

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<sup>©</sup>

	Name of Agent	Method of Exposure	Rate of Action & Odor	Signs/Symptoms	Treatment Plan
Blistering Agents	<b>Sulfur Mustard</b>	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.	<b>Provider Protection</b> +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 <b>+Lewisite Antidote (back)</b>
	<b>Lewisite</b>	Skin contact or Inhalation	Rapid <i>-garlic</i>	Immediate pain, eye and lung burning, bee-sting blisters, grayish skin	
	<b>Nitrogen Mustard</b>	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	<b>Phosgene Ammonia Chlorine</b>	Skin contact or Inhalation	Rapid and Delayed <b>-Ammonia &amp; Chlorine: pungent</b> <b>-Phosgene: mown hay</b>	<b>Ammonia &amp; Chlorine:</b> immediately irritating to eyes, skin, & upper resp. tract. <b>ALL</b> can cause delayed onset of pulmonary edema within 72 hours.	+Oxygen, bronchodilators +Nebulized 3.75% sodium bicarbonate for chlorine inhalation
Nerve Agents	<b>Tabun Soman Sarin</b>	Inhalation (most likely since volatile) or Skin contact	Very rapid for inhalation Dermal: Delay up to 18 hrs (Novichok onset may be delayed up to 3 days)	<b>Mild:</b> miosis, rhinorrhea, mild chest tightness, mild shortness of breath, sweating, lacrimation <b>Moderate:</b> vomiting, diarrhea, severe chest tightness, wheezing, profuse airway secretions, respiratory distress, muscle weakness, bradycardia <b>Severe:</b> unconsciousness, seizures, paralysis, cyanosis, respiratory failure, apnea	<b>Provider Protection</b> +Level B PPE (Level A if concern for vapor exposure) +Decon with soap & water; Reactive Skin Decon. Lotion (RSDL®) if available +Aggressive Resp. Support +Intubation/Ventilation (avoid succinylcholine) <b>+Antidotes (on back)</b> +Supportive Therapy
	<b>Organophosphate Insecticides</b>	Inhalation, Ingestion, or Skin contact	<b>-Tabun: fruity</b> <b>-Soman: camphor, fruity</b> <b>-Sarin, VX: odorless</b> <b>-Insecticides: garlic</b> <b>-Novichok: pungent</b>		
	<b>VX Novichok</b>	Skin contact, Ingestion (Inhalation is less likely)			
Cyanide	<b>Cyanide</b>	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 <b>+Med treatment on back</b>
Viruses	<b>Smallpox Variola virus</b>	Inhalation Person contact	Incubation 12-17 days Pox lesions form 2-3 days <i>Pox are deep, firm/hard, round</i>	<b>HIGHLY INFECTIOUS!</b> Febrile prodrome (fever >102, headache, backache, chills, vomiting, abdominal pain), <b>first lesions appear in oral mucosa, face, forearms</b>	<b>Protect ALL &amp; Vaccinate</b> <b>+Do NOT Vaccinate pregnant</b> +PPE = N95 mask +Completely protect skin & mucous membranes
	<b>Ebola, Marburg Viral Hemorrhagic Fevers</b>	Inhalation Person contact	Rate of reaction=variable High mortality	<b>HIGHLY INFECTIOUS!</b> Fever, myalgias, flushing, vomiting, diarrhea, petechiae, bleeding, hypotension, shock	<b>Provider Protection</b> +PPE=PAPR or N-95 mask +Completely protect skin & mucous membranes +Intensive supportive care
Toxins	<b>Botulism Botulinum toxin</b>	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 <b>+Med treatment on back</b>
	<b>Ricin Castor Bean Toxin</b>	Inhalation, Ingestion, Injection	18-24 hours	<b>Inhalation</b> -coughing, chest tightness, weakness, fever <b>Ingestion</b> -Nausea, vomiting, diarrhea, abdominal pain, fever	+Supportive care +For Ingestion - charcoal
Bacteria	<b>Tularemia Francisella tularensis</b>	Inhalation Open Wounds	Incubation 1-10 days	<b>No person-to-person transmission</b> Fever, headache, malaise, general discomfort, irritating cough, weight loss. <i>30% mortality rate</i>	<b>+Med treatment on back</b>
	<b>Anthrax Bacillus anthracis</b>	Inhalation Ingestion Cutaneous	Incubation is 1-6 days Toxic shock and death within 2-3 days Reactivation of spores up to 60 days	<b>No person-to-person transmission</b> <b>Contact with spores may cause illness</b> <b>Inhalation:</b> Fever & fatigue, then a slight improvement then an abrupt onset of resp. problems (cough, mediastinitis, dyspnea) <b>Ingestion:</b> Abdominal distress with/out bloody vomiting or diarrhea <b>Cutaneous:</b> Presents with a painless black, necrotic, eschar with redness and edema	<b>Provider Protection from spores</b> +PPE = N95 mask +Completely protect skin & mucous membranes <b>+Med treatment on back</b> +Aggressive treatment for suspected inhalation
	<b>Plague Yersinia pestis</b>	Inhalation	Incubation is 2-10 days	<b>HIGHLY INFECTIOUS!</b> Malaise, fever, tender lymph nodes, skin lesions, chills, headaches, bloody sputum, pneumonia, circulatory failure and death	<b>Provider Protection</b> +PPE = N95 mask +Completely protect skin & mucous membranes <b>+Med treatment on back</b>
Radiation	<b>Radiation</b>	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 <b>ID of radiation type is crucial for treatment: Iodine, Cesium, Thallium, Plutonium, Americium, Curium</b>	<b>Provider Protection</b> +External decon with water <b>+Med treatment on back</b>

# 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 of NS. *Administer through separate IV* Causes red skin and urine; interferes with some lab tests (i.e. 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 (bronchospasms & XS secretions)  
**Child** 0.02 mg/kg (minimum of 0.1 mg) IV/IM until resolution of muscarinic signs (bronchospasms & XS 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

### 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 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) Lorazepam is better absorbed for 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 q12 hours

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

**PLUS Anthrax Antitoxin (Raxibacumab) or Immune Globulin (Anthraxisil)**

### 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 - 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 (ferric hexacyanoferrate II)

Available from REAC/TS: 865-576-1005 or Heyltx 281-395-7040

**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  
**OR**

#### 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  
**OR**

#### 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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