Biological Clinical Guidelines

A Quick Guide for the Management of Biological Disasters for Emergency Department Personnel

Rev. April 2013

Center for Emergency Preparedness
and Disaster Response
YALE NEW HAVEN HEALTH
www.ynhhs.org/cepdr

D I S A S T E R

Emergency Information in Biological Emergencies

ORGANIZATION	PHONE NUMBER
Poison Control Center	(800) 222-1222
Centers for Disease Control and Prevention (CDC)	(800) CDC-INFO (800) 232-4636
Organization-Specific Contacts (see below)	

Emergency Biological Management Websites

ORGANIZATION	WEBSITE
CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings	www.cdc.gov/hicpac/2007ip/2007isolationprecautions.html
CDC Emergency Preparedness Bioterrorism Agents and Diseases	www.bt.cdc.gov/bioterrorism/
OSHA Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances	www.osha.gov/dts/osta/bestpractices/html/hospital_firstreceivers.html
US Army Handbook: Medical Management of Biological Casualties	www.usamriid.army.mil/education/bluebookpdf/USAMRIID%20BlueBook%207th%20Edition%20-%20Sep%202011.pdf

Center for Emergency Preparedness and Disaster Response

YALE NEW HAVEN HEALTH

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Introduction:

This guide is a quick reference for the hospital's initial response to biological emergencies. Based on the word **DISASTER***, it facilitates the ongoing qualitative and quantitative assessment of the incident.

D	Detection
I	ICS
S	Safety/Security
A	Assessment
S	Support
T	Triage and Treatment
E	Evacuate
R	Recovery

This guide includes components of the Hospital Incident Command System (HICS) version IV and utilizes components of MASS, START and JumpSTART triage systems. This reference guide provides a framework for a coordinated, effective hospital response to a biological incident.

In most instances of a biological disaster, the event results in a rise in the number of patients seen with similar symptoms. For example, the annual onset, increase, and ebb of patients with influenza can be predicted and tracked. For these events, healthcare facilities are able to monitor their capacity for additional patients and develop plans to accommodate the need.

In the event of an incident such as an accident at a laboratory, the Emergency Department should consider the need to open their fixed decontamination room if there is a concern that the biological agent may still be on the victims' clothing or skin. Since the victims are not suffering further injuries as they would be in the event of a caustic chemical, there is no immediate urgency in completing the decontamination process.

Knowing that the incubation period, from the time of contact to the time when symptoms appear is at least one day for most agents, there will not be a need to establish triage areas for:

Immediate	Delayed	Minor	Expectant	Deceased

The signs and symptoms of patients involved in a biological event will most likely mimic those routinely seen in the hospital especially during seasonal infectious diseases (e.g., respiratory viral illness in the winter). The principles of epidemiology, especially comprehensive surveillance and case definition, should be used to distinguish cases involving a disease currently in the community from those representing an unusual event.

Remember the event could be related to the emergence of a novel strain of a common illness; or to a release of a biological contagion. It may also be related to a laboratory accident.

** The mnemonic, D-I-S-A-S-T-E-R, is taken from the National Disaster Life Support program and is used with the gracious permission of the American Medical Association and the National Disaster Life Support Educational Foundation.*

DETECTION

The most common findings which should help lead to the detection of a biological disaster from an intentional event or from an emerging infectious disease may include:

ED Nurse or Physician

- ILI (Influenza-Like Illness) – a nonspecific respiratory illness characterized by fever, fatigue, cough and other symptoms that stop within a few days. Most cases of ILI are not caused by influenza but by other viruses
- A single case of an unusual illness (e.g., smallpox, or pulmonary anthrax) or an unexplained outbreak of a known illness.
- A rapid increase (hours, days, or weeks) in the number of otherwise healthy individuals exhibiting common symptoms, seeking medical treatment
- A cluster of previously healthy individuals exhibiting similar symptoms who live, work, or recreate in a common geographic area.
- An unusual presentation of a known infectious disease
- An increase in reports of dead or sick animals
- Any individual with a recent history (within 2-4 weeks) of international travel who presents with symptoms of high fever, rigors, delirium, unusual rash, extreme myalgia, prostration, shock, diffuse hemorrhagic lesions or petechiae and/or extreme dehydration related to vomiting or diarrhea with or without blood loss

Contact information for event verification and status updates:

