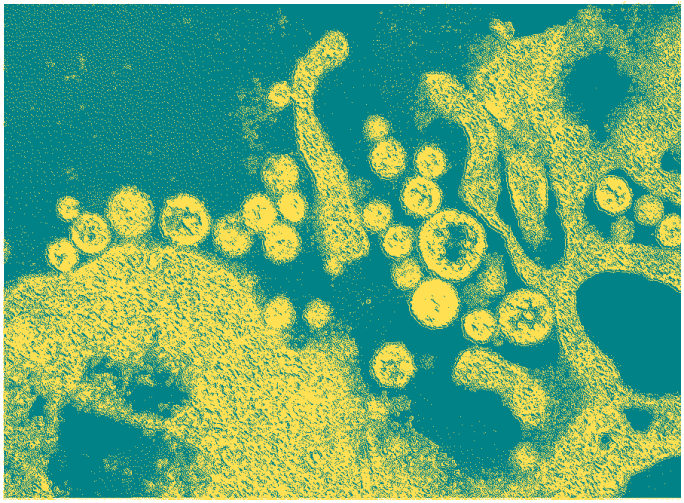
Preparing for and Responding to Bioterrorism

Information for the Public Health Workforce



Introduction to Bioterrorism

Developed by

Jennifer Brennan Braden, MD, MPH

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Seattle, Washington

*This manual and the accompanying MS Powerpoint® slides are current as of December 2002. Please refer to http://nwcphp.org/bttrain/ for updates to the material.

Last Revised December 2002

Acknowledgements

This manual and the accompanying MS PowerPoint® slides were prepared for the purpose of educating the public health workforce in relevant aspects of bioterrorism preparedness and response. Instructors are encouraged to freely use portions or all of the material for its intended purpose.

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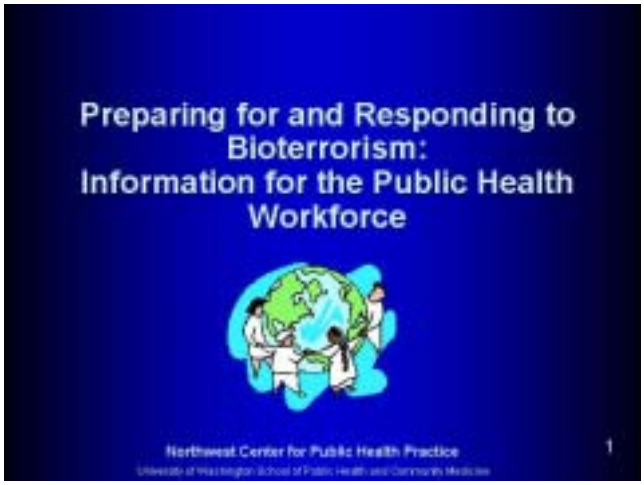
About This Course



Preparing for and Responding to Bioterrorism: Information for the Public Health Workforce is intended to provide public health employees with a basic understanding of bioterrorism preparedness and response and how their work fits into the overall response. The course was designed by the Northwest Center for Public Health Practice in Seattle, Washington and Public Health – Seattle & King County's Communicable Disease, Epidemiology & Immunization section. The target audience for the course includes public health leaders and medical examiners, clinical, communicable disease, environmental health, public information, technical and support staff, and other public health professional staff. Health officers may also want to review the more detailed modules on diseases of bioterrorism in *Preparing for and Responding to Bioterrorism: Information for Primary Care Clinicians*: Northwest Center for Public Health Practice (available at http://nwcphp.org/bttrain). Public health workers are a very heterogeneous group, and the level of detailed knowledge needed in the different aspects of bioterrorism preparedness and response will vary by job description and community. Therefore, the curriculum is divided into modules, described in Appendix A.

The course incorporates information from a variety of sources, including the Centers for Disease Control and Prevention, the United States Army Medical Research Institute in Infectious Disease (USAMRIID), the Working Group on Civilian Biodefense, the Federal Emergency Management Agency, Public Health – Seattle & King County, and the Washington State Department of Health, among others (a complete list of references is given at the end of the manual). The curriculum reflects the core competencies and capacities outlined in the following documents:

CDC. Bioterrorism preparedness and response: core capacity project 2001 (draft), August 2001. http://www.bt.cdc.gov/Documents/CoreCapacity082801.pdf

CDC. Cooperative Agreement U90/CCUXXXXXX-03-X Public Health Preparedness and Response for Bioterrorism. http://www.bt.cdc.gov/Planning/CoopAgreementAward/index.asp

CDC. The public health response to biological and chemical terrorism: interim planning guidance for state public health officials, July 2001. www.bt.cdc.gov/Documents/Planning/PlanningGuidance.PDF

Center for Health Policy, Columbia University School of Nursing. Core public health worker competencies for emergency preparedness and response, April 2001: http://cpmcnet.columbia.edu/dept/nursing/institute-centers/chphsr/

Center for Health Policy, Columbia University School of Nursing. Bioterrorism and emergency readiness: competencies for all public health workers (preview version II), November 2002. http://cpmcnet.columbia.edu/dept/nursing/institute-centers/chphsr/

The course is not copyrighted and may be used freely for the education of public health employees and other biological emergency response partners.

