool will improve safety for both patients and caregivers. Patients will receive assistance appropriate for their functional level, assuring safety and comfort. For caregivers, the goals are to decrease the incidence, severity, and costs associated with job-related injuries, as well as decreasing the intensity, duration, and frequency of job-related musculoskeletal pain and discomfort.

Background

A Technical Advisory Group (TAG), working in collaboration with the Public Health and Environmental Hazards, Patient Safety Center of Inquiry in Tampa, FL, and Healthcare Analysis and Information Group, was formed. The TAG developed an algorithm for each of the key transfer and repositioning tasks. The algorithms were tested with different patient populations in a variety of clinical settings. The algorithms are designed to assist health care employees in selecting the safest equipment and techniques based on specific patient characteristics. These guidelines were prepared based on scientific and professional information available in March 2001. Users of this guideline should periodically review this material to ensure the advice herein is consistent with current reasonable clinical practice. As with any guideline, this content provides general direction; professional judgment is needed to assure safety of patients and caregivers. **(For a form that can be used in patient care areas for assessing patients, see p. 3.)**

Key Points for Caregivers

- ✓ Assess the patient.
- ✓ Assess the area.
- ✓ Decide on equipment.
- ✓ Know how to use equipment.
- ✓ Plan lift and communicate with staff and patient.
- ✓ Work together, including actions of more than one caregiver as well as the patient.
- ✓ Have the right equipment available, in good working order, and conveniently located.

Key Assessment Criteria

- ✓ Ability of the patient to provide assistance.
- ✓ Ability of the patient to bear weight.
- ✓ Upper-extremity strength of the patient.
- ✓ Ability of the patient to cooperate and follow instructions.
- ✓ Patient height and weight.
- ✓ Special circumstances likely to affect transfer or repositioning tasks, such as abdominal wounds, contractures, or presence of tubes, etc.
- ✓ Specific physician orders or physical therapy recommendations that relate to transferring or repositioning patients. (For example, a patient with a knee or hip replacement may need a specific order or recommendation to maintain the correct angle of hip or knee flexion during transfer.)

Care Plan Considerations

- ✓ Type of task to be completed, e.g., transferring, repositioning, ambulating, or toileting.
- ✓ Type of equipment or assistive devices needed.
- ✓ Number of caregivers needed to complete the task safely.

Process for Using Assessment and Planning Criteria

The specific process for assessment and care planning may vary by facility, patient population, or level of care. However, key elements need to be considered and integrated into the assessment and care planning process for safe patient handling and movement:

- ✓ Who completes the assessment?
- ✓ How often assessment is completed.
- ✓ Communication plan.
- ✓ Updating/revising the plan as needed.

Purpose of Algorithms

This provides assessment criteria to assist health care staff in the planning for safe handling and movement of each patient. Algorithms should be used as guides when planning patient transfers and repositioning tasks. The algorithms are targeted for people directly involved with patient handling and movement, such as registered nurses, licensed practical nurses, nursing assistants, orderlies, physical/occupational therapists, radiology technicians, and patient care technicians. **(For a sample algorithm, see p. 4.)**

Background

The algorithms are designed to assist health care employees in selecting the safest equipment and techniques based on specific patient characteristics. These guidelines were prepared based on scientific and professional information available in March 2001. Users of this guideline should periodically review this material to ensure the advice herein is consistent with current reasonable clinical practice. As with any guideline, this content provides general direction; professional judgment is needed to assure safety of patients and caregivers.