Name: _____

Phone: _____

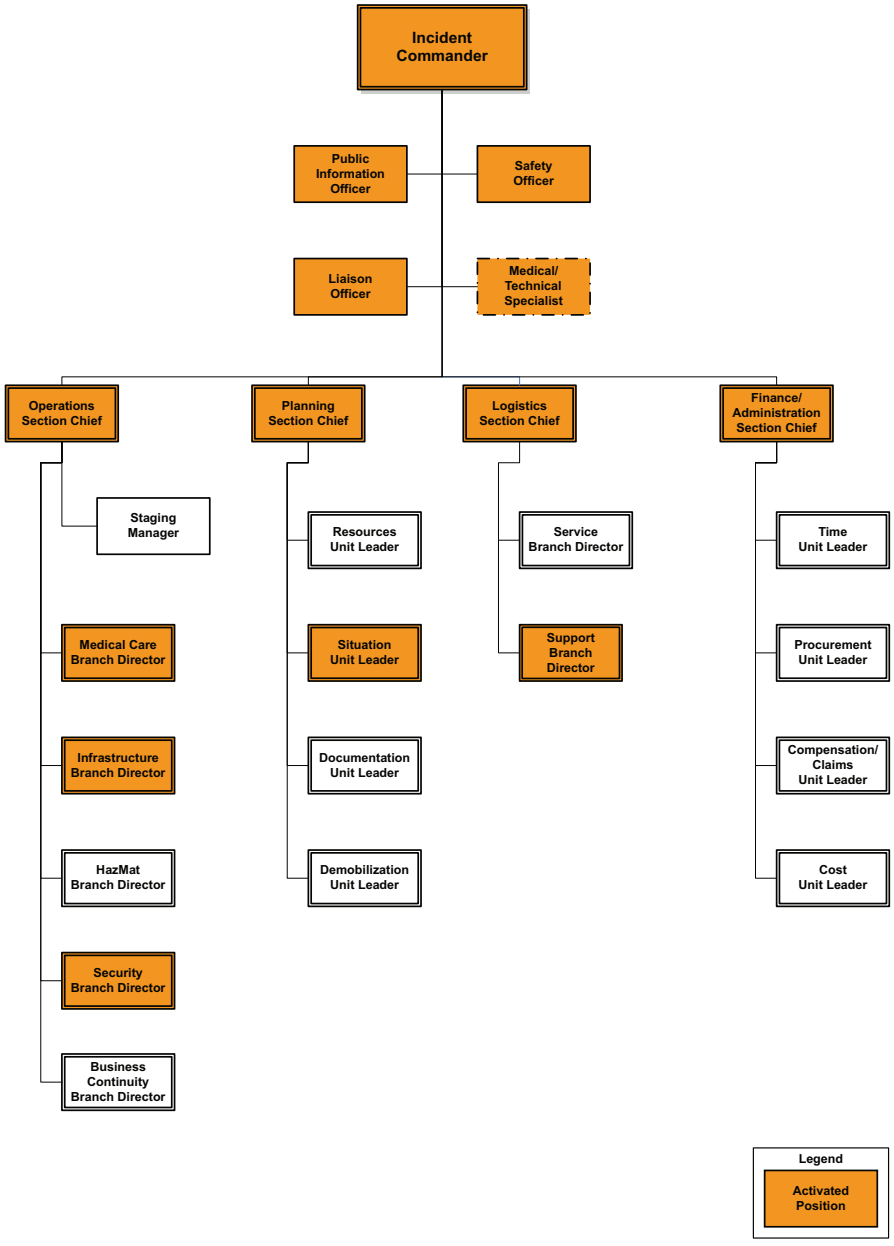
Agency: _____

INCIDENT COMMAND SYSTEM

Upon notification or determination of a biological event affecting a large number of patients:

Incident Commander (Administrator-on-Duty)

- Activate HICS positions as needed
- Activate Disaster Plan (EOP) if appropriate



Modified from CEMSA Hospital Incident Command System (HICS)
www.emsa.ca.gov/hics

SAFETY AND SECURITY

Upon notification or determination of a biological event affecting a large number of patients:

Employee Health and Well-being Unit Leader (reports to Support Branch Director):

- If appropriate, monitor all in-coming employees for signs/symptoms of illness
- Ensure that all personnel who could potentially be exposed to a contaminant are protected by appropriate level of PPE (Refer to appropriate chart in appendices.)
- All personnel must have completed a medical evaluation before donning PPE if it includes APR or PAPR respirators
- Ensure all persons using PPE are evaluated after doffing of Level C PPE and receive appropriate rehabilitation, according to policy

Security Branch Director:

- Assess security needs and capabilities
- Follow guidance from Operations Section Chief regarding possible screening and exclusion of certain visitors (e.g., no children under 16 years of age; no visitors with influenza-like illnesses)

Safety Officer:

- Monitors and ensures the appropriate isolation procedures are followed
- Monitors staff use of appropriate personal protective equipment and control procedures

NOTES:

ASSESSMENT

Upon notification or determination of a biological event affecting a large number of patients:

Medical / Technical Specialist (Epidemiologist or Infection Control Practitioner):

- Assesses and/or monitors situation updates from:
  - Centers for Disease Control and Prevention (CDC)
  - World Health Organization (WHO)
  - State Department of Public Health (DPH)
  - Local DPH
  - Facility-based
- Provides guidance to the Command Staff regarding:
  - Method of transmission of the identified biological agent (See Appendix 1)
  - Risks for cross-contamination or infection of staff, patients and visitors
  - Methods designed to limit the spread of the infection

Safety Officer:

- Monitors and ensures the visitor restriction policies are followed
- Monitors staff use of appropriate PPE and infection control procedures

Operations Section Chief:

- Works with Medical/Technical Specialist, Safety Officer, and Logistics Section Chief to develop infection control guidelines designed to limit the spread of the infection
- Shares information and plans with department managers to assure safety and infection control plans are properly and completely implemented

NOTES:

SUPPORT

Upon notification or determination of a biological event affecting a large number of patients:

Incident Commander:

- Considers need to activate Emergency Operations Plan
- Notifies senior hospital leadership of the situation
- Activates HICS positions as indicated
- Establishes operational periods and the schedule for briefings

Casualty Care Unit Leader (reports to the Medical Care Branch Director):

- Maintains contact with the regional EMS communication centers
- Ensures appropriate infection control procedures are followed by all staff, patients and visitors (See Appendix 4)
- Establishes area(s) for the cohorting of patients with the signs and/or symptoms associated with the presumed or known infectious agent
- Requests assistance from the laboratory department for evidence collection, if necessary

Inpatient Unit Leader (reports to the Medical Care Branch Director):

- Ensures appropriate infection control procedures are followed by all staff, patients and visitors (See Appendix 4)
- Provides for early patient discharge, if indicated
- Promotes rapid admission of victims to appropriate care areas
- Establishes area(s) for the cohorting of patients with the signs and/or symptoms associated with the presumed or known infectious agent

Logistic Section Chief:

- Ensures an adequate supply of all resources necessary for patient care activities

NOTES:

TRIAGE AND TREATMENT

Upon notification or determination of a biological event affecting a large number of patients:

Operations Section Chief:

