Bioterrorism Preparedness and Response: Lessons, Challenges and Opportunities

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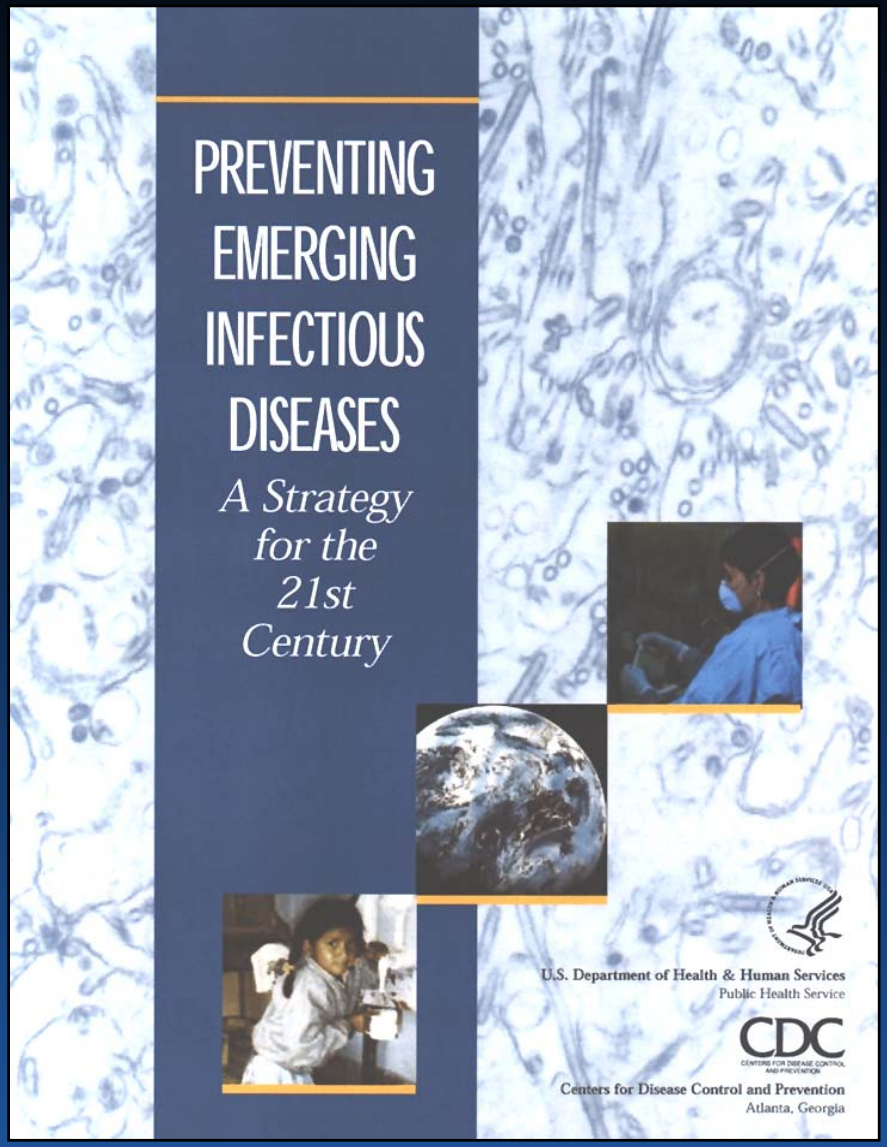
IOM Definition of Emerging Infections

New, reemerging or drug-resistant infections whose incidence in humans has increased within the past two decades or whose incidence threatens to increase in the near future.

Institute of Medicine Report, 1992



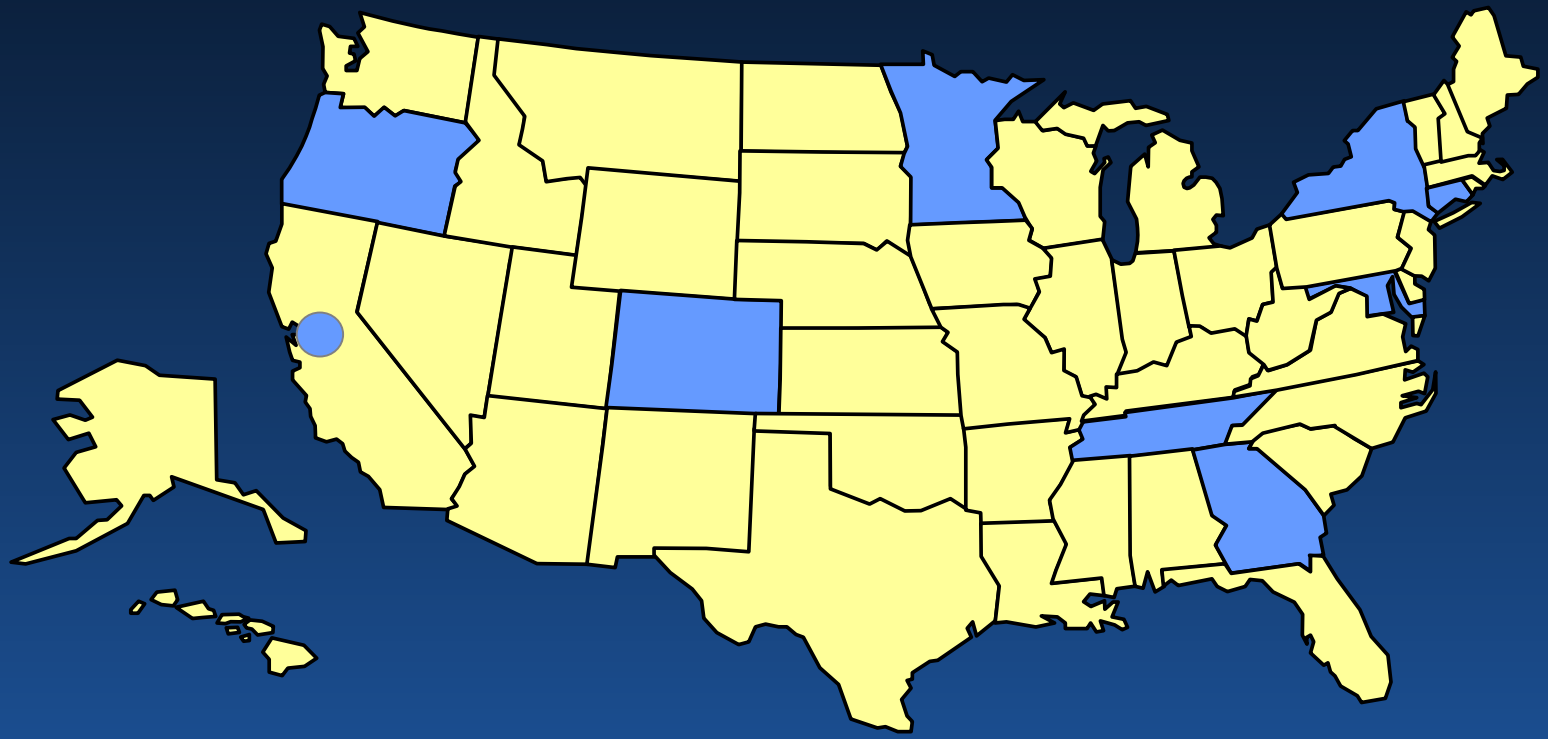
Goal I: Surveillance and Response

Goal II: Applied Research

Goal III: Infrastructure and Training

Goal IV: Prevention and Control

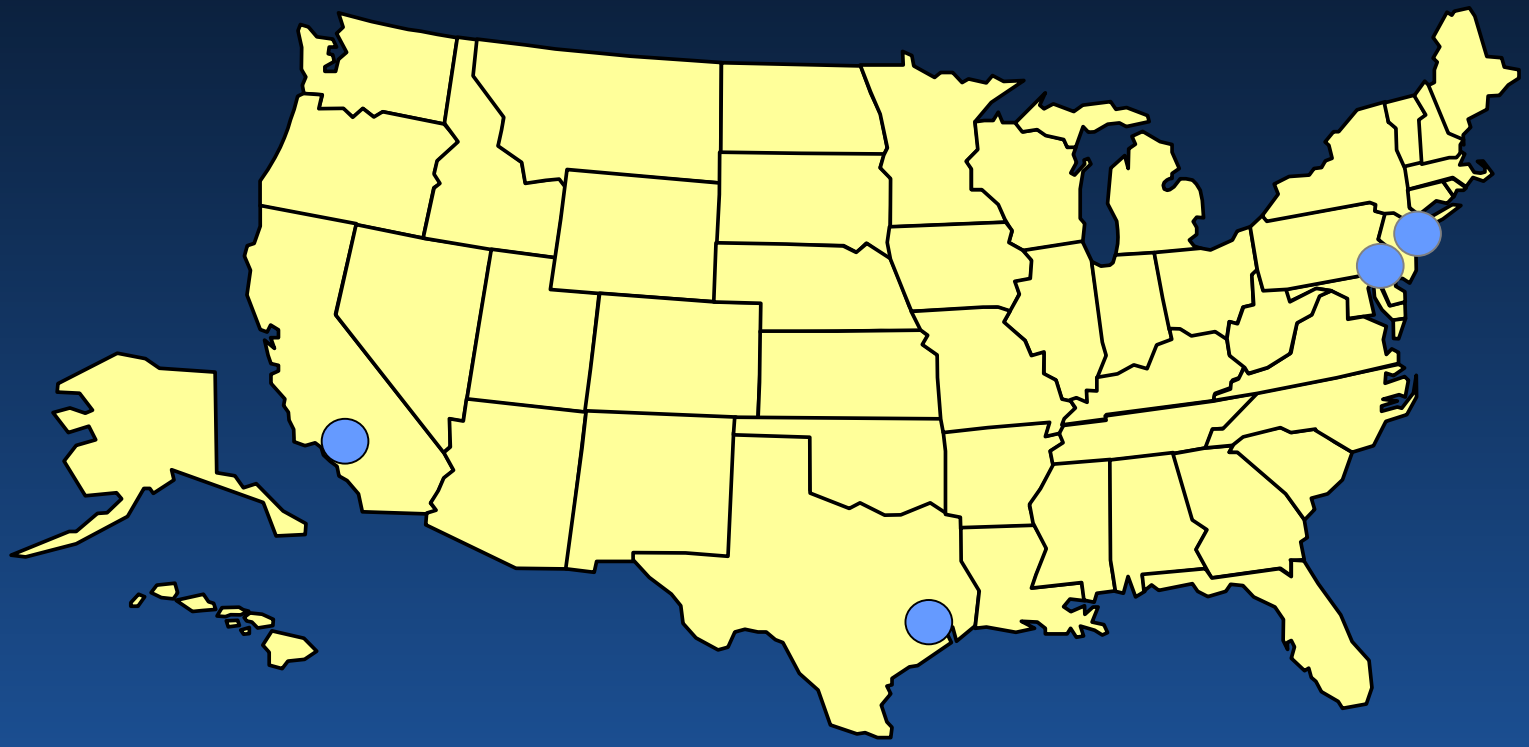
Emerging Infections Programs (EIPs)