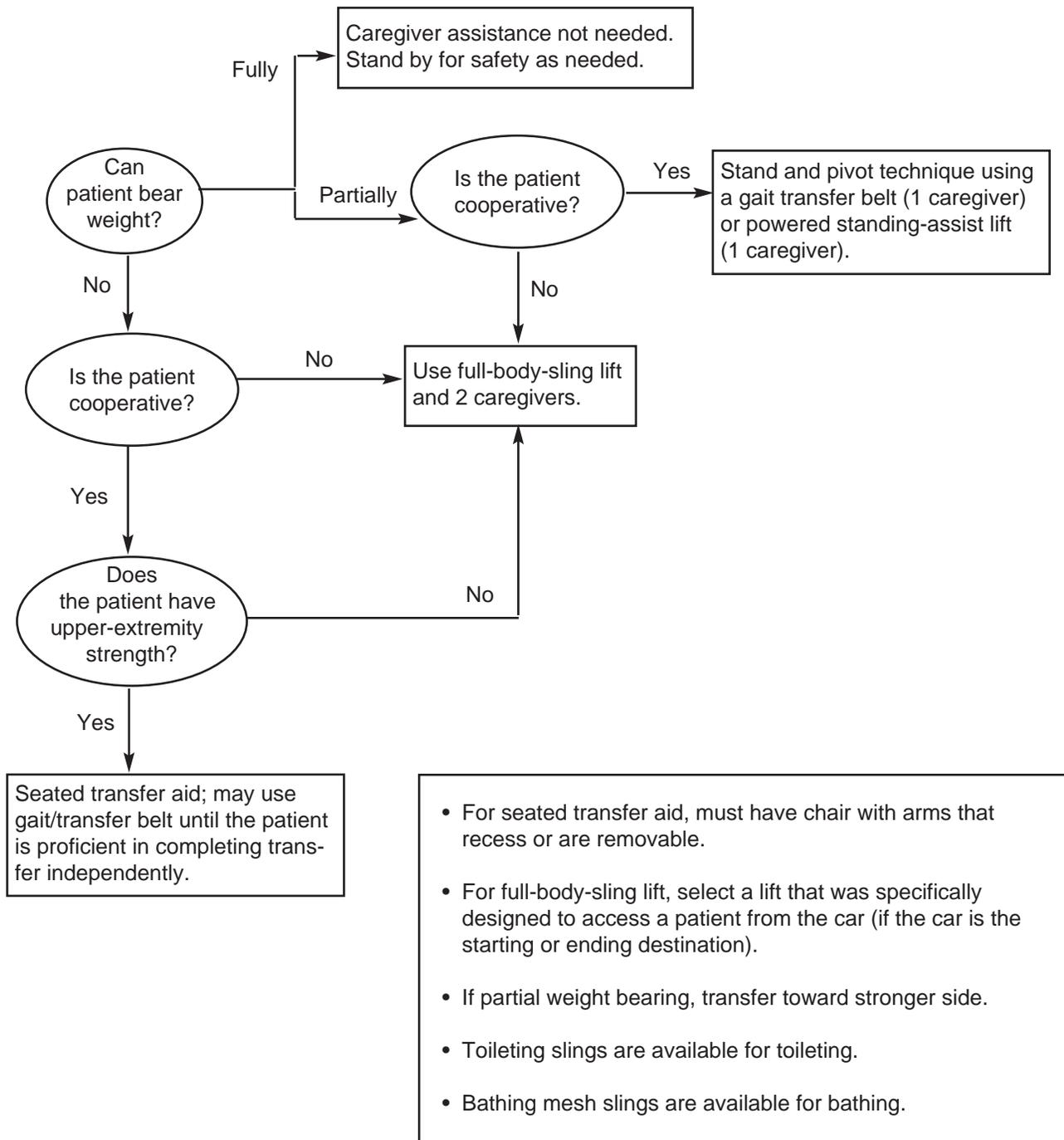
These algorithms were tested with different patient populations in six clinical areas:

1. intensive care units;
2. acute care units;
3. nursing home care units;
4. outpatient areas and clinics and emergency departments;
5. operating and recovery rooms;
6. spinal cord injury units and rehabilitation units.

The algorithms were reviewed and approved for use by Veterans Health Administration (VHA) nurse executives.

To see additional algorithms, go to VHA's web site: www.patientsafetycenter.com/products.htm.

Algorithm 1. Transfer to and from: Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair



- For seated transfer aid, must have chair with arms that recess or are removable.
- For full-body-sling lift, select a lift that was specifically designed to access a patient from the car (if the car is the starting or ending destination).
- If partial weight bearing, transfer toward stronger side.
- Toileting slings are available for toileting.
- Bathing mesh slings are available for bathing.

Source: Veterans Health Administration, Washington, DC. Web site: www.patientsafetycenter.com/products.htm.

BIOTERRORISM WATCH

Preparing for and responding to biological, chemical and nuclear disasters

Traumatized health care providers may need stress counseling in horrific aftermath of bioterror attack

A severe test for a mentally tough profession

In a finding that is likely relevant to many other states, a recent tabletop exercise in Columbus, OH, found that the health care system may be better prepared to deal with bioterrorism victims than the traumatized frontline providers who give them care.

