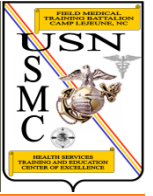




MANAGE BIOLOGICAL AGENT CASUALTIES





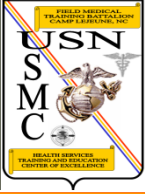
OVERVIEW



- General Groups of Biological Agents
- Treatment of Biological Agent Casualties
- The four defensive measures against Biological agents



LEARNING OBJECTIVES

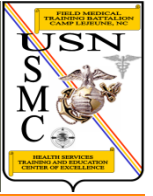


Please Read Your
Terminal Learning Objectives
And
Enabling Learning Objectives





HISTORY OF BIOLOGICAL WARFARE



- At the end of WWII, the Imperial Japanese army initiated an aggressive research effort to produce an effective biological agent. The goal was to learn the medical effects of such agents and determine the different methods of delivery.



BIOLOGICAL WARFARE



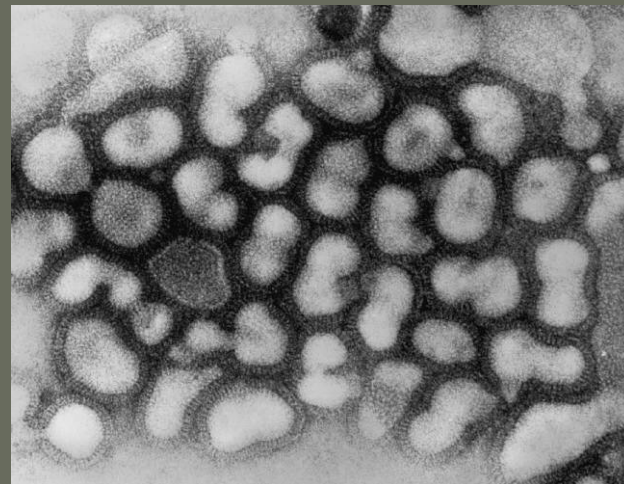
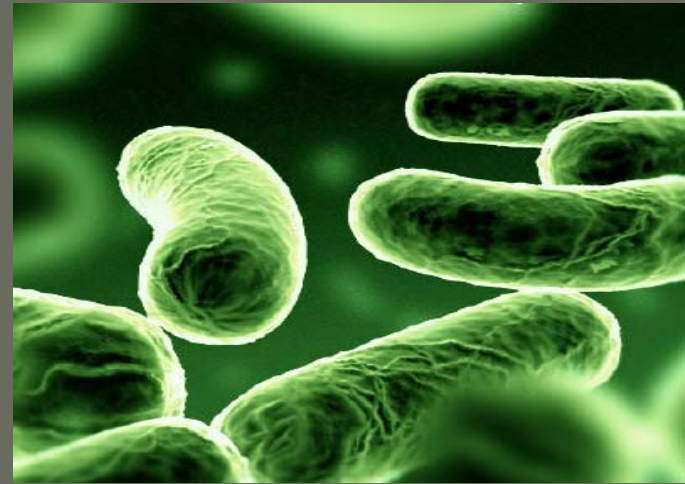
- Defined as the intentional use of living infectious microorganisms or toxins. Derived from living organisms, to cause death or disease in humans, animals or plants.
- Delivered in sprays, explosive devices, contaminated food / water supplies.
- Most common delivery is in a spray (i.e. crop dusting).
- Signs and symptoms make exposure difficult to diagnose.



GROUPS OF BIOLOGICAL AGENTS

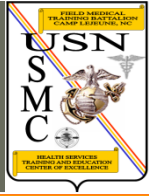


- Bacteria
- Virus
- Biological Toxins

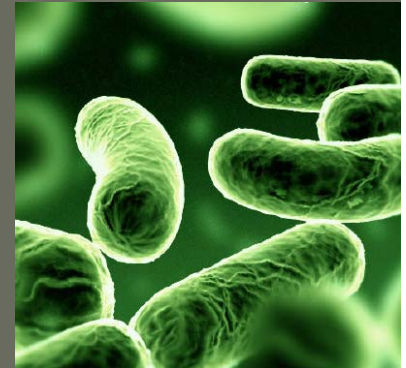




BACTERIA



- Free living microorganisms that are naturally occurring or engineered.
- They work by overcoming the body's defense mechanism by invading cells. Most are killed by antibiotics.



