OMHCC
Omaha Metropolitan Healthcare Coalition

NEBRASKA POISON CENTER
Serving NE, ID, WY, American Samoa, and Federated States of Micronesia

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

CBRN = Chemical, Biological, Radiological, Nuclear

CBRN Agents Overview©

	Agent Name	Route of Exposure	Rate of Action & Odor	Signs/Symptoms	Treatment Plan
Blister Agents (Vesicants)	**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	**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 -*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	
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	+Oxygen, bronchodilators +Prepare to intubate early +Nebulized Na 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	**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 Carbamate Insecticides	Inhalation, Ingestion, or Skin contact			
	VX Novichok	Skin contact, Ingestion (Inhalation is less likely)			
Cyanide	**Cyanide**	Ingestion Inhalation	Rapid -*bitter almonds* -*smoke inhalation*	Headache, dizziness, lethargy, tachycardia, hypotension, resp. depression, coma, death can occur in <5 minutes	+Maintain airway; Give oxygen immediately **+Med treatment on back**
Viruses	**Smallpox** *Variola virus*	Inhalation Person contact	Incubation 12-17 days Pox lesions form 2-3 days ***Pox are deep, hard, round***	**HIGHLY INFECTIOUS!** Prodrome (**fever**, headache, backache, vomiting, chills, abdominal pain), **first lesions appear in oropharynx, face, forearms** (macules to papules to vesicles)	**Protect ALL & Vaccinate** +PPE = N95 mask +Completely protect skin & mucous membranes
	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	**Provider Protection** +PPE=PAPR or N-95 mask +Completely protect skin & mucous membranes +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	+Aggressive Resp Support +Rapid use of antitoxin **+Med treatment on back**
	Ricin *Castor Bean Toxin*	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** *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)*	**+Med treatment on back**
	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 resp 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	**Provider Protection from spores** +PPE = N95 mask +Completely protect skin & mucous membranes **+Med treatment on back** +Aggressive treatment for suspected inhalation
	Plague *Yersinia pestis*	Inhalation Ingestion Flea Bites	Incubation is 2-8 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 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	**Provider Protection** +Standard Precautions +Time, Distance, Shielding +ID Rad type crucial for Tx **+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)

Alternative Tx: 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

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

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 Tx if miosis only): 1 DuoDote or ATNAA
Moderate exposure: 2 DuoDotes or ATNAAs
Severe exposure: 3 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

Radiation

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/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**

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, 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

Botulism

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

Lewisite

***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

Succimer (Chemet)

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

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 (ACAM2000, 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***

Anthrax

Anthrax Duration of Treatment & Prophylaxis is 60 days

Contained Treatment

Adult: multiple treatment regimens 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
Child: 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 (Anthrasil)

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 PO every 12 hours for 60 days
Child <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 & Plague

Plague Duration of Treatment is 10 days
Tularemia Duration of Treatment is 10-21 days

Contained Treatment

Gentamicin ***Preferred for severe tularemia***
Adult Gentamicin 5 mg/kg IV every 24 hours
Doxycycline 100 mg PO every 12 hours
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

Check www.nebraskapoison.com for the most recent version.

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