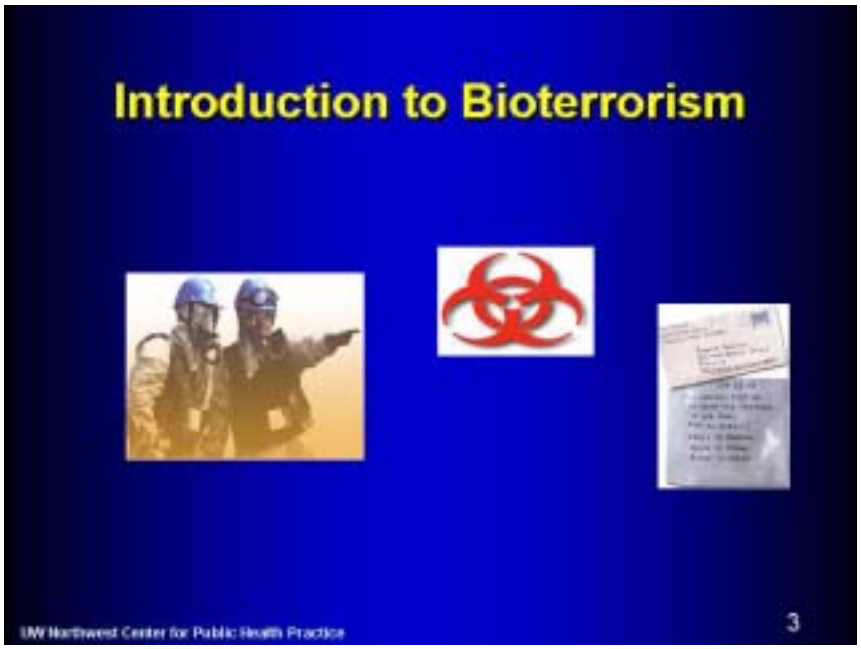
Course materials will be updated on an as-needed basis with new information (e.g., guidelines and consensus statements, research study results) as it becomes available. For the most current version of the curriculum, please refer to: http://nwcphp.org/bttrain.

How to Use This Manual

This manual provides the instructor with additional useful information related to the accompanying MS PowerPoint® slides. The manual and slides are divided into six topic areas: Introduction to Bioterrorism, Emergency Response Planning, Diseases of Bioterrorist Potential, Health Surveillance and Epidemiologic Investigation, Consequence Management, and Communications. Links to Web sites of interest are included in the lower right-hand corner of some slides and can be accessed by clicking the link while in the "Slide Show" view. Blocks of material in the manual are periodically summarized in the "Key Point" sections, to assist the instructor in deciding what material to include in a particular presentation. A Summary of Key Points is indicated in bold, at the beginning of each module.

The level of detailed knowledge required may vary for some topics by job duties. Therefore, less detailed custom shows are included in the Emergency Response Planning and Diseases of Bioterrorist Potential: Overview modules for those workers without planning oversight or health care responsibilities, respectively. In addition, there are three Consequence Management modules: for public health leaders, for public health professionals, and for other public health staff (see Appendix A).

Introduction to Bioterrorism



Summary of Key Points (Slide 29)

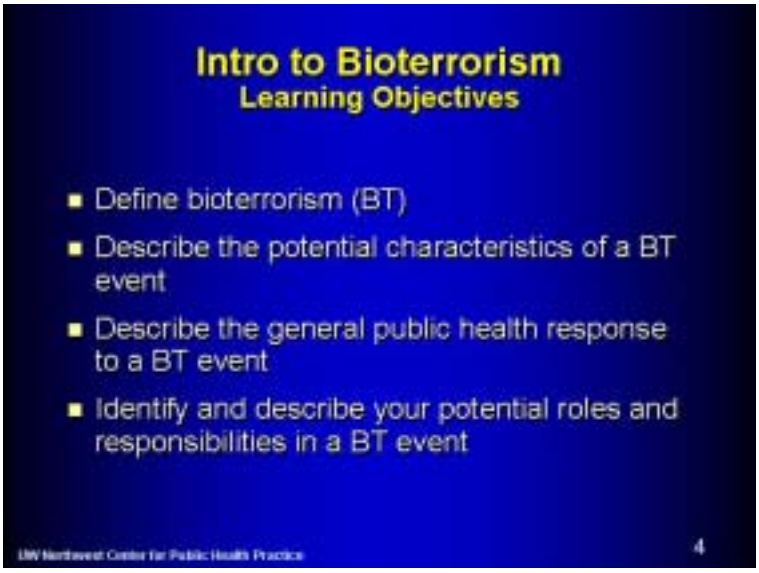
1. A bioterrorist attack is likely to be covert.
2. First responders in a covert attack are likely to be health care providers.
3. Public health workers will use many of the same skills in response to a bioterrorism incident as they do in a routine workday.
4. The manner in which job skills are implemented will potentially differ from a routine workday.

Slide 1: Curriculum Title

Slide 2: Acknowledgements

Slide 3: Module Title

Learning Objectives (Slide 4)



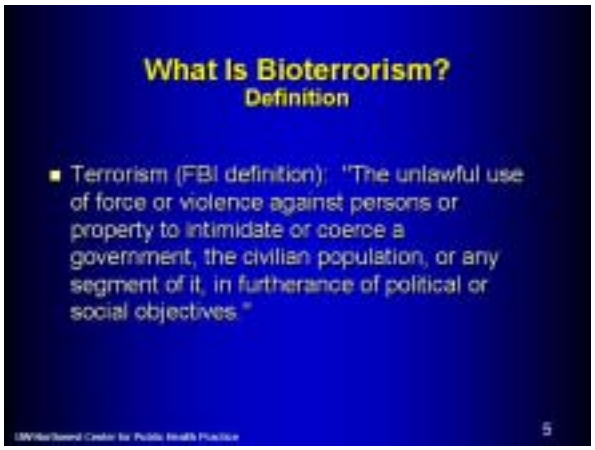
The learning objectives for this module are:

1. Define bioterrorism (BT)
2. Describe the potential characteristics of a BT event
3. Describe the general public health response to a BT event
4. Identify and describe your potential roles and responsibilities in a BT event

What Is Bioterrorism? (Slides 5-8)

