



# MANAGE CHEMICAL AGENT CASUALTIES





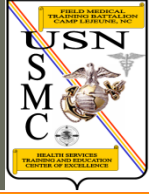
# HISTORY



- DATES FROM AT LEAST 423 B.C.
  - Sparta used sulfur fumes in Peloponnesian War
- WORLD WAR I
  - Germans used Chlorine and Mustard gas
- WORLD WAR II
  - Cyanide in Concentration Camps



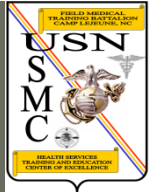
# HISTORY



- IRAQ
  - Used Mustard and Sarin on Kurds and Iranians in the 1980's
  - During Operation Desert Storm,
    - U.S. destroyed several chemical stockpiles by land and air
  - Congress has passed a bill mandating the destruction of all U.S. chemical agents



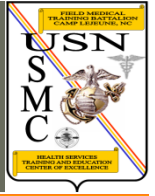
# CHEMICAL WARFARE (CW)



Defined as the use of chemical agents in military operations to kill, seriously injure, or incapacitate personnel through physiological effects.



# OVERVIEW



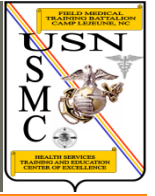
- Chemical Agents
  - Types
  - Signs and Symptoms
  - Treatment
- NATO Warning Marker



# LEARNING OBJECTIVES

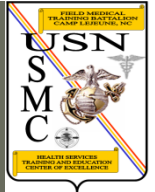


Please Read Your  
Terminal Learning Objectives  
And  
Enabling Learning Objectives





# CHEMICAL AGENTS





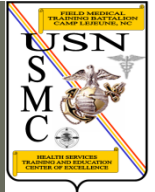
# NERVE AGENTS



- GA – TABUN
- GB – SARIN
- GD – SOMAN
- VX



# NERVE AGENTS



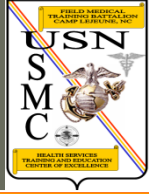
## DESCRIPTIONS:

- Colorless to **light brown** liquid
- Nonpersistent
- Faint *fruity* odor
- May be inhaled, ingested, or absorbed through the skin
- Most Toxic





# NERVE AGENTS

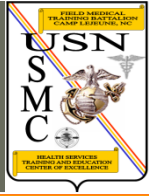


*Signs and symptoms* can appear within seconds to hours, depending on the agent and amount of exposure

- Massive secretions
- Chest tightness
- Headache
- Muscle twitching
- Constricted pupils
- Respiratory arrest
- Death, if left untreated!



# NERVE AGENTS



## TREATMENT:

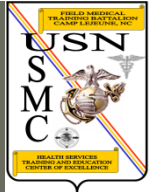
- Don protective mask
- Decontaminate exposed skin
- Inject MARK 1 Kit

# MARK 1 KIT





# MARK 1 KIT



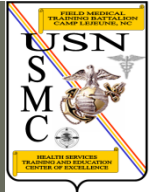
## MARK 1 KIT PROCEDURES:

1. Remove yellow cap from Atropine.
2. Press green tip against the meaty portion of the thigh and hold in place for 10 seconds.
3. Grasp the 2 PAM-Chloride auto injector like a pen. Remove gray cap.
4. Press black tip against the meaty portion of the thigh and hold in place for 10 seconds.
5. If signs/symptoms are mild, member can administer their own kit.