The exercise was conducted by the Ohio Senior Interagency Coordinating Group in Columbus.

After running a scenario involving intentional release of pneumonic plague at a rock concert, emergency preparedness officials discovered there was little in place to address the mental health needs of doctors and nurses in the horrific aftermath. In the exercise, an attack with *Yersinia pestis* resulted in 332 fatalities, 720 hospitalizations, and 4,300 people who were examined and released.

“How do you handle all of the nurses and doctors who have seen many, many deaths, who have tried to decrease panic by remaining calm, and who have survived this huge confusion and turmoil?” asks **Kay Ball**, RN, MSA, CNOR, FAAN, a participant in the exercise and perioperative consultant and educator at K & D Medical in Lewis Center, OH. “What about their mental health? That is something that we found that we are weak in. We really have to develop that better.”

The hypothetical event began Friday, March 15, when a popular regional band performed at Shawnee State University in Portsmouth, OH. Approximately 2,000 students and community members went to see the band, which is known for its use of smoke and visual enhancements,

according to the scenario. **(See tabletop timeline, p. 3.)**

“[The terrorists] aerosolized the agent in a fogging system and that is how it was spread throughout the building,” says **Darren Price**, exercise training officer with the state of Ohio Emergency Management Agency in Columbus.

The players take their seats

The exercise had four groups of about nine people, each working at different tables as the events unfolded. The groups were health/medical, law enforcement, fire/emergency medical services, and government. An audience of about 150 people was on hand to observe and evaluate the exercise.

“The whole purpose was to determine our strengths and weaknesses through the disaster that happened,” says Ball, who served as facilitator and discussion leader of the health/medical group. “The planning committee will meet and analyze what we learned from this, and then we will bring back everybody who participated.”

The scenario was divided into three phases: incubation, response, and recovery. Each phase received about an hour of discussion at the tables, and all players received updated information at the same time. **(See tabletop tips, p. 2.)** The scenario was necessarily arbitrary but designed to

This supplement was written by Gary Evans, editor of *Hospital Infection Control*. Telephone: (706) 742-2515. E-mail: gary.evans@ahcpub.com.

test the state's resources at many levels, Price notes.

"Anytime, you are dealing with tabletop exercises there are a lot of assumptions and artificialities built in just to make it flow," he says. "We ask [participants] to bring their emergency operations procedures and plans, and to actually react based upon their plan."

While the exercise is still being analyzed, the mental health needs for medical providers became apparent in playing out the scenario. Part of the problem is the historic perception that health care workers must not succumb to the emotional toll of patient care, Ball says.

"Even in surgery today, if we lose a patient on the table, there is nothing really in place to talk about the trauma the practitioners are going through," she says. "We just think that we are these stalwart people and we can't crumble under emotional strains. That was one of the [identified] weaknesses."

In contrast, firefighters and emergency medical service workers had a more thorough stress debriefing process than their hospital-based counterparts.

"Within the hospitals themselves we really don't have the mental and spiritual health that we need," she says.

Moreover, the scenario projected widespread "psychological manifestations" in the affected area, with students withdrawing from school and residents reluctant to return to their homes. Bioterrorism response planners brainstormed about how to fight the problem, including bringing in celebrities and public officials to show it was safe to return to the stricken area.

The scenario included a short delay in determining the etiological agent, with chaos building before plague was confirmed as the infecting pathogen. Even with the new emphasis on bioterror education, that scenario is fairly realistic because so few clinicians have seen infections caused by the potential bioterrorism pathogens.

"The first problem was what kind of a bug was it?" Ball says. "Where do we send the cultures, and how fast can we get them back?"

The scenario also had many students leaving on spring break. Given the anticipated exodus of people from the community — particularly into the neighboring states of Kentucky and West Virginia — there was no attempt to set up mass quarantine areas, Price says. Instead the national stockpile of antibiotics was called up and confirmed or suspect cases were treated and isolated.

"We looked at the issue of quarantine and determined it was not really feasible," he says. "You would have these large [quarantine] circles everywhere. We moved more toward isolation [of patients] at that point."

While identifying a weakness in mental health care, the planners found communications were strong between groups, there were no turf battles, and additional resources became available quickly.