KEY POINTS

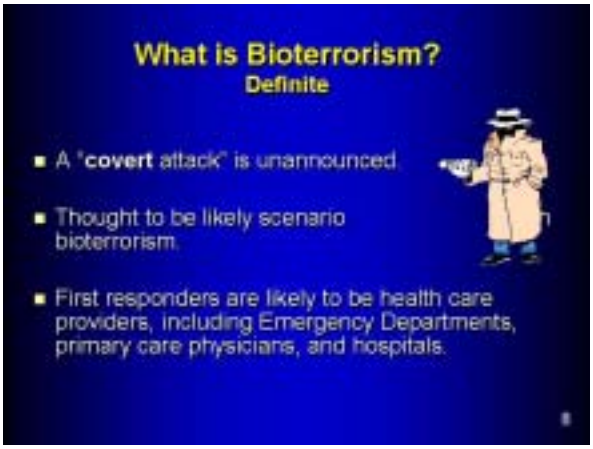
1. Biological agents producing either *high mortality* or *low mortality*, but *moderate-high morbidity*, are capable of creating significant terror and disruption in society.
2. A bioterrorist attack may be announced, but is more likely to be unannounced (covert).
3. Health care providers may be the first to recognize victims of a covert attack.



Bioterrorism (BT) is terrorism involving the use of biological weapons, i.e., microbes or biologically derived toxins to inflict disease on humans. Terrorists seek to create fear and consequent disruption in society. The number of cases and deaths may be large, although terrorism achieves fear and societal disruption out of proportion to the actual damage done by the attack, as illustrated in the 2001 anthrax outbreak on the East Coast of the United States. Biological agents producing both *high mortality* and *low mortality* with *moderate-high morbidity* are included among the CDC-identified "critical agents" of concern (to be discussed in the module on diseases of BT potential). Although terrorists ultimately seek to create terror in other humans, their activities may produce death or disease in plants and animals as well.

Animals and humans may both become infected through the intentional release of a biological agent in the environment, or animals and plants may be infected or contaminated for the purpose of infecting humans via the food supply.

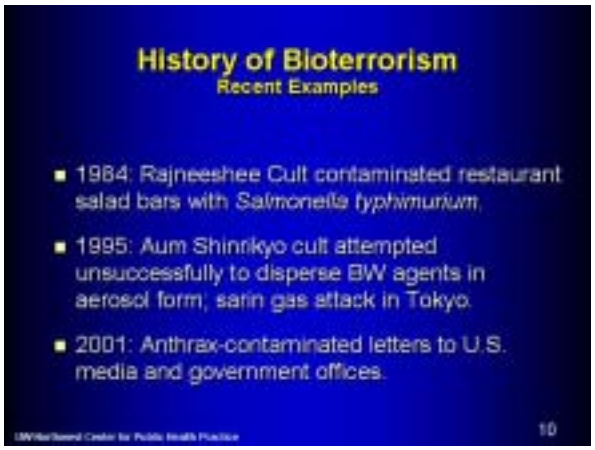
A bioterrorist attack can be either announced (overt, slide 7), or unannounced (covert, slide 8). The first scenario may result in a response similar to that of other overt emergencies, such as chemical spills and fires. The second scenario (covert) is thought to be the more likely scenario in a bioterrorist incident. The first casualties are likely to be discovered by health care providers, as opposed to traditional emergency first-responders such as fire and HAZMAT teams.



History of Bioterrorism (Slides 9-11)

KEY POINTS

1. Biological agents have been used in the past for offensive purposes.
2. Biological weapons programs existed in many countries prior to 1972 and most likely continued to exist in some countries beyond that time.
3. Although the United States no longer has an offensive biological weapons program, a defensive program has been active since 1953.



Bioterrorism is not a new concept. The use of biological agents for offensive purposes has been documented as far back as the 6th century BC. Historical examples of biological warfare are noted in slide 9, and more recent examples of their use in terrorist activity in slide 10. Many of the biological agents considered to have potential for use in terrorist activity are agents that have been used before in biological warfare or were known to have been studied for that purpose prior to the Biological Weapons Convention in 1972.

The United States actively studied biological agents for their use in warfare, from 1943 to 1969, when President Nixon ended the offensive arm of the program by executive order. By May 1972, all stockpiles of biological agents and munitions from the U.S. program had been destroyed. A treaty was signed that year by over 140 countries, agreeing not to stockpile or conduct research on biological weapons for offensive purposes. The USSR signed, but did not adhere to, this treaty; and their offensive program continued until the dissolution of the Soviet Union in 1992. It is suspected that other countries also did not adhere to the provisions of the treaty. The U.S. defensive biological weapons program to develop prophylactic and treatment interventions began in 1953 and continues today at the U.S. Army Medical Research Institute of Infectious Disease (USAMRIID), in Fort Detrick, Maryland.

Recognition of a BT Event (Slides 12-19)

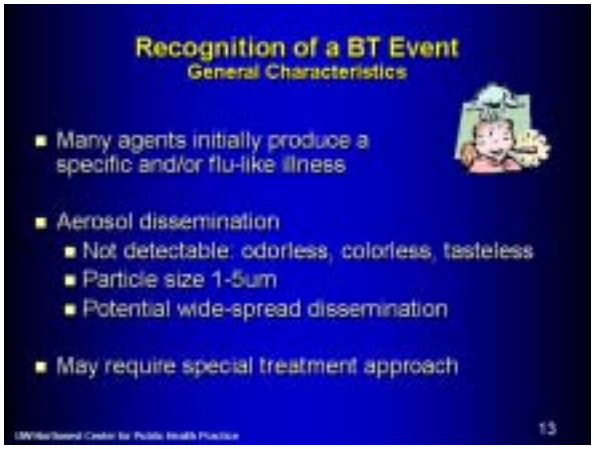
KEY POINTS

1. According to Washington State law, all suspected cases of illness caused by potential bioterrorism agents are immediately reportable to the local health jurisdiction.
2. Most diseases caused by potential bioterrorism agents present initially with a non-specific or flu-like illness.
3. Being alert to unusual clusters of illness and familiar with epidemiogical clues suggesting a potential bioterrorism event are important to allow early recognition of a bioterrorist event.