- Works with the Medical/Technical Specialist, Safety Officer and Logistics Section Chief to develop infection control guidelines designed to limit the spread of the infection (See Appendix 4)
- Shares information and plans with department managers to ensure infection control and treatment plans are properly and completely implemented

Casualty Care Unit Leader:

- Ensure appropriate infection control procedures are followed by all staff, patients, and visitors
- Uses established triage guidelines to prioritize patients according to severity of injury or illness (See Appendix 2 and 3)
- Ensures appropriate treatment of patients as indicated (See Appendix 3)
- Utilizes area(s) for the cohorting of patients with the signs and/or symptoms associated with the presumed or known infectious agent (See Appendix 2)

Inpatient Unit Leader:

- Assures continued care for inpatients (See Appendix 3)
- Manages the inpatient care areas
- Provides for controlled patient discharge
- Promotes rapid admission of victims to appropriate care areas

NOTES:

EVACUATE

Upon notification or determination of a biological event affecting a large number of patients:

Casualty Care Unit Leader:

- In consultation with the senior emergency department physican:
  - Prepare the emergency department by making prompt disposition decisions: discharge to home, or admission to hospital
  - Secondary distribution to another facility for continued care (e.g., children, burn victims, nursing home patients)

Inpatient Unit Leader:

- In consultation with Medical Care Branch Director:
  - Prepare the various inpatient units by making prompt disposition decisions: discharge to home or admission to hospital
  - Secondary distribution to another facility for continued care (e.g., children, burn victims, nursing home patients)

NOTES:

RECOVERY

Upon notification or determination of a biological event affecting a large number of patients:

Behavioral Health Unit Leader:

- Aid recovery by addressing the mental health needs of patients, visitors, and healthcare personnel (see Mental Health EOP)
- If needed, enlist the services of:
  - Social Services Department
  - Religious Services Department
  - Department of Psychiatry
  - Child Life Specialists
  - Employee Assistance Services
  - Other, outside behavioral health services

Section Chiefs:

- Maintain a continuous level of readiness by directing subordinates to:
  - Monitor staffing patterns and adjust according to anticipated needs
  - Relieve staff showing signs of excessive fatigue or stress
  - Monitor staff for signs/symptoms of illness
  - Instruct ill staff to remain at home, as suggested by the CDC, DPH or other reputable authority
  - Have all unneeded equipment cleaned and returned to the staging area, or returned to its original location
  - Return all unused supplies to staging or to their original location
  - Maintain an accurate accounting of all staff time and other expenses

NOTES:

Appendices

Appendix 1: Epidemiology of Bacterial, Viral, Biological Toxins
Appendix 2: Differential Diagnosis by Syndrome
Appendix 3: Treatment Guidelines
Appendix 4: Isolation, Placement and Transport of Patients with Probable Biopathogens
Appendix 5: Abbreviations

Appendix 1: Epidemiology - Bacterial Agents

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Anthrax, Inhalational	1-7 days (possibly up to 60 days)	**Non-specific:** Malaise, cough, dyspnea, headache, vomiting, abdominal and chest pain	Rapid onset of severe respiratory distress, respiratory failure and shock, widened mediastinum, +/- pleural effusion on chest X-ray	Natural transmission by inhalation of spores from infected animal material. May be weaponized. GI anthrax may result from ingestion of animal material contaminated with anthrax organisms. • No person-to-person transmission • Standard precautions	***Bacillus anthracis:*** Blood, serum, CSF (if meningeal signs are present), pleural or ascitic fluids, Gram stain or Wright stain, blood culture, IHC, serology, DFA, PCR
Anthrax, Cutaneous	1-7 days, up to 12 days	Painless or pruritic papule	Papule evolves into vesicular or ulcerative lesion, then forms black eschar after 3-7 days	Natural transmission by handling of infected animal materials (hides). Skin contact with weaponized spores • Person-to-person transmission unlikely; requires direct contact with skin lesion • Standard Precautions	***Bacillus anthracis:*** Swab of fluid or exudates from lesion; skin biopsy, blood / Gram stain, culture of lesion, blood culture, serology, PCR
Brucellosis	Highly variable, 5-60 days	Non-specific fever (often intermittent), headache, chills, heavy sweats, arthralgia	Systemic illness, may become chronic with fever and weight loss	Natural transmission by ingestion, inhalation or handling of infected material (usually milk). May be weaponized • Lab personnel at risk • Standard Precautions • Person-to-person transmission through respiratory droplets • Transmission by sexual contact rare	***Brucella* species:** Blood, serum, bone marrow, tissue / culture, serology, PCR

Appendix 1: Epidemiology - Bacterial Agents *(continued)*

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Food Safety Threats	Variable: Minutes to hours, possibly days	**Non-specific:** Malaise, cough, dyspnea, headache, vomiting, abdominal and chest pain	Depends on causative agent	• Transmission depends on causative agent • Standard precautions	Botulism, *E.coli* 0157:H7, ricin, Salmonella, *Shigella dysenteriae Type 1*, *staphylococcal Enterotoxin B*, typhoid, *Vibrio cholera*
Glanders	Few days to several weeks; dissemination 1-4 weeks after lymph node infection	**Dependent on route of exposure:** Broken skin, mucous membrane and inhalational routes described	**Localized:** Pyogenic cutaneous infection **Systemic:** Pulmonary infection, bacteremia/sepsis and chronic suppurative infection. Generalized symptoms include fever, rigors and diaphoresis, myalgias, chest pain, headache, mucopurulent nasal discharge and light sensitivity with excessive lacrimation. Abscesses in skin, muscle, lung, liver and spleen reported.	Natural transmission in equine species. May be transmitted to other species • Human cases are rare • Has been weaponized (aerosolization) • No naturally occurring cases in US since 1940s	***Burkhoderia mallei:*** Culture
Melioidosis	Symptoms generally appear 2 to 4 weeks after exposure but may range from one day to many years	**Dependent on route of exposure:** May occur in healthy individuals **Risk factors:** diabetes, liver or renal disease, thalassemia, other immunocompromise not related to HIV	Acute or localized infection. Pulmonary infection, bacteremia/sepsis or disseminated infection, sub-clinical infections possible	• Natural transmission by direct contact in tropical (endemic) regions • Direct contact with contaminated soil and surface waters on broken skin • Person-to-person spread rare • Inhalation of contaminated dust or water droplets • Ingestion of contaminated water. • By contamination of war wounds.	***Burkholderia pseudomallei:*** Culture

