

BIOTERRORISM



WATCH

Preparing for and responding to biological, chemical and nuclear disasters

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IN THIS ISSUE

- **Push packages:** Whether you live in Maine or Hawaii, the CDC has a push package of drugs that will be there within 12 hours after an attack is detected. cover
- **Smoking or nonsmoking?** Local planners must decide on segmented or nonsegmented drug distribution sites 35
- **Information breakdown:** Communication between hospitals, health departments was major problem in a federal bioterrorism drill 36
- **Baby food tampering:** Ground-up remnants of castor beans found in 2 baby food jars in Irvine, CA 37
- **Bioterror leadership:** Panel urges transparency in government actions 38
- **Exposure to chem agents:** CDC and toxicology journal collaboration 38

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The threat of airborne anthrax adds urgency to antibiotic stockpile plans

'A public health crisis unlike any we ever have faced'

The threat of airborne anthrax — the new clear and present danger in the realm of bioterrorism — is spurring public health officials to underscore the importance for states and communities to plan ahead for dispensing mass quantities of antibiotics.

A chilling new threat assessment of anthrax was described during a recent satellite training broadcast on rapid distribution of the federal Strategic National Stockpile (SNS) of antibiotics and other critical medicines.

"Recent threat analyses have made it clear that many of us have been underestimating the size of the threat associated with outdoor release of spores of *Bacillus anthracis* — the organism that causes anthrax," said **William Raub**, PhD, principal deputy assistant secretary of public health emergency preparedness at the U.S. Department of Health and Human Services (HHS). "We now realize that using only conventional microbiological techniques and commercially available spraying equipment, terrorists could distribute *Bacillus anthracis* spores over an area of several square miles. If those several square miles correspond to a densely populated area, we would have a public health crisis unlike any we ever have faced."

Raub's warning that terrorists could disperse airborne anthrax over an unsuspecting population with frightening ease follows dire assessments by other officials. For example, **Michael Osterholm**, PhD, an advisor to HHS Secretary Tommy Thompson, noted that there were 250 million infectious doses in each anthrax envelope that was sent in 2001. Yet as powerful as it was, the anthrax apparently was not the work of a highly skilled bioweapons laboratorian.

The FBI "reverse engineered" the anthrax powder used in the attacks and found it was made by somebody who probably had no more than a college education and spent less than \$5,000 using off-the-shelf technology, according to Osterholm.

The common theme of these risk assessments appears to be that little sophistication is required for either production or dispersal of airborne anthrax. The key to meeting the anthrax threat in medical

terms is outbreak detection and rapid distribution of antibiotics. Whether you live in Maine or Hawaii, the Centers for Disease Control and Prevention (CDC) said it has a "push package" of ciprofloxacin and other drugs that will be there within 12 hours after an attack is detected. The push packages are caches of pharmaceuticals, antidotes, and medical supplies designed to provide rapid delivery of a broad spectrum of assets for anthrax or an undefined threat in the early hours of an event. The packages are positioned in strategically located, secure warehouses ready for immediate deployment.

"[After an attack], the biggest remaining hurdle is to get pills from the airport into people's mouths

in time to save lives," Raub said. "We would know that among those who inhaled enough spores, the first cases of pulmonary anthrax almost certainly would appear within 48 hours. We, therefore, would have to initiate chemoprophylaxis for everyone in the affected geographic area within as short a period of time as possible. . . . Simply put, the longer we take to distribute the antibiotics the more people will die. If the affected area includes a million or more people, each day's delay in penetrating the community with antibiotics could translate into thousands if not tens of thousands of deaths," he added.

Rolling out the stockpile

The decision to roll out the SNS may be based on evidence showing the overt release of an agent, but more likely more subtle indicators such as patterns of unusual morbidity and mortality will trigger it. To receive SNS assets, the affected state's governor's office will directly request the deployment of the SNS assets from the CDC or HHS.

"Mass antibiotic dispensing is where the rubber meets the road during a bioterrorism attack," said **Curtis Mast, MS, SNS**, exercise coordinator at the CDC. "All other emergency plans may work flawlessly, but if a community cannot rapidly dispense medications to its population, lives may be lost. While many of us are familiar with dispensing clinics, this scenario will be different because of the quick ramp-up time required and the almost overwhelming number of people that will require medication."

To accomplish the basic goal of getting "pills in people" following an anthrax attack, for example, state and local planners must predetermine their points of dispensing or PODs. One of the best sources of information on setting up POD sites is Weill Medical College of Cornell University in New York City. POD researchers there have developed a Bioterrorism Epidemic Response Model (BERM), which can help planners determine staffing needs and ways to avoid patient bottlenecks at antibiotic distribution sites. (For information on BERM, go to www.ahrq.gov/research/biomodel.htm.)