Surveillance/Detection (Slide 12):

Surveillance systems play an important role in BT recognition by documenting baseline levels of disease and illness in a community and detecting case numbers and patterns that differ from typical. BT events are most likely to be covert, and lag times between exposure and disease development in the index case (i.e., incubation period), transmission to others (if person-person transmission exists), and laboratory diagnosis present a challenge in source identification and response. Health care providers also play an important role in recognizing a BT event by being alert to, and reporting to public health, suspicious cases or clusters of illness in their clinical practice.

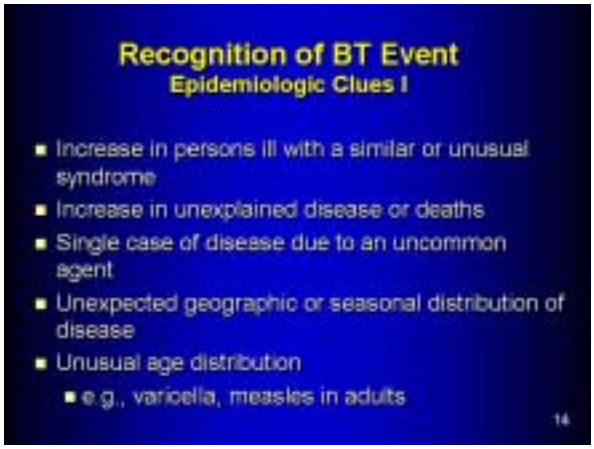
General Characteristics (Slide 13):



Most of the identified agents with bioterrorist potential produce an initial non-specific (e.g., fever, malaise, GI distress) and/or "influenza-like" illness—a common presentation that might not be recognized as atypical until the illness has progressed further. Because an effective mode of intentional dissemination for a biological agent is the aerosol route, pneumonia is another likely presentation. Aerosol dissemination is "ideal" because it has the potential to expose a large number of people in a short period of time when released in a densely populated area. Aerosols can be imperceptible to the senses, and thus individuals unaware of the presence of danger would not know they had been infected until symptoms began. A certain degree of sophistication, however, is required for aerosol production (the degree differing by agent); particles need to be between 1-5 microns to settle in the lungs.

Contamination of the food supply is another potential mode of biological agent dissemination. It is thought that a biological attack involving a community water supply would be unlikely because of dilution effects in reservoirs and the use of chlorination and filtration. Infiltrating smaller water distribution systems with infectious agents or toxins may be a more likely scenario.

Epidemiologic Clues (Slides 14-15)

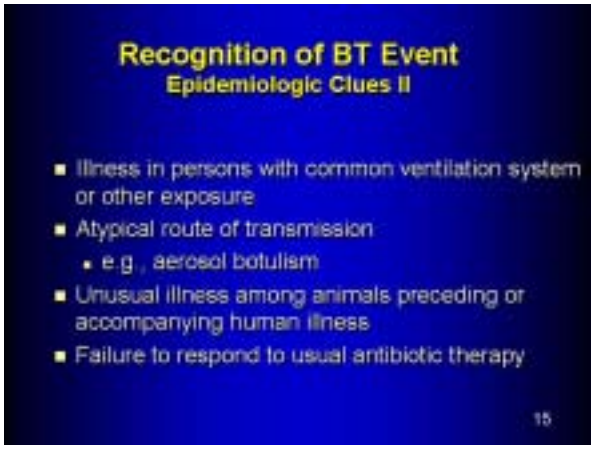


Single case of disease due to an uncommon agent

For example, anthrax cases do occur spontaneously among humans in the United States, but infrequently, and typically as an occupational exposure in those working with infected animals or animal products. A single case of anthrax in someone without a known animal exposure would, therefore, warrant investigation.

Unexpected geographic or seasonal distribution of disease

For example, plague occurs mainly in the Southwestern US, but is extremely rare in Washington State.



Unusual age distribution

(e.g., adults with a chickenpox-like rash illness)

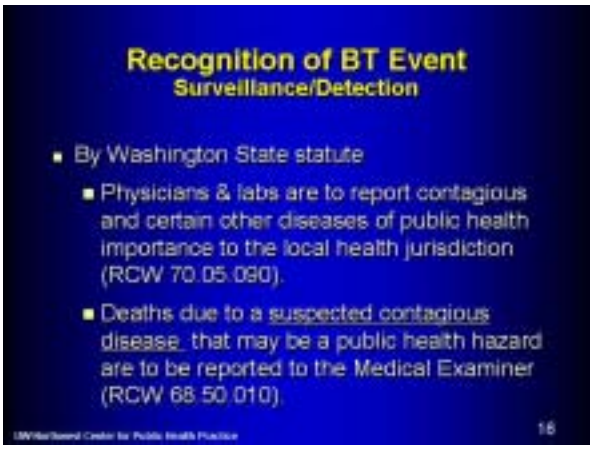
Illness in persons sharing a common ventilation system or other exposure

(i.e., an aerosol release indoors would create an exposure for all using the same ventilation system)

Atypical route of transmission

For example, botulism occurs when C. Botulinum spores release toxin under anaerobic conditions, such as improperly canned food or in wounds. Aerosol botulism does not occur naturally, and a botulism-like illness with no apparent food vehicle would suggest a deliberate source of infection.

