

TABLE 1: Some Potential Biological Warfare Agents

Disease	Incubation	Symptoms	Signs	Diagnostic tests	Transmission and Precautions	Treatment (Adult dosage)	Prophylaxis
Inhaled Anthrax	2-6 days Range: 2 day to 8 weeks	Flu-like symptoms Respiratory distress	Widened mediastinum on chest X-ray (from adenopathy) Atypical pneumonia Flu-like illness followed by abrupt onset of respiratory failure	Gram stain (“boxcar” shape) Gram positive bacilli in blood culture ELISA for toxin antibodies to help confirm	Aerosol inhalation <i>No person-to-person transmission</i> Standard precautions	Mechanical ventilation Antibiotic therapy Ciprofloxacin 400 mg iv q 8-12 hr Doxycycline 200 mg iv initial, then 100 mg iv q 8-12 hr Penicillin 2 mil units iv q 2 hr -- possibly add gentamicin	Ciprofloxacin 500 mg or Doxycycline 100 mg po Q 12 h ~ 8 weeks (shorter with anthrax vaccine) Amoxicillin in pregnancy and children Vaccine if available
Botulism	12-72 hours Range: 2 hrs – 8 days	Difficulty swallowing or speaking (symmetrical cranial neuropathies) Symmetric descending weakness Respiratory dysfunction No sensory dysfunction No fever	Dilated or un-reactive pupils Drooping eyelids (ptosis) Double vision (diplopia) Slurred speech (dysarthria) Descending flaccid paralysis Intact mental state	Mouse bioassay in public health laboratories (5 – 7 days to conduct) ELISA for toxin	Aerosol inhalation Food ingestion Parenteral nutrition <i>No person-to-person transmission</i> Standard precautions	Mechanical ventilation Parenteral nutrition Trivalent botulinum antitoxin available from State Health Departments and CDC	Experimental vaccine has been used in laboratory workers
Plague	1-3 days by inhalation	Sudden onset of fever, chills, headache, myalgia Pneumonic: cough, chest pain, hemoptysis Bubonic: painful lymph nodes	Pneumonic: Hemoptysis; radiographic pneumonia -- patchy, cavities, confluent consolidation Bubonic: typically painful, enlarged lymph nodes in groin, axilla, and neck	Gram negative coccobacilli and bacilli in sputum, blood, CSF, or bubo aspirates (bipolar, closed “safety pin” shape on Wright, Wayson’s stains) ELISA, DFA, PCR	<i>Person-to-person transmission in pneumonic forms</i> Droplet precautions until patient treated for at least three days	Streptomycin 30 mg/kg/day in two divided doses x 10 days Gentamicin 1-1.75 mg/kg iv/im q 8 hr Tetracycline 2-4 g per day	Asymptomatic contacts or potentially exposed Doxycycline 100 mg po q 12 h Ciprofloxacin 500 mg po q 12 h Tetracycline 250 mg po q 6 hr all x 7 days Vaccine production discontinued
Tularemia “pneumonic”	2-5 days Range: 1-21 days	Fever, cough, chest tightness, pleuritic pain Hemoptysis rare	Community-acquired, atypical pneumonia Radiographic: bilateral patchy pneumonia with hilar adenopathy (pleural effusions like TB) Diffuse, varied skin rash May be rapidly fatal	Gram negative bacilli in blood culture on BYCE (Legionella) cysteine- or S-H-enhanced media Serologic testing to confirm: ELISA, microhemagglutination DFA for sputum or local discharge	Inhalation of agents <i>No person-to-person transmission but laboratory personnel at risk</i> Standard precautions	Streptomycin 30 mg/kg/day im divided bid for 10-14 days Gentamicin 3-5 mg/kg/day iv in equal divided shoulders x 10-14 days Ciprofloxacin possibly effective 400 mg iv q 12 hr (change to po after clinical improvement) x 10-14 days	Ciprofloxacin 500 mg po q 12 hr Doxycycline 100 mg po q 12 hr Tetracycline 250 mg po q 6 hr All x 2 wks Experimental live vaccine
Smallpox	12-14 days Range: 7-17 days	High fever and myalgia; itching; abdominal pain; delirium Rash on face, extremities, hands, feet; confused with chickenpox which has less uniform rash	Maculopapular then vesicular rash -- first on extremities (face, arms, palms, soles, oral mucosa) Rash is synchronous on various segments of the body	Electron microscopy of pustule content PCR Public health lab for confirmation	<i>Person-to-person transmission</i> Airborne precautions Negative pressure Clothing and surface decontamination	Supportive care Vaccinate care givers	Vaccination (vaccine available from CDC)

