Nebraska Public Health Laboratory Newsletter

A publication of the Nebraska Public Health Laboratory (NPHL) at the University of Nebraska Medical Center
Spring 2000

Role of NPHL in Responding to Bioterrorism

Steven H. Hinrichs. M.D.

The previous edition of the Nebraska Public Health Laboratory Newsletter described issues regarding the transportation of infectious agents. It was further reported that the NPHL was collaborating with the Nebraska Departrnent of Health and Human Services (NHHS), and the Centers for Disease Control and Prevention (CDC), to provide diagnostic services for infectious organisms due to accidental exposure or from acts of bioterrorism. This issue of the NPHL Newsletter is an update on the progress made concerning laboratory preparedness for such events.

In the past several years, it has become apparent that terrorist organizations have acquired the technology and the reagents for launching an attack using biological agents. The experience with the bombing in Oklahoma City showed officials that terrorism may occur in any location in the country and is not just a problem of the east or west coast. In addition to the public airport and the Offutt Military base, the two major transportation corridors of Interstates 80 and 29 pose an additional risk to Nebraskans from the accidental spill of infectious waste or reagents. Refer to the summary of the Lincoln Joumal Star article in this issue about the recent incident in Nebraska. Hospital laboratories throughout the state should be prepared to encounter situations that may be due to intentional or unintentional exposure to certain organisms such as the plague or anthrax bacillus. One of the most likely scenarios is that local hospital laboratories will notice the unusual occurance of rarely seen infectious diseases such as tularemia. The article by Tony Sambol, Coordinator of the Bioterrorism Preparedness Laboratory at the NPHL, discusses procedures for dealing with these situations. Fact streets, such as the one included here are being developed for all relevant organisms. We will be making direct mailings to Nebraska microbiology laboratories in the near future.

Role of NPHL in Responding to Bioterrorism

By Anthony R. Sambol, M.S.

Last fall, the CDC began a program for developing stronger public health preparedness for bioterrorism. They encouraged communities to develop or enhance public health capacities at the local and state level. Specifically, CDC funded projects for the following: a) to develop laboratory expertise for the identification of biological or chemical agents that would be involved in bioterrorist acts, b) to expand state and local laboratory capacity to identify organisms from acts of bioterrorism, c) to access planning activities among local and state health officials, d) to develop surveillance capability for detecting outbreaks of diseases that might have been caused by terrorists, and e) to improve the electronics communications network. [1] The CDC selected 43 laboratories to help rebuild the nation's public health inftastructure. The NPHL was one of the laboratories selected to provide diagnostic services regarding potential exposure of the public to infectious organisms from accidents or acts of bioterrorism. CDC Director Jeffrey P. Koplan, M.D., M.P.H., commented that "Every dollar we spend on preparing public health locally for even the possibility of a biological or chemical release among the civilian population is also a dollar that helps reinvigorate our

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Suspected Anthrax Case in Lincoln

By Al J. Laukaits
March 31. 2000 Lincoln Journal Star

People who came in contact with a jar of suspected anthrax powder Thursday face no danger, said Scott Holmes, chief of the Lincoln-Lancaster County Health Department's environmental health division. "The material was in a container all the time. There was no released material," Holmes said. FBI agents took the substance to the Public Health Laboratory at the University of Nebraska Medical Center in Omaha for testing. But Holmes said he doubts the white powder is the real thing. "Anthrax powder is very restrictive access. This is not sornething that someone would have access to -- we're talking the highest military level personnel only," he said. "The likelihood is very, very small that this is real." Holmes said the jar was not broken and there was no evidence of spillage. Nevertheless, health officials treated the incident as if the powder were real. When police initially suspected a StarTran bus may have been exposed, health offtcials kept everyone on the bus until they could decide what measures to take. Eventually, the passengers and driver were told to shower and wash their clothes separately. A postal worker who handled the jar was told to do the same. "Even if there was a true exposure this would be adequate protection," Holmes said. And even if the report is false, local and state officials will learn from it. Said John Erickson, the state's first Bioterorism

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Anthrax Case

Surveillance Coordinator. Erickson was recently hired with federal money to help Nebraska develop a statewide plan to respond to any type of bioterorism emergency. "The potential for future incidents exists", said Erickson, who started his new duties February 22. "I think there are always people out there who are wanting attention or for whatever reasons rnay see this as an opportunity to get attention," he said. "We do know in the last three years the numbers have increased dramatically, especially in biological types of threats or incidents."