Appendix 1: Epidemiology - Bacterial Agents *(continued)*

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Plague, Pneumonic	1-6 days	**Non-specific:** High fever, cough, chills, dyspnea, headache, nausea, vomiting, diarrhea	Fulminant pneumonia, often with hemoptysis; rapid progression to respiratory failure, septicemia and shock. Presence of hemoptysis may help distinguish from anthrax	• Natural vector: infected fleas (from rodents) • May be weaponized • Droplet precautions until patient on appropriate antibiotics for at least 2 days and showing clinical improvement • Contact precautions as well if buboes present	***Yersinia pestis:*** Blood, sputum, serum, CSF. Lymph node aspirate if buboes are present, Gram, Wright or Wayson stain, culture, serology, DFA, PCR
Tularemia, pneumonic	3-5 days; range: 1-14 days	**Non-specific:** Fever, fatigue, chills, dry cough, malaise, body aches, headache, dyspnea, chest pain	Pneumonitis, pleural effusion, ARDS, hemoptysis, sepsis. May have rash. Ocular lesions and skin ulcers associated with regional lymphadenitis may occur with weaponized aerosol attack	Natural transmission through handling or ingestion of infected animal material (rabbits, hares, rodents) or arthropod borne. May be weaponized for terrorism • No documented person-to-person transmission • Lab personnel at risk • Standard Precautions • Contact precautions if ulcers, drainage	***Francisella tularensis:*** Serum, urine, blood, sputum, pharyngeal washing, fasting gastric aspirate; ulcer swabs, lymph node aspirates if lesions. Gram strain, culture, DFA or IHC staining of secretions, exudates or biopsy specimens
Q Fever	10-40 days	Non-specific: fever, headache, chills, heavy sweats, arthralgia	**Acute:** Self-limited febrile illness lasting 2 days to 2 weeks; may present like atypical pneumonia **Chronic:** Endocarditis	Natural transmission through inhalation of infected barnyard (cattle, sheep and goats) material. May be weaponized • No person-to-person transmission • Standard Precautions	***Coxiella burnetii:*** Serum, sputum/serology (difficult to culture)

Appendix 1: Epidemiology – Viral Agents

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Equine Encephalitides (Eastern, Western, Venezuelan), La Crosse virus	Venezuelan: 2-6 days Others: 5-15 days	**Non-specific:** Sudden onset of malaise, high fever, rigors, severe headache, photophobia, nausea, vomiting, myalgias of legs and back	Fever, headache, stiff neck, nausea, vomiting, sore throat, diarrhea lasting several days leading to prolonged weakness and lethargy; CNS symptoms may develop	• No natural person-to-person transmission: natural vectors are arthropods (mosquitoes) • Standard precautions	**Viruses:** Serum, or CSF viral culture, serology, PCR
Smallpox (Variola)	12 days; Range 7-17 days	**Prodrome (non-specific):** Fever, malaise, headache, prostration, rigors, vomiting, severe backache. Historical mortality 30%. Laboratory stockpiles only. No natural outbreaks since 1977.	Centrifugal rash: maculopapular, vesicular, then pustular lesions all at same stage in any one location. Begins on tongue, mucous membranes, spreads to face, arms, legs, then hands and feet; may include palms and soles. Deep-seated lesions (relative to chickenpox/varicella) may be umbilicated as they evolve (usually on day3-4) **Types:** Ordinary (90% of cases), modified (in vaccinated-mild), flat (severe), Hemorrhagic (severe)	• Person-to-person transmission by respiratory droplet • Rarely airborne or direct contact • Airborne precautions with negative pressure and contact precautions • Clothing and bedding need appropriate handling and laundering	***Variola* virus:** Vesicular or pustular fluid and scrapings, pharyngeal swab, scab, material, serum • Lesion specimens must be obtained only by staff with recent vaccination and wearing PPE • PCR, viral culture, electron or light microscopy, serology
Viral hemorrhagic fevers (arenavirus, bunyavirus, Dengue, Ebola virus, filovirus, flavivirus, Lassa fever, Marburg virus, others)	2-21 days; varies among viruses	**Non-specific:** Fever, myalgia, rash, lethargy, abdominal pain, hematemesis, diarrhea, pharyngitis, petechiae, easy bleeding, red itchy eyes	Febrile illness complicated by easy bleeding, petechiae, hypotension and shock. Case fatality rates range widely (ex. from 25 - >80% for Marburg).	• Person-to-person transmission of certain viruses by contact with blood, tissue and body fluids • Possibly airborne • Airborne and contact precautions: double gloves, leg and shoe coverings	Viruses: Serum or blood viral culture, PCR, serology

