

Large-scale Biological Events

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Goals of Talk

- Disaster teams will understand:
 - What a biological event is
 - How an event may occur
 - Aspects of a bioterrorist event
 - General info
 - Most likely agents
 - Treatments
 - Pre- and post-exposure prophylaxis
 - Other team issues

January 2, 2008

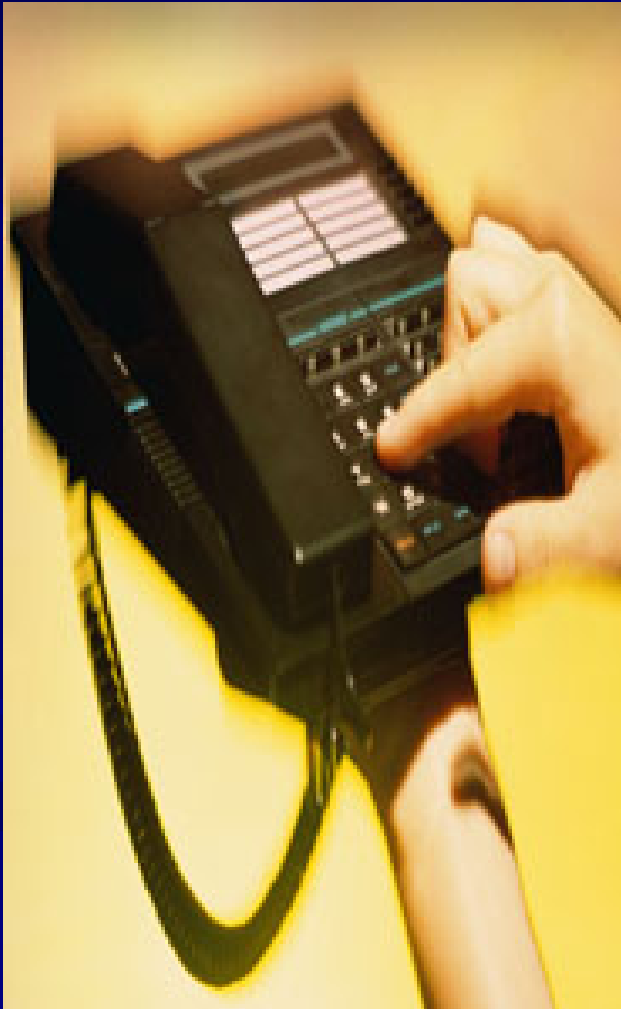
Snow was falling, painting a cottony white coating on the trees while making the holiday lights glisten and the snowmen smile. The Red Sox had won the World Series, the Revolution had made it to the championship game, the Patriots were undefeated and the Celtics had the best record in basketball. All seemed right with the world.....until....

January 3, 2008



- The local hospitals see many and admit several teenagers ill with fever, cough, shortness of breath, and chest pain.
- Doctors suspect Influenza
 - The flu has been reported in the Northeast during the last two weeks
- MD's recommend bed-rest and fluids
- Specimens from hospitalized patients are sent to DPH to confirm influenza (rapid tests have been negative)

At the Local Health Office January 4th

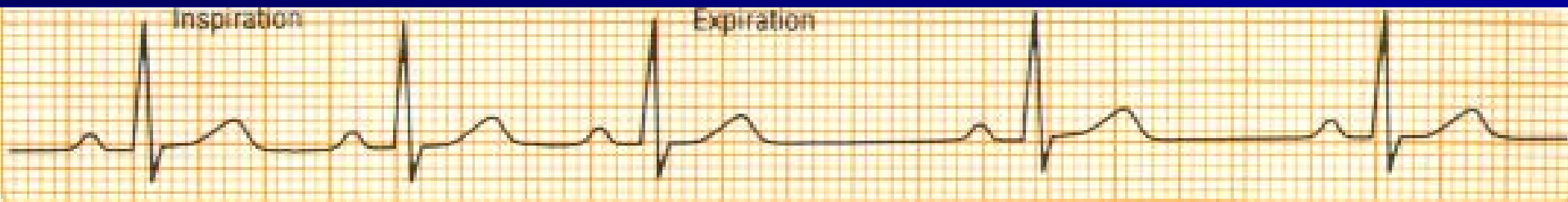


- **Doctors contact the local health department requesting more flu vaccine**

The Morning News- January 4th



- 4 teenagers, all friends, have died from pneumonia and large numbers of teenagers have been hospitalized with serious flu like symptoms