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Responding to Bioterrorism

public health infrastucture. The medical expertise, laboratories, and communication network needed to counter bioterorism are the same resources that are needed to detect diseases in the community from any source, whether natural or deliberate." [1]

The CDC and APHL established a laboratory response network for bioterrorism (LRNB) that designated a four-tier nationwide laboratory infrastructure. The LRNB structure is as follows:

a) **Level A laboratories**: Most existing state and hospital laboratories are designated at this level. They will function to both "rule-out" organisms and to provide the transportation link to forward organisms to the Level B/C laboratories. Additional information regarding the CDC's role and Level A laboratory procedures can be found at the following website, www.bt.cdc.gov.

b) **Level B laboratories**: These laboratories operate at a Biosafety Level (BSL) 2/3 and have confirmation tests available to "rule-in' or "rule-out" organisms. These tests include specialized reagents for Bacteriophage assays and Direct Fluorescent Antibody staining. In addition, these laboratories have the reference capacity and transportation function to forward organisms to the Level C/D laboratories.

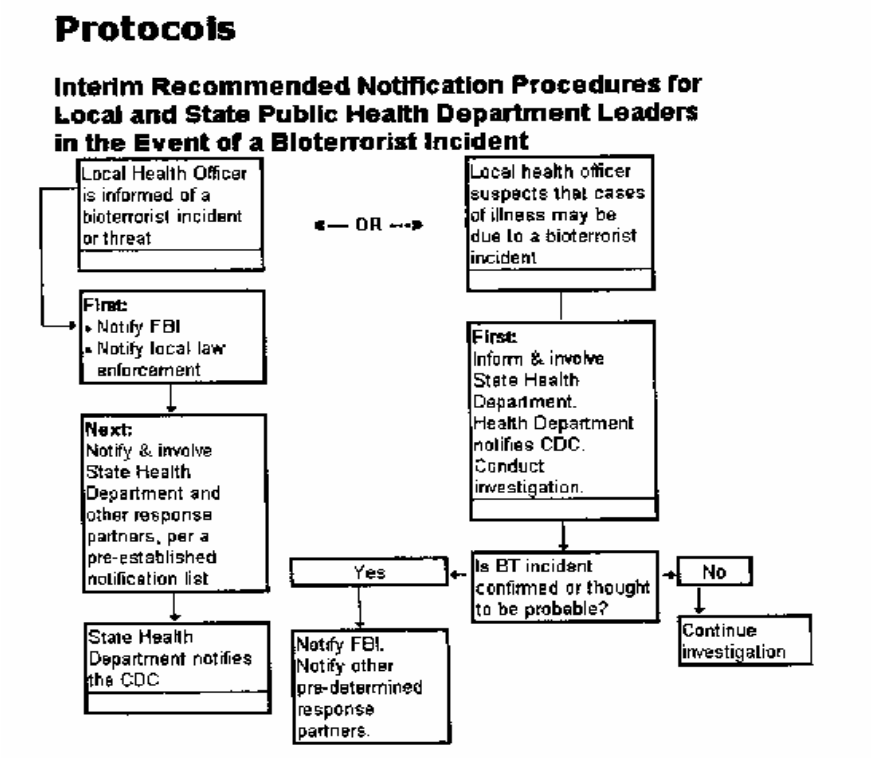
c) **Level C laboratories**: These laboratories which operate at a BSL-3, have additional confirmation tests including molecular assays, animal testing, and the reference capcity and transportation function to forward organisms to the Level D laboratory.

d) **Level D laboratories**: This is the highest level of the LRNB where definitive identification of bioterrorist agents would take place. This facility consists of a BSL-4 laboratory located at the CDC.