Appendix 1: Epidemiology - Biological Toxins

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Botulism	**Food borne:** 12-72 hours (range: 2 hours - 8 days) **Inhalation:** 12-80 hours	**Ingestion of preformed toxin:** Often no initial symptoms. Possible nausea, vomiting, abdominal cramps or diarrhea followed by clinical syndrome. Wound, intestinal and infant forms from spores.	Ptosis; symmetrical descending flaccid paralysis/ paresis, diplopia, dysarthria, dysphonia, and dysphagia. Generally afebrile, with normal mental status. Can progress to airway obstruction and respiratory failure. No sensory deficits.	• No person-to-person transmission • Standard precautions	***Clostridium botulinum:*** serum (before antitoxin); gastric aspirate, stool, and/ or food sample(s) if possible food borne
Ricin	**Inhalation:** 4-8 hours **Ingestion:** 1-4 hours	**Inhalation:** Dyspnea, cough, fever, weakness, hypothermia, arthralgia, hypotension, cardiac collapse **Ingestion:** abdominal pain, nausea, vomiting, diarrhea	**Inhalation:** In high doses, short incubation period and rapid onset suggestive of chemical agent **Ingestion:** Dehydration, hypovolemic shock	**Inhalation** of aerosolized ricin, a toxalbumin extracted from castor beans (weapon) • No person-to-person transmission **Ingestion** of castor bean with broken seed coat (occasional pediatric ingestion) or extract from castor beans (weapon) • Standard precautions	Toxin from castor beans. Blood, tissue for toxin/ serology/IHC tissue staining
Staphylococcal Enterotoxin B	**Inhalation:** 3-12 hours **Ingestion:** Minutes to hours	**Inhalation:** Fever, chills, headache, myalgias, cough, nausea **Ingestion:** Nausea, vomiting, diarrhea. Short incubation period and rapid onset suggestive of chemical agent	**Inhalation:** Dyspnea, retrosternal pain may develop **Ingestion:** Nausea, vomiting and diarrhea	**Inhalational** toxidrome only results from aerosolization of weaponized toxin • No person-to-person transmission • Standard precautions **Ingestion** of material contaminated with Staph species elaborating pre-formed toxin or intentionally poisoned with extracted toxin • Standard precautions	Toxin elaborated by/ extracted from Staph species. Poisoning by inhalation: serum, urine Poisoning by ingestion: stool, vomitus / Ag-ELISA, Ab-ELISA, serology

Appendix 1: Epidemiology - Biological Toxins *(continued)*

Disease	Incubation Period	Symptoms	Clinical Symptoms	Transmission and Precautions	Causative Organism and Diagnostic Samples/Tests
Trichothecene Mycotoxins	May occur within seconds of exposure (topical, oral, inhalation)	Progressing skin or oral burning, pain, redness or rash, vomiting, diarrhea, dyspnea and bleeding	Multiple organ systems involved, progressing rapidly. Differentiated from Staph. Enterotoxin B by burning dermal and mucocutaneous symptoms. Differentiated from ricin by the presence of dermal symptoms	Topical exposure, ingestion or inhalation of toxin which may be weaponized. • Standard and contact precautions are required until the victim is decontaminated	Immunoassay/antibodies to trichothecene mycotoxins (not validated). Nasal throat and respiratory secretions for mass spectrometric evaluation; serum, urine and tissue for toxin detection. ELISA screening for exposure; sequential absolute lymphocyte count; coagulation panel. Environmental assay may be most reliable confirmation.

Appendix 2: Differential Diagnoses by Syndrome

Syndrome	Bioterrorism Threat Disease	Other Conditions/Infections
Acute respiratory distress with fever	Inhalation anthrax	Influenza and other respiratory viruses causing pneumonia, Tularemia, Plague, community acquired Pneumonia, Bacterial meningitis, Necrotic arachnidism
	Pneumonic plague	Systemic Inflammatory Response Syndrome (SIRS), suppurative lymphadenopathy, diphtheria, sepsis, impetigo, bacterial meningitis, ARDS, anthrax, meningococcemia, bacterial pneumonia, lymphogranuloma venereum, typhoid fever, tularemia, Rocky Mountain Spotted Fever, Parotitis, Chancroid, Hantavirus pulmonary syndrome, necrotizing fasciitis
	Pneumonic tularemia (rare)	Bacterial pneumonias, Anthrax, ARDS, Rocky Mountain Spotted Fever, Q Fever, Typhoid Fever, Cat Scratch Disease, Sporotrichosis
	Ricin/Abrin	Atypical pneumonias (Mycoplasma, Chlamydia, Legionella). Anthrax, phosgene, SEB, cellulitis, Q fever, tularemia. Also to be considered: plague, salmonella, shigella, cholera, necrotizing fasciitis
	Staphylococcal Enterotoxin B (SEB)	Dependent on route of exposure. Hantavirus, Streptococcal Toxic shock syndrome, Kawasaki disease, Scarlet fever, Rocky Mountain Spotted Fever, Meningococcemia, Leptospirosis, Stevens-Johnson syndrome, necrotizing fasciitis. Conjunctivitis, otitis media/externa. Ricin exposure.
	T2 Mycotoxin	Ricin/Abrin, SEB, Vesicant exposure (mustard/lewisite)
Acute rash with fever	Smallpox	Vesicular or pustular: varicella, enterovirus, disseminated herpes simplex or zoster, impetigo, monkey pox, drug eruptions, contact dermatitis, erythema multiforme, scabies/insect bites, molluscum contagiosum
	Viral hemorrhagic fever	Non-vesicular: meningococcemia, rickettsia, leukemia, erythema multiforme, drug eruptions, enterovirus. Influenza, viral hepatitis, Staph/Gram Negative Sepsis, Toxic Shock Syndrome, salmonelosis, shigellosis, Leptospirosis, boreliosis, psittacosis, dengue fever, Hantavirus Pulmonary Syndrome, malaria, trypanosomiasis, septicemic plague, rubella, measles, hemorrhagic smallpox
Neurologic syndromes	Botulism	West Nile virus, St. Louis encephalitis, CVA, meningitis, Myasthenia Gravis, tick paralysis, arsenic, lead mercury or organic poisoning
	Encephalitides (Venezuelan, Eastern, Western)	Guillain-Barre syndrome, bacterial meningitis, viral meningitis, fungal CNS infections, intracranial absess, subdural hematoma, vasculopathy, encephalopathy, DIC, rabies, HSV encephalitis, enteroviral CNS infection, measles affecting CNS, Myasthenia Gravis, Eaton-Lambert syndrome, tick paralysis, intoxication, Polio
Influenza-like illness	Brucellosis	Influenza and other respiratory viruses; malaria, lyme disease, typhoid fever, typhus, tuberculosis mononucleosis, rheumatic fever, syphilis, HIV, Q Fever
	Tularemia	Mononucleosis (EBV, CMV, toxoplasmosis, HIV) Anthrax, Rocky Mountain Spotted Fever, Q Fever, typhoid fever, cat scratch disease, Sporotrichosis