"If you're in a situation where there has been a covert or hidden release of an anthrax agent and people are starting to become ill, you may need to move a truly unprecedented amount of antibiotics into the public's hands in record time," said **Nathaniel Hupert, MD, MPH**, one of the principals in the BERM program at Cornell. "It is a

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Editorial Questions

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good strategy to think about what would be for the most extreme situations and then [work] backward to more easily managed scenarios.”

The BERM model was essential in helping planners in Minnesota, said **Luane McNichols**, BSN, MN, clinical coordinator at the state department of health in Minneapolis.

“We found that deciding on the number of PODs was a huge challenge,” she explained. “The BERM model enabled us to manipulate variables to look at multiple scenarios for mass dispensing. It also helps the regions look at their available staff, population, and facilities and make a judgment about how large their dispensing sites should be in terms of throughput or persons per hour.”

POD sites selected in Minnesota include schools, conference centers, and churches with throughputs ranging from 250 patients per hour to 1,000 per hour, she noted. Implementing the state smallpox immunization program previously helped establish regional contacts that made the POD planning go easier, McNichols added. The state has regional and local interdisciplinary teams that include representatives from public health, hospitals, emergency management, Native American tribal members, and volunteer groups.

Concerning the latter, the issue of volunteers is a formidable one every community has to face in planning to meet the challenge of mass distribution of antibiotics. “After all of the structure is in place, we are left with a really huge challenge: finding the people, filling the positions with the appropriate people, and of course, getting them trained,” McNichols explained. “This is an almost overwhelming task.”

Experts dealing with volunteer groups say it is not so much a question of whether people will step forward in an emergency — they will — but how to assign them tasks and duties that can make for a smooth operation. One idea is to give volunteers consistent, defined roles in all PODs, McNichols said. “Volunteer recruitment is being planned through a statewide registry, and a number of the counties have a medical reserve crop, or they are looking at forming them. We realize that many PODs will still have staffing gaps. It is our hope that volunteers will come forward in an event and then be just-in-time trained on- or off-site.”

Borders will not be respected

To ease dispensing, the state plans call for standing prescription orders that will be written by the state epidemiologist. The state has been

Picking the right POD design: Segmented or nonsegmented?

In the wake of a bioterrorism attack requiring the release of the Strategic National Stockpile (SNS), local planners will have to set up points of distribution (PODs) for antibiotics and other medicinal interventions. Though stressing there is no right or wrong answer to the question, planners must decide initially whether there PODs are going to be segmented or nonsegmented, noted **Curtis Mast**, MS, SNS exercise coordinator at the Centers for Disease Control and Prevention (CDC).

“Segmented operations mean physically separated pre-prophylaxis activities from the actual dispensing of medication,” he explained during a satellite training broadcast. Under the segmented strategy, the public is instructed to gather in one location, where they could be screened, triaged, and given the required educational materials. Then they are transported in groups to the actual POD site to receive medication.

“The benefits of a segmented approach include reduced parking and traffic congestion at the POD, indirectly improving security at the POD by controlling access to it,” Mast added. The segmented design also potentially decreases the number of worried well who show up for antibiotics, allowing a means to regulate the flow of people into the POD site and balance public flow to all sites.

“With a segmented approach, you have to consider the additional layer of logistics,” he said. “You’ll need to provide buses, drivers, and fuel at the POD locations; and you must consider the cost for each of these items when planning.” In a nonsegmented approach, all aspects of POD operations are conducted at one location. “POD sites must be large enough to keep several hundred or possibly even thousands of people under cover and out of the weather. Protecting people waiting in line from excessive heat, cold, rain, and snow is very important.”

At a minimum, each site distributing antibiotics must have electricity, heat, and air conditioning, a receiving area for supplies that is out of the public view, plenty of water, and space for parking. “One big concern is parking,” Mast noted. “One of the things that the SNS program discovered during our research was that the number of abandoned cars increased proportionally to the attack rate of the illness. Once you screen someone out of the crowd as being sick and transport them to the hospital, you have an abandoned car. How would you handle this? Are you planning to use tow trucks?”

One approach is to screen people in their cars, directing those who need medical care to area hospitals. “Another drawback to the nonsegregated approach is that the public — and not you — controls the access to the site,” he added. ■

divided into eight regions in terms of planning, but, of course, disease does not respect borders.