TABLE 2: SOME POTENTIAL CHEMICAL TERRORISM AGENTS AND SYNDROMES (including biologic toxins)

Agents	Symptom Onset	Symptoms	Signs	Clinical Diagnostic Tests	Decontamination	Exposure route and treatment (adult dosages)	Differential diagnostic considerations
Nerve agents	Vapor: seconds Liquid: minutes to hours	Moderate exposure: Diffuse muscle cramping, runny nose, difficulty breathing, eye pain, dimming of vision, sweating, High exposure: The above plus sudden loss of consciousness, flaccid paralysis, seizures	Pinpoint pupils (miosis) Hyper-salivation Diarrhea Seizures	Red Blood Cell or serum cholinesterase (whole blood) Treat for signs and symptoms; lab tests only for later confirmation Collect urine for later confirmation and dose estimation	Rapid disrobing Water wash with soap and shampoo	Inhalation & dermal absorption Atropine (2mg) iv or im (titrate to effect up to 6 to 15 mg) 2-PAMCI 600mg injection or 1.0 g infusion over 20-30 minutes Additional doses of atropine and 2-PAMCI depending on severity, Diazepam or lorazepam to prevent seizures if >4 mg atropine given Ventilation support	Pesticide poisoning from organophosphorous agents and carbamates cause virtually identical syndromes
Cyanide	Seconds to minutes	Moderate exposure: Dizziness, nausea, headache, eye irritation High exposure: Loss of consciousness	Moderate exposure: non-specific findings High exposure: convulsions, cessation of respiration	Cyanide (blood) or thiocyanate (blood or urine) levels in lab. Treat for signs and symptoms; lab tests only for later confirmation	Clothing removal	Inhalation & dermal absorption Oxygen (face mask) Amyl nitrite Sodium nitrite (300mg iv) and sodium thiosulfate (12.5g iv)	Similar CNS illness results from: Carbon monoxide (from gas or diesel engine exhaust fumes in closed spaces) H ₂ S (sewer, waste, industrial sources)
Blister Agents	2-48 hours	Burning, itching, or red skin Mucosal irritation (prominent tearing, and burning and redness of eyes) Shortness of breath Nausea and vomiting	Skin erythema Blistering Upper airway sloughing Pulmonary edema Diffuse metabolic failure	Often smell of garlic, horseradish, and mustard on body Oily droplets on skin from ambient sources No specific diagnostic tests	Clothing removal Large amounts of water	Inhalation & dermal absorption Thermal burn type treatment Supportive care For Lewisite and Lewisite/Mustard mixtures: British Anti-Lewisite (BAL or Dimercaprol)	Diffuse skin exposure with irritants, such as caustics, sodium hydroxides, ammonia, etc., may cause similar syndromes. Sodium hydroxide (NaOH) from trucking accidents
Pulmonary agents (phosgene etc)	1 – 24 (rarely up to 72 hours)	Shortness of breath Chest tightness Wheezing Mucosal and dermal irritation and redness	Pulmonary edema with some mucosal irritation (more water solubility = more mucosal irritation)	No tests available but source assessment may help identify exposure characteristics (majority of trucking incidents generating exposures to humans have labels on vehicle)	None usually needed	Inhalation Supportive care Specific treatment depends on agents	Inhalation exposures are the single most common form of industrial agent exposure (eg: HCl, Cl ₂ , NH ₃) Mucosal irritation, airways reactions, and deep lung effects depend on the specific agent, especially water-solubility
Ricin (castor bean toxin)	18 – 24 hours	Ingestion: Nausea, diarrhea, vomiting, fever, abdominal pain Inhalation: chest tightness, coughing, weakness, nausea, fever	Clusters of acute lung or GI injury; circulatory collapse and shock	ELISA (from commercial laboratories) using respiratory secretions, serum, and direct tissue	Clothing removal Water rinse	Inhalation & Ingestion Supportive care For ingestion: charcoal lavage	Tularemia, plague, and Q fever may cause similar syndromes, as may CW agents such as Staphylococcal enterotoxin B and phosgene
T-2 mycotoxins	2-4 hours	Dermal & mucosal irritation, blistering, and necrosis Blurred vision, eye irritation Nausea, vomiting, and diarrhea Ataxia Coughing and dyspnea	Mucosal erythema and hemorrhage Red skin, blistering Tearing, salivation Pulmonary edema Seizures and coma	ELISA from commercial laboratories Gas chromatography/Mass spectroscopy in specialized laboratories	Clothing removal Water rinse	Inhalation & dermal contact Supportive care For ingestion: charcoal lavage Possibly high dose steroids	Pulmonary toxins (O ₃ , NO _x , phosgene, NH ₃) may cause similar syndromes though with less mucosal irritation.