Provider-Based Sentinel Surveillance Systems

- Emergency Department Sentinel Network
- Emerging Infections Network (IDSA)
- International Travel Clinics (ISTM)
- Border Infectious Diseases Surveillance Project

Epidemiology and Laboratory Capacity Support (ELCs)



Is That an Epidemic — or a Terrorist Attack?

DIALOGUE

Bioterrorism Is the Least of Our Worries

By Jonathan B. Tucker

The news media are fascinated with bioterrorism. After a New Yorker article this week quoted unnamed Central Intelligence Agency analysts who speculated, apparently wrongly, that the outbreak of West Nile-like fever in New York could have been the work of Iraqi terrorists, a number of television news programs reported the story. And earlier this month, ABC's "Nightline" aired a weeklong docudrama in which a hypothetical anthrax attack on the subway system of a major city inflicts more than 50,000 deaths.

This sort of worst-case scenario is extremely unlikely. In truth, most terrorists aren't interested in staging catastrophic biological attacks, and those who are would have significant technical hurdles to overcome.

Over the past century, not a single

provide technical help, but only at grave risk: the sponsor could lose control over the terrorists and invite severe retaliation if its involvement became known. Or a wealthy terrorist group might try to recruit scientists formerly employed by the Soviet Union, for example, which had advanced bioweapons programs. But no evidence currently available points to such assistance.

Without technical help, small terrorist cells would have a hard time mounting a large-scale biological attack. Germs suitable for warfare are difficult to mass-produce and even harder to disseminate effectively. Microbes might be spread, for example, as an aerosol cloud, but it is technically complex and dangerous to produce a concentrated aerosol that could infect thousands of people. Contaminating urban water supplies is also beyond the ability of most terrorists, mainly because a huge volume of harmful agent would be needed to overcome the effects of dilution, chlorination and filtration.

In the late 1980's in Japan, the Aum Shinrikyo cult, which had vast financial resources, recruited scientists from leading Japanese universities to develop bioweapons. But even though the cult acquired anthrax bacteria and botulinum toxin and carried out several attacks in Japan, no injuries or deaths were reported. The cult then resorted to sarin, a chemical nerve agent. In March 1995, the group released the poison on the Tokyo subway, killing 12 people and injuring more than a thousand.

Given the constraints, a bioterrorist attack in the United States in which thousands of people are killed remains extremely unlikely. While planning for such an event is warranted, government authorities should pay attention to a far more probable scenario: small-scale incidents involving food or drug contamination, which could cause widespread fear and economic disruption. □

A Lethal Weapon We Must Learn to Recognize

By Jessica Stern

CAMBRIDGE, Mass.

The flurry of rumors last week about the origins of the encephalitis outbreak in the New York metropolitan area proved how anxious we are about biological terrorism.

After an article in The New Yorker quoted unnamed Central Intelligence Agency sources who speculated that the West Nile-like virus might have been spread in an Iraqi biological attack, the C.I.A. found itself having to reassure the public that this chain of events was highly unlikely.

And indeed, it is.

For one thing, West Nile encephalitis is a relatively mild disease, and Saddam Hussein has far more virulent agents in his arsenal. For another, the outbreak has all the earmarks of a naturally occurring infectious disease, according to the Centers for Disease Control and Prevention.

But this case illustrates one of the most troubling aspects of biological terrorism: it can be extremely difficult to distinguish germ warfare from a natural outbreak of disease.

After all, this is not the first time that biological attacks have been blamed for sudden epidemics. In 1997, when foot-and-mouth disease struck pigs in Taiwan for the first time in 83 years, the Taiwanese Government was forced to slaughter some four million hogs. Taiwanese farmers, without any evidence, suspected that China had deliberately introduced the disease on the island to damage the economy.

After Cuba suffered an epidemic of dengue fever in 1981, it accused the United States of biological aggression. In 1997 Cuba made a similar claim, charging that the United States had dropped crop-eating pests from a low-flying plane.

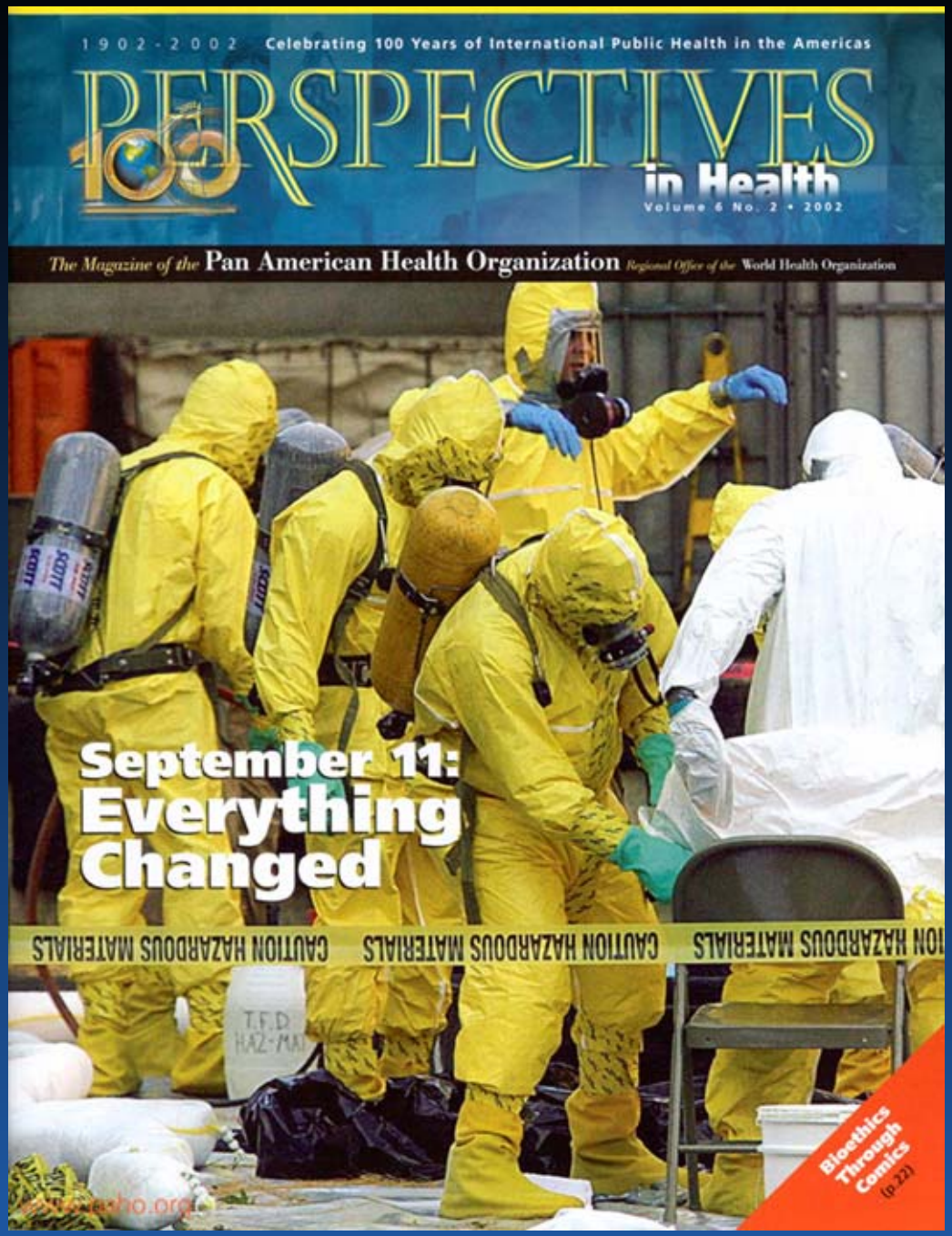
On the rare occasions when biological weapons have been used or accidentally released, scientists and government officials often first assumed that the epidemics were natural outbreaks.