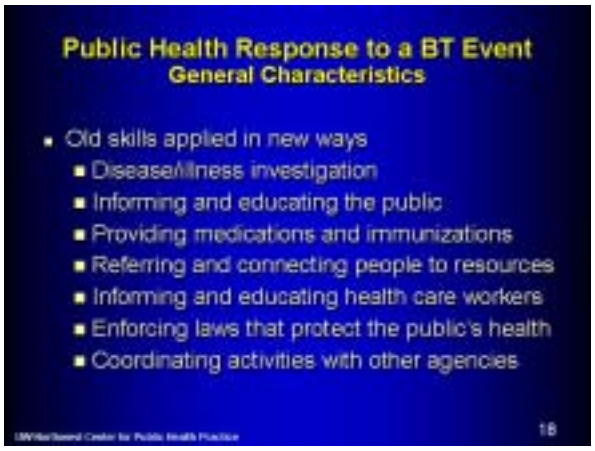
Slides 16-17 summarize disease reporting requirements in Washington State.



Public Health Response to a BT Event (Slides 18-27)

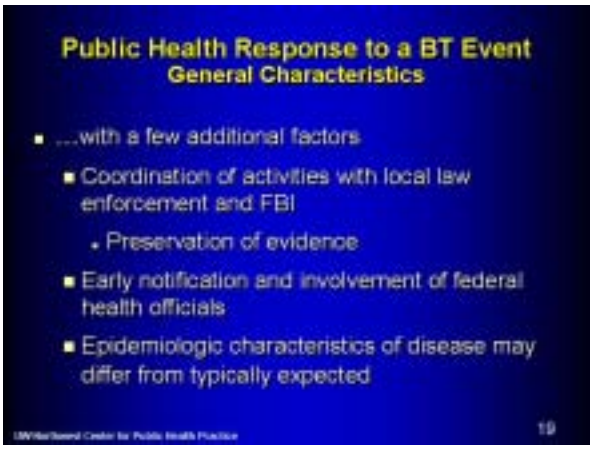
Key Points

1. Public health workers will use many of the same skills in response to a bioterrorism incident that they use in a routine workday.
2. Potential differences between a routine public health workday and the response to a bioterrorism event include the coordination of activities with different agencies such as law enforcement and the size and scope of response efforts.



For the most part, the response of public health to a bioterrorism incident is similar to the response to other public health emergencies. Workers will use the same job-related skills required of them on a daily basis, but the size and scope, time frame, involved partners, and security precautions may differ from that of a typical day. The criminal nature, the potentially covert presentation, and the potentially large numbers of casualties each present a challenge to the public health response in a bioterrorism incident. Public health workers may be called upon to address the needs of the public for information and education, resource referral, medications and immunizations in larger numbers than typical, within a more concentrated time period, and in a higher state of stress.

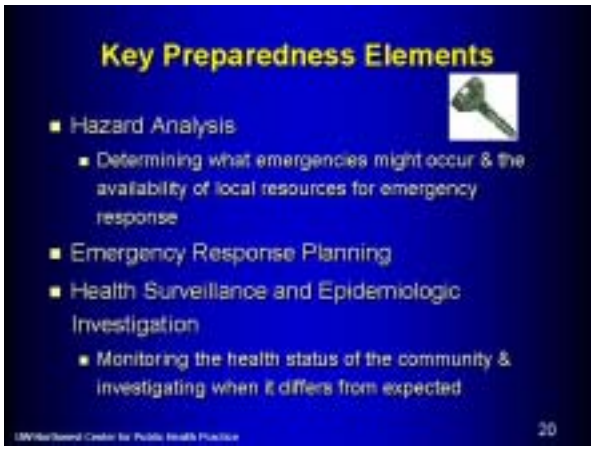
Law enforcement has chain of custody procedures (i.e., to preserve evidence) that may influence when and where public health workers can gather information for their investigation (i.e., epidemiologists conducting surveys, environmental health workers conducting site investigations, etc.). The need to preserve evidence and security may also influence what information is released and when.



Public health workers may need security clearance to enter the crime scene or, at the very least, identification. Agents used in BT may have engineered resistance to the usual treatment (i.e., antibiotics); the population exposed and the time of year may differ than that typically seen.

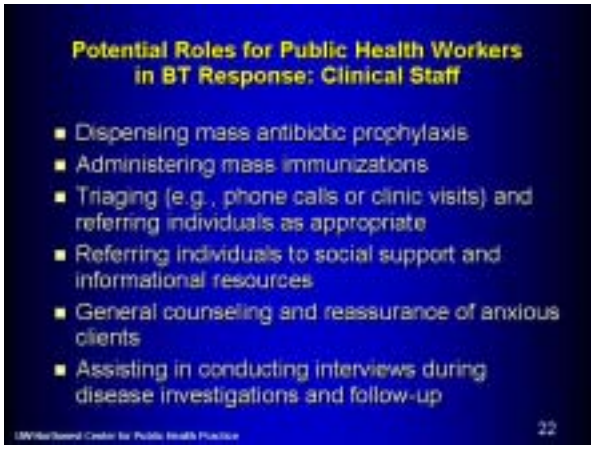
Key Preparedness Elements (Slides 20-21)

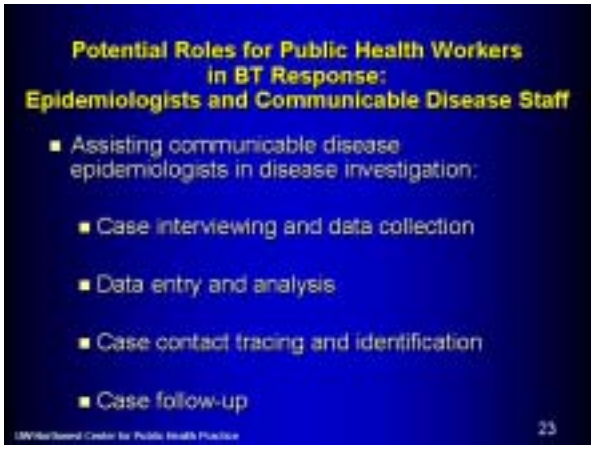
The key preparedness elements listed in slides 20 and 21 come from the Center for Disease Control's Interim Planning Guidance for State Public Health Officials. Although the guide was written for state public health officials, each of the elements has applicability at the local level. The preparedness elements, with the exception of laboratory diagnosis and characterization, are discussed in varying levels of detail (depending on the target audience) in the other modules included in this curriculum.

