

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**

Rajneeshee Cult, *Salmonella* - Oregon, 1984



MN Patriots Council, Douglas County, 1991



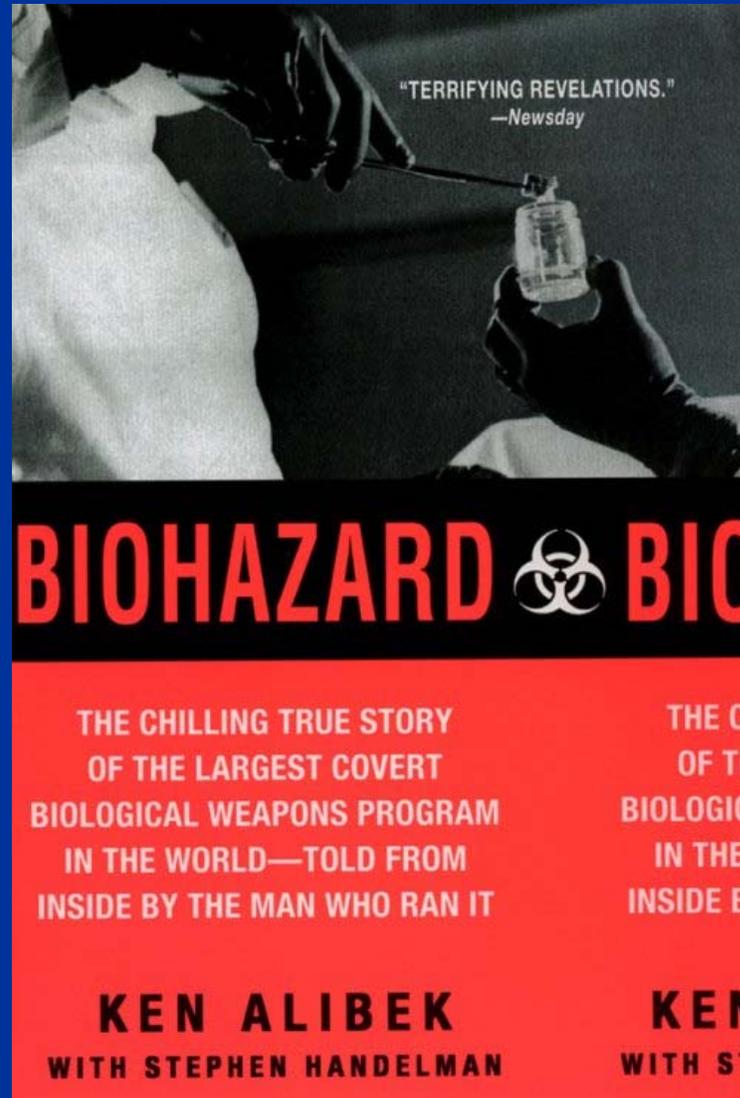
Sarin Gas Attack, Tokyo Subway, 1995



Operation Desert Storm



Ken Alibek - U.S.S.R. Program





Luis M. Alvarez / AP

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*

<u>Agent</u>	<u>Downwind Reach</u> <u>(km)</u>	<u>Dead</u>	<u>Sick**</u>
Rift Valley Fever	1	100	10,000
Typhus	5	2,500	30,000
Brucellosis	10	150	27,000
Plague	10	6,500	27,000
Q Fever	>20	50	60,000
Tularemia	>20	4,500	60,000
Anthrax	>20	24,000	60,000

*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

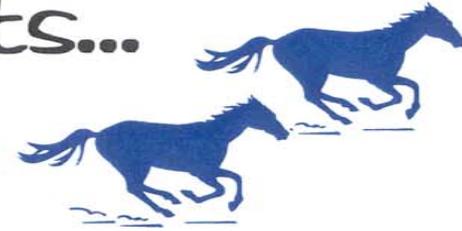
<u>Agent</u>	<u>Clinical Effect</u>	<u>Initial Symptoms</u>
Anthrax	Mediastinitis	} Headache Fever Malaise Cough
Plague	Pneumonia	
Q fever	Pleuritis, hepatitis	
Tularemia	Pneumonia	
Smallpox	Pustules	

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