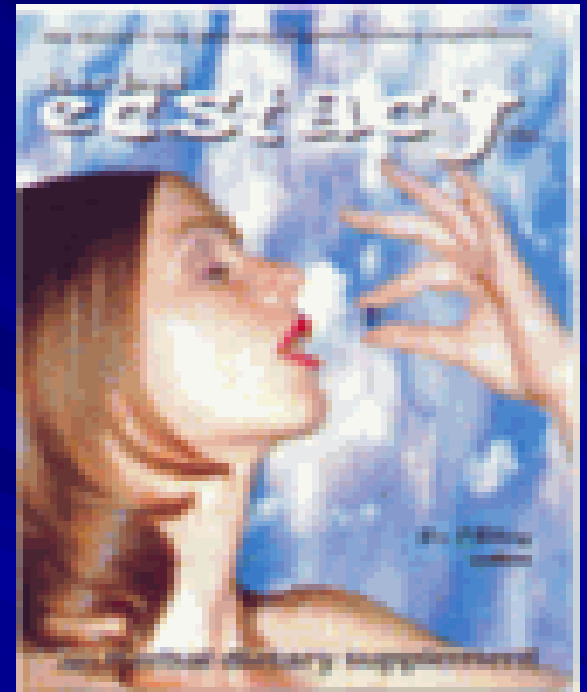
At the Department of Public Health....



- Channel 4 News contacts the local health department for comment on the death of the four teenagers
- The hospital reports to DPH that blood cultures on three of the dead teenagers have grown an unidentified bacteria
- DPH reports no increase in hospital admissions in other areas of the state.

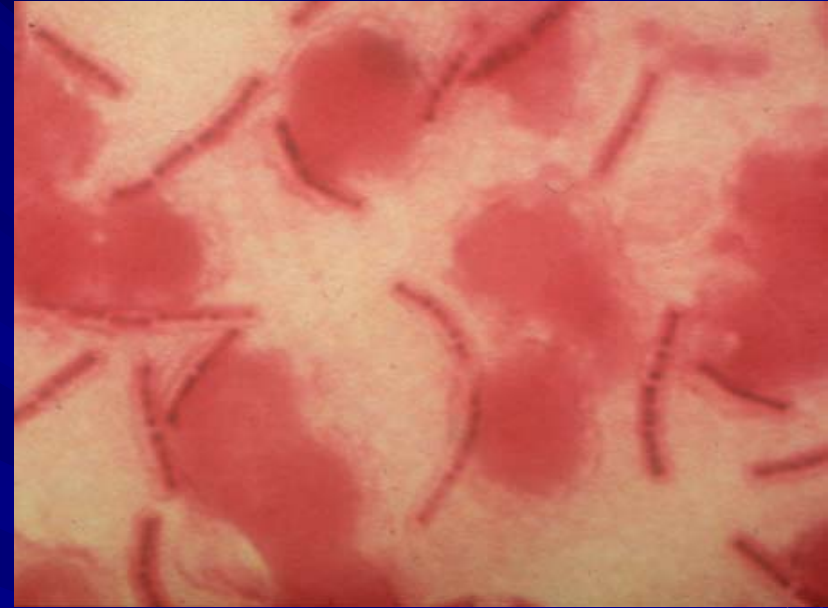
The Rumor Mill.....

- Many people are convinced that the deaths were caused by tainted Ecstasy
- Rumors circulate that family members of the dead teenagers have become ill
- There is widespread hysteria that the deaths were caused by pneumonic plague imported by an exchange student from India at Williams College



January 5, 2008

- Ill teenagers overwhelm local hospitals
- Additional deaths in surrounding hospitals are reported
- Isolation protocols breakdown
- Local law enforcement and the FBI are contacted



DPH, working with the CDC, confirms inhalation Anthrax. A bioterrorist attack is suspected.

