



OMHCC

Omaha Metropolitan Healthcare Coalition



Contact the Nebraska Poison Center (402-955-5555 or 800-222-1222) for questions and patient care advice

CBRN Agents Overview

(Chemical, Biological, Radiological, Nuclear)

	Agent Name	Route of Exposure	Rate of Action & Odor	Signs and Symptoms	PPE and Decontamination	
Blister Agents	Sulfur Mustard	Skin contact or Inhalation	Delayed (2-24 hours) - garlic, onions, mustard	Eye pain, red skin, fluid-filled blisters within 2-24 hours. Dyspnea, pulmonary edema within 24 hours, low CBC & platelets.	Level B PPE. Decon with soap & water.	
	Lewisite	Skin contact or Inhalation	Rapid - geraniums	Immediate eye & skin pain, redness, blisters, cough, dyspnea, hypotension.		
	Nitrogen Mustard	Skin contact or Inhalation	Delayed (2-12 hours) - fruity, fishy, almond	Eye pain/burns/blindness, red skin, large fluid-filled blisters, cough, dyspnea, tremors, seizures.		
TREATMENTS	Blisters: Petrolatum gauze (or Silverlon, if available, for sulfur mustard); sulfa cream. Pruritus: Topical steroids or calamine lotion. Antibiotics for infection. Lewisite only: Succimer (Chemet) - Adult & Child: 10 mg/kg PO every 8 hours for 5 days, then every 12 hours for the next 14 days. BAL-in-Oil (Dimercaprol) CURRENTLY UNAVAILABLE Adult & Child: 2 to 4 mg/kg/dose IM every 4 to 12 hours. Dose & frequency dependent upon symptom severity. Contraindicated in patients with a PEANUT ALLERGY.					
Irritant Gases	Ammonia, Hydrogen Chloride, Chlorine, Phosgene	Skin contact or Inhalation	Rapid and Delayed - Chlorine: pungent, yellow-green gas - Phosgene: mown hay	Ammonia, HCl, & Chlorine: immediately irritating/caustic to eyes, skin, upper airway. Chlorine & Phosgene: can cause delayed onset of pulmonary edema within 72 hours.	Level B PPE. Exposures to gas only with no skin/eye irritation, dry skin/clothes generally do not need decon. Liquids require decon.	
Treatment - Oxygen, bronchodilators. Prepare to intubate early. Nebulized sodium bicarbonate for chlorine inhalation.						
Nerve Agents	Tabun, Soman, Sarin	Inhalation (most likely since volatile) or Skin contact	Inhalation: Very rapid Dermal: Delay up to 18 hrs Novichok onset may be delayed up to 3 days and absorption may continue until fully decontaminated - Tabun: fruity - Soman: camphor - Sarin, VX: odorless - Insecticides: garlic	Mild: miosis or mydriasis, rhinorrhea, hypersalivation, sweating, lacrimation. Moderate: vomiting, diarrhea, chest tightness, wheezing, profuse airway secretions, respiratory distress, muscle weakness/fasciculations, bradycardia. Severe: coma, seizures, paralysis, cyanosis, respiratory failure, apnea.	Level B PPE (Level A if concern for vapor exposure). Decon with soap & water. Use Reactive Skin Decontamination Lotion (RSDL®) if available. DO NOT decontaminate with alcohol.	