> Our uncertainty about a virus's origin is a warning.

For instance, many American security experts initially believed that a 1979 outbreak of anthrax in the Soviet Union was caused by contam-

Jessica Stern, a fellow at Harvard's Center for Science and International Affairs, is the author of "The Ultimate Terrorist."

NY Times, Oct. 16, 1999


1902-2002 Celebrating 100 Years of International Public Health in the Americas
PERSPECTIVES in Health
Volume 6 No. 2 • 2002
The Magazine of the Pan American Health Organization Regional Office of the World Health Organization
September 11: Everything Changed
CAUTION HAZARDOUS MATERIALS
Bioethics Through Comics (p. 22)
www.paho.org

Bioterrorism Threat Agents

- Little familiarity
- Little immunity
- Little research

Characteristics of Potential Agents of Bioterrorism

Category A

- Can be easily disseminated or transmitted from person-to-person
- High mortality, with potential for major public health impact
- Mass casualties which may overwhelm healthcare systems
- May cause public panic and social disruption
- Require special efforts for public health preparedness

Critical Biological Agents

Category A

- Variola major (Smallpox)
- Bacillus anthracis (Anthrax)
- Yersinia pestis (Plague)
- Franciscella tularensis (Tularemia)
- Clostridium botulinum toxin (Botulism)
- Hemorrhagic fever viruses (Ebola, Marburg)

Report Summary

Public Health Assessment of Potential Biological Terrorism Agents

As part of a Congressional initiative begun in 1999 to upgrade national public health capabilities for response to acts of biological terrorism, the Centers for Disease Control and Prevention (CDC) was designated the lead agency for overall public health planning. A Bioterrorism Preparedness and Response Office has been formed to help target several areas for initial preparedness activities, including planning, improved surveillance and epidemiologic capabilities, rapid laboratory diagnostics, enhanced com-

Em Inf Dis 2002;8:225

Fears of Anthrax and Smallpox

With potential biological terrorism looming large in the minds of government officials and a frightened public, attention has focused on two threats above all others: the germs that cause anthrax and smallpox. Both are hardy and highly lethal, making them good weapons for inflicting mass casualties. The consequences of such an attack could be so awful — deaths conceivably reaching into the tens or hundreds of thousands — that the government obviously has an obligation to prepare for the worst. At the same time, individual citizens need to be educated about how remote the danger is.

Among some 30 biological agents that have been studied as potential weapons, anthrax may be the most likely choice for terrorists because it is easier to acquire than most and is so lethal, killing 80 to 90 percent of all unvaccinated people who are not treated promptly. The anthrax spore is also very durable, able to survive for decades in the soil or other areas protected from direct sunlight.

those who were vaccinated only once in earlier years are almost certainly now vulnerable again. Should smallpox be reintroduced in this country, it could move progressively through the population and, in today's highly mobile world, flash back to hit the rest of the planet as well.

However, the smallpox virus should be extremely difficult for a terrorist to get. Once the disease was eradicated, the World Health Organization made a concerted effort to concentrate all remaining samples of the virus in two laboratories, one in the United States and one in Russia. Those worried about smallpox say no one can be sure that all samples were really destroyed elsewhere, or that disaffected Russian scientists have not made the virus available to other countries. There are persistent rumors that rogue nations like Iraq and North Korea have clandestine supplies. Obviously, the most important defense against smallpox is better intelligence on just who has samples of the virus. If they are tightly guarded in the United

NY Times, Oct 7, 2001

Ongoing Investigation of Anthrax — Florida, October 2001

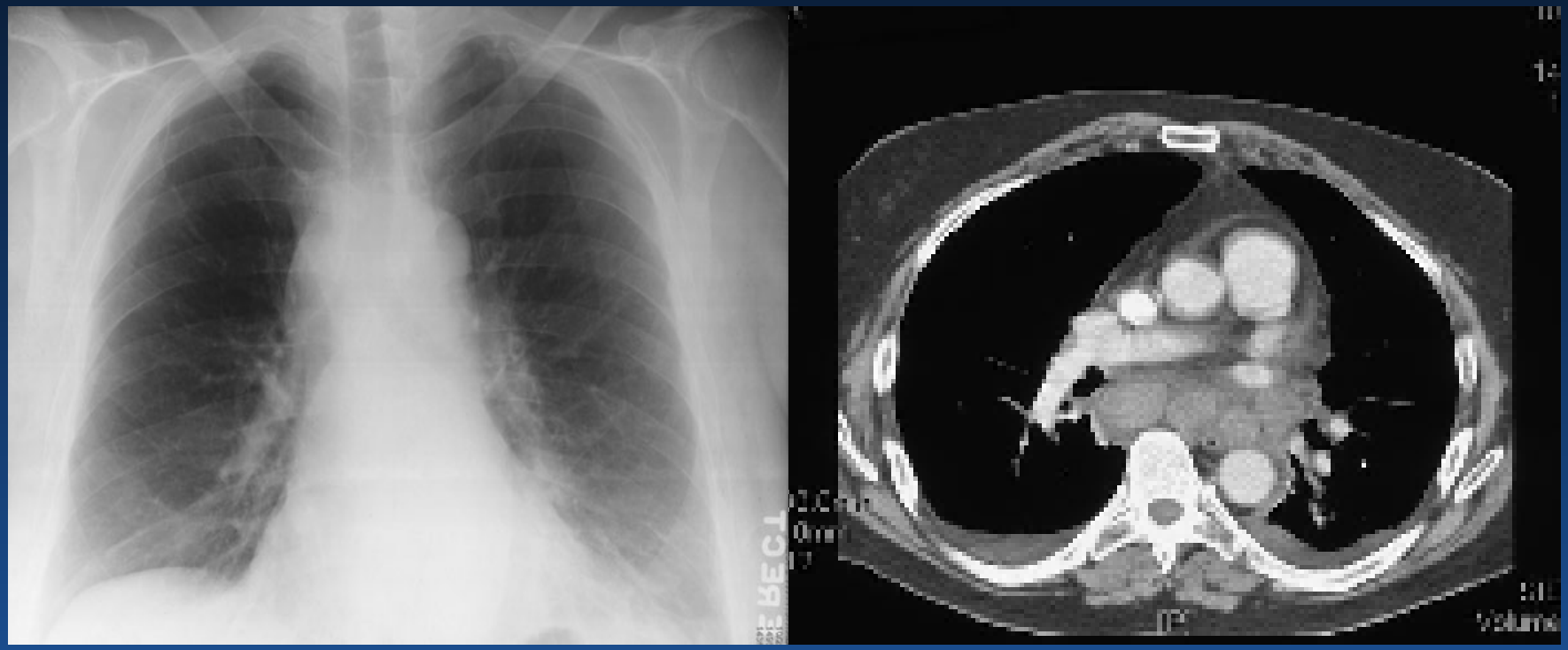
On October 4, 2001, the Palm Beach County Health Department (PBCHD), the Florida State Department of Health (FSDOH), and CDC reported a case of anthrax in a 63-year-old resident of Florida. The patient was hospitalized with the respiratory form of anthrax and subsequently died. PBCHD, FSDOH, and CDC initiated an epidemiologic investigation and public health surveillance to identify how infection with *Bacillus anthracis* occurred and to identify other infections. An environmental investigation identified one sample taken from the patient's workplace (America Media Inc. [AMI], Boca Raton, Florida) as positive for anthrax. *B. anthracis* also was identified in one nasal sample from another worker in the same building, which suggests exposure. Testing of additional samples is in progress. Public health officials, in conjunction with the Federal Bureau of Investigation, are continuing the investigation.

