Appendix E: Chemical Agents – Background Information[53]

Items in this section are as follows:

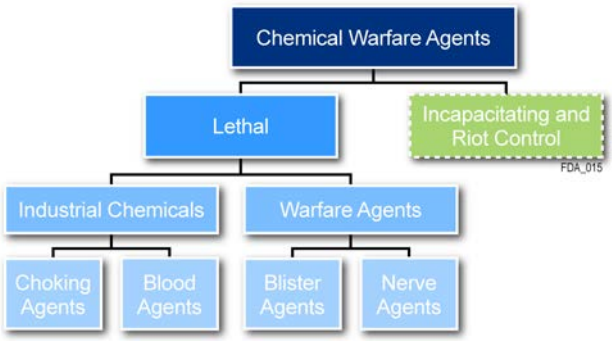
A. General Information
B. Classes of Chemical Warfare Agents
C. Nerve Agent Exposure versus Nerve Agent Intoxication
D. Chemical Agent Characteristics
E. List of Additional Chemical Agents

Additional information on chemical agents may be found at: http://emergency.cdc.gov/chemical/

A. General Information

- Generally liquid (when containerized)
- Normally disseminated as aerosol or gas
- Present a respiratory, dermal, ocular, and mucus membrane hazard
- May be detectable by smell or other senses, but not consistent for all agents
- Dispersal or lack thereof by weather conditions impacts hazard of agent

B. Classes of Chemical Warfare Agents



Lethal

- **Choking Agents (Pulmonary Agents).** Choking agents primarily attack lung tissue, causing pulmonary edema. However, there may also be mild irritation of the eyes and upper respiratory tract.
- **Cyanides (Blood Agents).** Blood agents enter the body following ingestion, skin contact, or inhalation. Once in the body, blood agents inactivate a critical enzyme (cytochrome oxidase); this prevents the cell from using oxygen. Symptoms of blood agent poisoning include respiratory changes, convulsions, and death.
- **Vesicants (Blister Agents).** Blister agents include the mustards, arsenicals (primarily Lewisite), and phosgene oxime. They cause pain and tissue damage. Mustards can have delayed effects (hours), but Lewisite and phosgene oxime cause immediate effects. Vesicants cause either fluid-filled blisters ("blister agents"—mustard and arsenicals) or red, elevated skin lesions (phosgene oxime).
- **Nerve Agents.** Nerve agents cause the greatest concern because of their toxicity, rate of action, and ability to enter the body by multiple routes of entry. Nerve agents are extremely fast acting

[53] Access additional training in this area via the online courses offered by ORA University at http://intranet.ora.fda.gov/dhrd/default.htm.

and classically categorized as colorless and odorless. The symptoms of nerve agents include dimness of vision, runny nose, drooling, difficulty breathing/tightness of chest, nausea, vomiting and diarrhea, muscle jerking or twitching, involuntary urination, defecation, coma, and death.

Incapacitating and Riot Control

Incapacitating and riot control agents are not primary terrorist threats, due to their relatively short duration of effects and minimal toxicity.

C. Nerve Agent Exposure versus Nerve Agent Intoxication

"SLUDGE," bracketed in the box below, is an acronym often used by medical personnel for identifying the symptoms of organophosphate poisoning.

			Vapor Exposure	Liquid Exposure
Mild	P	Pinpointing pupils	X	
	S	Salivation	X	
	L	Lacrimation (tearing)	X	
Severe	U	Urination	X	X
	D	Defecation	X	X
	G	Gastrointestinal; pain and gas	X	X
	E	Emesis (vomiting)	X	X
	M	Muscle twitching	X	X
	C	Convulsions, coma	X	X

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D. Chemical Agent Characteristics

Material was removed from this page in accordance with information rules under 21 CFR 20.66.

E. List of Additional Chemical Agents

Available at: www.bt.cdc.gov/agent/agentlistchem.asp with links for agent description

Chemical Agents	
Abrin	Mustard Gas (H) (Sulfur Mustard)
Adamsite (DM)	Mustard/Lewisite (HL)
Ammonia	Mustard/T
Arsenic	Nitrogen Mustard (HN-1, HN-2, HN-3)
Arsine (SA)	Paraquat
Benzene	Phosgene (CG)
Bromobenzylcyanide (CA)	Phosgene Oxime (CX)
BZ	Phosphine
Chlorine (CL)	Phosphorus, elemental, white or yellow
Chloroacetophenone (CN)	Potassium Cyanide (KCN)
Chlorobenzylidenemalononitrile (CS)	Ricin*
Chloropicrin (PS)	Sarin (GB)
Cyanide	Sesqui Mustard
Cyanogen Chloride (CK)	Sodium Azide
Dibenzoxazepine (CR)	Sodium Cyanide (NaCN)
Diphosgene (DP)	Soman (GD)
Distilled Mustard (HD)	Stibine
Ethylene glycol	Strychnine
Fentanyls and Other Opioids	Sulfur Mustard (H) (Mustard Gas)
Hydrofluoric acid (hydrogen fluoride)	Super warfarin
Hydrogen Chloride	Tabun (GA)
Hydrogen Cyanide (AC)	Thallium
Hydrogen fluoride (hydrofluoric acid)	Unidentified Chemical PDF (20 KB/10 pages)
Lewisite (L, L-1, L-2, L-3)	VX
LSD	White Phosphorus
Mercury	

* May also be considered a biological agent

- For more information on chemical emergencies, including specific chemical agents, information for the public, and information for first responders, refer to the Center for Disease Control and Prevention's Emergency Preparedness and Response Web site at: www.bt.cdc.gov/chemical/.
- For response information for thousands of hazardous materials, including fire and explosion hazards, health hazards, firefighting techniques, cleanup procedures, protective clothing, and chemical properties, refer to: www.cameochemicals.noaa.gov/search/simple