	Organophosphate Carbamate Insecticides	Inhalation, Ingestion, or Skin contact				
	VX, Novichok	Skin contact, Ingestion (Inhalation is less likely)				
TREATMENTS	Aggressive Respiratory Support, Intubation/Ventilation (avoid succinylcholine). Atropine Sulfate: Adult: 2 mg IV or IM q 2-5 min. until resolution of muscarinic signs (bronchospasm & excess secretions) *; Child: 0.02 mg/kg (minimum of 0.1 mg) IV/IM until resolution of muscarinic signs (bronchospasm & excess secretions) * AtroPen (Atropine) 0.5 mg IM Auto-Injector: 6-18 kg (13-40 lbs)=1 Pen (0.5 mg), 19-28 kg (41-62 lbs)=2 Pens (1 mg), 29-38 kg (63-84 lbs)=3 Pens (1.5 mg), >38 kg (>84 lbs)=4 Pens (2 mg). *Repeat entire dose every 5 minutes for muscarinic signs. Atropine 1% (SL) or ipratropium (inhaled), if atropine unavailable. Pralidoxime Chloride (2 -PAM or Protopam): Adult: 30 mg/kg (up to 2 gm) IV; follow with infusion: 8 to 10 mg/kg/hr. Child: 30 mg/kg (up to 2 gm) IV; follow with infusion: 10 to 20 mg/kg/hr. ***Administration over 30 minutes may minimize side effects (hypertension, headache, nausea/vomiting, blurred vision)*** DuoDote & ATNAA (Antidote Treatment Nerve Agent Auto-Injector) for Adults Only: Both Contain: Atropine 2 mg & Pralidoxime 600 mg (single auto-injector). Adult: Mild exposure (no treatment if miosis only): 1 DuoDote or ATNAA, Moderate exposure: 2 DuoDotes or ATNAAs, Severe exposure: 3 DuoDotes or ATNAAs. Midazolam (Versed, Seizalim) Adult: 5 to 10 mg IV/IM - May repeat q 5 min as needed for seizures, Child: 0.2 mg/kg IV/IM - May repeat q 10 to 15 min. Diazepam (Valium) Midazolam & Lorazepam are better absorbed via IM route. Adult: 5 to 10 mg IV/IM - May repeat q 5-10 min as needed for seizures, Child: 0.2 to 0.5 mg/kg IV/IM - May repeat q 5 to 10 min. Lorazepam (Ativan) Adult: 2 to 4 mg IV/IM - May repeat q 5 to 10 min as needed for seizures, Child: 0.05 to 0.1 mg/kg IV/IM - May repeat q 5 to 10 min.					
Cyanide	Cyanide	Inhalation, Ingestion Skin/Ocular Contact	Rapid - bitter almonds - smoke inhalation	Headache, dizziness, lethargy, tachycardia, hypotension, respiratory depression, coma, death can occur in <5 minutes.	Level B PPE. Hydrogen cyanide readily penetrates most rubber and barrier fabrics, but butyl rubber provides short-term skin protection.	
TREATMENTS	Maintain airway. Give oxygen immediately. Hydroxocobalamin (Cyanokit®): Adult: 5 grams IV over 15 min. Repeat 5 grams if no improvement. Child: 70 mg/kg IV (pediatric dosing not FDA approved) Reconstitute each vial with 200 mL NS. Administer through separate IV. Causes red skin and urine; interferes with some lab tests (e.g., COHb) Alternative Treatment: Sodium Nitrite: Adult: 300 mg (10 mL of 3% solution) IV, over 5-10 minutes; followed by Sodium Thiosulfate: Adult: 12.5 grams (50 mL of a 25% solution) IV over 10-15 minutes.					
Viruses	Smallpox Variola virus	Inhalation Person contact	Incubation 12-17 days Pox lesions form 2-3 days <i>Pox are deep, hard, round</i>	HIGHLY INFECTIOUS! - Prodrome (fever, headache, backache, vomiting, chills, abdominal pain), first lesions appear in oropharynx, face, forearms (macules to papules to vesicles).	PPE = N-95 mask. Completely protect skin & mucous membranes.	
	TREATMENTS	Protect ALL & Vaccinate Tecovirimat (TPOXX) Available from the CDC: 770-488-7100. Adult or Child ≥ 40 kg: 600 mg PO every 12 hours for 14 days. Child 25 to <40 kg: 400 mg PO every 12 hours for 14 days. Child 13 to <25 kg: 200 mg PO every 12 hours for 14 days. Live Smallpox Vaccine (ACAM 2000, APSV) Available from the CDC: 770-488-7100 OR Obtain through county or state health departments. Vaccine used prophylactically or for post-exposure up to 96 hours. *No absolute contraindications exist for smallpox vaccination in a post-event setting. Relative contraindications include eczema, severe immunodeficiency, vaccine allergies. TYNNEOS Vaccine (non-replicating) is also available. Vaccine Reaction Treatment - Vaccinia IG 0.6 mL/kg IM, may increase to 1-10 mL/kg IM divided doses depending on symptoms. Available from CDC: 770-488-7100.				