MMWR 2001;50:877

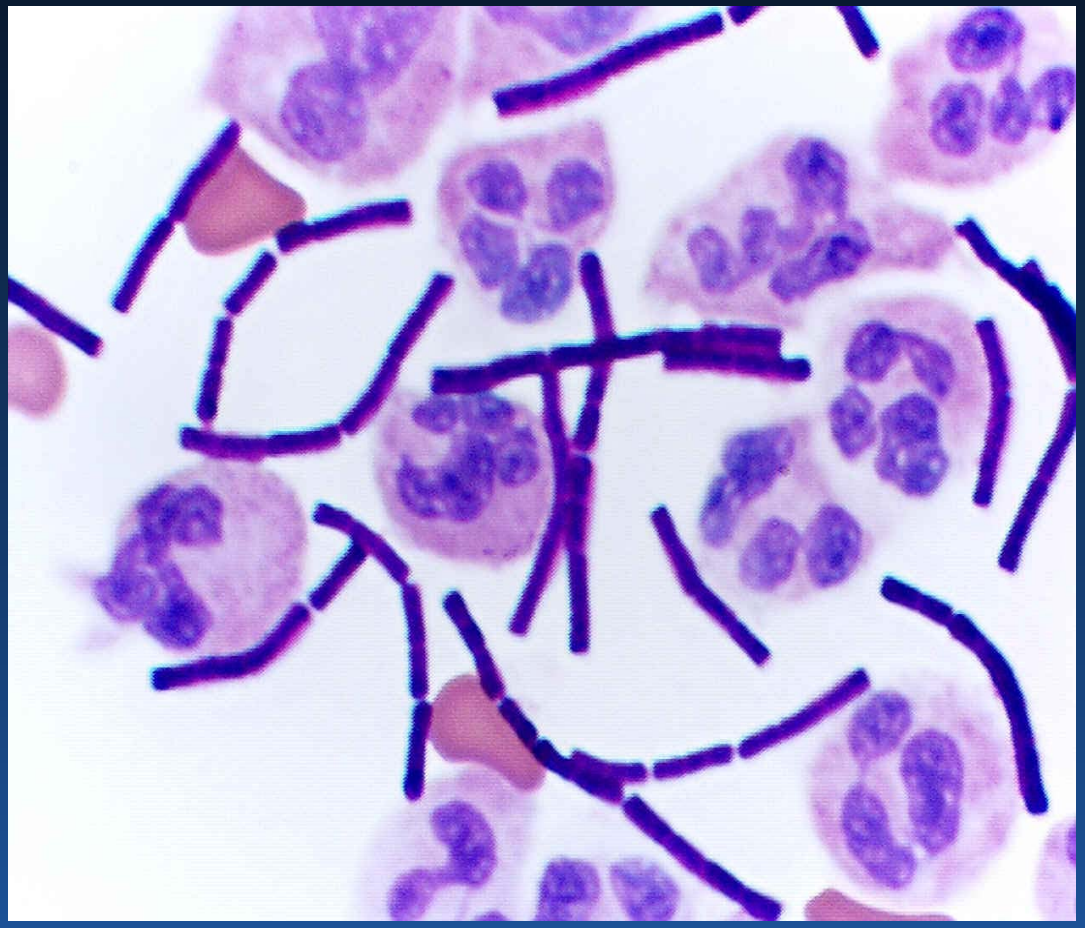
Anthrax Recognition in Florida

- 63 yo male photo editor employed by AMI
- Onset 9/30/01
  - Fever, fatigue, sweats, altered mental status
  - Admitted to hospital 10/2/01
  - Gram + bacilli detected in cerebrospinal fluid
  - Cultures from blood and cerebrospinal fluid positive
- CDC notification 10/3/01; case confirmed 10/4/01
- Autopsy consistent with inhalational anthrax on 10/6/01

Inhalational Anthrax Chest CT



Florida Index Inhalational Anthrax Case CSF Gram's Stain



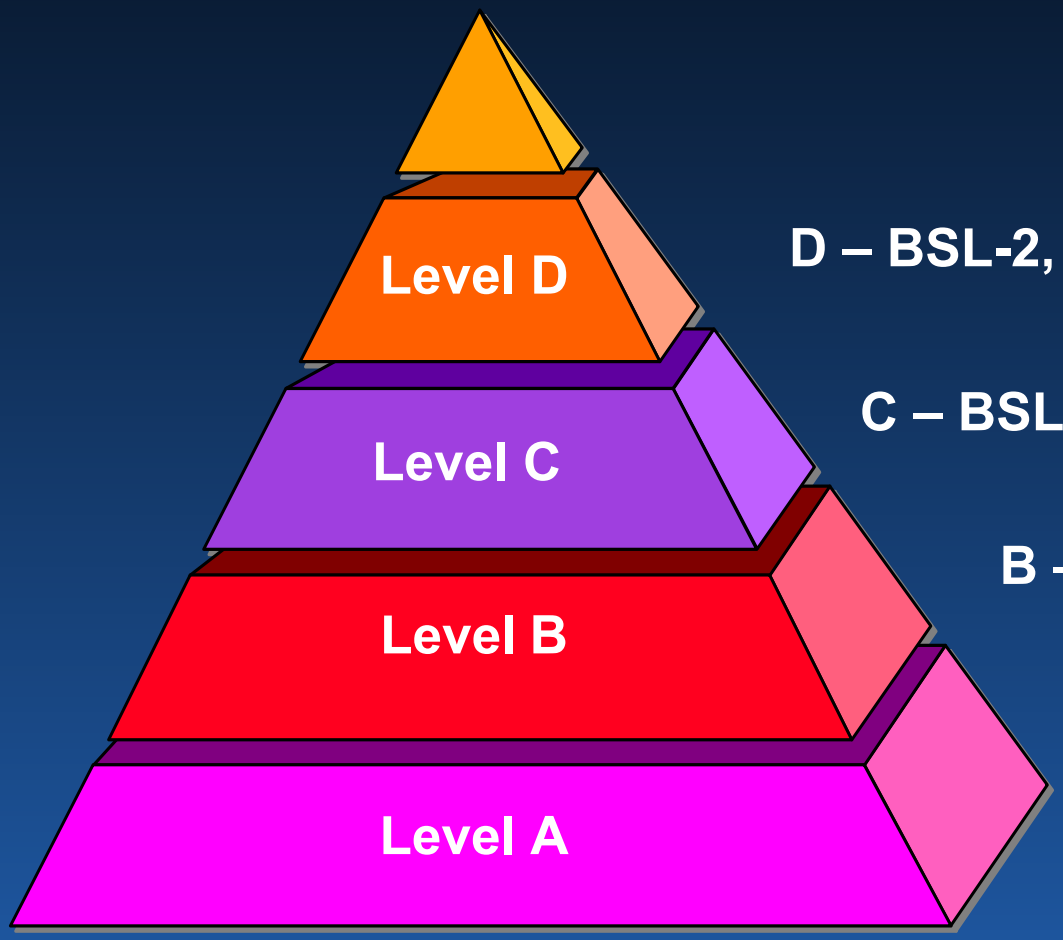
Index Case of Fatal Inhalational Anthrax Due to Bioterrorism in the United States

Larry M. Bush, M.D., Barry H. Abrams, M.D., Anne Beall, B.S., M.T., and Caroline C. Johnson, M.D.

SINCE the mid-1990s, *Bacillus anthracis*, the causative agent of anthrax, has been postulated to be a likely agent of biological warfare or terrorism because of its physical properties and its virulence factors. Several countries have been known to have biologic-weapons programs that were focusing on *B. anthracis* for potential military use. However, fatal anthrax had not been encountered in the United States as a weapon in an act of war or terror until the index case we report was recognized[1].

NEJM 2001;345:1607

Laboratory Response Network Concept



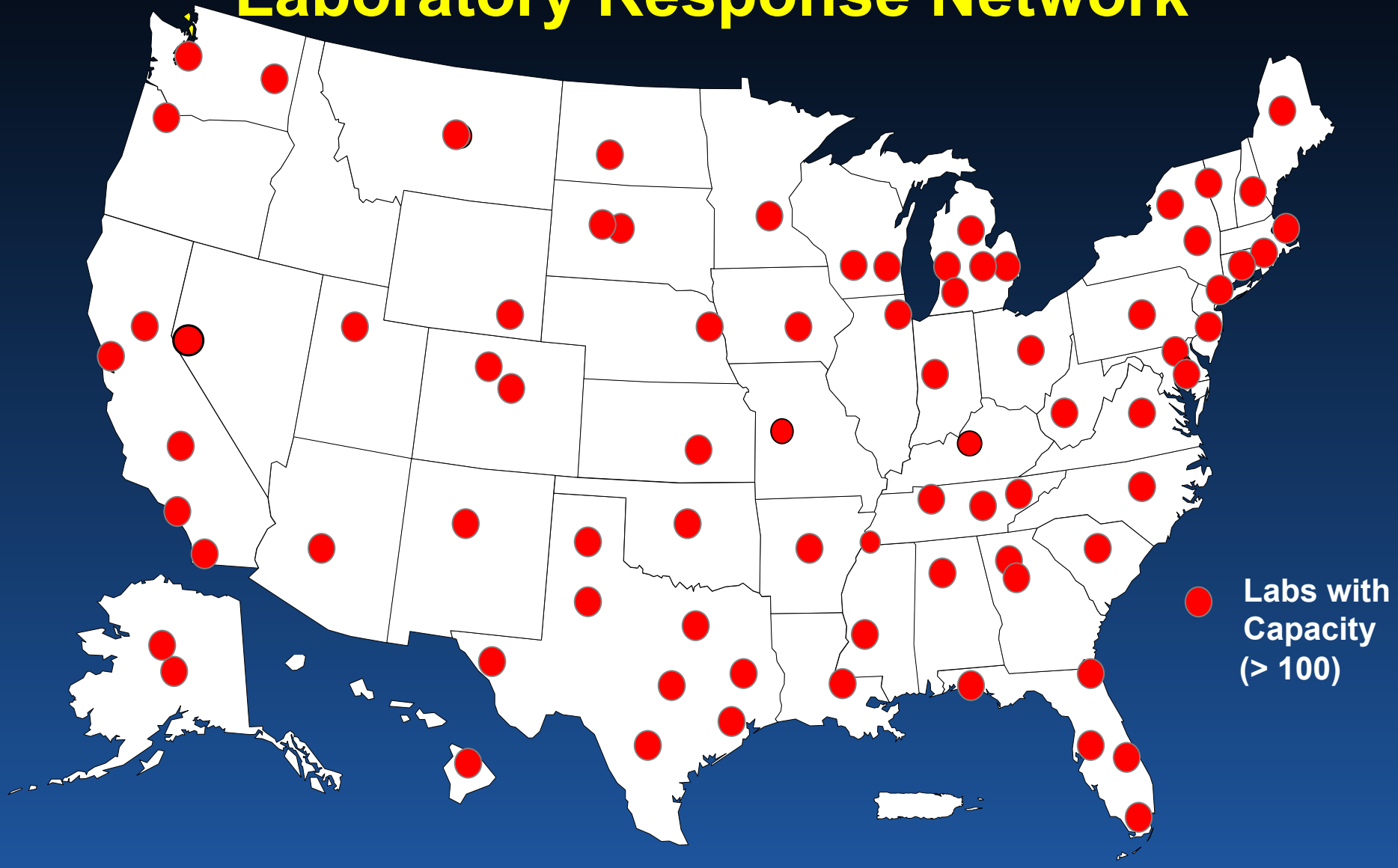
D – BSL-2, -3, and -4

C – BSL-3

B – BSL-2 with BSL-3 practices

A - Rule-out and forward

Laboratory Response Network



Anthrax Found in NBC News Aide

Suspicious Letter Is Tested at Times — Wide Anxiety

By DAVID BARSTOW

An assistant to the NBC anchor Tom Brokaw has tested positive for anthrax infection more than two weeks after she opened a threatening letter addressed to Mr. Brokaw that contained a white powder, officials said yesterday.

