Recognizing the Threat of Bioterrorism

USF Center for Biological Defense

www.bt.usf.edu
Types of Terrorism

• Chemical
• **Biological**
• Radiological or “Dirty – Bomb”
• Nuclear
• Explosive
The only thing we have to fear is... Anthrax, Smallpox, Ebola Virus, Bubonic Plague, Nerve Gas, Nuclear Meltdown, Contaminated Letters, Airplanes, Spores...
Bioterrorism

• The application of biologic agents or their toxins as a weapon against people, animals or crops.

• Most confirmed cases have involved biocrimes rather than bioterrorism or biowarfare.
Category A Agents

- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (Variola major)
- Tularemia (Francisella tularensis)
- Viral Hemorrhagic Fevers (Filoviruses [e.g., Ebola, Marburg] and Arenaviruses [e.g., Lassa, Machupo])
Category B Agents

- **Brucellosis** (Brucella species)
- Epsilon toxin of Clostridium perfringens
- Food safety threats (e.g., *Salmonella* species, *Escherichia coli* O157:H7, Shigella)
- Glanders (Burkholderia mallei)
- Melioidosis (Burkholderia pseudomallei)
- Psittacosis (Chlamydia psittaci)
- Q fever (Coxiella burnetii)
- **Ricin** toxin from Ricinus communis (castor beans)
- Staphylococcal enterotoxin B
- Typhus fever (Rickettsia prowazekii)
- **Viral encephalitis** (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])
- Water safety threats (e.g., *Vibrio cholerae*, *Cryptosporidium parvum*)
Category C Agents

- Emerging infectious disease threats such as:
  - Nipah Virus
  - Hanta Virus
  - SARS
  - Avian Flu (H5N1)
  - Swine Flu (H1N1)
  - West Nile Virus
  - Genetically Engineered Threats
Why Use Biological Agents?

- **Cheap, Relatively Simple Propagation**
  - Infectious via aerosol
  - Organisms fairly stable in environment
  - Susceptible civilian populations
  - The guilty can escape to “fight another day”
  - High morbidity and mortality
  - Person-to-person transmission (smallpox, plague, VHF)
  - Difficult to diagnose and/or treat
  - Enormously disruptive and costly
  - Wide range of biological agents
Possible Delivery Systems

1. Point Source Delivery
2. Upwind line delivery (eg. Crop Duster)
3. Vector transmission
4. Human Carrier – “Outbreak”
Dissemination methods
The ideal aerosol contains a homogeneous population of 2 or 3 micron particulates that contain one or more viable organisms.

Maximum human respiratory infection is a particle that falls within the 1 to 5 micron size.

<table>
<thead>
<tr>
<th>Particle Size (Micron, Mass Median Diameter)</th>
<th>Infection Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-20</td>
<td>Less Severe</td>
</tr>
<tr>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>7-12</td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td>More Severe</td>
</tr>
<tr>
<td>1-5</td>
<td></td>
</tr>
</tbody>
</table>
Weaponization
Potential Targets in Your Area

- Government Offices and Facilities
- Political Organizations and Emotionally Charged Issues!!!
- Professional Sporting Events
- Amusement Parks
- Concerts and Outdoor Events
- Convention Centers
- Commercial & Retail Facilities
What Constitutes a Reasonable Threat?

SUSPICIOUS MAIL ALERT
If you receive a suspicious letter or package:

1. Handle with care. Don't shake or bump.
2. Isolate it immediately.
3. Don't open, smell, touch or taste.
4. Treat it as suspect. Call local law enforcement authorities.

For a Bomb:
- Evacuate immediately
- Call Police
- Contact Postal Inspectors
- Call Local Fire Department/HAZMAT Unit

For Radiological:
- Limit Exposure - Stay Hands
- Evacuate Area
- Shield Yourself from Object
- Call Police
- Contact Postal Inspectors
- Call Local Fire Department/HAZMAT Unit

For Biological or Chemical:
- Solate - Don't handle
- Evacuate Immediate Area
- Wash your hands with soap and warm water
- Call Police
- Contact Postal Inspectors
- Call Local Fire Department/HAZMAT Unit
Identifying Suspicious Packages and Envelopes

- Excessive postage
- *Handwritten or poorly typed addresses*
- Misspelled common words
- *Strange or absent return address*
- Not addressed to a specific person
- Marks such as “Personal,” “Confidential,” or “Do Not X-Ray”
- Marked with threatening language

- Powdery substance felt through or appearing on the package or envelope
- Oily stains, discolorations or odor
- Lopsided envelope
- Excessive packaging material - masking tape or string
- Excessive weight
- Ticking sound
- Protruding wires or aluminum foil
Types of Threats

Overt
- Announced
- **Example:** Letter announcing contents of a package with ricin or anthrax
- May be for publicity
- May be hoax

Covert
- Unannounced
- Intended to cause mass casualties before detected
- Health care providers may not initially recognize
Surveillance

• **Syndromic Surveillance** – analysis of medical data to detect or anticipate disease outbreaks

• Many of the biological threats have very similar presenting symptoms.