	Ebola, Marburg, Lassa Viral Hemorrhagic Fevers	Inhalation Person contact	Incubation 2-21 days High mortality	HIGHLY INFECTIOUS! Fever, myalgias, flushing, vomiting, diarrhea, petechiae, bleeding, hypotension, shock.	PPE = PAPR or N-95 mask. Completely protect skin & mucous membranes.	
Treatment - Intensive supportive care.						
Toxins	Botulism Botulinum toxin	Ingestion, Inhalation, Open Wounds	Delayed (6-72 hrs) Illness length may be prolonged	Double vision, ptosis, dysphagia, progressive descending weakness of muscles to paralysis and respiratory failure.	Ricin Ingestion: consider activated charcoal.	
	Ricin Castor Bean Toxin	Inhalation, Ingestion, Injection	18-24 hours	Inhalation - coughing, chest tightness, weakness, fever. Ingestion - Nausea, vomiting, diarrhea, abdominal pain, fever.		
	TREATMENTS	Botulism Antitoxin Heptavalent (BAT®) Available from the CDC: 770-488-7100. Prior to administration, collect specimens but do not await lab confirmation before giving (consult with CDC for guidance). Adult Dose: Administer 1 vial slowly IV in a 1:10 dilution in normal saline. **Equine-Derived: Monitor closely for anaphylaxis and serum sickness** Botulism: Aggressive Respiratory Support. Ricin: Intensive supportive care.				
Bacteria	ANTHRAX Bacillus anthracis	Inhalation, Ingestion, Cutaneous	Incubation is 1-6 days Toxic shock and death within 2-3 days Reactivation of spores up to 60 days	No person-to-person transmission. Contact with spores may cause illness! Inhalation: Fever & fatigue, then a slight improvement, then an abrupt onset of respiratory effects (cough, mediastinitis, dyspnea). Ingestion: Abdominal distress, vomiting or diarrhea (may be bloody), fever. Cutaneous: Presents with painless black, necrotic, eschar with redness and edema.	PPE = N95 mask. Completely protect skin & mucous membranes.	
	TREATMENTS	Anthrax Duration of Treatment and Prophylaxis is 60 days. Contained Adult Treatment: Multiple treatment regimens are available. Example: ciprofloxacin 400 mg IV every 8 hours + meropenem 2 gm IV every 8 hours + minocycline 200 mg x 1 dose IV, then 100 mg IV every 12 hours. Contained Child Treatment: Multiple treatment regimens available. Example: ciprofloxacin 10 mg/kg IV every 8 hours + meropenem 40 mg/kg IV every 8 hours + minocycline 4 mg/kg IV once, then 2 mg/kg IV every 12 hours. - Can change to PO after 2 weeks to complete 60 total days. - PLUS, Anthrax Antitoxin (Raxibacumab) or Immune Globulin (Anthraxil). Mass Casualty Setting and Post-Exposure Prophylaxis Adult: Ciprofloxacin (Cipro) 500 mg PO or 400 mg IV every 12 hours for 60 days OR Doxycycline (Vibramycin) 100 mg PO every 12 hours for 60 days. Child: Ciprofloxacin (Cipro) 15 mg/kg PO or 10 mg/kg IV every 12 hours for 60 days OR Doxycycline (Vibramycin) <45 kg: 2.2 mg/kg PO every 12 hours; ≥45 kg 100 mg every 12 hours. - PLUS, Anthrax Vaccine Adsorbed (BioThrax) in adults 18-65 years.				