Even as law enforcement officials were cordoning off Rockefeller Center, the newsroom at The New York Times was evacuated when a reporter opened an envelope that also contained a white powder.

The substance was still being tested last night, as investigators explored potential links between the two incidents. Both letters were mailed from St. Petersburg, Fla., and had similar handwriting, according to law enforcement officials.

The reports of possible bioterrorism caused widespread anxiety in New York and across the country. People depleted supplies of antibiotics at drugstores and besieged their doctors. Offices were evacuated after a spate of threats, and companies made emergency adjustments to the way they received mail. [Page B9.]

The NBC case marked the second time an American has been stricken with a form of anthrax since the Sept. 11 terror attacks.

In the other case, a man died after he contracted an inhaled form of the disease at a newspaper office in Boca Raton, Fla. Two other people at the office were exposed to anthrax

Reuters

Mayor Rudolph W. Giuliani after a news conference yesterday at NBC, where he tried to calm new fears that were raised by an anthrax case.

NY Times, Oct 13, 2002

Recognition in New York City

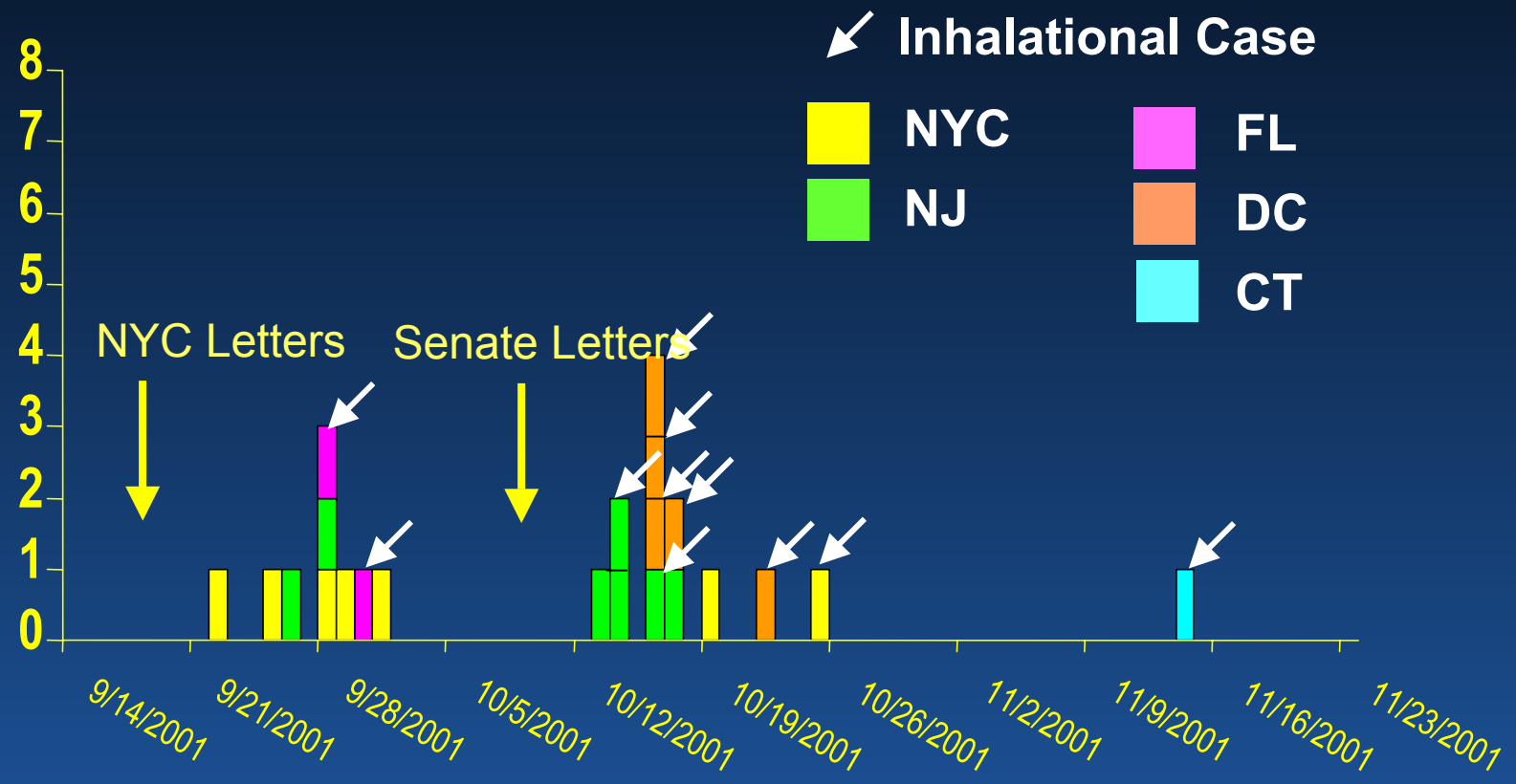
- 38 year old woman; NBC TV anchor assistant
- Recalled handling a suspicious letter with powder before onset
- Cutaneous lesion onset 9/25/01
  - Central necrosis with eschar
  - Cultures negative
  - Immunohistochemical staining of skin biopsy showed *B. anthracis* on 10/12/01

Epidemiologic Investigations

Confirmed and Suspected Cases of Anthrax

Confirmed	FL	NYC	DC	CT	NJ	Total
Cutaneous	0	4	0	0	3	7
Inhalational	2	1	5	1	2	11
Suspected	**FL**	**NYC**	**DC**	**CT**	**NJ**	**Total**
Cutaneous	0	3	0	0	1	4
Inhalational	0	0	0	0	0	0

Bioterrorism-related Anthrax Cases Reported Date of Onset

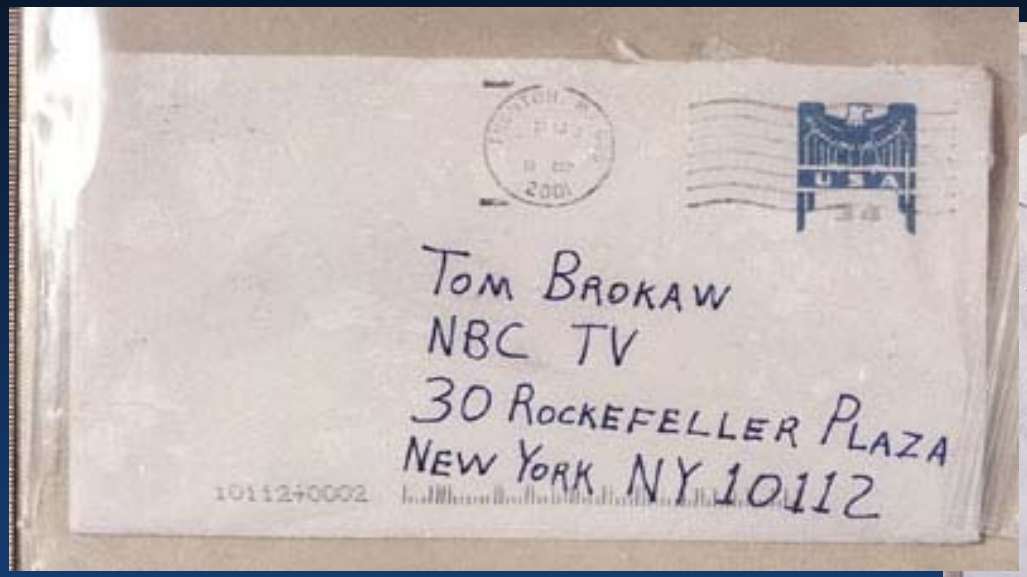


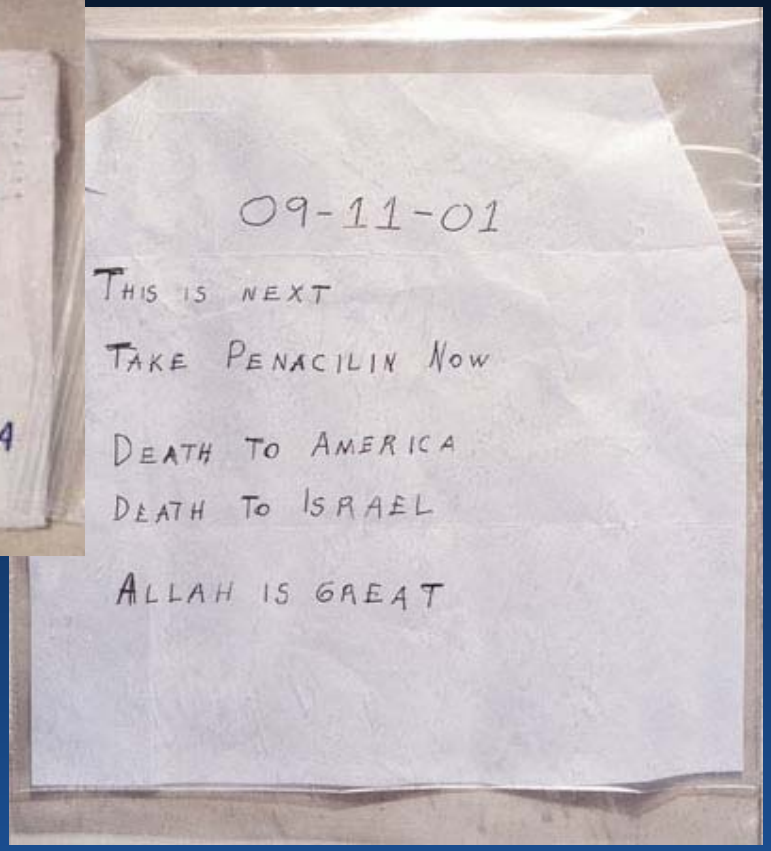
Envelopes Containing *B. anthracis*: Known and Suspected