"All of them are aware that an event will cross all borders, so we are actively planning across the regions, with neighboring states and with Canada on all cross-border issues," McNichols said. "As the regions are picking their POD sites, they are projecting where their populations will go in an event based on normal traffic patterns and normal habits. As we work with a neighboring state we realize that populations are often more apt to go a bordering city that's nearby rather somewhere further away in their own state."

Using population density data and the BERM model, Minnesota planners have figured out how to place the PODs where only 15% of the population will have to drive more than five miles to reach a site in urban areas, she pointed out.

In the states' vast rural areas each region had to make a reasonable commute decision for their population, with some deciding on one, two hours, or even longer, she says. "Some have chosen to set up traveling dispensing units," added McNichols.

Indeed, given the complex issues raised by establishing PODs, federal planners are looking at novel ways to augment the process.

In addition to mobile dispensing units, another strategy under discussion with the U.S. Postal Service is to have mail carriers deliver antibiotics to residential addresses. While these efforts may augment the process, PODs still will have to be established and run by local health responders and volunteers. "The primary initial burden falls entirely on the local community," Raub said.

Common problems and questions are expected to arise regardless of the region. For example, what do you do with the worried well, those patients who do not meet the exposure definition but nevertheless demand antibiotics at the POD site.

"They are going to show up; what do you do with them?" Mast asked. "Do you turn them away because they don't meet the exposure profile? You'll have to have a response and an information packet for the worried well. Your response may be as simple as, 'We understand your concern. You don't need the criteria for exposure that the health officer defined; and because of that, you're not going to get medication today. But here is a packet of information that includes a phone number and web site where you can receive more information.'"

Such issues underscore the importance of adequate security and a public education campaign through the local media. "Providing information

and medication go hand in hand, he added. "You will not have a successful [distribution effort without] a media, public relations, risk communications campaign."

An initial priority is that all key local players — and their families — are given antibiotics or other medicine first as warranted by the bioterrorism agent, he said.

(Editor's note: For more information about the public health satellite training broadcast described in this story, go to www.phppo.cdc.gov/phtn/antibiotic.) ■

Communication breakdown plagues bioterrorism drill

But follow-up drill shows improvement

Communication between hospitals and public health departments was a major problem among Chicago-area facilities participating in a federal bioterrorism drill, says **Connie Cutler**, RN, MS, CIC, director of clinical excellence for Advocate Healthcare.

As the coordinator for infection control activities in the eight-hospital system, Cutler also was particularly aghast that in some of the hospitals, the infection control department was not contacted during the exercise.

"My colleagues said they were waiting by the phone for the call from the emergency department," she says. "It never came."

During the May 2003 exercise held by the U.S. Department of Homeland Security, there was inadequate communication between hospitals in health departments.

"Part of the problem was that we have eight hospitals that report to four different health jurisdictions," she says. "They use different reporting forms and different mechanisms of notifying the health department. Some departments want a simple one-page form faxed to them, and others wanted a three-page form on every patient."

While some health departments worked well with their area hospitals, others were overwhelmed by the number of patient reports they received. The scenario was a release of pneumonic plague at a large indoor sports arena and at the metropolitan airport.

The hospitals were not aware of the venues, but had been advised by drill planners that the

agent would be pneumonic plague.

"To me, it would be a better drill had we not known it was pneumonic plague," Cutler says. "That kind of made it a slam-dunk for our ED [emergency department] docs to know what these patients had when they came in. I think [planners] did it to allay panic and allow us to better triage the patients and not disrupt patient care. But it might have been hard for them [to make the diagnosis] because pneumonic plague is fairly nonspecific."

As it was, surges of incoming "patients" were played by drill participants and represented by incoming faxes. The surge of patients seriously challenged the capacities of the hospitals, she adds. More than 300 patients — human and paper — were sent to the eight EDs during the drill.

Approximately one-third of the patients had symptoms consistent with pneumonic plague. A number of patients were dead on arrival or expired soon after.

While communication was lacking, all hospitals initiated appropriate isolation precautions, Cutler reports. Symptomatic patients were placed on airborne precautions in negative-pressure rooms, and personnel wore N95 particulate respirators. Most hospitals switched to surgical masks once the health departments identified the agent. One site recorded an inadequate supply of personal protective equipment. Infection control or employee health gave prophylaxis to exposed patients and personnel. However, one hospital did not take the drill seriously enough, simply setting the patients aside, designating them for isolation and — as previously mentioned — not contacting the infection control department.

"They didn't go through the exercise of trying to move people around — at least on paper — and they did not contact infection control," she says. "They did a postmortem on the drill, and the observers who were sent from the federal government said, in this particular hospital, you would have had infections spread all over the hospital."

