



OMHCC

Omaha Metropolitan Healthcare Coalition



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

CBRN = Chemical, Biological, Radiological, Nuclear

CBRN Agents Overview[©]

	Name of Agent	Method of Exposure	Rate of Action & Odor	Signs/Symptoms	Treatment Plan
Blister Agents (Vesicants)	Sulfur Mustard	Skin contact or Inhalation	Delayed (2-24 hours) <i>-almond, garlic, mustard</i>	No immediate symptoms. Eye pain, red skin, fluid-filled blisters within 2-24 hours. Dyspnea, pulmonary edema within 24 hrs.	Provider Protection +Level B PPE +Decon with soap & water +Blisters: Petrolatum gauze (or Silverlon, if available, for sulfur mustard); sulfa cream +Pruritus: Topical steroids or compound calamine lotion +Antibiotics for infection +Lewisite Antidote (back)
	Lewisite	Skin contact or Inhalation	Rapid <i>-garlic</i>	Immediate pain, eye and lung burning, bee-sting blisters, grayish skin	
	Nitrogen Mustard	Skin contact or Inhalation	Rapid <i>-almond, garlic, mustard</i>	Eye pain, gritty eyes, reddened skin, large fluid-filled blisters, respiratory damage; smells like almonds	
Irritant Gases	Phosgene Ammonia Chlorine	Skin contact or Inhalation	Rapid and Delayed -Ammonia & Chlorine: pungent -Phosgene: mown hay	Ammonia & Chlorine: immediately irritating to eyes, skin, & upper resp. tract. ALL can cause delayed onset of pulmonary edema within 72 hours.	+Oxygen, bronchodilators +Nebulized 3.75% 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	Mild: miosis, rhinorrhea, mild chest tightness, mild shortness of breath, sweating, lacrimation Moderate: vomiting, diarrhea, severe chest tightness, wheezing, profuse airway secretions, respiratory distress, muscle weakness, bradycardia Severe: unconsciousness, seizures, paralysis, cyanosis, respiratory failure, apnea	Provider Protection +Level B PPE (Level A if concern for vapor exposure) +Decon with soap & water; Reactive Skin Decon. Lotion (RSDL®) if available +DO NOT Decon with alcohol +Aggressive Resp. Support +Intubation/Ventilation (avoid succinylcholine) +Antidotes (on back)
	Organophosphate Insecticides	Inhalation, Ingestion, or Skin contact	-Tabun: fruity -Soman: camphor, fruity -Sarin, VX: odorless -Insecticides: garlic		
	VX Novichok	Skin contact, Ingestion (Inhalation is less likely)			
Cyanide	Cyanide	Ingestion Inhalation	Rate of RXN=Rapid <i>-almonds</i> <i>-smoke inhalation</i>	Headache, dizziness, lethargy, tachycardia, hypotension, resp. depression, coma, death can occur in <5 min.	+Maintain airway; Admin oxygen immediately +Med treatment on back
Viruses	Smallpox <i>Variola virus</i>	Inhalation Person contact	Incubation 12-17 days Pox lesions form 2-3 days <i>Pox are deep, firm/hard, round</i>	HIGHLY INFECTIOUS! Febrile prodrome (fever >102, headache, backache, chills, vomiting, abdominal pain), first lesions appear in oral mucosa, face, forearms	Protect ALL & Vaccinate +Do NOT Vaccinate pregnant +PPE = N95 mask +Completely protect skin & mucous membranes
	Ebola, Marburg <i>Viral Hemorrhagic Fevers</i>	Inhalation Person contact	Rate of reaction=variable High mortality	HIGHLY INFECTIOUS! Fever, myalgias, flushing, vomiting, diarrhea, petechiae, bleeding, hypotension, shock	Provider Protection +PPE=PAPR or N-95 mask +Completely protect skin & mucous membranes +Intensive supportive care
Toxins	Botulism <i>Botulinum toxin</i>	Ingestion Inhalation Open Wounds	*Rapid (24-36 hours) *Illness length may be prolonged	Dizziness, vomiting, double vision, ptosis, dysphagia, progressive weakness of muscles to paralysis and respiratory failure	+Aggressive Resp. Support +Rapid use of antitoxin +Med treatment on back
	Ricin <i>Castor Bean Toxin</i>	Inhalation, Ingestion, Injection	18-24 hours	Inhalation -coughing, chest tightness, weakness, fever Ingestion -Nausea, vomiting, diarrhea, abdominal pain, fever	+Supportive care +For Ingestion - charcoal
Bacteria	Tularemia <i>Francisella tularensis</i>	Inhalation Open Wounds	Incubation 1-10 days	No person-to-person transmission Fever, headache, malaise, general discomfort, irritating cough, weight loss. <i>30% mortality rate</i>	+Med treatment on back
	Anthrax <i>Bacillus anthracis</i>	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 resp. problems (cough, mediastinitis, dyspnea) Ingestion: Abdominal distress with/out bloody vomiting or diarrhea Cutaneous: Presents with a painless black, necrotic, eschar with redness and edema	Provider Protection from spores +PPE = N95 mask +Completely protect skin & mucous membranes +Med treatment on back +Aggressive treatment for suspected inhalation
	Plague <i>Yersinia pestis</i>	Inhalation	Incubation is 2-10 days	HIGHLY INFECTIOUS! Malaise, fever, tender lymph nodes, skin lesions, chills, headaches, bloody sputum, pneumonia, circulatory failure and death	Provider Protection +PPE = N95 mask +Completely protect skin & mucous membranes +Med treatment on back
Radiation	Radiation	Amount of time exposed, internal versus external, and distance from the irradiation	Slow progression <i>-Thallium: garlic</i>	Nausea, vomiting, severe burns, fatigue, reduced white blood cells ID of radiation type is crucial for treatment: Iodine, Cesium, Thallium, Plutonium, Americium, Curium	Provider Protection +External decon with water +Med treatment on back

CBRN Quick Reference Guide

Treatment for Mass Casualties & Post-Exposure Prophylaxis®

Please contact the poison center for patient-specific treatment recommendations (1-800-222-1222)

Cyanide

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)

Sodium Thiosulfate IV can be used as adjunctive

DO NOT administer through same IV line as Cyanokit
Adult 50 mL 25% solution IV; **Child** 1 mL/kg 25% solution IV, over 10-20 min.