Known	Postmark
NBC	9/18/01
NY Post	9/18/01
Senate	10/09/01
Senate	10/09/01

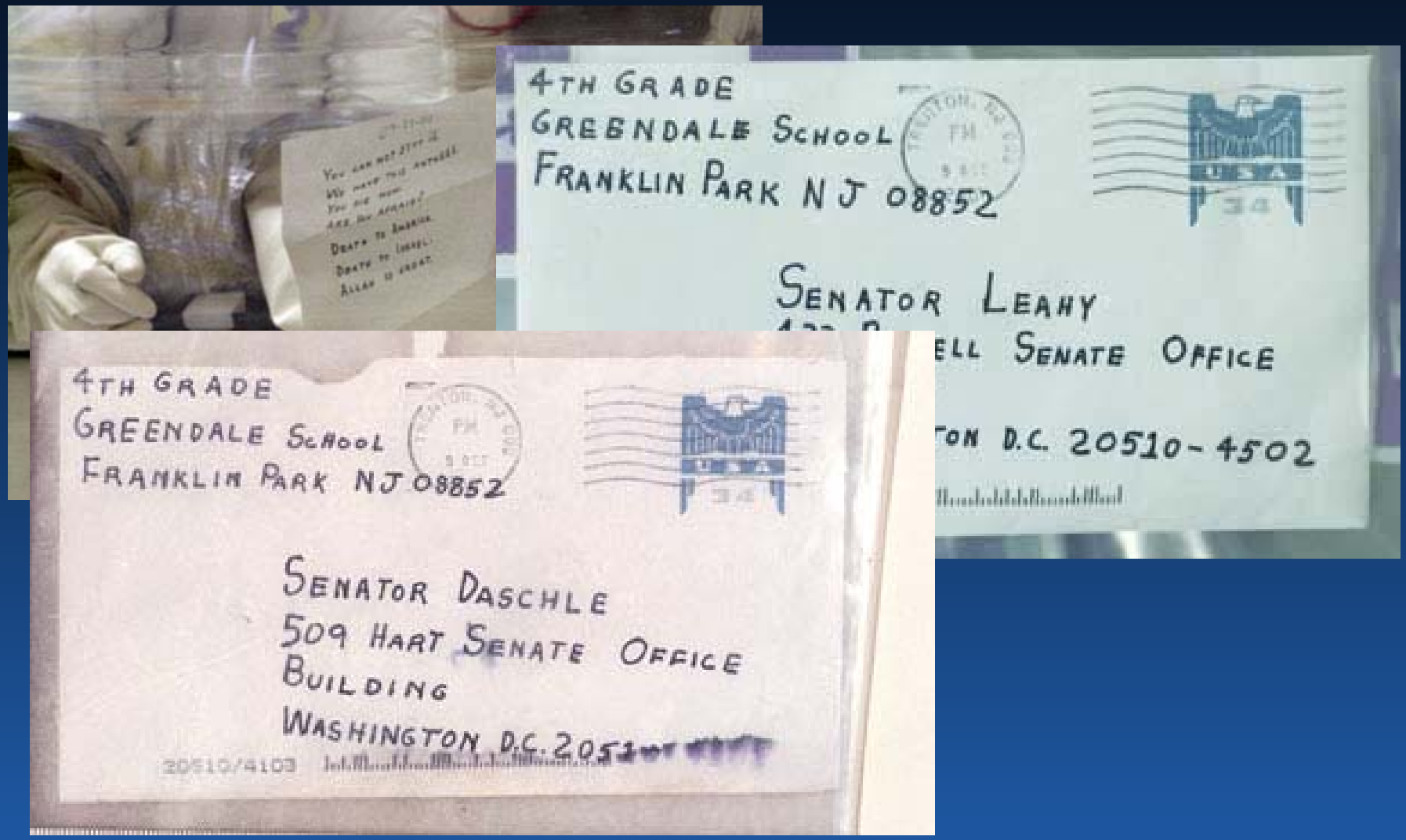
Suspected	Postmark
Florida AMI	?
CBS	?
ABC	?
State Dept	?
Capitol Hill	?
Other ?	?

Tom Brokaw Letter: Postmarked 09/18/01





Senate Letters: Postmarked 10/9/01



Fatal Inhalational Anthrax With Unknown Source of Exposure in a 61-Year-Old Woman in New York City

Bushra Mina, MD
J. P. Dym, MD
Frank Kuepper
Raymond Tso, MD
Carmina Arrastia, MD
Irina Kaplounova, MD
Hasan Faraj, MD
Agnieszka Kwapniewski, MD
Christopher M. Krol, MD
Mayer Grosser, MD
Jeffrey Glick, MD
Steven Fochios, MD
Athena Remolina, MD
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Jeffrey Moses, MD
Thomas Robin, M(ASCP)
Maria DeVita, MD
Michael L. Tapper, MD

A 61-year-old woman who was a New York City hospital employee developed fatal inhalational anthrax, but with an unknown source of anthrax exposure. The patient presented with shortness of breath, malaise, and cough that had developed 3 days prior to admission. Within hours of presentation, she developed respiratory failure and septic shock and required mechanical ventilation and vasopressor therapy. Spiral contrast–enhanced computed tomography of the chest demonstrated large bilateral pleural effusions and hemorrhagic mediastinitis. Blood cultures, as well as DNA amplification by polymerase chain reaction of the blood, bronchial washings, and pleural fluid specimens, were positive for *Bacillus anthracis*. The clinical course was complicated by liver failure, renal failure, severe metabolic acidosis, disseminated intravascular coagulopathy, and cardiac tamponade, and the patient died on the fourth hospital day. The cause of death was inhalational anthrax. Despite epidemiologic investigation, including environmental samples from the patient's residence and workplace, no mechanism for anthrax exposure has been identified.

JAMA. 2002;287:858-862 www.jama.com

ANTHRAX IS CAUSED BY THE BACterium *Bacillus anthracis* and recently has been used as an

As of January 9, 2002, a total of 23 cases of anthrax have been reported to the Centers for Disease Control and Prevention (CDC; Atlanta, Ga): 11 cases were confirmed inhalational anthrax and 12 cases (7 confirmed and 5 suspected) were cutaneous anthrax.[8] An estimated

CASE REPORT

On October 28, 2001, a 61-year-old Vietnamese woman was brought into the emergency department of Lenox Hill Hospital in New York City complaining of weakness, chest heaviness, dyspnea, malaise, cough, and chills for

JAMA 2002;287:858

Fatal Inhalational Anthrax in a 94-Year-Old Connecticut Woman

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David L. Kirschke, MD
Kevin Griffith, MD, MPH
Stephen M. Spear, MD
Katherine Kelley, PhD
Diane Barden, MT
Donald Mayo, ScD
David S. Stephens, MD
Tanja Popovic, MD, PhD
Chung Marston
Sherif R. Zaki, MD, PhD
Jeanette Guarner, MD
Wun-Ju Shieh, MD, PhD
H. Wayne Carver II, MD
Richard F. Meyer, PhD
David L. Swerdlow, MD
Eric E. Mast, MD, MPH
James L. Hadler, MD
for the Anthrax Bioterrorism Investigation Team

We describe the 11th case of bioterrorism-related inhalational anthrax reported in the United States. The presenting clinical features of this 94-year-old woman were subtle and nondistinctive. The diagnosis was recognized because blood cultures were obtained prior to administration of antibiotics, emphasizing the importance of this diagnostic test in evaluating ill patients who have been exposed to *Bacillus anthracis*. The patient's clinical course was characterized by progression of respiratory insufficiency, pleural effusions and pulmonary edema, and, ultimately, death. Although her *B anthracis* bacteremia was rapidly sterilized after initiation of antibiotic therapy, viable *B anthracis* was present in postmortem mediastinal lymph node specimens. The source of exposure to *B anthracis* in this patient is not known. Exposure to mail that was cross-contaminated as it passed through postal facilities contaminated with *B anthracis* spores is one hypothesis under investigation.

JAMA. 2002;287:863-868 www.jama.com

ON OCTOBER 4, 2001, A DIagnosis of inhalational anthrax in a media outlet employee in Florida marked the recognition of the first confirmed patients associated with this outbreak have been described previously.[2-5] Direct exposure to envelopes containing *Bacillus anthracis* or to contaminated postal equipment was likely in the first 9 patients. The 10th reported patient was a resident of New York, NY, and the nature of her exposure is currently unknown. The 11th patient with bioterrorism-related inhalational anthrax was identified in Connecticut and is described in this article.