However, a follow-up, unannounced exercise held a few months ago yielded much better results. "In the year since [the drill], we have made major improvements, especially at the hospitals that were not reacting the right way," Cutler adds. "We had another bioterrorism drill on a smaller scale that was unannounced. It happened on a Saturday, when we [ICPs] don't normally come in, but every infection control professional was called at home. It was very impressive how much we had learned in a year." ■

Ground castor beans put in tampered baby food jars

Domestic terror scare does not involve refined ricin

In what appears to be a relatively crude attempt at domestic bioterrorism, ground-up remnants of castor beans were found in two baby food jars in Irvine, CA.

Although ricin can be purified through chemical extraction processes from castor beans, the material found in these jars was far less toxic than purified ricin, the Food and Drug Administration (FDA) reported.

Contrary to the impression given by some early reports, the FDA did not find purified ricin in the baby food jars, the agency stressed in a news release posted on its web site.

To date, no injuries have been reported, and the problems seem to be isolated within the immediate Irvine area. Nevertheless, consumers who find anything suspicious concerning the packaging or contents of baby food products should not feed it to anyone, but instead notify their local FDA office.

Look for lid safety

As with all baby foods, caregivers should carefully examine all food product packaging, including such anti-tampering devices as "lid safety buttons." According to a published report in the *Orange County Register*, a 47-year-old transient man was being sought for questioning in the case. Two sets of parents found threatening notes inside jars of Gerber Banana Yogurt Dessert fed to their infants. A third jar containing the same note couldn't be tested because one father washed out the food after his 11-month-old son had eaten some. The boy and a 9-month-old girl who ate from a separate jar were not harmed.

Notes inside the jars, purchased May 31 and June 16 at an Irvine supermarket were wrapped in cellophane. They implied that an Irvine police officer had planted the message. Confirmation of the mashed castor beans took weeks because the food was sent to the Orange County Crime Lab for forensic analysis and then to the FDA to test for chemical contents, officials said.

For more information on food tampering, go to FDA's web page at www.cfsan.fda.gov/~dms/fstamper.html. ■

Panel urges leaders to be forthright and open

Don't withhold info out of fear of public panic

Given the well-chronicled vulnerabilities of human society to large-scale disease outbreaks, the prospect of “deliberate epidemics” is a daunting one for both political and medical leadership.

In that regard, a working group has published a bioterrorism leadership guide to assist such decision makers, including governors, mayors, and health officials.¹

The panel concluded that governing successfully during large, fast-moving, lethal epidemics requires dynamic collaboration among members of a community and the community's leaders.

“Particularly in the context of bioterrorism, when fear and uncertainty may be significant forces, leaders' abilities to enlist communities in a collaborative effort to care for the sick and prevent the spread of disease could prove pivotal, not only in terms of implementing an adequate response to the health crisis, but in limiting social and economic losses and in preserving fundamental democratic values and processes,” the authors concluded. They outline five strategic goals:

1. Limit death and suffering through proper preventive, curative, and supportive care; tend to the greater vulnerability of children, the frail elderly, and the physically compromised.
2. Defend civil liberties by using the least restrictive interventions to contain an infectious agent that causes communicable disease.
3. Preserve economic stability, managing the financial blow to victims as well as the near- and long-term losses of hard-hit industries, cities, and neighborhoods.
4. Discourage scapegoating, hate crimes, and the stigmatization of specific people or places as “contaminated” or unhealthy.
5. Bolster the ability of individuals and the larger community to rebound from unpredictable and traumatic events; provide mental health support to those who need it.

The report urges transparency in government actions, noting attempts to hide or hinder reports of disease historically have backfired. Breaches of social trust are a common predicament for leaders during outbreaks and are likely to arise during a bioattack. Social and economic fault lines as well as preconceived notions about “the government,” “the public,” and “the media” can alienate leaders and the public and community members from one another. The authors urged leaders to:

- **Share what you know.** Do not withhold information because you think people will panic. Creative coping is the norm; panic is the exception.
- **Hold press briefings early and often to reach the public.** Answering questions is not a distraction from managing the crisis; *it is* managing the crisis.
- **Confirm that local health agencies and medical facilities are prepared to handle an onslaught of questions** from concerned individuals, in person and by phone.
- **Convey basic health facts clearly and quickly so people have peace of mind that they are safe or so that they seek out care, if needed.** Similarly, brief health care and emergency workers so they have a realistic understanding about job safety.
- **View rumors as a normal sign of people's need to make sense of vague or disturbing events.** Refine your outreach efforts; the current ones may not be working.