"One of the strengths that we found was that we were able to get supplies in and to call in extra people," Ball says. "We were able to pull in lots of people very rapidly. We are learning how to work more with all of the other diverse factions."

Indeed, the exercise was set in a rural area so that resources would be taxed, reaching thresholds that would trigger state response, Price adds.

"We're better prepared today than we were yesterday," he says. ■

Bioterror tips for running a tabletop

Planners of a recent bioterrorism tabletop exercise in Columbus, OH, (**see cover story for more information**) offered the following tips for participants in the exercise:

- The scenario is plausible, and events occur as they are presented.
- There are no hidden agendas or trick questions.
- All players receive information at the same time.
- There is not a "textbook" solution. Varying viewpoints and possible disagreements are anticipated.
- Respond based on your knowledge or current plans and capabilities.
- Current agency or department policies and procedures should not limit discussion and development of key decisions.
- The outcome is neither intended to set precedents or reflect an organization's final position on specific issues.
- Assume cooperation and support from other responders and agencies.
- Speak up! Talk to your colleagues and ask questions. This is your chance to learn how other agencies in your community would respond in an emergency. ■

Dire straits: Plague released at concert

Tabletop scenario from first case to aftermath

Highlights of a recent bioterrorism tabletop exercise run by planners in Ohio (**see cover story for more information**) included the following timeline of events:

Sunday, March 17, 2002, Portsmouth, OH

8:00 a.m.: At the emergency department (ED) of Southern Ohio Medical Center (SOMC), a doctor has just come on duty and sees her first patient, a 22-year-old woman. The patient's sister says the woman has been complaining of chest pain and has a temperature of 102 degrees F. The sister worries that the patient may have caught the "bug" through her position at the Shawnee State University (SSU) dormitory mailroom where she works part time. A rapid flu test shows a negative result.

The physician is suspicious in light of the national anthrax cases five months earlier and orders a sputum and blood culture. Transport assistance is requested for sending the cultures to the Ohio Department of Health (ODH) laboratory for anthrax testing. The woman is admitted. The Portsmouth City Health Department and Scioto County District Board of Health are notified of the situation. In turn, the ODH and Ohio Emergency Management Agency (EMA) duty officer are called.

2:00 p.m.: The 22-year-old woman admitted to SOMC earlier this morning develops severe respiratory complications and dies. A full autopsy is ordered, and the physician awaits the preliminary results of the sputum and blood cultures. As the day progresses, local emergency medical services (EMS) become overwhelmed with patients presenting with flu-like symptoms. People presenting with the most severe symptoms, including high fever and difficulty breathing, are hospitalized; however, with many more sick waiting in the ED, the hospital beds and wards are filling rapidly.

5:00 p.m.: Traffic around SOMC becomes impassible, and several ambulances are severely hindered. Medical facilities request security assistance from local law enforcement agencies.

10:00 p.m.: Six patients admitted during the day with the severe flu-like symptoms also die. New cases continue to arrive at SOMC with an increase in the number of patients reporting each hour.

Monday, March 18

8:00 a.m.: Overnight, a public health emergency was declared in Scioto County. A request was made

by Scioto County Health, via the Scioto County EMA and elected officials for state support in the growing crisis.

A Level 2 emergency status is reached in Scioto County. The state assessment room is activated to support the events in Scioto County.

10:00 a.m.: The preliminary tests of clinical specimens taken from the 22-year-old woman who died Sunday are complete. The ODH Lab notifies the local health departments that the specimens have tested negative for *Bacillus anthracis*. The laboratory begins rule-out testing for other pathogens.

3:00 p.m.: Epidemiological evidence points to an event three days earlier as a common activity of the majority of new patients. On Friday, March 15, a popular regional band performed at SSU in Portsmouth. The band is well known for use of visual enhancements. Approximately 2,000 students and community members attended the concert.

4:00 p.m.: Hospital supplies are insufficient to meet demand. Fifteen additional patients have died, and 111 are listed in critical condition. Reports now include similar symptoms among several health care workers and first responders. SOMC hospital beds are full.

5:30 p.m.: ODH Lab staff notifies Scioto County local health officials that the 22-year-old patient's cultures are preliminarily positive for *Yersinia pestis*. Local health officials inform local health care professionals and EMS personnel that, in order to prevent the spread of disease, patients having confirmed pneumonic plague should be isolated until sputum cultures are negative for *Y. pestis* bacilli.