	Tularemia Francisella tularensis	Inhalation, Cutaneous, Arthropod Bites, Contaminated Food/Water	Incubation 3 - 5 days	No person-to-person transmission. Fever, headache, malaise, general discomfort, cough, weight loss. Up to 30% mortality rate (untreated).	PPE = N95 mask. Completely protect skin & mucous membranes.	
Plague Yersinia pestis	Inhalation, Ingestion, Flea Bites	Incubation 2 - 8 days	HIGHLY INFECTIOUS! Malaise, fever, tender lymph nodes, skin lesions, chills, headaches, bloody sputum, pneumonia, circulatory failure and death.			
Tularemia and Plague Treatment - Plague duration of treatment is 10 days. Tularemia duration of treatment is 10 - 21 days. Contained Treatment: Gentamicin is preferred for severe tularemia. Adult: Gentamicin 5 mg/kg IV every 24 hours OR Doxycycline 100 mg PO every 12 hours OR Ciprofloxacin 400 mg IV every 8 hours or 750 mg PO every 12 hours. Child: Gentamicin 4.5 to 7.5 mg/kg IM or IV every 24 hours. Alternative Choices: Doxycycline If weight ≥ 45 kg, 100 mg IV; every 12 hours, If weight < 45 kg, 2.2 mg/kg IV; every 12 hours. Ciprofloxacin 15 mg/kg IV every 12 hours. Mass Casualty Setting and Post-Exposure Prophylaxis: Doxycycline (Vibramycin) Adult 100 mg PO every 12 hours. Child If <45 kg: 2.2 mg/kg, If ≥ 45 kg: 100 mg PO every 12 hours. OR Ciprofloxacin (Cipro) Adult 500 mg to 750 mg PO every 12 hours. Child 15 mg/kg PO every 12 hours. OR Levofloxacin (Levaquin) Adult 500 mg to 750 mg PO every 24 hours. Child <50 kg: 8 mg/kg up to 250 mg PO every 12 hours.						
Radiation	Radiation	Amount of time exposed, internal versus external, and distance from radiation source	Most radiation exposures = no physical effects High Doses Only: Slow progression days-weeks	Doses 0.5-1.5 Gy: temporary CBC changes. Doses >1.5 Gy: vomiting onset <4 hrs, CBC changes (low lymphocytes ~ 48 hrs). >3 Gy or high localized doses: diarrhea, skin burns, infections, coma.	Standard precautions. Time, Distance, Shielding.	
	TREATMENTS	Identification of radiation type is crucial for treatment. Potential for Intake of Radioactive Iodine ONLY: Oral Potassium Iodide (KI or SSKI 1 gm/mL) Adult OR adult-sized adolescents: 130 mg PO or 0.13 mL of SSKI PO. Child: 0-1 month: 16 mg; >1 month to 3 years: 32 mg; 3 years to 18 years: 65 mg. Blocking Agent - Will only work prior to intake. Immediate dosing before or after exposure can block up to 90%; 3-4 hours post-exposure dosing can provide only a 50% block. Intake of Radioactive Cesium OR Thallium: Oral Prussian Blue (Radiogardase® 0.5 gm per capsule) Adult: Initially start 3 gm PO 3 times a day; reduce dose to 1 gm orally 3 times a day once Cesium counts <1 Gy or Thallium counts <1 mg/24 hr. Child (2-12 years): Initially start 1 gm orally 3 times a day. *Capsules may be opened and sprinkled on food for ease of administration. Intake of Transuranics (Plutonium, Americium, Curium) Ca-DTPA (pentetate calcium trisodium) injection - FIRST. Adult: 1 gm IV over 3-5 minutes x 1. Child (<12 years): 14 mg/kg IV over 3 to 5 min not to exceed 1 gm. Zn-DTPA (pentetate zinc trisodium) injection - Maintenance Adult: 1 gm IV over 3 to 5 minutes. Child (<12 years): 14 mg/kg IV over 3 to 5 min not to exceed 1 gm. Refer to package insert for suggested supplements & duration of treatment.				