

Weapons of Mass Destruction



Understanding the risks and
planning for the response

WMD vs. CBRNE

Chemical

Biological

Radiation

Nuclear

Explosive

Chemical Weapons

- Nerve agents
 - Sarin, Soman
- Blister agents
 - Mustard
- Blood agents
 - Cyanide
- Pulmonary agents
 - Phosgene, Chlorine
- Incapacitating agents
 - Riot control agents such as Mace, pepper spray



Tokyo March 1995

- Sarin released in subway
 - inefficient dispersal of weapons grade nerve agent
 - 11 deaths
 - 5500 injuries
 - Research 6 years later showed 17% of those affected continued to have flashbacks
 - Not the first attack by this cult

Case Study: St. Luke's Hospital

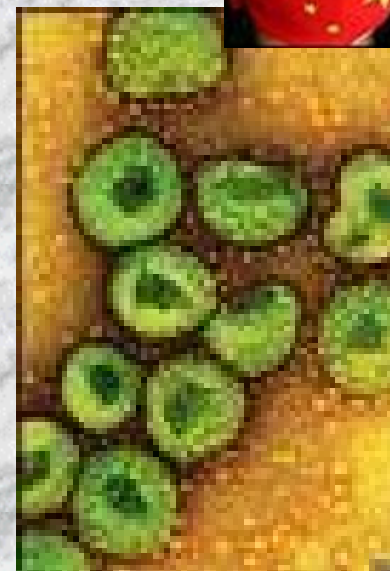
- 641 patients seen on day one
- 349 additional patients in the next week
- 5 critical, 4 pregnant women, 106 hospitalizations
- no pre-hospital intervention
- ~80% of patients arrived as self referrals



(CNN)

Bioterrorism vs. Public Health Emergency

- Defining bioterrorism
 - *the deliberate use of a biological agent to cause illness, death or terror*
 - May be covert or overt
- Bioterrorism hoaxes
 - “white powder envelopes”
- Natural disease outbreaks
 - lessons learned from SARS
 - West Nile Virus



Biological Agents

- CDC classifies biological agents as Category A, B, C
- Category A
 - easily disseminated
 - result in high mortality with a major public health impact
 - may cause panic
 - Examples include Anthrax, Botulism, Plague, Smallpox



Biological Agents

■ Category B

- moderately easy to disseminate
- result in moderate morbidity and low mortality
- required enhanced diagnostics and enhanced surveillance
- Examples include Brucella, Ricin, Q Fever, Staph Enterotoxin B

Biological Agents

■ Category C

- easily available; must be mass engineered for use
- ease of production and dissemination
- high mortality and morbidity
- major public health impact
- Examples include emerging infectious diseases such as Hantavirus

Radiation / Radioactive Agents



- Most concerning source may be medical waste
- Planning centers on containment and recognition of event / release
- Radiation Dispersal Devices (RDD)
 - aka the “Dirty Bomb”



Explosive Events

- Olympic Park bombing
- Oklahoma City bombing
- World Trade Center bombing
- World Trade Center attack 9/11
- Pentagon 9/11
- Embassy bombings in Kenya
- Bali nightclub bombing
- Madrid Rail bombings



Oklahoma City Bombing

- April 19, 1995
- 168 deaths
- 700 injuries
- First wave of patients within 15 minutes with peak arrival of ~220 patients per hour within 90 minutes
- Second wave of more critical injuries

Madrid Railway Attack

- 10 IEDs detonated in 15 minutes on 4 trains
- 198 casualties
- 1247 injuries



Injuries seen in explosive events

- Primary blast injury
 - Blast pressure wave affects air filled cavities
- Secondary blast injury
 - shrapnel, propelled objects
- Tertiary blast injury
 - individual propelled by blast wave
- Thermal injury
- Crush, debris and dust injuries

Planning in San Francisco

- Enhancing the knowledge and awareness of all first responders
- All hazards planning: identifying your risks and vulnerabilities
- Threat specific response plans
- Collaborative planning, training, exercises