The Nebraska Public HealthLaboratory has been designated as a level B/C facility. The NPHL uses a BSL-3 laboratory at UNMC for handling high risk specimens or isolates involved in accidental exposure or bioterrorist acts. When a local health officer is informed of a bioterrorist incident or threat, or suspects that cases of illness may be due to a bioterrorist incident they should proceed to a) notify their local law enforcement officers, b) notify their local FBI office, or the state FBI office at l-402-493-8688 and, c) notify either county epidemiologists in Lincoln or Douglas County, or contact Dr. Tom Safranek at NHHS (1-402-471-0550).

The LRNB has developed diagnostic protocols that can be used to either "rule-in' or "rule-out" certain biological agents that represent a threat to the public. Each of the four LRNB laboratory levels has a specified list of diagnostic tests and procedures to identify the bioterrorism agents. This list is based on the bio-safety level classification of each agent, and the capacity of each laboratory to meet the biosafety level guidelines specified by the CDC and NIH for each organism. Several different scenarios could occur anywhere in the state. An accident rnay occur with a truck carrying biological wastes, a threatening act rnay occur associated with a potential biological agent as seen in Lincoln on March 30th of this year, or an unusual organism may be encountered by a diagtostic laboratory. If a clinical specimen is encountered that contains a high-risk biological organism, a discussion should occur with personnel at the NPHL. A telephone call to the NPHL laboratory alerting them of the specimen may also be helpful in providing specific shipping instructions (l-402-559-7774 or 1-402-559-3032). Personnel at the NPHL have been trained in the handling and identification of *Bacillus anthracis*, *Brucella* spp., *Francisella tularemia*, *Yersinia pestis*. Persons at the NPHL can also forward any of these or other hi-risk agents through the LRNB infrastructure to the CDC for diagnostic testing not available at NPHL.

In addition to providing the diagnostic capacity to "rule-out" or "rule-in" certain bacterial agents of potential bioterrorist acts, the NPHL will be working with the appropriate agencies to provide training and educational material for the law enforcement agencies and the Level A laboratories in our state in the coming year. This material will be available in a multi-media format and focus on "ruling-out" specified agents. The training will enphasize bench-level safety issues regarding the handling of



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bacterial agents, viruses, and fungi since they will probably enter community laboratories as routine clinical specimens. More information on educational materials will follow through a separate mailing from NPHL.

James W. Snyder, director of the Microbiology Department at the University of Louisville School of Medicine, commented recently that "we must be prepared to accept the fact that it is inpossible to fully protect against biological weapons and that people will die in spite of efforts to quickly recognize, detect and identiify biological agents and their associated disease syndromes. Clinical microbiologists are encouraged to meet the challenges of bioterrorism by preparing themselves and their laboratories for the inevitable day when they are called upon to examine either environmental or human samples for the presence of a biological agent. By creating and supporting an infrastnrcture cornprised of training and education, surveillance, early warning, and communication networks, the fronfline responders will be better prepared to recognize and respond to acts of terrorism involving the use of biological agents." [2]

In conclusion, the function of the NPHL is to serve as Nebraska's resource for for diagnostic procedures related to hi-risk biological organisms due to accidental exposure or from acts of bioterrorism. These functions include: a) to provide training for Level A laboratories to "rule-out" these high-risk organisms, b) to coordinate the transportation of suspected bioterrorism agents to the NPHL at UNMC through local law enforcement officers and the FBI, and c) to provide the diagnostic services and consultation necessary regarding potential exposure of the public to infectious organisms.

Questions concerning isolates dealing with an agent involved in a natural disease process as a result of accidental exposure or any suspected bioterrorist agent, should be directed to Dr. Steven Hinrichs at (402) 559-4116, Tony Sambol at (402) 559-3032 or Peter Iwen at (402) 559-7774 at the NPHL.

References:

1 . CDC Office of Communication-Media Relations press release, September 15, 1999.