Lewisite

BAL-in-Oil (Dimercaprol)

Adult & Child 2 to 4 mg/kg/dose IM every 4 to 12 hours
 The dose & frequency dependent upon symptom severity
Contraindicated in patients with a PEANUT ALLERGY

Succimer (Chemet)

Adult & Child 10 mg/kg PO every 8 hours for 5 days, then every 12 hours for the next 14 days

Nerve Agents

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 scarce

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)***

Mark I Kit/DuoDote/ATNAA (Auto-Injectors)

Mark I Kit (in CHEMPACKS) consists of 2 auto-injectors; DuoDote and ATNAA are single auto-injectors

All Contain: Atropine 2 mg & Pralidoxime 600 mg

Adult Dose ONLY: Mild exposure 1 Kit, DuoDote, or ATNAA
 Moderate exposure 2 Kits, DuoDotes, or ATNAAs
 Severe exposure 3 Kits, DuoDotes, or ATNAAs

Midazolam (Versed, Seizalam)

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

Smallpox

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

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

Contraindications—allergies: latex, polymyxin-B, dihydrostreptomycin, chlortetracycline; **or the following:** heart disease, eczema, use of systemic corticosteroids (>2 mg/kg or >20 mg/day prednisone for >2 weeks), use of immunosuppressive drugs, radiation therapy, HIV+, immunosuppressive diseases, pregnancy or household contacts of mentioned disease states

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

Anthrax Duration of Treatment and Prophylaxis is 60 days Contained Treatment

Suspected Meningitis:

Adult: ciprofloxacin 400 mg IV every 8 hours + meropenem 2 gm IV every 8 hours + linezolid 600 mg IV every 12 hours

Child: ciprofloxacin 20-30 mg/kg/day divided q 12 hours + meropenem 60-90 mg/kg/day divided q 8 hours + linezolid 20-30 mg/kg/day divided q 8 hours

Can transition to PO after 2-3 weeks to complete 60 total days

Without Meningitis:

Adult: ciprofloxacin 400 mg IV every 12 hours + linezolid 600 mg IV every 12 hours or clindamycin 900 mg every 8 hours

Child: ciprofloxacin 20-30 mg/kg/day divided q 12 hours + clindamycin 10-20 mg/kg/day divided q 12 hours

Can transition 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

Ciprofloxacin (Cipro)

Adult 500 mg PO or 400 mg IV every 12 hours for 60 days
Child 15 mg/kg PO or 10 mg/kg IV every 12 hours for 60 days **OR**

Doxycycline (Vibramycin)

Adult 100 mg every 12 hours for 60 days
Child <45 kg: 2.2 mg/kg every 12 hours; ≥45 kg 100 mg every 12 hours
PLUS Anthrax Vaccine Adsorbed (BioThrax) in adults 18-65 years

Anthrax

Radiation

Duration of treatment is until no evidence of radiation exists
Exposure to Radioactive Iodine

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

Immediate dosing before or after exposure can block up to 90%
3-4 hours post-exposure dosing can provide only a 50% block
CAUTIOUS USE with SHELLFISH ALLERGY or PREGNANCY

Exposure to 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/24hr
Child (2 to 12 years) - Initially start 1 gm orally 3 times a day
 *capsules may be opened and sprinkled on food for ease of administration

Internal Contamination with Plutonium, Americium, or 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, refer to PI for duration
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

Tularemia & Plague

Plague Duration of treatment is 10 days

Tularemia Duration of treatment is 10-21 days

Contained Treatment

Gentamicin PREFERRED

Adult Gentamicin 5 mg/kg IM or IV every 24 hours

Alternative Choices

Doxycycline 100 mg IV every 12 hours
 Chloramphenicol 25 mg/kg IV every 6 hours

Ciprofloxacin 400 mg IV every 12 hours

Child Gentamicin 2.5 mg/kg IM or IV every 8 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

Chloramphenicol 25 mg/kg IV every 6 hours

Ciprofloxacin 15 mg/kg IV every 12 hours

Mass Casualty Setting and Post-Exposure Prophylaxis

Doxycycline (Vibramycin)

Adult 100 mg PO or IV every 12 hours
Child If <45 kg: 2.2 mg/kg, If ≥45 kg: 100 mg PO or IV every 12 hours

Ciprofloxacin (Cipro)

Adult 500 mg PO every 12 hours or 400 mg IV every 12 hours
Child 15 mg/kg PO or IV every 12 hours ***Not to exceed 1gm/day**

Levofloxacin (Levaquin)

Adult 500 mg to 750 mg PO or IV q 24 h
Child <50 kg 8 mg/kg up to 250 mg PO or IV every 12 hours

Botulism

Heptavalent Botulinum Antitoxin (HBAT)

Available from the CDC: 770-488-7100

Prior to dose draw diagnostic lab for toxin sub type ABE and test for equine serum reaction

Dose: Administer 1 vial slowly IV in a 1:10 dilution with 0.9% normal saline (may also give a dose of 1 vial IM)

Adverse effects include anaphylaxis and serum sickness

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