Technology and Bioterrorism

Using Information Technology to Detect and Respond to Biological Weapon Attacks

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Overall Objective

Using IT to combat the effects of bioterrorism and to protect the health of the nation
Learning Objectives

• Understand the essential elements of public health preparedness

• See how the associated public health activities relate to the existing IT infrastructure

• Evaluate gaps that exist in the current IT infrastructure

• Ascertain the rationale for disease surveillance and command and control
The Post 9-11 World

- Sept. 11 attacks changed the perception about the invulnerability of the homeland
- Bioterrorist attacks could cripple the public health infrastructure with mass casualties
- Fear of bioterrorism in U.S. cities is high, satisfaction with preparedness to respond is low
What is Lacking

- Detection systems and data collection mechanisms
- Interconnectivity
- Effective communication mechanisms - Electronic and non-electronic
- Comprehensive database of relevant point data for analysis
- Training and education - Public and providers
Scenario 1
Incident Response

- Flooded 911 call centers
- Emergency teams dispatched
- Specialists cannot be located
- Treatment information hard to find or outdated
- Support teams cannot communicate with one another
Scenario 2
Incident Response

- Pathogen not readily identified for several days
- Lack of patient records for review of relevant past history
- Providers not trained to recognize biological warfare diseases
- Delay in diagnosis adversely affects treatment outcome
Importance of Information Sharing/Reuse

• Ongoing monitoring and surveillance to differentiate natural disease patterns from terrorist attacks

• Quick response upon incident or occurrence of bioterrorist event

• Effective communication and coordination
How Can This Be Accomplished?

Foundation exists to respond to bioterrorism

Needs to be reinforced to deal with WMD terrorist attacks
Public Health Preparedness

Disease Surveillance System

Planning and Coordination

Medical Management

Surveillance and Detection

Training and Public Awareness

Surge Capacity

Communications

Command and Control (C2) System

Detection

Response
Public Health Preparedness

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Detection

Response
Disease Surveillance System

- Collection of health data from disparate sources
- Continuous monitoring and analysis of disease patterns
- Prompt identification and suppression of disease outbreaks
- Provide elements necessary for decision-making and legislation
Disease Surveillance System Examples

- NEDSS
- EMERGEncy ID NET
- FoodNet
- GeoSentinel
- NARMS
- NNDSS
“...Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.”

Final draft of proposed revision of Joint Pub 1-02; Memo from Chief, Joint Doctrine Division, the Joint Staff, 20 October 1994.
Command and Control Concept

- Assured Connectivity: Situational assessment and coordination
- Attribution: Accessing and tracking threat across multiple information domains
- Crisis Coordination: Contain, neutralize threats and recover from damage
Command and Control Sample Components

- Emergency Equipment Locators (GPS enabled)
- PSA Announcements / Emergency Messaging System
- Medical Supply & Pharmaceutical Logistics System
- Communication Tools
- Data Analysis and Reporting Tools
- Triage Logistics / Hospital Bed Counts
- Patient Immunization Tracking
- Real-time Incident & Street Mapping System (GPS-enabled)
- Medical Professional and Technician Locator Database
- Medical Training Tracking & Reporting
- Environmental Testing Equipment and Reporting Tools
- Health Emergency Command and Control Center / System
- Other

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- PSA Announcements / Emergency Messaging System
- Medical Supply & Pharmaceutical Logistics System
- Communication Tools
- Data Analysis and Reporting Tools
- Triage Logistics / Hospital Bed Counts
- Patient Immunization Tracking
- Real-time Incident & Street Mapping System (GPS-enabled)
- Medical Professional and Technician Locator Database
- Medical Training Tracking & Reporting
Command and Control
Planning and Coordination

How do we prepare for a biological event and ensure that all the responders can coordinate with one another?
Planning and Coordination Approach

• **Build on systems already in place**

• **Facility/Locality/State readiness assessments**

• **Apply risk management concepts to detection and response preparation**

• **Evaluate coordination capabilities between federal and local entities**

• **Overall IT coordination and data sharing at the facility, city, and state levels**
How can we recognize covert exposure in a population?