CASE REPORT

On November 16, 2001, a 94-year-old was no recent history of headache, chills, sweats, sore throat, rhinorrhea, hemoptysis, chest pain, abdominal pain, nausea, vomiting, or diarrhea. She had chronic obstructive pulmonary disease. She had a 22-pack-year smoking history but had not smoked in 30 years. She also had hypertension and chronic renal insufficiency. Her medications included montelukast, irbesartan, loratadine, alprazolam, inhaled salmeterol xinafoate/fluticasone propionate, and azelastine nasal spray. Her only nonprescription medication was a mul-

JAMA 2002;287:863

Bioterrorism-Related Inhalational Anthrax: The First 10 Cases Reported in the United States

John A. Jernigan,* David S. Stephens,*† David A. Ashford,* Carlos Omenaca,‡ Martin S. Topiel,§ Mark Galbraith,¶ Michael Tapper,# Tamara L. Fisk,*† Sherif Zaki,* Tanja Popovic,* Richard F. Meyer,* Conrad P. Quinn,* Scott A. Harper,* Scott K. Fridkin,* James J. Sejvar,* Colin W. Shepard,* Michelle McConnell,* Jeannette Guarner,* Wun- Ju Shieh,* Jean M. Malecki, Julie L. Gerberding,* James M. Hughes,* Bradley A. Perkins,* and members of the Anthrax Bioterrorism Investigation Team[1]**

*Centers for Disease Control and Prevention, Atlanta, Georgia, USA; †Emory University School of Medicine, Atlanta, Georgia, USA; ‡Cedars Medical Center, Miami, Florida, USA; §Virtua Health, Mount Holly, New Jersey, USA; ¶Winchester Medical Center, Winchester, Virginia, USA; #Lenox Hill Hospital, New York City, New York, USA; and **Palm Beach County Department of Public Health, West Palm Beach, Florida, USA

From October 4 to November 2, 2001, the first 10 confirmed cases of inhalational anthrax caused by intentional release of *Bacillus anthracis* were identified in the United States. Epidemiologic investigation indicated that the outbreak, in the District of Columbia, Florida, New Jersey, and New York, resulted from intentional delivery of *B. anthracis* spores through mailed letters or packages. We describe the clinical presentation and course of these cases of bioterrorism-related inhalational anthrax. The median age of patients was 56 years (range 43 to 73 years), 70% were male, and except for one, all were known or believed to have processed, handled, or received letters containing *B. anthracis* spores. The median incubation period from the time of exposure to onset of symptoms, when known (n=6), was 4 days (range 4-6 days). Symptoms at initial presentation included fever or chills (n=10), sweats (n=7), fatigue or malaise (n=10), minimal or nonproductive cough (n=9), dyspnea (n=8), and nausea or vomiting (n=9). The median white blood cell count was 9.8 X 10^3 /mm^3 (range 7.5 to 13.3), often with increased neutrophils and band forms. Nine patients had elevated serum transaminase levels, and six were hypoxic. All 10 patients had abnormal chest X-rays; abnormalities included infiltrates (n=7), pleural effusion (n=8), and mediastinal widening (seven patients). Computed tomography of the chest was performed on eight patients, and mediastinal lymphadenopathy was present in seven. With multidrug antibiotic regimens and supportive care, survival of patients (60%) was markedly higher (<15%) than previously reported.

Em Inf Dis 2001;7:933

Inhalational Anthrax Cases (n=10), 2001

- Median age = 56 yrs (range 43-73 yrs)
- Male = 7
- Journalist = 1; Postal workers = 6; Mail handlers or sorters = 2; ? = 1
- Median incubation (n=6) 4 days (range 4-6 d)

Symptoms of Inhalational Anthrax Cases (n=10)

Fever, chills	10	Myalgias	6
Fatigue/malaise	10	Headache	5
Cough	9	Confusion	4
Nausea/vomiting	9	Abdominal pain	3
Dyspnea	8	Sore throat	2
Sweats	7	Rhinorrhea	1
Chest discomfort	7		

Inhalational Anthrax Initial Evaluation (n=10)

- Median WBC = 9.8 (range 7.5-13.3)
- CXR abnormal in all
  - pleural effusion = 8
  - infiltrates = 7
  - mediastinal widening = 7
- Elevated transaminase levels in 9 (90%)
- Hypoxia in 6 (60%)

Stockpile

<u>Each 12-hour Push Package:</u>

- Over 100 specialized cargo containers
- Weighs 94,424 pounds
- Measures 10,329 cubic feet
- Requires 5000 square feet ground/floor space for proper staging and management

Issues Not Confronted

- Multiple agents
- Multiple drug resistance
- Genetic engineering
- Transmission to animals
- Multiple modes of transmission
- Multiple time zones
- Cases in other countries
- Cyberterrorism

Other Issues Related to Other Agents

- Organism difficult to isolate or identify
- Vectorborne transmission

$1B for State and Local Preparedness

Health Departments (CDC)	$918 M
Hospitals (HRSA)	$125 M
Metro Med Resp Systems (OEP)	$15 M

State and Local Support

- $918 M
- Budget period 2/19/02 – 8/30/03
- Proposals due 4/15/02
- Awards 5/15/02

Public Health Preparedness: State and Local Support

Priorities

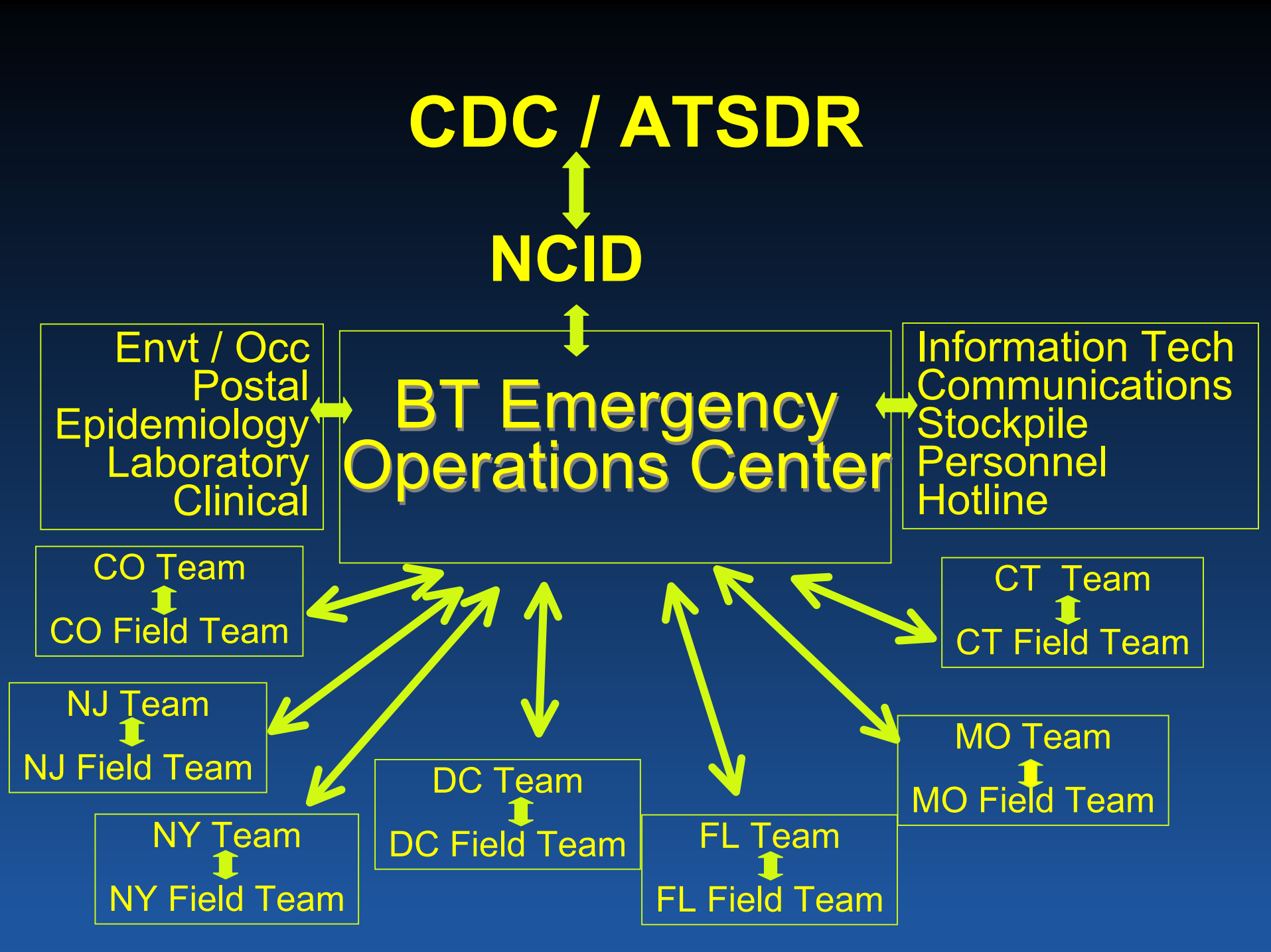
- Bioterrorism
- Other infectious disease outbreaks
- Other urgent public health threats

State and Local Support Focus Areas

- Preparedness Planning and Readiness Assessment
- Surveillance and Epidemiology Capacity
- Biological Laboratory Capacity
- Health Alert Network /Communication and Information Technology
- Communicating Health Risks and Health Information Dissemination
- Education and Training

Lessons Learned: Anthrax 2001

- Capacity
- Competence
- Consistency
- Collaboration
- Coordination
- Communication
- Consultation
- Commitment
- Compassion
- Cultural Competency


CDC / ATSDR
NCID
Envt / Occ
Postal
Epidemiology
Laboratory
Clinical
BT Emergency Operations Center
Information Tech
Communications
Stockpile
Personnel
Hotline
CO Team
CO Field Team
CT Team
CT Field Team
NJ Team
NJ Field Team
MO Team
MO Field Team
DC Team
DC Field Team
NY Team
NY Field Team
FL Team
FL Field Team

The Flu Pandemic That Might Have Been

The influenza virus is a nasty piece of work that frequently changes its looks to dodge immune attack. But its evasions aren't perfect: Each new strain of the virus bears some resemblance to its predecessors, which means that most people's immune systems will provide some defense against whatever form of influenza they meet. This summer, however, a flu strain known as Type A H5N1, which is unlike any that has infected humans before, appears to have jumped directly from birds to a human, killing a Hong Kong boy. "It's a significant event," says Robert Webster, an influenza specialist at St. Jude Children's Research Hospital in Memphis, Tennessee. "How many people have immunity to H5? Zippo. And if it was transmitted to other humans, that would be scary."