Appendix 3: Treatment Guidelines

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
Anthrax, Inhalation/ Cutaneous	**Inhalation:** Ciprofloxacin, doxycycline and penicillin G procaine have proven effective in non-human primates and are approved by FDA for the prophylaxis of inhalational B. anthracis. Ciprofloxacin or doxycycline is recommended for prophylaxis and treatment of adults and children, plus 1 or 2 other antimicrobials with the ciprofloxacin or doxycycline. Ciprofloxacin/ doxycycline regimens should be maintained for a total of 60 days IV/ PO **Cutaneous:** Ciprofloxacin or doxycycline; add 1 or 2 other antimicrobials if systemic, extensive edema, face/neck lesions **References:** Exposure management and antimicrobial therapy: MMWR 50(42);909-919, 2001. For information regarding pregnant women, breastfeeding and children: MMWR 50(45);1014-16, 2001.	**Ciprofloxacin prophylaxis:** For a total of 60 days IV/PO. Treatment: IV route plus 1 or 2 additional antibiotics.	**Ciprofloxacin** • 500 mg PO q12 hours x 60 days *Or* • 400mg IV q12 hours x 60 days	**Ciprofloxacin** • 10-15mg/kg PO q12 hours x 60 days (not to exceed 500mg/dose) *Or* • 10mg/kg IV q12 hours x 60 days (not to exceed 400mg/dose)
		Doxycycline prophylaxis: For a total of 60 days. Treatment: IV route plus one or two additional antibiotics	**Doxycycline** • 100 mg PO/IV q12 hours x 60 days	**Doxycycline** • >8 years and >45kg: 100mg PO/IV q12 hours x 60 days • >8 years ≤ 45kg: 2.2mg/kg PO/IV q12 hours x 60 days
		PCN If sensitive - constitutive and inducible beta-lactamases and cephalosporinases present in some isolates; ***Caution:*** Penicillin alone not recommended	**PCN G:** • 8-12 million units IV divided q4-6 hours **PCN V:** • 200-500mg PO q6 hours	**PCN G:** • 100,000-150,000 U/kg/day IV divided q 4-6 hours **PCN V:** • 25-50mg/kg/day PO divided b.i.d/q.i.d
		Amoxicillin Option in cutaneous disease for pregnant women and children if isolate is sensitive - has not been studied in animal models; ***see caution above***	**Amoxicillin** • 500mg PO q8 hours	**Amoxicillin** • 40 kg: :500mg PO q8 hours • <40 kg: 15mg/k q8 hours* • (total 45 mg/kg/day) This is the minimum amoxicillin dose for pediatric patients weighing <40 kg. Doses <45mg/kg/day and dosing intervals greater than q8 hr should not be used. • <8 years:2.2mg/kg PO BID

Appendix 3: Treatment Guidelines *(continued)*

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
Anthrax, Inhalation/ Cutaneous	**Inhalation:** Ciprofloxacin, doxycycline and penicillin G procaine have proven effective in non-human primates and are approved by FDA for the prophylaxis of inhalational B. anthracis. Ciprofloxacin or doxycycline is recommended for prophylaxis and treatment of adults and children, plus 1 or 2 other antimicrobials with the ciprofloxacin or doxycycline. Ciprofloxacin/ doxycycline regimens should be maintained for a total of 60 days IV/ PO **Cutaneous:** Ciprofloxacin or doxycycline; add 1 or 2 other antimicrobials if systemic, extensive edema, face/neck lesions **References:** Exposure management and antimicrobial therapy: MMWR 50(42);909-919, 2001. For information regarding pregnant women, breastfeeding and children: MMWR 50(45);1014-16, 2001	**Anthrax Vaccine -** Adsorbed	**Anthrax Vaccine** • Immunization consists of a series of five 0.5 mL intramuscular doses. Administer 1 dose at 0 and 4 weeks and 6, 12, and 18 months • May be initiated as risk of exposure is identified (antibiotic prophylaxis may be indicated). For pre-exposure vaccination individuals are not considered protected until the full series is complete.	**Anthrax Vaccine** • Recommended for selected individuals age 18-65 years. Annual booster immunization recommended. • Safety and effectiveness in pediatric patients < 18 years old have not been established