TABLE 3: ACUTE RADIATION SYNDROME

Whole body radiation from external radiation or internal absorption							
Phase of Syndrome	Feature	Subclinical range		Sublethal range		Lethal range	
		0 – 100 rad (cGy)	100 – 200 rad (cGy)	200-600 rad (cGy)	600-800 rad (cGy)	600-3000 rad (cGy)	>3000 rad (cGy)
Initial or prodromal	Nausea, vomiting	none	5-50%	50 – 100%	75-100%	90-100%	100%
	Time of onset		3-6 hrs	2-4hrs	1-2 hrs	<1 hr	<1 hr
	Duration		<24 hrs	<24 hrs	<48 hrs	<48 hrs	<48 hrs
	Lymphocyte count			< 1000 at 24 h	< 500 at 24h		
	CNS function	No impairment	No impairment	Routine task performance Cognitive impairment for 6-20 hrs	Simple and routine task performance Cognitive impairment for >24 hrs	Progressive incapacitation	
Latent	Duration	> 2 wks	7-15 days	0-7 days	0-2 days	none	
“Manifest illness” (obvious illness)	Signs and symptoms	none	Moderate leukopenia	Severe leukopenia, purpura, hemorrhage Pneumonia Hair loss after 300 rad (cGy)		Diarrhea Fever Electrolyte disturbance	Convulsions, ataxia, tremor, lethargy
	Time of onset		> 2 wks	2 days – 2 wks		2-3 days	
	Critical period		none	4-6 wks		5-14 days	1-48 hrs
	Organ system	none		Hematopoietic and respiratory (mucosal) systems		GI tract Mucosal systems	CNS
Hospitalization	%	0	<5%	90%	100%	100%	100%
	Duration		45-60 days	60-90 days	90+ days	2 weeks	2 days
Fatality		0%		0-80%	90-100%	90-100%	
Time to death				3 wks – 3 months		1-2 wks	1-2 days

Table 3A: Intermittent/Chronic Exposure and Effects

Headache	1°, 2°, 3° burns
Fatigue	Epilation
Weakness	Ulceration
Anorexia	Lymphopenia
Nausea	Neutropenia
Vomiting	Thrombocytopenia
Diarrhea	Purpura
	Opportunistic infections