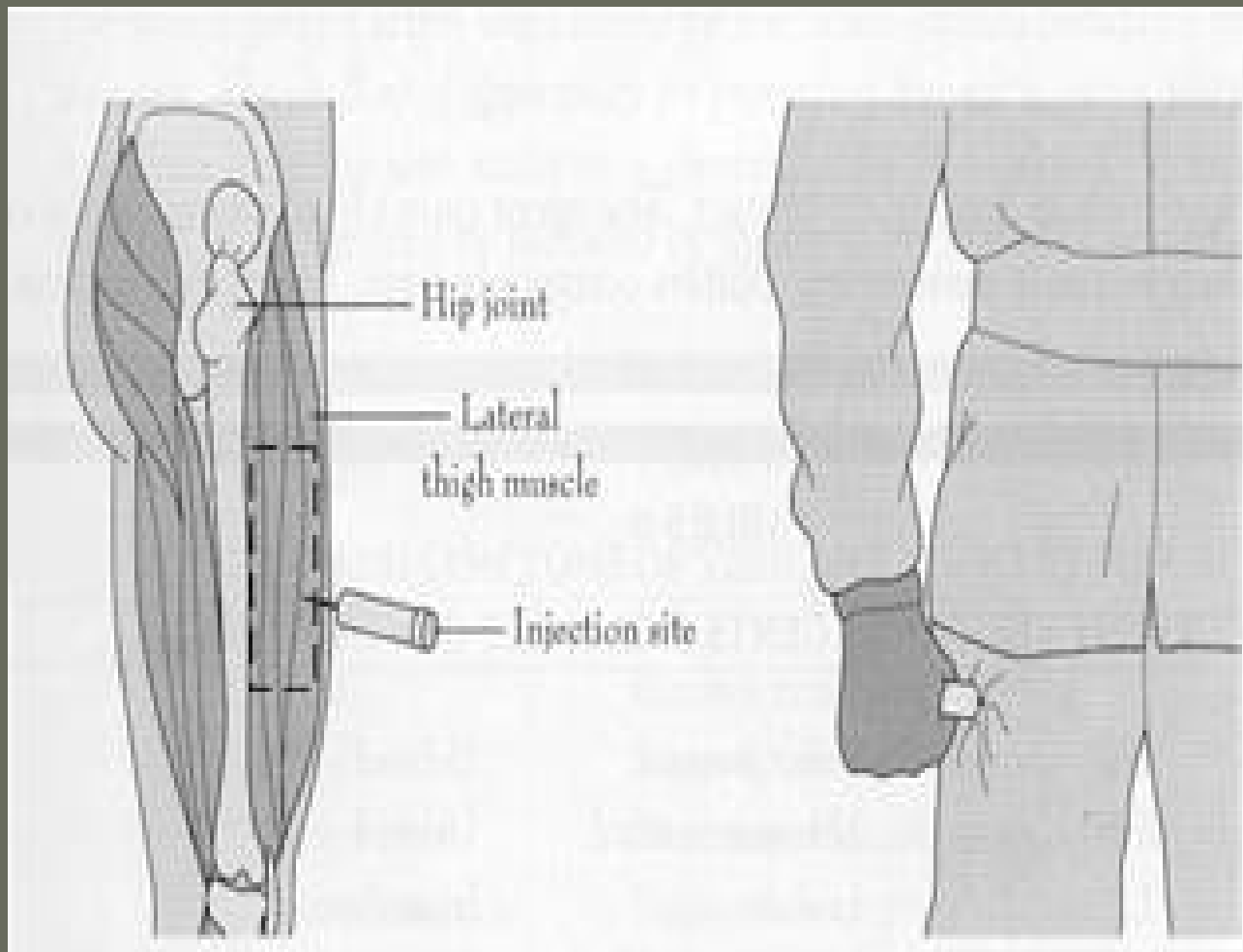


# MARK 1 KIT



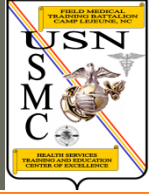
6. One kit may be given every 10 minutes until improvement is seen or a total of three kits have been given.
7. If signs/symptoms are severe, (member is unable to inject themselves) give all three kits immediately then inject 10mg Diazepam.
8. If symptoms continue after three kits have been administered, medical personnel may administer repeated Atropine (2mg) injections at three to five minute intervals and should be titrated to a reduction of secretions and to a reduction in respiratory distress.