FBI Briefing- Noon- January 5th



- The FBI confirms a prior terrorist threat
- A RAVE on New Year's Eve, attended by local area teenagers, is suspected as the point of attack

DPH Press Conference

2 PM- January 5th

- DPH confirms Anthrax attack but assures that there is no threat of person to person spread
- All those at the RAVE are advised to see their doctor immediately for prophylactic treatment with the antibiotic Cipro.
- DPH confirms that high mortality rates are to be expected in symptomatic patients despite treatment



At the Hospitals... January 5th

- Emergency departments are overwhelmed by sick patients, as well as healthy patients requesting antibiotics, some of whom were not at the concert.
- Hospital pharmacy stocks run out.
- Hospital security is unable to deal with the violence that erupts from panicked citizens and their families
- The hospital morgues are overflowing



January 5th.....

- Dispatchers are overwhelmed by requests for urgent transport
- Some hospitals close to ambulance traffic
- Ambulances are diverted



Six PM News... January 5th

- The governor appeals for calm and requests Federal help
- MA-1 and MA-2 DMAT's are activated
- The CDC stockpile is mobilized



CDC stockpile tapped....

- Cipro and vaccinations arrive
- DMAT teams open vaccination and medication distribution stations
- Many thousands are treated by the hospitals and the DMAT teams



The Aftermath

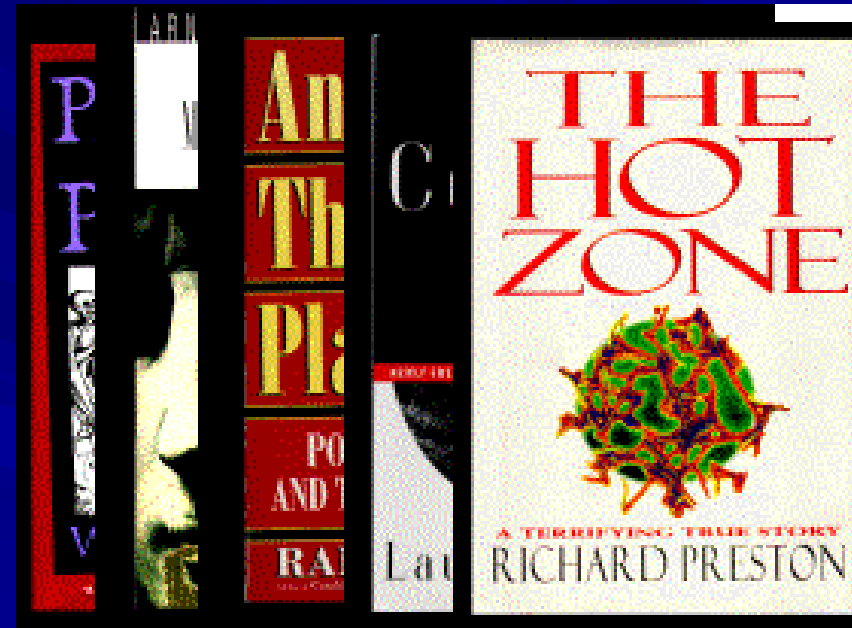
- 500 people dead
- 2500 people require Cipro for two months
- 5,000 with other illnesses seek care
- Several deaths are reported among those exposed who failed to complete the one month antibiotic course.
- Al Qaeda claims responsibility



Aspects of a Biological Event

What makes a large-scale ID emergency?

- Can be natural or manmade (bioterrorism)
- Significant public health impact
- Infectivity and risk of transmission
- Widespread fear and panic
- Intervention necessary to prevent and control infection



Fear and panic

- Lack of good information
- Delay in identification of disease
- Ineffective response
- Worried well
- Civil disorder



Early diagnosis = Vigilance

- Groups of individuals becoming ill simultaneously
- Sudden increase in severity of illnesses in otherwise healthy individuals
- Sudden increase in non-specific illnesses
- Simultaneous outbreaks in human and animal populations
- Unusual temporal or geographic clustering

History

■ George Santayana,
philosopher, poet and novelist:

**“Those who cannot
learn from history
are doomed to
repeat it”**



Smallpox, Yugoslavia 1972

- Pilgrim returns from Mecca with fever
- 2 weeks later- 11 family and friends become ill with fever
- Secondary cases hospitalized
 - 38 additional people
 - 8 hospital workers
- Diagnosis @ 4 weeks- 150 infections



The Response: Yugoslavia- 1972

- Vaccination of 20 million within 12 days
- 10,000 contacts quarantined for two weeks
- Borders closed
- 175 cases and 35 deaths



Bioterrorism Events

- ❖ 1995 Tokyo attack: 5,510 people
 - ❖ 640 self drive to one hospital
- ❖ 50 Kg Anthrax upwind of 500,000 potential 250,000 victims



Dalles, Oregon 1984

- 751 salmonella cases
- Most cases associated with 10 restaurants
 - salad bars without common food or water source
- Source, Rajneeshee cult, discovered 18 months after the incident
 - ‘Practice’ for an election day attack



Comparison of Natural vs. Bioterrorism Events:

Bioterrorism

- Encephalitis
- Flu-like illness
- Papulo-pustular rash
- Fever with hemorrhage
- Gradual paralysis
- Nausea, vomiting, diarrhea

Community Illness

- Encephalitis
- Flu-like illness
- Papulo-pustular rash
- Fever with hemorrhage
- Gradual paralysis
- Nausea, vomiting, diarrhea

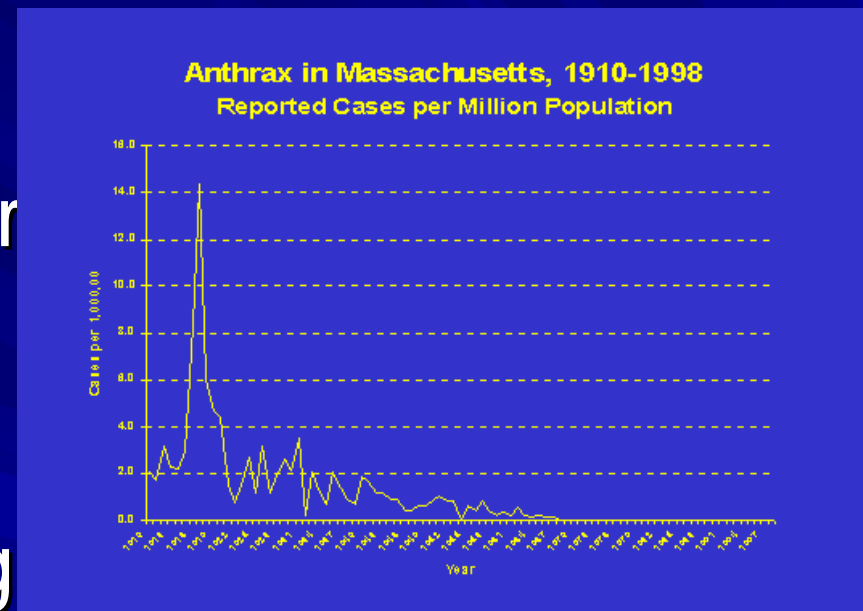
Bioterrorism vs. Community Acquired

Issue	Bioterrorism	Pandemic Flu
Likelihood	High	High
Warning	None to days	Days to months
Occurrence	Focal/Multifocal	Nationwide
Transmission	POS/limited	P2P/weeks
Casualties	100's-1000's	Millions
1 st responders	Yes/no	Yes
Disaster support	Yes	Yes

Bioterrorist Event

Indicators of a Bioterrorism Event

- Large numbers of ill persons
- Unexplained disease or death
- Unusual illness
- High attack rate among exposed
- “Exotic” disease for area



Routes of Exposure

- Inhalation
- Oral
- Dermal

Oral Routes of Exposure

DIRECT: Contamination of food or water supply

INDIRECT: Secondary contamination after
aerosol attack

Dermal Routes of Exposure

- Mucous membranes
- Abraded skin*

* Intact skin provides protection from many, BUT NOT ALL, biological agents!