Appendix 3: Treatment Guidelines *(continued)*

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
Botulism toxin	**Supportive care:** Ventilation may be necessary (vital capacity <12 ml/kg). Trivalent (types A,B,E) equine antitoxin available- request through local/ state Dept of Health. Need test dose because of potential hypersensitivity. Heptavalent (HBAT) antitoxin for types A-G may be obtained directly from CDC/ US Army/DHHS Strategic National Stockpile For infant botulism: Human-derived antitoxim (types A, B) "baby big" Contact Hospital infection control, local and state health department, if available; *CDC (770) 488-7100*	None	**HBAT – Refer to full CDC protocol:** • 20 ml IV infusion to be diluted with NS to yield 1:10 concentration; • Slow infusion via volumetric pump at 0.5ml/min x 30 minutes • If no reaction, increase to 1ml/ min x 30 minutes • If no reaction evident, may increase to 2ml/min for remainder of infusion **Other formulations:** Refer to dosing information and protocols supplied	**Trivalent and HBAT** antitoxins can be used in food borne, weaponized and wound botulism. Infant Botulism can be treated with Human Botulism Immune Globulin (Baby BIG-IV available from Div. of Communicable Disease Control, CA Dept. of Public Health 510-231-7600 24 hours/day, 365 days/yr). In infants < 1 year: 50 mg/ kg infusion; 25 mg/kg/hr initially (over 0-15 minutes) not to exceed 50 mg/kg/hr. BIG-IV not recommended for any over 1 yr. Antibiotics not indicated except for secondary infection. ***Caution:*** Use of amioglycosides (such as gentomicin) or tetracylines may worsen paralysis in infant botulism
Brucellosis	**Doxycycline plus streptomycin or rifampin.** Alternatives: ciprofloxacin plus rifampin; doxycycline plus gentamicin; TMP/ SMX plus gentamicin. **Reference:** emedicine article CBRNE- Brucellosisupdate April 29,2009	**Doxycycline/Streptomycin**	**Doxycycline 100 mg PO IV b.i.d for:** • 3-6 weeks plus streptomycin 15mg/kg (not to exceed 1 Gm/day IM for three weeks	**Doxycycline 5 mg/kg/day PO for:** • 3 weeks plus 20-40 mg/kg IM daily (not to exceed 1 GM daily)
		Rifampin	**Rifampin:** • 600-900 mg PO/IV daily	**Rifampin:** • 10-20 mg/kg PO/IV daily not to exceed 600 mg

Appendix 3: Treatment Guidelines *(continued)*

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
Brucellosis	**Doxycycline plus streptomycin or rifampin.** Alternatives: ciprofloxacin plus rifampin; doxycycline plus gentamicin; TMP/SMX plus gentamicin. **Reference:** emedicine article CBRNE- Brucellosisupdate April 29,2009	**Gentamicin**	**Gentamicin:** • 5.1 mg/kg IV/IM daily *Or* • 2mg/kg loading dose IV followed by 1.7 mg/kg IV/IM every eight hours for 5 days	**Gentamicin:** • 5 mg/kg IM for 5 days in combination with either Doxycycline or TMP/SMX
		TMP/SMX	**TMP/SMX:** • 1 double strength tablet PO twice a day (160/800) or 8-10 mg/kg IV	**TMP/SMX:** • 5 ml/10kg (40/200) PO twice a day
		Dexamethasone: Consider as adjunct to improve outcome in neurobrucellosis/brucella meningitis	**Dexamethasone:** • 0.15 mg/kg IV every 8 hours	**Dexamethasone:** • 0.6 mg/kg/d IV divided into every 6 hour doses for 2 doses prior to starting antibiotics
Plague	**Streptomycin; gentamicin.** Chloramphenicol should be used for meningitis. **Reference:** JAMA 2000; 283(17):2281-2290.	**Doxycycline; tetracycline; ciprofloxacin**	**Streptomycin** • 30mg/kg (up to 2 GM) per day divided b.i.d/q.i.d. **Alternative: Doxycycline** • Loading with 200 mg IV followed by100mg IV b.i.d **Chloramphenicol:** • 25 mg/kg every 6 hours	**Alternatives** **Doxycycline:** • < 45kg body weight: 2.2mg/kg IV b.i.d (not to exceed 200 mg daily) • > 45 kg: use adult dosing; In children > 2 years Chloramphenicol: 25 mg/kg IV each 6 hours
	Alternatives: Doxycycline; tetracycline; ciprofloxacin; and chloramphenicol. **Reference:** emedicine: CBRNE - Plague Sept. 22, 2009.	**Chloramphenicol** (for Plague meningitis)	**Chloramphenicol** • 50-100 mg/kg/day divided q6 hours: • 30mg/kg/day PO divided q 6 hours may be substituted for the last 5 days of therapy	**Chloramphenicol:** • < 7 days: 25 mg/kg PO/IV daily • > 7 days:50 mg/kg/day PO/IV divided q12 hours

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
Q-Fever	**Doxycycline; tetracycline, chloramphenicol**	**Doxycycline; tetracycline** (may delay but not prevent illness)	**Doxycycline** • 100 mg PO q12 hours	**Doxycycline:** • > 8 yrs: 3 mg/kg/day PO q12 hours (not to exceed 200 mg/day). • < 8 yrs: not recommended
		Chloramphenicol	**Chloramphenicol** • 500-750 mg PO/IV q6 hours (not to exceed 4 GM/day)	**Chloramphenicol:** • 50 mg/day PO/IV divided q.i.d
Ricin/Abrin	**Supportive care:** Treatment for pulmonary edema, dehydration, hypotension. Cefazolin (secondary bacterial infections), Dopamine/Norepinephrine (hypotension), Diphtheria and Tetanus toxoids (induce active toxin immunity) H2 inhibitors and activated charcoal may be used.	**None**	**Supportive Care Only** No definitive treatment	**Supportive Care Only** No definitive treatment
Smallpox	**Supportive care:** IV hydration, fever and pain management treatment of secondary infections. Vaccination. Possible role for antiviral such as cidofovir (or analog) Consult: hospital infection control, local and state Dept. of Health, CDC for assistance in management vaccine and immune globulin.	Vaccination given within 3 days of exposure can prevent or decrease the severity of disease. Not established for use in children < 16.	**Immune globulin** (from CDC and vaccine immune globulin intravenous, human (VIGIV) may be of some use. Otherwise, supportive care only No definitive treatment, consider cidofovir.	**Immune globulin** (from CDC and vaccine immune globulin intravenous, human (VIGIV) may be of some use. Otherwise, supportive care only No definitive treatment
Staphylococcal Enterotoxin B	**Supportive care:** Fluid resuscitation, vasoactives, antipyretics. Removal and discarding of contaminated clothes; Cleanse infected/exposed areas	**None**	Supportive Care Only No definitive treatment	Supportive Care Only No definitive treatment