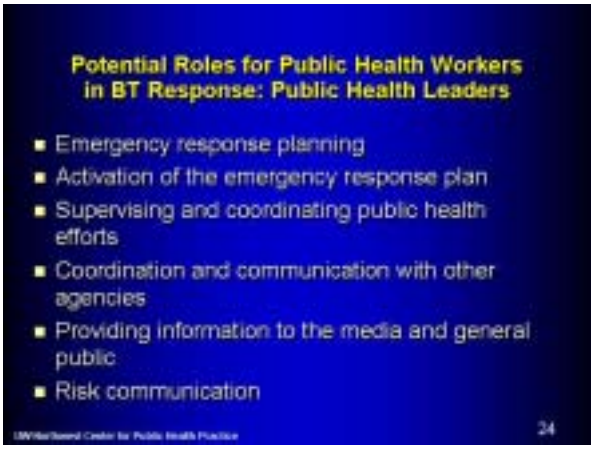


Potential Roles for Public Health Workers in BT Response

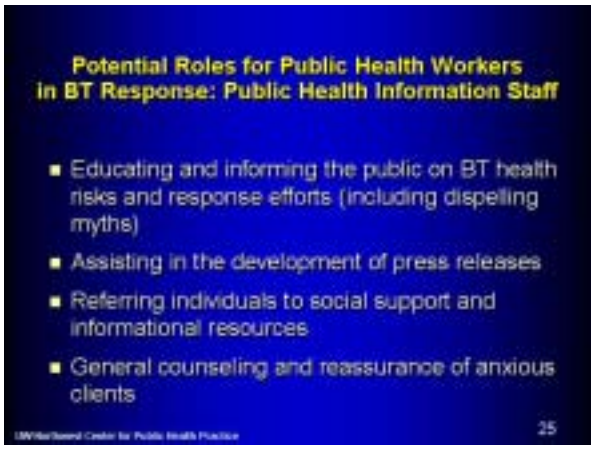
(Slides 22-28)

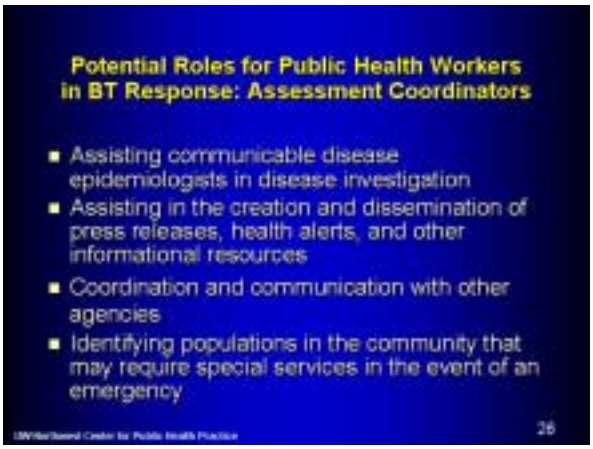


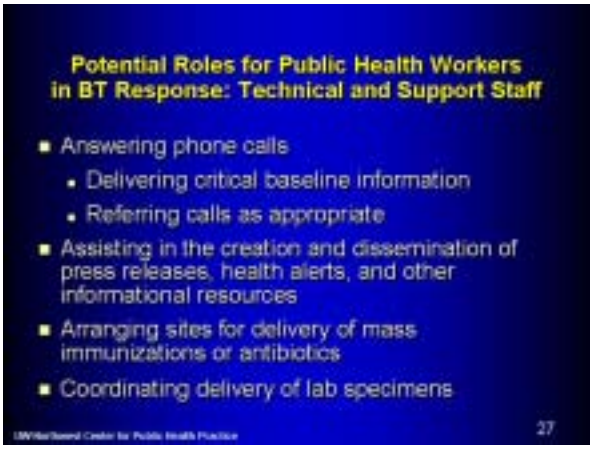


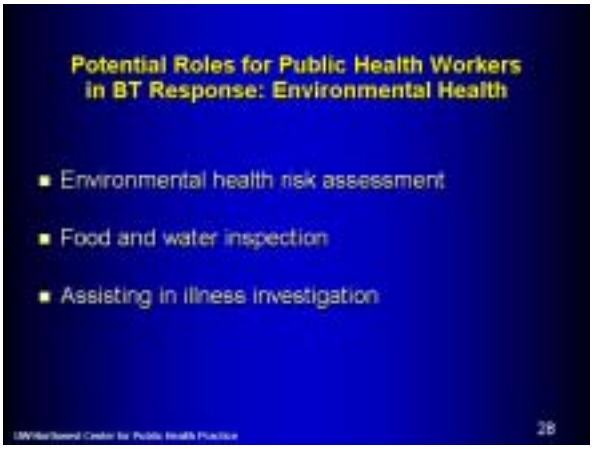


A variety of activities are required to ensure the health and safety of the public. In routine public health practice, workers perform different tasks, depending on their specific job category; and for the most part, tasks performed in a bioterrorism event can also be expected to reflect specific job categories. Workers may be called upon to assist in areas outside of their usual "job description" (e.g., answering phones, making deliveries), but not outside their scope of training (i.e., non-medically trained individuals would not be expected to give medical advice). Slides 22-28 list potential roles for epidemiologists, public health nurses, managers/administrators, assessment coordinators, administrative staff, health educators, and environmental health workers in the public health response to a biological terrorism incident. Note that these are *potential* roles. The scope of responsibility for any one worker will vary depending on the size, organization, and location of the department.