• **Is every respiratory outbreak a terrorism incident?**

• The ideal system is **real time reporting** of patients with specific symptom complexes with immediate processing of this information by the health department, and rapid feedback to the medical care providers.
October 2001 Anthrax Mailings

09-11-01
This is next
Take Penicillin now
Death to America
Death to Israel
Allah is great
“Toxic Ricin found at South Carolina postal facility."

“A letter addressed to the White House was intercepted after it was found to contain Ricin”

“Senator Frist reports that Ricin found in Dirksen Building.”
The Florida Experience...

• Approximately **7,000** items tested in Florida

• No item tested positive on confirmatory testing – outside of the AMI building

• Most items were simply everyday items

Cream Filled Cookies
Keyboards
Catalogs with Absorbent Powder
Collection Notices
Rolls of Money
Airliner Seat Trays
Sets of Luggage
Car Bumpers and Doors
The “REAL” effect of Bioterrorism

• In 2001, there were 11 cases of inhalation Anthrax and 12 cases of cutaneous anthrax, 5 deaths.
• 32,000 people took Ciprofloxacin for 60 days.
• There were thousands hoaxes and false alarms in the months following the attacks.

• Billions of $$$ have been spent to protect our citizens.
• One postal facility re-opened recently after a $180 million renovation.
• Is this the most efficient way of protecting Americans and assuring National Security?
Where are the Weapons??
“With the collapse of the Soviet Union, the danger once posed by our weapons work has sharply diminished. Biopreparat claims that it no longer conducts offensive research, and Russia's stockpile of germs and viruses has been destroyed. But the threat of a biological attack has increased as the knowledge developed in our labs - of lethal formulations that took our scientists years to discover - has spread to rogue regimes and terrorist groups.”

“Through our covert program, we stockpiled hundreds of tons of anthrax and dozens of tons of plague and smallpox”

****From Biohazard by Ken Alibek and Stephen Handelman- Published by Random House****
### Iraqi Offensive BW Program: Weaponized Agents

**1995 disclosures to U. N.**

<table>
<thead>
<tr>
<th>Agent</th>
<th>Produced</th>
<th>Weaponized</th>
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<tbody>
<tr>
<td>Botulism toxin</td>
<td>19,000 L</td>
<td>10,000 L</td>
</tr>
<tr>
<td>Anthrax spores</td>
<td>8,500 L</td>
<td>6,500 L</td>
</tr>
<tr>
<td>Aflatoxin</td>
<td>2,200 L</td>
<td>1,580 L</td>
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</table>
North Korea

R & D Efforts:

- Anthrax
- Botulinum toxin
- Hemorrhagic Fever
- Smallpox
- Tuberculosis
- Typhus
- Typhoid
- Yellow Fever
- Cholera
Additional Challenges

- Extraordinary advances in modern biology and life science research
- Access and knowledge becomes easier and more sophisticated
- Growth of companies researching and looking for alternative applications of these agents
- Declining share of technology under government control
- Getting into more and more hands
Examples

• 2005, Maine Biological Labs was fined $500,000 by US Government and given 5 yrs probation marketing unlicensed viruses and toxins to Syria.

• 2005, A New Jersey Company, Becton Dickinson, was fined for exporting viruses and toxins to India

• A Texas company was recently fined for exporting 13 chemical and biological agents to various locations

• A San Diego company also recently fined $1M for exporting toxins to Canada
Identifying the Threat

• As of 2002, an estimated 1,469 facilities in the US possess, work with, or transfer listed agents.
• USA Patriot Act 2001 and Bioterrorism Act of 2002
• BWC has lack of formal mechanisms for monitoring and verification, and efforts to strengthen the treaty have been unsuccessful.
• Lack of international biosecurity guidelines
Bottom Line

• Global security nightmare – failing to keep pace with changes
• Guards, guns, and gates approach will NOT work
• Need to be more innovative on we approach these threats
Thank you

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