Examples are: Anthrax, Plague, Brucellosis



VIRUS



- An infectious agent, smaller than bacteria, that lacks independent metabolism and is able to replicate only within a host cell.
- Viruses produce diseases that do not respond to antibiotics. Supportive care is the only treatment.
- Examples are: Smallpox, Venezuelan Equine Encephallitis (VEE), Viral Hemorrhagic Fever (VHF)



BIOLOGICAL TOXINS

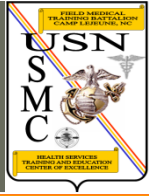


- Toxins are a poisonous substance produced within living cells or organisms.
- Toxins do not grow or replicate, but have been classified biological agents by the United States due to their ability to be biochemically engineered.





TREATMENT

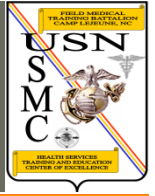


Bacterial:

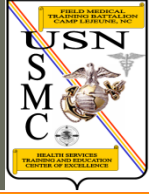
1. Anthrax (*Bacillus anthracis*)- An acute bacterial infection of the skin, lungs or gastrointestinal tract.
- Primarily a disease of plant eating animals. Cattle, sheep and horses are the most common domesticated animal hosts.



Cont.



- Cutaneous infection occurs when handling infected animal tissue, contaminated hair, wool, hides or products made from infected slaughtered animals.
- Respiratory infection
- Intestinal infection



Signs and Symptoms

Signs and Symptoms- Signs usually present within 48 hours. The incubation period for anthrax is hours to 7 days.

Cutaneous:

- Begins as a papule followed by the formation of a fluid filled vesicle.

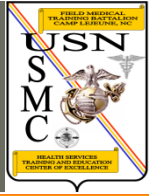
Cont.

- The vesicle typically dries and forms a coal-black eschar (scab). This eschar is usually surrounded by mild to moderate edema and sometimes with small secondary vesicles.





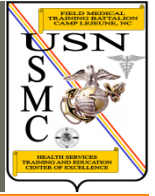
Cont.



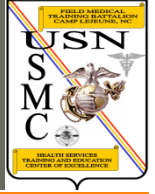
- Inhalation:
 - Gradual and nonspecific onset of fever, malaise, fatigue, nonproductive cough and mild chest discomfort.
 - Initial symptoms are followed by a short period of improvement (hours to 2-3 days).
 - Abrupt onset of severe respiratory distress with dyspnea, diaphoresis, stridor and cyanosis.



CONT.



- Gastrointestinal:
 - Presents with severe sore throat or a local oral or tonsillar ulcer.
 - Nonspecific symptoms of nausea, vomiting and fever.
 - Followed by severe abdominal pain with hematemesis and diarrhea.

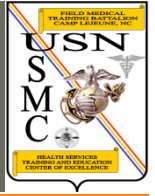


Treatment

- Treatment:
 - Ciprofloxacin 400mg IV Q8-12 hours or 500mg PO twice daily for four (4) weeks.
 - Employ standard precautions for active cases.
- Prevention:
 - Prophylactic vaccination series.



Plague



- Caused by the bacterium *Yersinia Pestis* which naturally infects rodents in certain parts of the world.
- Three main types of plague:
 - Bubonic
 - Pneumonic
 - Septicemic



Signs and Symptoms

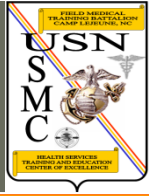


Bubonic

- Acute onset fever, malaise, headache nausea/vomiting
- Bubo (painful swollen lymph nodes) develop
- May have lesions at site of bite from flea.
- Bubonic plague may progress spontaneously to lungs and produce pneumonic disease



Bubonic Plague





Signs and Symptoms



Pneumonic

- Acute onset fever, chills and malaise
- Hemoptysis
- Death is caused by respiratory failure and circulatory collapse

Pneumonic

Main symptoms of Pneumonic plague

Systemic:

- Fever

Central:

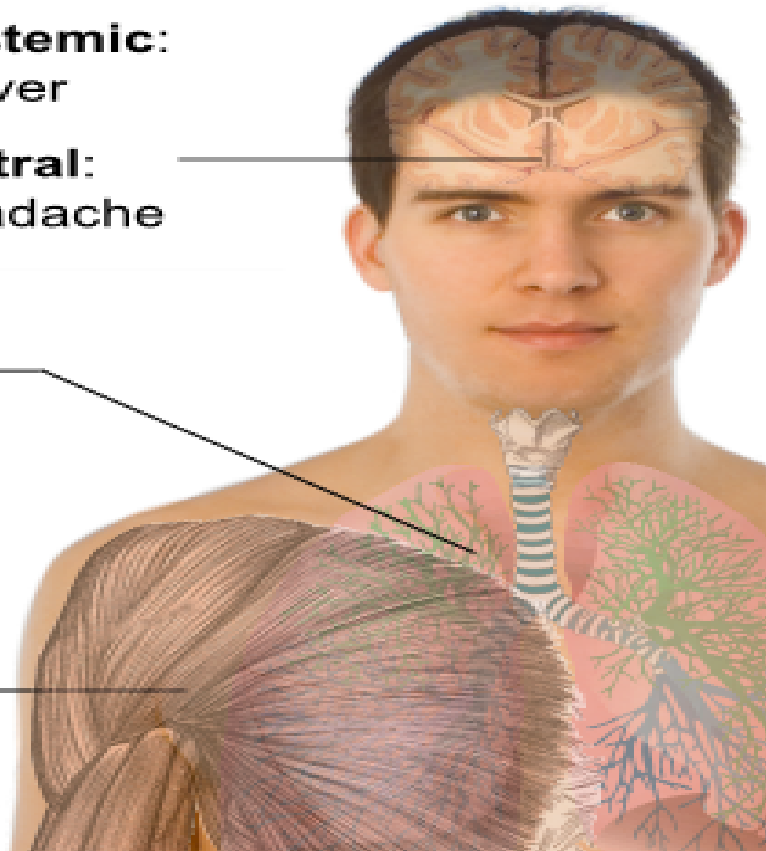
- Headache

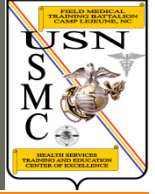
Respiratory:

- Cough
- Hemoptysis
- Dyspnea
- Chest pain

Muscular:

- Weakness





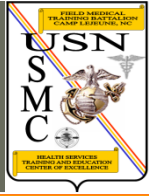
Signs and Symptoms

Septicemic:

- Fever, chills, malaise, nausea, vomiting and diarrhea
- Purpura, acrocyanosis and necrosis
- 25% of bubonic plague progress to septicemic plague



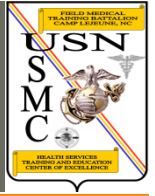
Treatment



- Quarantine the casualty for the first 48 hours of treatment.
- Maintain standard precautions for bubonic plague patients and droplet precautions for pneumonic plague patients.



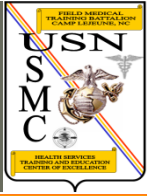
Treatment Cont.



- Streptomycin 30mg/kg/day IM in two (2) divided doses for 10-14 days
- Doxycycline 200mg IV initially , followed by 100mg every 12 hours for 10-14 days
- Vigorous fluid resuscitation



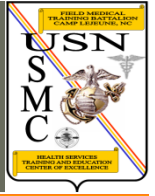
Prevention



- Prophylactic vaccination series



Viral Agents

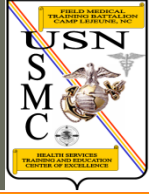


Small pox:

A systemic viral disease caused by the Variola virus. Endemic smallpox was declared globally eradicated in 1980 by the World Health Organization (WHO).



Smallpox

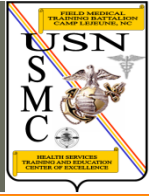


Causes:

- Contact with infected respiratory discharge
- Contact with infectious bed linens or clothing of casualties.
- Contact with drainage from wound.



Smallpox



Signs and symptoms:

- Sudden onset of nonspecific symptoms:
 - Fever
 - Headache
 - Backache that lasts 2-3 days
 - Vomiting
 - Malaise



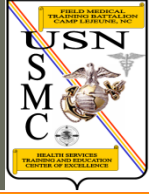
Smallpox Cont.



- 2-3 days after onset, rash appears
- Starting with face, hands and forearms, then moves to trunk
- Lesions initially appear as macules and will eventually turn to scabs.
- At 14-28 days scabs slough off



Smallpox



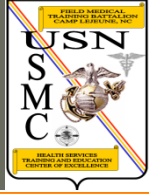
- Casualty is infectious throughout the entire term of the disease until the scab separates and falls off.
- All lesions progress simultaneously, unlike Varicella where all stages of lesions may be present at one time.