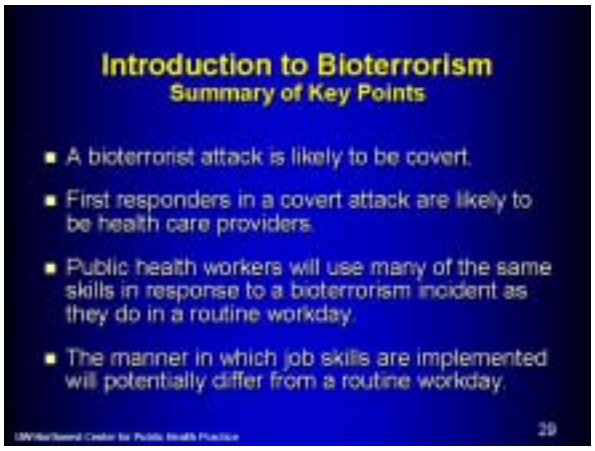

Potential Roles for Public Health Workers in BT Response: Public Health Information Staff
Educating and informing the public on BT health risks and response efforts (including dispelling myths)
Assisting in the development of press releases
Referring individuals to social support and informational resources
General counseling and reassurance of anxious clients
25


Potential Roles for Public Health Workers in BT Response: Assessment Coordinators
Assisting communicable disease epidemiologists in disease investigation
Assisting in the creation and dissemination of press releases, health alerts, and other informational resources
Coordination and communication with other agencies
Identifying populations in the community that may require special services in the event of an emergency
26

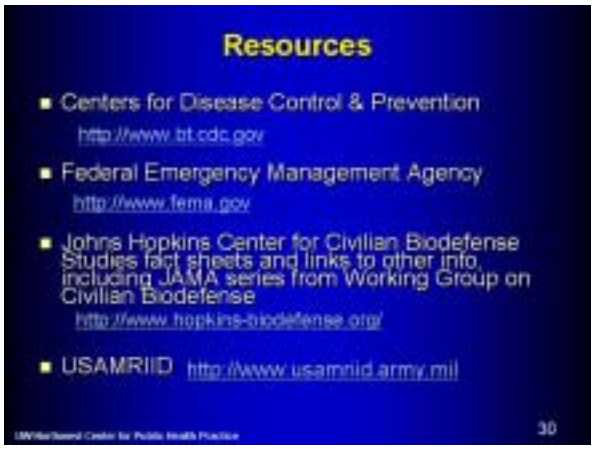

Potential Roles for Public Health Workers in BT Response: Technical and Support Staff
Answering phone calls
Delivering critical baseline information
Referring calls as appropriate
Assisting in the creation and dissemination of press releases, health alerts, and other informational resources
Arranging sites for delivery of mass immunizations or antibiotics
Coordinating delivery of lab specimens
27

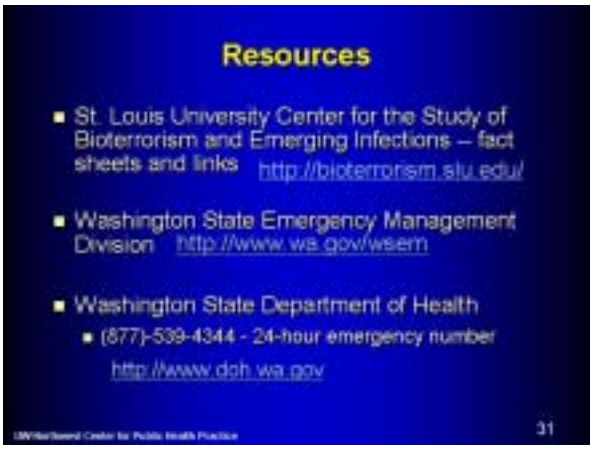

Potential Roles for Public Health Workers in BT Response: Environmental Health
Environmental health risk assessment
Food and water inspection
Assisting in illness investigation
28

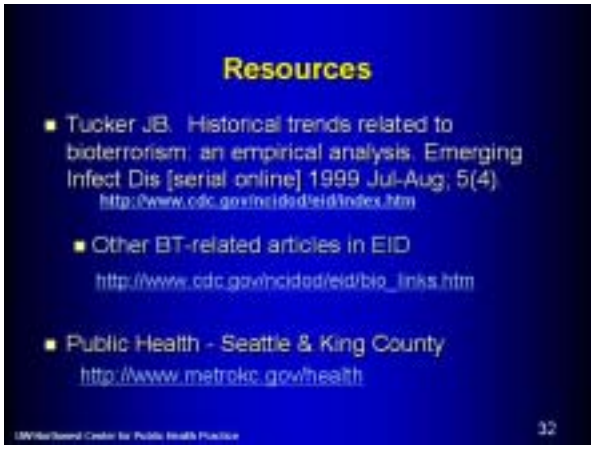
Summary of Key Points (Slide 29)



General Resources (Slides 30-32)