Most Likely Infectious Agents

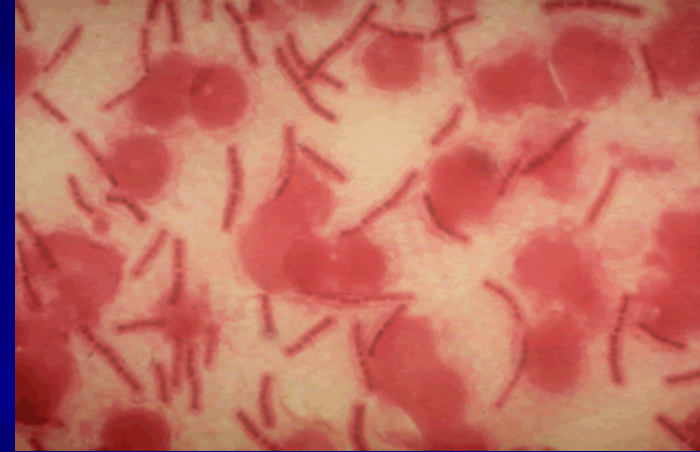
- Anthrax
- Smallpox
- Plague
- Botulism
- Tularemia
- Viral hemorrhagic fever



Anthrax

■ Anthrax

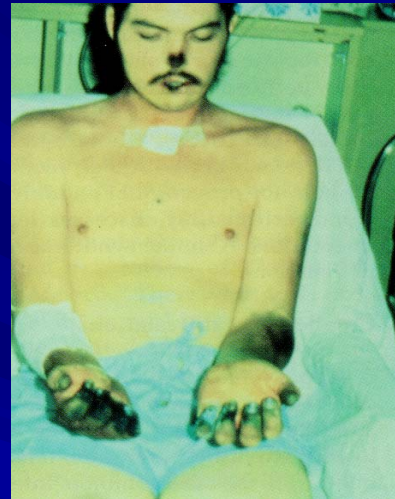
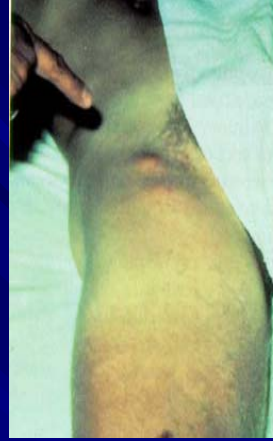
- Skin, oral, respiratory
- 1-6 days to 8 weeks incubation
- Flu-like sxs, respiratory distress
- Mortality
 - 80-90% untreated respiratory
 - 5% untreated cutaneous
- Ciprofloxacin



Anthrax:

What disaster teams needs to know

- Not person to person spread
- Train to recognize disease
 - Skin
 - Systemic (wide mediastinum)
- Treatment-antibiotics
- Standard precautions
- Post-exposure-antibiotic
- Pre-exposure-vaccine,



Smallpox

- Systemic, respiratory, skin
- 7-19 days incubation
- Fever, rash
- Up to 30% mortality
- Vaccination, anti-virals



Smallpox:

What disaster teams needs to know

- Person to person spread, VERY contagious
- Train to recognize (rash all lesions same stage)
- Treatment-supportive, Abx, vaccine
- Isolation, negative pressure, droplet
- Post-exposure treatment-vaccine
- Pre-exposure treatment-vaccine



Plague

- Respiratory route or vector
- 2-3 days incubation
- Respiratory, Bubonic, Septicemic
- Fever, headache, respiratory (cough with bloody sputum)
- Untreated mortality
 - bubonic 50%
 - Pneumonic, septicemic 100%
- Streptomycin



Pneumonic Plague:

What disaster teams needs to know

- Person to person spread (respiratory)
- Treatment-antibiotics
- Droplet precautions
- Post-exposure treatment-antibiotic
- Pre-exposure treatment-vaccine



Botulism

- Oral or respiratory route
- Food-borne, wound, infant
- 1-4 days incubation
- 4 D's (dysphagia, dysphonia, drooping lids, diplopia)
- 60% untreated mortality



Botulism:

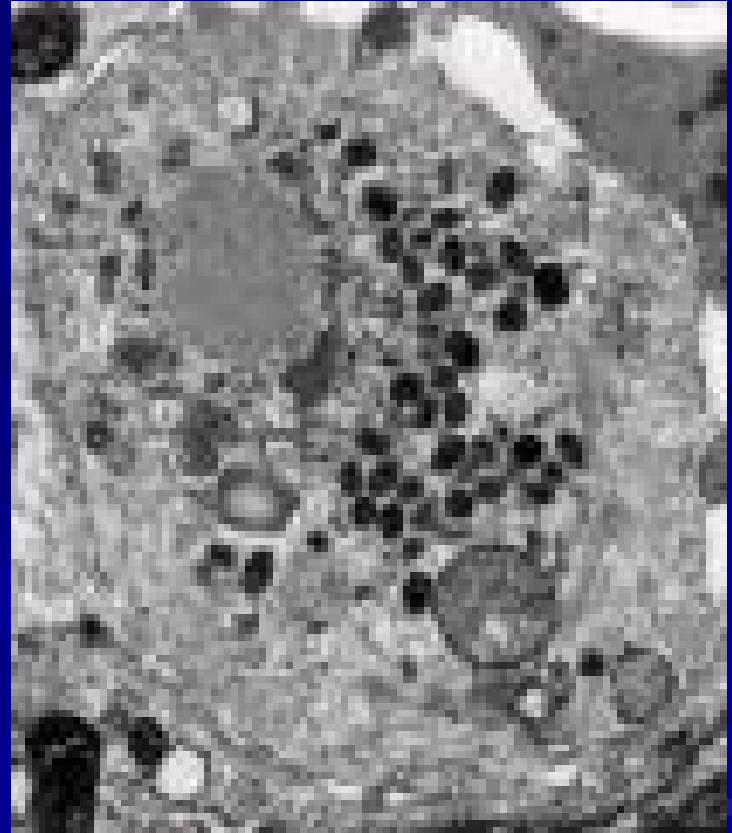
What disaster teams needs to know

- Not person to person spread
- Neurological disease:
 - swallowing difficulty, facial paralysis, descending to respiratory/other paralysis
 - GI symptoms (food-borne)
- Treatment-antitoxin
- Standard precautions
- Pre-exposure treatment-possibly antitoxin, vaccine being developed
- Post-exposure treatment-antitoxin or immunoglobulin



Tularemia

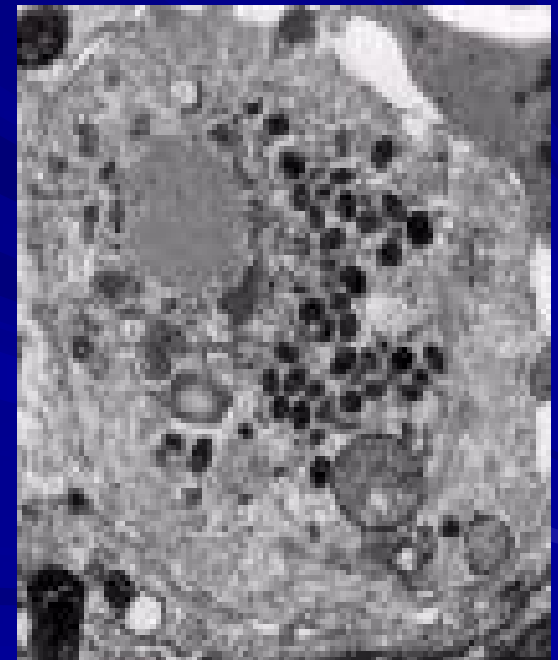
- Skin, vector, ingestion, respiratory route
- 1-14 days incubation
- 5-15% mortality
- Strep/Genta/Cipro



Tularemia:

What disaster teams needs to know

- Not person to person spread
- Skin, respiratory
- Treatment-antibiotics
- Standard precautions
- Post-exposure treatment-antibiotics
- Pre-exposure treatment-vaccine



Viral Hemorrhagic Fever: What disaster teams needs to know

- It is person to person spread
- Respiratory, bleeding
- Treatment- supportive
- Full precautions
- Post-exposure treatment- none
- Pre-exposure treatment- none