2. James W. Snyder. Responding to Bioterronsm: The role of the Microbiology laboratory. American Society of Micrcbiology Ncws, Volue 65, November 8, 1999, Pg 524-525.

Anthrax (Bacillus anthracis) F act Sheet

What is anthrax?

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in warm-blooded animals, but can also infect humans.

How common is anthrax and who can get it?

Anthrax is most common in agricultural regions where it occurs in animals. These include South and Cental America Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. When anthrax affects humans, it is usually due to occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products (industrial anthrax) from other countries where anthrax is more common may become infected with *B. anthracis*. Anthrax in animals rarely occurs in the United States.

Bacillus Anthracis

How is anthrax transmitted?

Anthax infection can occur in three forms: cutaneous (skin), inhalation, and gastointestinal. *B. anthracis* spores can live in the soil for many years and humans can become infected with anthrax by handling animal products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be qpread by eating undercooked meat from infected animals.

What are the symptoms of anthrax?

Symptoms usually occur within seven days. Cutaneous: Most anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area rnay swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy. Inhalation: Initial syrnptoms rnay resemble a common cold. After several days, the syrnptoms may progress to severe breathing problems and shock. Inhalation anthrax usually results in death in 1-2 days after onset of the acute symptoms. Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is charactarized by an acute inflammation of the intestinal tract. initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. intestinal anthrax results in death in 25% to 60% of cases.

Is there an anthrax vaccine for humans?

The anthrax vaccine for humans licensed for use in the United States is a cell-free filtrate vaccine, which means it uses dead bacteria as opposed to live bacteria. Anthrax vaccine is indicated for individuals who come in contact in the workplace with imported animal hides, furs, bonemeal, wool, animal hair (especially goat hair), and bristles; and for individuals engaged in diagnostic or investigational activities which may bring them into contact with anthrax spores. The vaccine is reported to be 93% effective in protecting against cutaneous anthrax. Anthax vaccines intended for use in animals should not be used in humans.

Who should be vaccinated?

Because anthrax is considered to be a potential agent for use in biologic warfare, the Department of Defense recently announced that it will begin systematic vaccination of U. S. military personnel.

Among civilians, the Advisory Committee for Immunization Practices (ACIP), recommends anthrax vaccine be given to individuals engaged in diagnostic or investigational activities which may bring them intocontact with anthrax spores.

Reference: Nebraska HHS Website

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Medical Technologist Named to New Position

The Nebraska Public Health Laboratory has named Anthony Sambol, MA, SV (ASCP), M (ASCP) to a new position as Public Health medical technologist responsible for diagnostic procedures related to public health surveillance efforts. Tony has many years previous experience as a hospital medical technologist involved in both bacteriology and virology. He has worked in the development of diagnostic procedures as well as in experimental methods for testing vaccines and microbiological reagents. In his new position Tony will be responsible for development of tests for the identification of unusual organisms, including those that might be used in a bioterrorism attack or accidental spill. Preparation for this position has included intensive training sessions at the Centers for Disease Control and elsewhere, in addition to participation in the Association of Public Health Laboratories network. In addition, he has received training in high level safety precautions needed for working with classified or restricted biological agents. Because of his extensive background in diagnostic procedure development Tony has been recruited by the CDC to participate in the creation of protocols for identification of chlamydia organisms, and these will be published soon. We encourage technologists, pathologists or other individuals associated with public health to call Tony with questions related to identification or handling of unusual organisms or packages. If bench technologists or community pathologists encounter a situation where further discussion may be helpful, consultation services are available. Tony can be reached on a 24 hr basis by calling 402-559-3032. If Tony is not immediately available please contact Dr. Hinrichs through the university hospital operator at (402) 559-4000.

The Nebraska Public Health Laboratory Newsletter is a publication of the Department of Pathology and Microbiology, Samuel M. Cohen, M.D., Ph.D., Professor and Chairman, at the University of Nebraska Medical Center. The views expressed here do not necessarily reflect the opinions of the Nebraska Department of Health and Human Services.

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