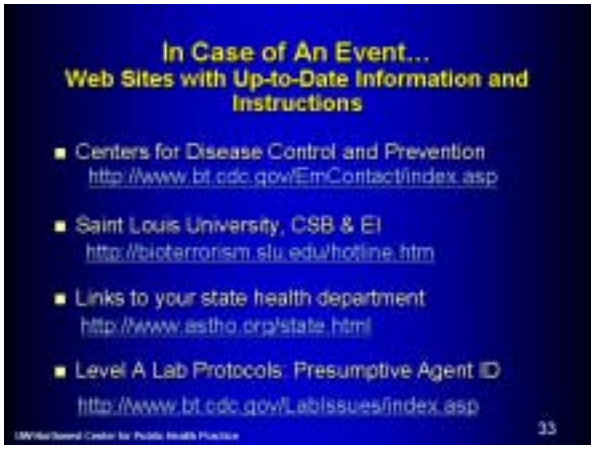


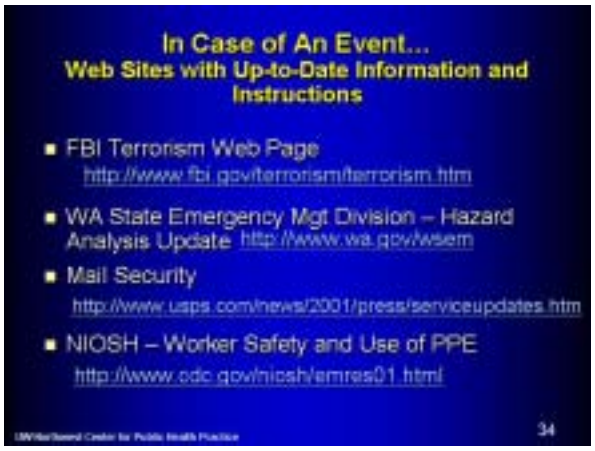




In Case of an Event (Slides 33-34)

The next two slides highlight Web-based resources valuable during a BT event. Most of the links have been presented previously in the resources following the different modules of this curriculum.





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Appendix A: Modules (MS® Powerpoint files)

Introduction to Bioterrorism

One module (33 slides)

Emergency Response Planning

One module, with one custom show for personnel without planning oversight responsibilities

-Public health leaders (36 slides)

-Other public health staff (24 slides)

Diseases of Bioterrorist Potential

Six modules

Overview (25 slides, with 20-slide custom show for staff without health care responsibilities)

Anthrax (29 slides)

Smallpox (44 slides)

Plague and Botulism (33 slides)

Tularemia and VHF (38 slides)

Environmental Sampling and Decontamination (43 slides)

Health Surveillance & Epidemiologic Investigation

One module (32 slides)

Consequence Management

Three modules

-Public health leaders (51 slides)

-Public health professional staff (51 slides)

-Other public health staff (30 slides)

Communication & Informatics

One module (42 slides)

Appendix B: Glossary

Bulbar: Referring to the cranial nerves

Coagulopathy: A disease affecting the coagulability (clotting) of the blood

Confluent: Joining, running together

Conjunctivitis: Inflammation of the conjunctiva; "red eye"

Depigmentation: Loss of pigmentation (color)

Diplopia: Double vision

Dyspnea: Shortness of breath

Edema: An accumulation of an excessive amount of watery fluid in cells or tissues

Enanthem: A mucous membrane eruption (rash)

Epistaxis: Nose bleed

Erythema: Redness

Eschar: A thick, coagulated crust or slough

Exanthem: A skin eruption (rash) occurring as a symptom of an acute viral or coccal disease

HAZMAT: Hazardous materials management; HAZMAT workers respond to discharges and/or releases of oil, chemical, biological, radiological, or other hazardous substances .

Hematemesis: Vomiting of blood

Hemoptysis: Coughing up blood

Hemorrhagic mediastinitis: Bloody inflammation in the chest cavity

Hypotension: Low blood pressure

Indolent ulcer: Chronic ulcer, showing no tendency to heal

Leukocytosis: Elevated white blood cell count

Lymphadenitis: Inflammation of a lymph node or lymph nodes

Lymphadenopathy: A disease process (e.g., swelling) affecting a lymph node or nodes

Macule: A small, discolored patch or spot on the skin, neither elevated above nor depressed below the skin's surface

Malaise: General ill feeling

Myalgia: Muscle aches

Papule: A small, circumscribed solid elevation on the skin

Percutaneous: Denoting the passage of substances through unbroken skin; passage through the skin by needle puncture

Petechiae: Pin-head sized hemorrhagic spots in the skin

Pharyngitis: Inflammation of the tissues of the pharynx; "Sore throat"

Pleuropulmonary: Relating to the pleura and the lungs

Preauricular: Anterior to the auricle of the ear

Prodrome: An early or premonitory symptom of a disease

Prophylaxis: Prevention of a disease, or of a process that can lead to disease

Prostration: A marked loss of strength, as in exhaustion

Pustule: A small circumscribed elevation of the skin, containing purulent material

Sepsis: The presence of various pus-forming and other pathogenic organisms, or their toxins, in the blood or tissues

Stomatitis: Inflammation of the mucous membrane of the mouth

Vesicle: A small, circumscribed elevation on the skin containing fluid (I.e., blister)

*Reference: Stedman's Medical Dictionary, 26th Ed.

Preparing for and Responding to Bioterrorism Instructor's Manual Series

In the wake of the 2001 anthrax attacks, thousands of people and organizations across the country have scrambled for information on how to protect themselves, their families, and their employees from anthrax and other potential agents of bioterrorism. Health officials have been flooded with requests to deliver presentations on bioterrorism preparedness and response at community forums, clinical conferences, business meetings, and other public venues. Potential instructors and trainers, however, have been handicapped by the lack of up-to-date, basic orientation resources on bioterrorism preparedness and response.

Preparing for and Responding to Bioterrorism: Information for the Public Health Workforce is a series of train-the-trainer resources that addresses the public health aspects of bioterrorism. It is scientifically accurate, up-to-date (as of the date of publication), and immediately relevant to the public health workforce. The series consists of thirteen PowerPoint™ slide sets, each accompanied by a detailed instructor's manual. The slide sets cover emergency response planning, surveillance and epidemiologic response, diseases of bioterrorist potential, consequence management, and communication and informatics. They are flexible and can be customized for local community needs. Included in each slide set and instructor's manual is a list of resources, references, and contacts for further information on bioterrorism preparedness and response—before, during, and after an incident.

We hope these resources will help the public health workforce to plan for and respond to public health emergencies, including a bioterrorist attack, and facilitate coordination between public health and other emergency responders.

Cover image: Lassa Fever virus

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