# MARK 1 KIT





# NERVE AGENTS

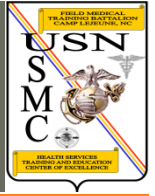


## Prevention/Pre-treatment

- Pyridiostigmine
  - Inhibits nerve agents from binding
  - Dose: 30mg, Q8 hrs. (Not to exceed 14 days)



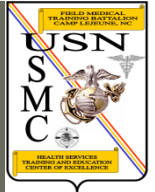
# VESICANTS (Blister Agents)



- HD – Distilled Mustard
- HN – Nitrogen Mustard
- Lewisite
- Phosgene Oxide



# BLISTER AGENTS





# BLISTER AGENTS



## DESCRIPTION:

- *Light yellow to brown in color*
- Persistent
- Odors
  - Distilled Mustard smells of *garlic or horseradish*
  - Nitrogen Mustard smells *fishy*
  - Lewisite smells like *geraniums*
  - Phosgene Oxide smells *pepperish/pungent odor*
- Heavier than water
- May be absorbed through the skin



# BLISTER AGENTS



*Signs and symptoms* can appear 2-48 hours after contamination

- Erythemic skin with blisters
- Necrosis where agent touches
- Nausea and vomiting
- Edema of the eyes and eyelids
- Corneal scarring
- If ingested – intense pain in the GI tract and diarrhea



# BLISTER AGENTS

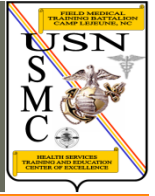


## TREATMENT:

- Don protective mask
- Decontaminate exposed skin
- Flush eyes to prevent scarring of the cornea
- Apply Vaseline to the eyes to prevent adhesions
- Apply Calamine lotion to reduce burning and itching of the skin
- Consider giving Morphine
- Use antibiotics and IV fluid replacement as required



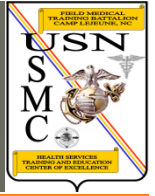
# BLOOD AGENTS



- AC – Hydrogen Cyanide
- CK – Cyanogen Chloride



# BLOOD AGENTS

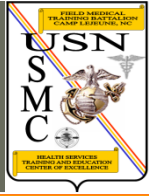


## DESCRIPTION :

- Colorless liquids dispersed in gas form
- Smells like *bitter almonds* or *peach pits*
- Must be inhaled



# BLOOD AGENTS

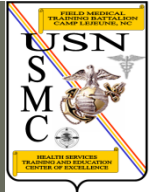


## SIGNS/SYMPTOMS:

- Hyperpnea
- Anxiety, agitation, vertigo
- Weakness
- Nausea/vomiting
- Cherry red skin; possibly streaked
- Unconsciousness/seizures within 30 seconds
- Respiratory arrest and death within 2-4 minutes if treatment is delayed



# BLOOD AGENTS

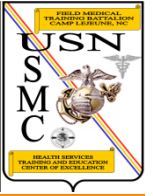


## TREATMENT:

- Don protective mask
- Decontaminate exposed skin
- Treat symptomatically
- Administer IV Sodium Nitrite (10ml) followed by Sodium Thiosulfate (50ml)
- Second treatment with each of the two antidotes may be given, up to half the original dose if needed



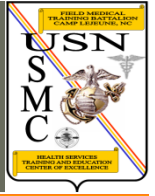
# CHOKING AGENTS



- CG – Phosgene
- DP – Diphosgene
- CL – Chlorine

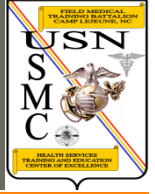


# CHOKING AGENTS



## DESCRIPTION :

- Colorless
- Smells like *freshly mown hay, grass, or corn*
- Must be inhaled
- Contaminated food is of little consequence
- No known effect on body when ingested
- Rapidly becomes nontoxic in water



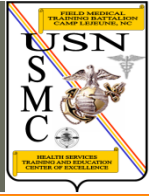
# CHOKING AGENTS

## SIGNS/SYMPTOMS:

- Headache and eye irritation
- Coughing and Choking
- Substernal ache with sensation of pressure
- 2 to 6 hours after exposure
  - Dyspnea/Cyanosis
  - Hypotension
  - Pneumonia (late sign)
  - Pulmonary edema and red frothy sputum
  - Hypoxia
  - Death