Smallpox Progression





Smallpox



Treatment:

- Quarantine the casualty and maintain strict sterile procedures.
- Supportive care



Smallpox

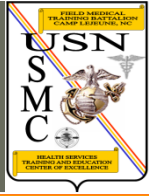


Prevention:

- Prophylaxis: Vaccination of Vaccinia virus. Revaccination should be carried out every 10 years.
- There are no routine immunizations of US forces for smallpox. If indicated, senior leadership may direct vaccination.



Biological Toxins

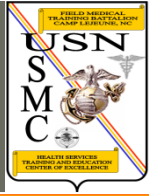


Botulism:

- A biological toxin caused by the bacterium *Clostridium botulinum*.
- The most toxic substance to man.
- Due to its incredible potency and relative ease of manufacture, botulinum toxin is considered a likely threat.



Biological Toxins



Signs and Symptoms:

- Blurred vision
- Dry mouth
- Dysphagia(difficulty swallowing)
- Diplopia(double vision)
- Muscular weakness
- Symmetrical flaccid paralysis(loss of tone and reflexes)
- Respiratory arrest



Biological Toxins



Treatment

- Rest
- Oxygen, if available
- Cricothyroidotomy, if needed
- Mechanical ventilation
- IV and IM administration of trivalent botulinum antitoxin (ABE)

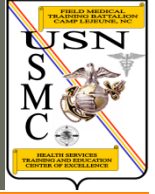


Biological Toxin



Ricin:

- A toxin made from the mash that is left over after processing Castor beans for oil.
- Castor bean processing is a worldwide activity: therefore, the raw materials are readily available.
- The toxin may be either inhaled or ingested.



Signs and Symptoms

Inhalation:

- Acute onset of fever
- Respiratory Distress
- Hypoxia(lack of oxygen)
- Cough
- Malaise(discomfort, weakness, fatigue)
- Myalgia(tenderness in the muscles)
- Pulmonary edema within 18-24 hours
- Death occurs within 36 to 72 hours



Signs and Symptoms Cont.



Ingestion:

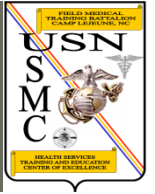
- Severe vomiting
- Abdominal cramping
- Diarrhea
- Shock
- Renal failure
- Circulatory collapse



Treatment



- There is NO antitoxin is available
- Give supportive care.
- Isolation is not required

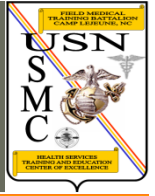




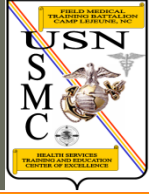
Four (4) phases of Defense or Protective measures against BW agents.



Pre-attack Phase of BW

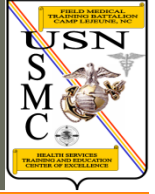


- Train and inform personnel of possible agents
- Discourage rumors
- Practice good sanitation and hygiene
- Ensure immunizations are up to date



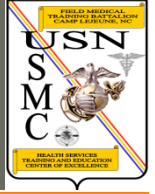
Attack phase of BW

- Aircraft spraying or dropping objects
- Lobbing of low blast shells or bombs
- Smokes and mists of unknown origin
- Dead animals with no visible cause
- You may have a doubling in the number of sickcall illnesses in a 48 hour period



Attack Phase Cont.

- Stop breathing and don protective mask
- Give the alarm
- Remain under cover, and move outside only after cloud has passed or “ALL CLEAR” is sounded
- Cover exposed skin

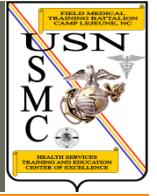


Post-attack Phase

- Continue to practice an increased level of good health, field sanitation and hygiene discipline
- Keep wounds clean by using soap and water, utilize available first aid
- Don't consume local foods, eat and drink only approved food and water



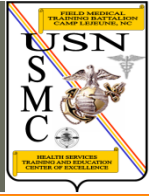
Post-attack Cont.



- Do not bathe in lakes, ponds and streams
- Do not touch animals, especially dead ones
- Observe BW contamination markers



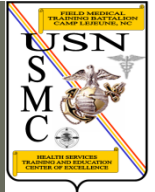
Decontamination Phase



- Designate an area for the decontamination station
- Establish and operate the station
- Provide personnel for monitoring teams
- Post Nato Biological Warning Markers



NATO Biological Warning Marker



A triangular shaped marker measuring 11" x 8" x 8" with blue background and red letters spelling "BIO"





MANAGE BIOLOGICAL AGENT CASUALTIES