Other Disaster Team Issues

Critical Steps for Large-scale Event

- Maintain index of suspicion
- Protect yourself and your team (PPE)
 - Vaccination
 - Post-exposure antibiotic
 - Appropriate precautions
- Decontaminate as appropriate (rare for bioterrorism event)
- Establish a diagnosis
- Provide prompt treatment
- Provide good infection control
- Assist epidemiologic investigations
- Know and spread information



Maintain a high index of suspicion

- Wide mediastinum=Anthrax X
- Centripetal rash=Smallpox
- Hemoptysis=Plague
- Flaccid Paralysis=Botulism
- Characteristic rash (for skin spread)=Tularemia



Protect yourself and your team

- Decontamination not usually required
- Clothing removal and bagging
- Standard infection protocols
 - respiratory precautions (especially for certain agents)
- Antibiotic prophylaxis
- Vaccinations



PHYSICAL PROTECTION

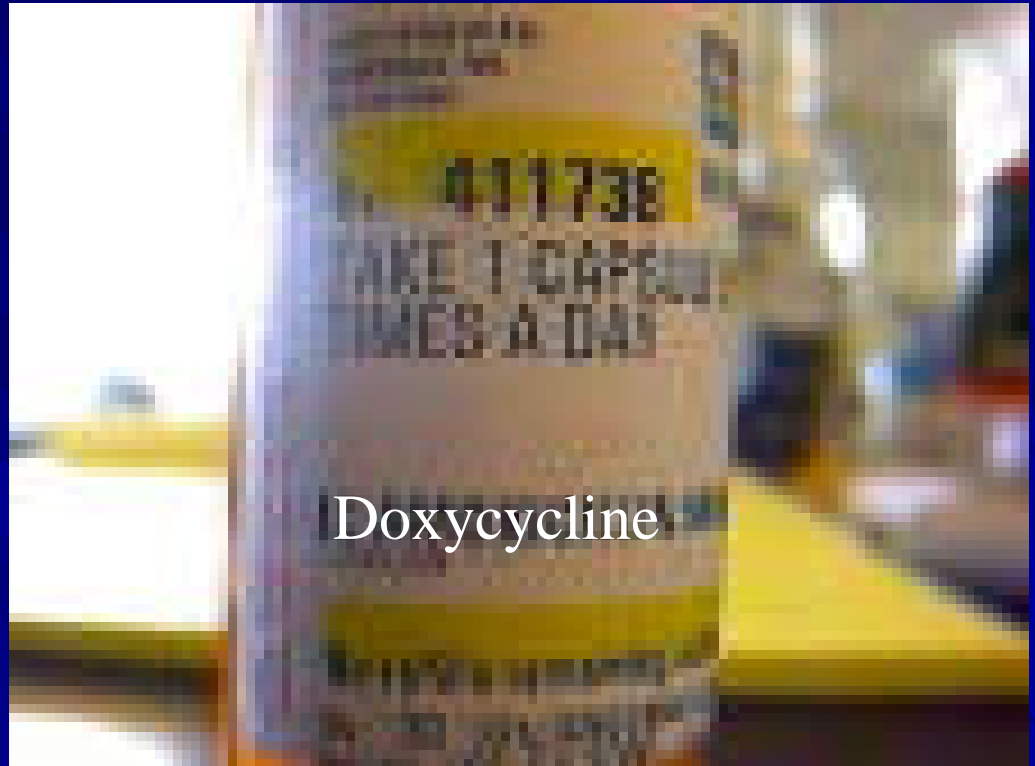
is the most important prophylaxis against biological agents!



*Level B Personal Protective
Equipment
(PPE)*

Render prompt treatment

- Doxycycline can be used to treat virtually all likely bacterial pathogens



Provide good infection control

- Always standard precautions
- Droplet precautions for Plague and Tularemia
- Airborne precautions for Smallpox
- Strict contact precautions for VHF



Large-scale Biological event: Summary

- We may or may not know what we are up against
- Maintain high index of suspicion
- Protect yourself and the team
 - Appropriate PPE
- Consider pre- and post-exposure treatments

??Questions??