Medical Reserve Corps
Clinical Orientation

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Communicable Diseases
Pandemics, Bioterrorism, Post-Disaster Threats
A. Pandemics
Definitions

- **Endemic**: ongoing presence of a disease in a particular region or population

- **Epidemic**: significant increase of disease above baseline; attacks many people at about the same time; may spread through one or several communities

- **Pandemic**: an epidemic that spreads throughout the world
Pandemic Influenza Strain

- A new influenza A virus subtype in humans
- Easily transmitted from person-to-person
- Able to cause significant illness and/or death
- Affects MANY people across the globe
Influenza Pandemic Estimates (Moderate Severity)

Sonoma County

- 153,000 ill
- 76,500 outpatient visits
- 1,470 hospitalizations (x 10 if severe)
- 112 on ventilation (x10 severe) – 59 ventilators in County
- 355 deaths (x10 severe)
Response to a Pandemic
Public Health Responsibilities

• Organize response using County emergency command structure (ICS) and written/practiced plans

• Coordinate assessments of situation – epidemiology & surveillance

• Risk Communication to partner agencies/organizations, stakeholders and the public

• Lead and/or coordinate efforts to prevent and mitigate

• Help with health care response – surge capacity
MRC Response in Pandemic

No Vaccine Available

• Strategies – with education on:
  – ReAssist prevention & mitigation respiratory transmission:
    • Respiratory hygiene - Social distancing
    • Isolation or Quarantine
  – Vector transmission:
    • ID of and steps to eliminate vector breeding sites
    • Effective barriers to mosquitoes: screens, air conditioning
    • Prevent mosquito bites (e.g., wear long sleeves/pants, DEET)
• Assist with mental health issues
• Provide surge capacity
  - In hospitals, alternate treatment sites, clinics
MRC Response in Pandemic

Vaccine Available

• Coordinate and support efforts to vaccinate population
  – Distribute vaccine to partner agencies/organizations
  – Coordinate clinics for mass vaccinations
    • Provide screening/triage
    • Give immunizations
    • Provide health education, including medication counseling

• Assist with mental health issues
B. Bioterrorism
Biologic Warfare Agents – Bioterrorism

Category A
- easily transmitted
- high mortality rates
- need special action for public health preparedness

Category B  Examples: Salmonella, Q Fever, Brucellosis and Ricin toxin
- moderately easy to transmit
- low mortality rates

Category C  Examples: Nipah virus, hantavirus
- availability;
- ease of production and dissemination
- potential high morbidity, mortality rates; major health impact.
BW Agents: Category A – highest risk

1) Smallpox  
   *Variola major*

2) Anthrax  
   *Bacillus anthracis*

3) Plague  
   *Yersinia pestis*

4) Botulism  
   *Clostridium botulinum* toxin

5) Tularemia  
   *Francisella tularensis*

6) Viral Hemorrhagic Fevers  
   Ebola, Marburg, Lassa

CDC. *MMWR* 2000; 49 (RR-4)
1) Smallpox

Typical Pustular Lesions

Highly contagious
Vaccine preventable
2) Anthrax

- 3 primary clinical types of anthrax:
  - Cutaneous
  - Gastrointestinal
  - Inhalational

- Meningitis: complication of the primary forms

Compliments of Dr. Martin Ananias, Kaiser Permanente, Southern Chile 1983

JAMA, 1999: 281(18);1735-45
3) Plague

Bubonic

Naturally occurring:

Yersinia pestis

Transmitted by

- No vaccine
- Antibiotic treatment

Pneumonic
Plague

Multiple countries conducted research for use as a weapon. Can spread person to person.

<table>
<thead>
<tr>
<th>Type</th>
<th>Incidence</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bubonic Plague</td>
<td>84 %</td>
<td>no Tx ~ 20 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abx Tx &lt; 1 %</td>
</tr>
<tr>
<td>Septicemic Plague</td>
<td>13 %</td>
<td>22 %</td>
</tr>
<tr>
<td>Pneumonic Plague</td>
<td>2 %</td>
<td>57 %</td>
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</tbody>
</table>
4) **Botulism**

**Naturally occurring:**
- Rare with an annual incidence of ca. 100-200 cases in US.

**Mortality:**
- Varies with time to recognition, dose of toxin and age.
- In outbreak settings can be 25% for the first case and 4% with subsequent cases.

**Treatment:**
- Antitoxin (Botulinum Immune Globulin)
5) Tularemia

- Pneumonic
- Ulceroclandular
- Oculoglandular
- Oropharyngeal
- Typhoidal/septicemic

Figure 2. Chest Radiograph of a Patient With Pulmonary Tularemia

Naturally occurring:

- Rare with an annual incidence of ca. 100 cases in US.

Mortality:

- About 2%
- Weapon: Several countries conducted research for use as a weapon

Francisella tularensis

JAMA. 2001; 285: 2763-2773
6) Viral Hemorrhagic Fever

**Ebola and Marburg VHF (Filoviridae)**
- Highly contagious
- High mortality

**Yellow fever (Flaviviridae)**
- Mosquito vector

**Lassa VHF ( Arenaviridae)**

**Rift Valley (Bunyaviridae)**

**Illness:** acute onset of severe life-threatening disease with bleeding manifestations (e.g., hemorrhagic or purpuric rash, epistaxis, hematemesis, blood in stool or other bleeding)

**Naturally occurring:**
- VHF virus reservoirs are zoonotic and vary. Disease is relatively rare world wide and extremely rare in the US.

**Spread varies:**
- Person-to-person
- Vector: insect; rodent droppings

**Mortality varies:**
- Ebola and Marburg: ~50%
- Lassa fever: 1%
- Rift Valley fever: 15%
C. Post-disaster (Infectious Disease) Threats
What contributes to ID threats after disaster?

- Contaminated food, water and/or air
- Poor or no water quality maintenance
- Inadequate toilet facilities
- Poor or no solid waste management
- Poor personal hygiene
- Poor respiratory etiquette
- Crowding
- Poor or no shelter
- Inadequate control of rodents and other animals
- Inadequate control of insects
- Inadequate evacuation facilities
- Scarcity of soap
- Inadequate wound care
Pre-Conditions for Infectious Diseases

• Presence of an infectious agent (bacteria, virus, parasites or fungus)
  Somewhere

• A susceptible host
  Someone

• Exposure of a susceptible host to the agent
  Somehow
Sources of Infectious Disease?

• Water
• Air
• Food
• Soil
• People
• Animals
• Vectors
Susceptible Individuals?

- Elderly
- Very young
- Immunocompromised
- Unvaccinated
- Underlying medical conditions
Modes of Transmission

• Direct Contact
• Indirect Contact
• Droplets
• Airborne
• Vehicle-borne
• Vector-borne
• Vertical
Basic Sanitation

During and after a disaster, keep sanitary practices in check as much as possible:

• Use clean water
• Wash hands frequently or use hand sanitizers
• Practice respiratory etiquette
• Practice safe food consumption
• Keep wounds clean
• Wear protective clothing such as gloves and/or a mask
• Ensure sanitation and waste managed appropriately
Questions?