Appendix 3: Treatment Guidelines *(continued)*

Agent	Treatment	Prophylaxis	Adult Dosing	Pediatric Dosing
T2 Mycotoxin ("Yellow Rain")	**Potent dermal irritant.** Can be absorbed through intact skin causing systemic illness. Symptoms are usually experienced within seconds LD 50= ~1mg/kg Human exposure causes protracted lethal illness with sore throat, bloody nasal discharge dyspnea, cough and fever		**Activated Charcoal** • 1 Gm/kg PO/NG may repeat 20-50 GM q 2-6 hours	**Activated Charcoal:** • < 1 yr- 1 Gm/kg PO • 1-12 years: 25-50 GM PO • Adolescents 25-100 GM PO • Repeat dosing in children not established • Half initial dose recommended without sorbitol
Tularemia	**Streptomycin:** Vaccine exists but not currently available **Reference:** JAMA 2001:285(21): 2763-2773	Tetracycline; doxycycline; ciprofloxacin Gentamicin (monitor for renal insufficiency)	**Streptomycin** • 1 g IM b.i.d for 7-14 until afebrile *Or* • 1 Gm/kg PO/NG may Doxycycline 100mg IV/PO b.i.d for 14 days **Alternatives: Gentamicin** • 5mg/kg IM/ IV daily **Chloramphenicol** • 15 mg/kg IV q 6 hrs; **Ciprofloxacin** • 400 mg IV b.i.d.	**Streptomycin** • 15 mg/kg IM twice a day (not to exceed 2 g/day) **Alternatives: Doxycycline** • < 45 kg body weight 2.2 mg/kg IV b.i.d. • >45 kg: 100 mg IV b.i.d. **Gentamicin** • 2.5 mg/kg IM/IV q8 hours with normal renal function **Chloramphenicol** • 15 mg/kg IV q 6 hours
Viral Hemorrhagic Fevers	**Supportive care:** Empiric ribavirin until virus identified. Ribavirin may be effective for Lassa, Crimean-Congo, Rift Valley fevers	Ribavirin may be effective for Lassa, Crimean-Congo, Rift Valley fevers	Intensive Supportive Care Only No definitive treatment	Intensive Supportive Care Only No definitive treatment
Glanders	Limited human experience. In vitro: ceftazidime, gentamicin, imipenem, doxycycline, and ciprofloxacin. **Reference:** N Engl J Med 2001; 345:256-258.			

Appendix 4: Isolation, Placement and Transport of Patients with Probable Biopathogens

	Biological Agents									Viral Agents				Biotoxins			Misc. Biologicals				
CDC Bioterrorism Agents/Diseases by Category **A – Agents with high risk to National Security** **B – Agents easy to disseminate with high morbidity/low mortality**	Anthrax (A)	Bubonic Plague (A)	Pneumonic Plague (A)	Tularemia (A)	Brucellosis (B)	Q Fever (B)	Glanders (B)	Food/Water Safety Threats (B)	Meliodosis (B)	Smallpox (A)	Viral Hemorrhagic Fever (A)	Viral Encephalitis (B)	SARS-CoV	Botulism (A)	Ricin and Abrin (B)	Trichothecene (T2) Mycotoxin	Influenza	Bacterial Meningitis	Methicillin Resistant Staphylococcus aureus (MRSA)	Vancocillin Resistant Entrococci (VRE)	Unprotected abcess or draining wound
Isolation Precaution																					
Contact	❶				❶		❷	X		X	X		X						X	X	X
Droplet			X							X	❸		X				X	X			❹
Airborne										X			X								
N95 Required										X			X								
Patient Placement																					
No Restriction	X			X		X						X		X	X	X					
Private Room		X	X		X		X			X	X		X					X	X	X	X
May Cohort		X	X				X	X					X				X		X	X	
Negative Pressure Room										X	❸		X								
Patient Transport																					
No Restriction	X			X		X		X				X		X	X	X					
Essential movement only		X	X		X		X		X	X	X	X	X								X
Mask patient to minimize droplet contamination			X							X	❸		X				X	X		❺	
Notify receiving unit before transport	X		X		X		X	X		X	X		X				X	X	X	X	X

❶ Contact precautions with extensive skin involvement or lesions than cannot be covered
❷ Contact precautions required when skin involved
❸ Airborne Precautions with for prominent cough, vomiting, diarrhea or hemorrhage
❹ Add Droplet Precautions for the first 24 hours of appropriate antibiotic therapy if invasive Group A streptococcal disease is suspected.
❺ Patient must wash hands with antibacterial soap, wear a gown, avoid touching common surfaces (elevator or TV buttons).

NOTE: ALL PATIENTS receive ***STANDARD PRECAUTIONS*** in addition to any recommended transmission based (airborne, droplet, contact) precautions.

Appendix 4

Appendix 5: Abbreviations

ABLS	**Advance Burn Life Support**
ACA	**Ambulatory Care Area**
ADLS	**Advance Disaster Life Support**
APR	**Air Purifying Respirator**
ATLS	**Advance Trauma Life Support**
CDC	**Centers for Disease Control and Prevention**
DHHS	**Department of Health and Human Services**
DPH	**Department of Public Health**
ED	**Emergency Department**
EMP	**Emergency Management Plan**
EOC	**Emergency Operations Center**
EOP	**Emergency Operations Plan**
FDA	**Food and Drug Administration**
HICS	**Hospital Incident Command System**
ILI	**Influenza-Like Illness**
MASS	**Move, Access, Sort, Send**
PAPR	**Powered-Air Purifying Respirators**
PPE	**Personal Protective Equipment**
START	**Simple Triage and Rapid Transport**
WHO	**World Health Organization**

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