Fortunately, the transmission appears so far to have been an isolated event, but it is drawing intense scientific interest. On 20 August, the U.S. Centers for Disease Control and Prevention (CDC) sent researchers to Hong Kong to join an international team of scientists now conducting an "extensive investigation" there and in mainland China. To date, says CDC epidemiologist Nancy Arden, no other human cases of infection with H5N1 ("H" stands for hemagglutinin and "N" for neuraminidase, both of which are surface proteins of the virus) have been found. But, she notes, the researchers still have their guard up, and they are trying to figure out why this particular virus crossed the species barrier. "When you have a virus that's so easily transmissible and the entire world population is susceptible to it, that's a

Bioterrorism Preparedness and Response

Clinicians and Public Health Agencies as Essential Partners

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BEGINNING IN MID-SEPTEMBER 2001, THE UNITED States experienced unprecedented biological attacks involving the intentional distribution of *Bacillus anthracis* spores through the postal system.[1] The full impact of this bioterrorist activity has not been assessed, but already the toll is large. A total of 22 persons have developed anthrax and 5 have died as a direct result.[2-5] More than 10 000 persons were advised to take post-exposure prophylactic treatment because they were at known or potential risk for inhalational anthrax; in addition, more than 20 000 others started such treatment until the investigation provided reassurance that exposure was unlikely and treatment could be stopped; thousands more were vic-

occupation, must be addressed in bioterrorism preparedness and response programs.

From the public health perspective, recognition and response to the recent bioterrorist attacks has evolved in a series of overlapping phases at each location. The initial phase involved detection and then confirmation of a case of anthrax or a powder-containing envelope, followed by rapid deployment of public health and law enforcement personnel and other needed resources to the site. The second phase has been characterized by full-scale investigations as well as interventions to prevent additional cases. Longer-term consequence management, including follow-up of affected individuals and remediation of contaminated sites that could pose an occupational health risk, are major activities in the current phase. In all these phases, clinicians have proven to be essential partners, which is a lesson that must be incorporated into future bioterrorism preparedness and re-

JAMA 2002;287:898

Local Bioterrorism Preparedness: Detection and Response

Healthcare Providers and Microbiologists

Healthcare Organizations

Public Health

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

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WEEKLY REPORT

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Evaluation of *Bacillus anthracis* Contamination Inside the Brentwood Mail Processing and Distribution Center — District of Columbia, October 2001

During October 19–21, 2001, four postal workers at the Brentwood Mail Processing and Distribution Center in the District of Columbia were hospitalized with inhalational anthrax; two of the workers died. The building, which was closed on October 21, was believed to have been contaminated by a letter containing *Bacillus anthracis* spores sent to the Hart Senate Office Building (HSOB) that had passed through the postal facility on October 12. A second contaminated letter addressed to another U.S. senator that was processed through the same mail sorter and sort run as the first letter was discovered on November 17. This report describes the results of CDC's evaluation of *B. anthracis* in the facility, which showed widespread contamination of the facility and suggest that wipe samples and high efficiency particulate air (HEPA) vacuum samples complement each other in assessing contamination.

Surge Capacity Constraints

- Epidemic investigation
- Laboratory capacity
- Outbreak control
- Patient care
- Vaccine production
- Antimicrobial production

Tex. Lab Worker Handling Anthrax Specimens Is Infected

By RICK WEISS
Washington Post Staff Writer

A Texas laboratory worker processing specimens from last fall's anthrax attacks under a federal contract has become ill with the skin form of anthrax, the first domestic case of the disease since November and a reminder that the ongoing bioterrorism investigation continues to carry risks.

The worker, whom federal officials declined to identify, is being treated with antibiotics and is recovering from the infection, which appears to have been acquired in the laboratory.

But a preliminary investigation by the Centers for Disease Control and Prevention in Atlanta suggests there were irregularities in the way the potentially infectious specimens were handled by the worker after he became ill. That has raised concerns among some experts that some of the specimens under study from last fall's attacks may not be subject to adequate accounting.

The patient was working in a private laboratory, one of several with which the CDC has contracted in recent months to work through a backlog of specimens collected during the peak of last fall's attacks. The specimens include tens of thousands of environmental swabs that investigators hope will give them a measure of how far and wide anthrax spores spread at contaminated sites. Each swab is being tested for the presence of the bacterium that causes anthrax.

The lab worker went to his doctor March 4 because of an unusual skin lesion on his neck, said CDC spokesman Tom Skinner. The doctor swabbed the lesion. But rather than sending the swab to a county or state health lab for analysis, as is standard practice when anthrax is suspected, the doctor gave the swab to the worker, who brought it to the lab where he worked. There he or his co-workers analyzed the specimen, obtaining preliminary evidence of cutaneous anthrax.

The lab staff contacted the CDC, which late last week sent a team of investigators to look into the apparent laboratory exposure. Yesterday, tests conducted by the CDC on the doctor's office specimen confirmed it was positive for the anthrax bacterium.

"We still don't know the circumstances in the lab that led to him getting infected," Skinner said.

Several experts said that the worker's efforts to keep the specimens under his personal control appeared to be unusual. And although anthrax bacteria are not generally capable of causing deadly inhalational anthrax unless they are pro-

Washington Post, Mar 13, 2002

Lessons Learned:
Emerging Infection / Bioterrorism Outbreaks

- Importance of
  - surveillance
  - prompt epidemiologic investigation
  - laboratory capacity
- Disruption of travel and commerce
- Global implications of local problems
- Critical linkages and partnerships

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Highlighted Resources

- CDC En Español
- CDC Fact Book 2000/2001
- MMWR
- EMERGING INFECTIOUS DISEASES JOURNAL
- CDC FOUNDATION
- CDC Prevention Guidelines
- Hoaxes and Rumors

SPOTLIGHTS

- Update: Flu Vaccine Supply.
- World AIDS Day 2000: Information and activities about World AIDS Day.
- National Drunk and Drugged Driving Prevention Month -- December 2000: Learn about efforts to reduce alcohol-and drug-related traffic deaths.
- SafeUSA's web site and toll-free hotline (1-888-252-7751) provide injury prevention and safety information for the general public and health professionals.
- State Laws Relating to Breast Cancer, January 1949 to May 2000: This report contains breast cancer statutes enacted by the 50 states and the District of Columbia.

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Conclusions

- The anthrax outbreak is an unprecedented biological attack on the United States…the epidemic is not over until the criminals are caught!
- We have an unprecedented opportunity to strengthen the public health system to detect and respond to bioterrorism, other infectious diseases outbreaks and other urgent public health threats

Public Health Preparedness

Public health is a cornerstone of health protection and public safety, yet it has long been relegated to the backseat of our nation's priorities for attention and support. We can't let it stay there. The events of September 11 and the subsequent anthrax attacks have brought new urgency to old concerns about the capacity of our nation's public health system. These tragic circumstances may provide the political will to do what should have been done earlier to protect our citizens against significant infectious disease threats, whether naturally occurring or intentionally imposed.

Our complacency arose from different causes. Many assumed that advances in science and medicine made public health programs obsolete; a view reinforced, ironically, because when functioning well, the contributions of public health are often invisible to the public. Public health measures have sometimes been the victim of their own success: We know that there are periodic outbreaks of infectious disease, but the successful prevention or control of each epidemic conceals the years of neglect that have eroded the institutional capabilities of public health agencies and left them ill-equipped to do their jobs.

What is to be done? Local, state, and federal public health agencies working together represent the backbone of effective response to a major outbreak of infectious disease, including a bioterrorist attack. How quickly we recognize threats and act on them dramatically influences our ability to reduce casualties, control contagion, and minimize panic and disruption. Upgrading current public health capacities is vital, but it will require enhanced investment on many levels and must be sustained.

Hamburg, MA. Science 2002;295:1425

“ Looking to the future, we can expect an increasing array of infectious disease threats. Our public health system will be challenged to confront both routine and unexpected outbreaks of disease, including possible acts of bioterrorism. We have a chance to defend the nation against its adversaries and improve the public health system with the same steps. We must do it.”

Margaret A. Hamburg
Science 2002;295:1425