Those suspected of having pneumonic plague should be isolated for 48 hours after antibiotic treatment begins.

Wednesday, March 27

It has been 10 days since the first victims arrived at SOMC and local clinics. There have been no further cases of illness identified in Scioto County in the past seven days.

Waiting for signs of recovery

Resources begin to flow into the area as a result of national public outreach. Visitors, however, avoid the area and the impact of the event on the local economy becomes apparent as local businesses are slow to reopen.

The psychological manifestations associated with this event are widespread. Although school reopens, many students withdraw from classes for the quarter. Local residents, still frightened and shocked, look to local and state officials for guidance as they attempt to return to normalcy. ■

Winds of war: Researchers track airborne anthrax

A strikingly rapid and wide dispersion

Struck by the surprising level of aerosolization after merely opening an envelope, Canadian researchers are now using a spore surrogate to study how airborne anthrax silently spreads within an office building, *Bioterrorism Watch* has learned.

Researchers are using *Bacillus globigii* spores to simulate the movements of *Bacillus anthracis* in a one-story research building at the Defence Research Establishment Suffield (DRES) at the Canadian Forces Base in Suffield, Alberta, says **Kent Harding**, chief scientist at DRES. “We will be looking at movement between actual offices along corridors using the *B. globigii* as a simulant. It is a spore-like material that is a well-accepted simulant used to assess and challenge biological detection apparatus.” The DRES is on the cutting edge of bioterrorism research; scientists there were studying the dispersion of anthrax from envelopes prior to Sept. 11 and its aftermath. In response to an anthrax hoax mailing in Canada in February 2001, the DRES conducted a study last year using an 1,800 cubic foot test chamber to represent an office space. “We had a hoax letter in this country that closed down a major federal office building,” he says. “We were interested in [determining] had it been a real infectious material in the envelope, what was the extent of the risk? We went to the scientific literature and really didn’t find anything.”

It was hypothesized that opening an envelope constituted a “passive form of dissemination” that would produce minimum aerosolization of spores unless additional energy was added via panic behavior or strong airflows, the researchers stated.¹

“Our scenario was in a chamber, which was conducive to studying the movement of materials on air currents,” Harding says. “An individual was given a stack of envelopes and told to keep opening them until powder fell out. When that happened, [he or she] stood quietly by the desk and didn’t move for 10 minutes. We just looked at the movement of material around the room, just simply as a consequence of opening the envelope and pulling out a piece of standard 8½ by 11 paper folded in three.” Almost immediately upon opening the envelope, a significant aerosol concentration was observed in the area of the “desk.” It

declined slowly over the 10-minute sampling period, but the high-resolution slit sampler plates used to measure the release became densely packed with bacterial colonies. In the study, significant numbers of respirable aerosol particles were released upon opening envelopes containing 0.1 g or 1.0 g of *B. globigii* spores. A potentially deadly dose could be inhaled within seconds of opening an anthrax spore-filled envelope. Also, the aerosol quickly spread throughout the room so that other workers, depending on their exact locations and the directional airflow within the office, would likely inhale doses. There was very heavy contamination on the back and front of clothing worn by the test subject.

“There was a large dose presented to the person opening the envelope, which was not unexpected,” Harding says. “But what was surprising was the very rapid and extensive movement around that room simply as consequence of the movement of normal air currents. It distributed around the room very quickly and in fairly high quantity.”

The researchers also found that the spores could escape from a sealed envelope, a phenomenon that caught U.S. investigators off-guard during the 2001 attacks. “We did note that in a standard envelope sealed in the usual way — just with licking the glue on the back of — that there are substantial openings on the back of the envelope,” he says. “In fact, the ‘envelope people’ design them that way so you can get a letter opener inside. Spores did escape from those openings, but we never quantified that and never referred to it to anything more than an anecdotal manner.”

The Centers for Disease Control and Prevention (CDC) in Atlanta was apparently unaware of the study during the initial stages of the U.S. anthrax attacks. Whether it would have made any difference is impossible to say, though some wonder if it would have resulted in more aggressive treatment of postal workers.² Regardless, the CDC decision to administer antibiotics to a broad range of people, not just those in the immediate exposure area, is reinforced by the study, Hawkins says. The Canadian researchers have now fully briefed the CDC about the study and their ongoing research.

References

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