# CHOKING AGENTS



## TREATMENT:

- Don protective mask
- Establish airway
- Provide rest, warmth, and sedation
- No known antidote for choking agents
- Give Oxygen, if available



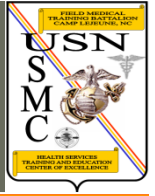
# VOMITING AGENTS



- DA – Diphenylchlorarsine
- DC – Diphenylcyanarisine
- DM – Adamsite



# VOMITING AGENTS



## DESCRIPTION :

- Crystalline solid, dispersed as gas
- Color
  - DA and DC (**white** smoke color)
  - DM (**canary yellow** smoke color)
- Smells like burning fireworks/shoe polish
- Must be inhaled



# VOMITING AGENTS

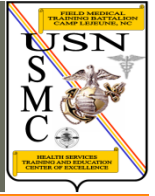


*Signs and Symptoms appear 30 seconds to 2 minutes after exposure*

- Severe headache
- Intense burning in throat
- Chest pain and tightness
- Lacrimation
- Coughing, sneezing, nausea, vomiting



# VOMITING AGENTS



## Treatment

- Don protective mask
- Get fresh air ASAP
- Lift mask ONLY to vomit
- Symptoms usually subside within 30 minutes to 3 hours if left untreated



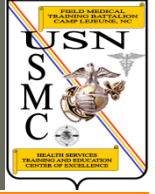
# LACRIMATORS / TEAR AGENTS



- CS – Ochlorobenzylmalonitrile
- CN – Chloracetophenone



# LACRIMATORS / TEAR AGENTS

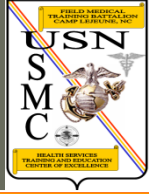


## DESCRIPTION :

- Crystalline solids or liquids dispersed in the air as vapors or white smoke
- *Strong pepper* odor for CS, and *apple blossom* odor for CN
- Absorbed through the eyes, nasal passages, and skin pores



# LACRIMATORS / TEAR AGENTS

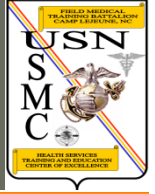


## SIGNS/SYMPTOMS:

- Pain and burning in the eyes
- Profuse tearing and photophobia
- Rhinorrhea, epistaxis
- Chest tightness, coughing, dyspnea
- Blepharospasm



# LACRIMATORS / TEAR AGENTS

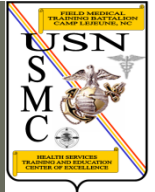


## TREATMENT:

- Don protective mask
- Get to fresh air ASAP
- Heavy contaminants should be flushed from the eyes with copious amounts of water



# INCAPACITATING AGENTS

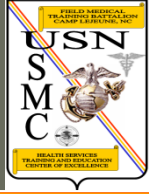


- BZ - Buzz Gas
- Agent 15





# INCAPACITATING AGENTS



## DESCRIPTION:

- Odorless and non-irritating
- Highly potent
- Rate of action: Delayed by 30 minutes to 4 hours



# INCAPACITATING AGENTS



## SIGNS/SYPMTOMS:

- Skin
  - “Dry as a bone”
  - “Hot as a Hare”
  - “Red as a beet”
- Slowing of mental activity
  - ”Mad as a Hatter”
  - “Blind as a Bat”



# INCAPACITATING AGENTS

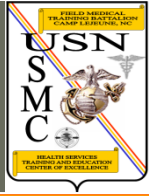


## TREATMENT:

- Clear the airway if needed
- Treat for heat stroke
- Give PO fluids only if the victim can drink unassisted
- Approach with caution, the individual could become dangerous



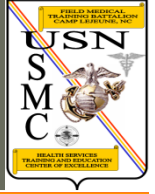
# INCAPACITATING AGENTS



## TREATMENT:

- Remove all weapons
- Restrain as needed
- Physostigmine
  - 45 mcg/kg (IM)
  - Observe for 1 hour, repeat if needed





# NATO CW WARNING MARKER

A triangular sign measuring 11"x 8" x 8" with yellow background, and red letters spelling "GAS."



**GAS**





# MANAGE CHEMICAL AGENT CASUALTIES