Reference

1. The Working Group on “Governance Dilemmas” in Bioterrorism Response. Leading during bioattacks and epidemics with the public's trust and help. *Biosecurity and Bioterrorism* 2004; 2. Web: www.biosecurityjournal.com/PDFs/v2n104/p25.pdf. ■

Journal out on assessing exposure to chem agents

The Centers for Disease Control and Prevention (CDC) and the *Journal of Analytical Toxicology* have collaborated on a special issue

devoted to assessing human exposure to chemical agents.

The edition (available at www.jatoc.com/current.htm) highlights new methods using state-of-the-art instruments to measure low-level exposure to chemicals.

The chemicals agents include those that might be used by terrorists, such as nerve agents, sulfur mustard agents, and cyanide compounds. The issue also provides detailed animal-exposure information and reference values for assessing potential human exposure.

"Exposure to chemical agents is a relatively modern concern, and the literature base describing methods for detecting exposure is scant," says **John Barr**, PhD, a CDC research chemist and guest editor of the journal.

"This research is the most complete compilation of methods and data related to biomonitoring for chemical agents," he explains.

The 15 journal articles will serve as a preview of new techniques and methods that have been developed and are used by the National Biomonitoring Program (NBP), which is part of CDC's Environmental Health Laboratory.

The program specializes in measuring toxic substances or their metabolites in human specimens, such as blood or urine. NBP has developed methods to measure about 300 environmental chemicals from two to three tubes of blood and a regular urine sample.

In a chemical event, biomonitoring data provide information about the extent of exposure in a given individual and the proportion of a population affected by the exposure. The methods described in the journal will be used to identify people who need treatment, those at risk of developing long-term health effects or delayed health effects, and those who are worried that they may have been exposed to a chemical agent. The methods also will be used to assist in other disciplines such as forensics.

"The methods described in these manuscripts will primarily be useful for forensic applications, but also for crisis management — identification of the affected for treatment — or consequence management — differentiation of the worried well from those at risk of developing long-term

or delayed health effects — following a chemical emergency," Barr wrote in an accompanying editorial.¹

Reference

1. Barr JR. Editorial: Biological monitoring of human exposure to chemical warfare agents. *J Anal Toxicol* 2004; 28;305. ■

Clinician network created for bioterrorism info

The Centers for Disease Control and Prevention (CDC) has established partnerships with national clinician organizations for the purpose of timely communication of information on disease outbreaks and terrorism events.

This outreach effort to clinicians, Clinician Outreach and Communication Activity (COCA), is designed to:

- Assist clinicians in offering optimal care to patients by providing them with the most current and reliable information available on emerging diseases and terrorist threats.
- Provide information on infection control and protective measures for preventing spread of disease.
- Provide a system through which clinicians can communicate their educational needs to the CDC and receive answers to questions related to emerging diseases and terrorism from subject matter experts.

The CDC communicates with these partners via monthly conference calls and weekly e-mail updates. Partner organizations, in turn, serve as networks for dissemination of CDC communications to their memberships.

Conference calls serve as a venue for clinician partners to question CDC experts and to provide input to the CDC about their needs and concerns.

In the event of an urgent or emergency situation, these communications with partners are more frequent.

For more information on COCA, go to www.bt.cdc.gov/coca/index.asp. ■

COMING IN FUTURE MONTHS

■ Coverage of conference on syndromic surveillance

■ Determine exposure groups in an attack

■ The difference between bioterror and disaster drills

■ Learning the agent incubation periods

CE/CME questions

5. According to William Raub, PhD, which of the following would be required for terrorists to distribute *Bacillus anthracis* spores over an area of several square miles?
 - A. conventional microbiological techniques
 - B. access to a bioweapons lab
 - C. commercially available spraying equipment
 - D. A and C
6. Given the complex issues raised by establishing antibiotic distribution sites, federal planners are looking at novel ways to augment the process, including:
 - A. bicycle couriers
 - B. cash prizes
 - C. the postal service
 - D. all of the above
7. Which of the following agents can be made through chemical extraction processes from castor beans?
 - A. anthrax
 - B. ricin
 - C. bubonic plague
 - D. botulism
8. A working group on bioterrorism leadership urged transparency in government actions, saying "creative coping is the norm; panic is the exception."
 - A. true
 - B. false

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

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To clarify confusion surrounding any questions answered incorrectly, please consult the source material. After completing this semester's activity, you must complete the evaluation form that will be provided and return it in the reply envelope to receive a certificate of completion. When your evaluation is received, a certificate will be mailed to you. ■

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CE/CME objectives

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

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