How can we pinpoint the problem in the presence of an incubation period, enabling victims to disperse widely before symptoms appear?
Surveillance and Detection Approach

- Integrated disease surveillance system
- Link local facility systems to laboratory, regional, and national systems for data sharing
- Streamlined deployment of advanced technologies
- Deployment of information systems to all sectors that could affect public health (e.g., Food inspection)
Training and Public Awareness

With resources already overstretched, how can we adequately train our emergency and medical personnel?

How do we provide a single, cohesive message to the general public?
Training and Public Awareness

- Health Promotions/Advertisements/Public Service Announcements

Communications Authority

- Internet
- TV
- Radio
- Print
Training and Public Awareness

- Simulation exercises
  - Functional
  - Roundtable
  - PC and Internet based

- Health professional training

- Immediate availability of recent findings and procedures
Surge Capacity

How do we manage the massive flow of individuals who think they are infected but are simply part of the general panic?

How do we handle such a patient load when we are already overwhelmed with regular patient care?
Surge Capacity Approach

- Inventory management systems
- Laboratory overflow mechanisms
- Mutual aid agreements
- Area-wide plan for information sharing and standardization
What methods and tools should be used to share data, information, and warnings, and communicate with the first responders and other agencies that arrive to assist us?
Communications Approach

- Health Alert Network (HAN)
- Emergency call centers
- Secure network between intelligence, law enforcement, and medical communities
How should we keep our medical personnel abreast of everything related to those conditions they do not regularly encounter?
Medical Management Approach

- Access to experts
- Electronic repository of critical medical information and knowledge
- Decision support system for clinicians
Scenario 3
What is Different?

- Expedited information flow
- Trend analysis
- Electronic reporting
- Wide area data collection
- Rapid access to alerts and training materials
Who Needs All This Information?

Everyone!
Impairment of Day-to-Day Operations?

- Improvement to quality and speed of medical treatments
- Reduction of workload
- Information available anytime and anywhere
- Impacts on health care workforce needed
Dual Use for Non-terrorist Events

• View within full spectrum
• Utilize activities for common ailments
• Dedicated networks will improve flow of information
• Regular use facilitates use in a crisis
What Next?

• Superimpose response capability onto existing health infrastructure

• Recognize IT as a force multiplier

• Deliver rapid education and training, wherever and whenever

• Improve communications and intelligence
Levels of Medical Intervention for Terrorist Incidents

- Federal Agencies and Resources
- State Agencies and Resources
- Initial Treatment Facility
- Local Responders
Federal Government Role

- Serve as the lead provider of financial resources
- Coordinate initiatives at all government levels
- Act as arbiter of commonalties for emergency response
- Develop standards for public health preparedness?
State Government Role

- Serve as conduit between federal government and city government
- Facilitate dialogues between cities and outlying communities
- Provide foundation for standardization throughout the state
- Responsible for public health assets
Local Government Role

• Responsible for first responder units
• Create adequate response plans for various catastrophes
• Responsible for establishing critical resource sharing during emergencies
• Coordinate response plans with neighboring cities and towns
Facility Administrator Role

- Ensure funding used as efficiently as possible
- Ensure technology end users are adequately trained
- Maintain active alliances with other local health care facilities
- Coordinate with city officials on response plans and scenarios
Technology Needed

- Databases
- Search engines
- Applications
- Internet connectivity
- Desktops
- Servers
- Secure networks
- Wireless technology GPS-enabled 911 call centers
Solutions

- System integration/interoperability
- Data standards
- Data storage management
- Data mining
- Knowledge management
Financing The Solution

- White House
- HHS
- CDC
- NIH
- FEMA
Homeland Defense and Public Health: Intertwined Existence
Summary

- **Business process lifecycle** provides full spectrum support before, during, and after an incident
- **Linkages of information systems** provide detection and response capabilities
- **Information systems** provide up-to-date information at all times
Summary

• Capabilities for the consequence management of a biological attack reside within the existing IT infrastructure.

• All levels of government and industry have a role in strengthening the capabilities to respond to a terrorist event.

• The federal and state governments can play pivotal roles in establishing the standards needed for bioterrorism preparedness.
Questions?

Thank you!