Bioterrorism:
Background and Significance
History of Biological Warfare

• 1346  Siege of Kaffa; plague
• 1763  French and Indian War; smallpox
• WW I  German program; anthrax, glanders
• 1925  Geneva protocol bans biological weapons
• WW II  Japanese program; anthrax, plague, cholera, shigella
History of Biological Warfare (cont.)

- 1941 George W. Merck named U.S. civilian head of Chemical Warfare Service later changed to War Research Service
- 1946 U.S. announces its involvement in bioweapons research
- 1969 Nixon eliminates offensive biological warfare program
History of Biological Warfare (cont.)

• 1972  Biological Weapons Convention
• 1979  Accidental release of *B. anthracis* spores at bioweapons research center, Sverdlovsk, U.S.S.R
• 1989-92  Scientists from the former U.S.S.R. involved in biological weapons research defect to the West
Domestic Biological Terrorism

- 1984 Rajneeshee cult members contaminate salad bar with *Salmonella typhimurium* in Oregon
- 1992 Ricin attack planned by Minnesota militia
- 2001 Anthrax releases in FL, DC, NY, NJ
Biological Terrorism

- Use of biological agents to intentionally produce disease or intoxication in susceptible populations - humans, animals, or plants - to meet terrorist aims.
Advantages of Biologics As Weapons

- May be easier, faster to produce and more cost-effective than other weapons
- Potential for dissemination over large geographic area
- High morbidity and mortality
- Creates panic
- Person-to-person transmission possible (smallpox, plague, and viral hemorrhagic fever)
- Difficult to diagnose and/or treat
Ideal Characteristics for Potential Biological Terrorism Agent

- Inexpensive and easy to produce
- Can be aerosolized (1-10 µm)
- Survives sunlight, drying, heat
- Cause lethal or disabling disease
- Person-to-person transmission
- No effective treatment or prophylaxis
Sarin Gas Attack, Tokyo Subway, 1995
Operation Desert Storm
Ken Alibek - U.S.S.R. Program

“TERRIFYING REVELATIONS.”
—Newsday

BIOHAZARD

THE CHILLING TRUE STORY OF THE LARGEST COVERT BIOLOGICAL WEAPONS PROGRAM IN THE WORLD—TOLD FROM INSIDE BY THE MAN WHO RAN IT

KEN ALIBEK
WITH STEPHEN HANDELMAN

MINNESOTA DEPARTMENT OF HEALTH
Biological Agents Ranking System

Public Health impact criteria based on:

- Morbidity and mortality
- Delivery potential
- Public perception (fear, civil disruption)
- Public health preparedness needs
Level A Bioterrorism Agents

- Anthrax (*Bacillus anthracis*)
- Smallpox (Variola major)
- Plague (*Yersinia pestis*)
- Botulism toxin (*Clostridium botulinum*)
- Tularemia (*Francisella tularensis*)
- Viral hemorrhagic fevers (VHF)
Other Potential Bioterrorism Agents

- Brucellosis (*Brucella* species)
- Glanders (*Burkholderia mallei*)
- Q fever (*Coxiella burnetii*)
- Cholera (*Vibrio cholera*)
- *Salmonella* sp. and *Shigella* sp.
- Venezuelan Equine Encephalitis (VEE)
- Staphylococcal Enterotoxin B
- Ricin (from castor beans)
- T-2 Mycotoxins

(Note that this is not a complete listing)
## Estimated Casualties From a Hypothetical Bioterrorism Release

### Downwind Reach

<table>
<thead>
<tr>
<th>Agent</th>
<th>(km)</th>
<th>Dead</th>
<th>Sick**</th>
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</thead>
<tbody>
<tr>
<td>Rift Valley Fever</td>
<td>1</td>
<td>100</td>
<td>10,000</td>
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<tr>
<td>Typhus</td>
<td>5</td>
<td>2,500</td>
<td>30,000</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>10</td>
<td>150</td>
<td>27,000</td>
</tr>
<tr>
<td>Plague</td>
<td>10</td>
<td>6,500</td>
<td>27,000</td>
</tr>
<tr>
<td>Q Fever</td>
<td>&gt;20</td>
<td>50</td>
<td>60,000</td>
</tr>
<tr>
<td>Tularemia</td>
<td>&gt;20</td>
<td>4,500</td>
<td>60,000</td>
</tr>
<tr>
<td>Anthrax</td>
<td>&gt;20</td>
<td>24,000</td>
<td>60,000</td>
</tr>
</tbody>
</table>

*50 kg by aircraft, 2 km line upwind of a city of 500,000

** Includes deaths
Investigation of Potential Bioterrorism Incident

- Clinical
- Epidemiology
- Laboratory
### Symptoms of Potential Bioterrorism Diseases - Challenges of Detection

<table>
<thead>
<tr>
<th>Agent</th>
<th>Clinical Effect</th>
<th>Initial Symptoms</th>
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<tbody>
<tr>
<td>Anthrax</td>
<td>Mediastinitis</td>
<td>Headache</td>
</tr>
<tr>
<td>Plague</td>
<td>Pneumonia</td>
<td>Fever</td>
</tr>
<tr>
<td>Q fever</td>
<td>Pleuritis, hepatitis</td>
<td>Malaise</td>
</tr>
<tr>
<td>Tularemia</td>
<td>Pneumonia</td>
<td>Cough</td>
</tr>
<tr>
<td>Smallpox</td>
<td>Pustules</td>
<td></td>
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</table>
Biological Terrorism?
Epidemiologic Clues

- Tight cluster of cases
- High infection rate
- Unusual or localized geography
- Unusual clinical presentation
- Unusual time of year
- Dead animals
If you hear these hoofbeats...

- Widened mediastinum on thoracic radiograph
- Influenza-like illness in summer months
- Pneumonia death in otherwise healthy young adult
- Vesicular rash that starts on extremities
- Hemorrhagic fever syndrome
- Cluster of unusual, severe or unexplained illnesses
- Unexplained critical illness in otherwise healthy young adult

...consider these zebras

- Anthrax
- Tularemia
- Plague
- Smallpox
- Brucellosis
- Viral hemorrhagic fever
- Other potential bioterrorism agents

Please report any of these diseases or syndromes immediately by telephone to:
Minnesota Department of Health
Infectious Disease Epidemiology, Prevention and Control Division

(612) 676-5414
or
(877) 676-5414