

**REGION I EMERGENCY MEDICAL SERVICES
STANDING MEDICAL ORDERS
All Levels**

SMO: Mark I Kit

Revised Date:

Overview: To provide Illinois EMS Region 1 agencies and Illinois licensed EMT personnel at any level, including First Responder, with guidelines for the appropriate use of Mark I kits. The Mark I kit contains antidotes to be used in instances of exposure to nerve agents (Sarin, Soman, Tabun, VX) or to organophosphate agents (Lorsban, Cygon, Delnav malathion, Supracide parathion, carbopenthion).

Only those licensed emergency EMS providers that are governed by the State of Illinois EMS Act (210 ILCS 50/) are authorized by an EMS System Medical Director to utilize the specialized equipment and medications needed in Weapons of Mass Destruction (WMD) incidents including Mark I auto-injectors. Other organized response teams not governed by the EMS Act (rescue squads, law enforcement agencies, fire departments, etc.) may use the Mark I auto-injectors on themselves or other members of their team when acting under the Illinois Emergency Management Agency Act (20 ILCS 3305).

The guidelines for the use of the Mark I kits were developed by the EMS Committee of the Illinois College of Emergency Physicians. They were then adopted by the Illinois Medical Director, Illinois Department of Public Health, and Mutual Aid Box Alarm System, and the Illinois Terrorism Task Force to provide guidance to EMS agencies and providers who are a part of an EMS System

Guidelines:

1. To utilize these kits, you must be an EMS agency or provider with an Illinois EMS System and participate within an EMS disaster preparedness plan.
2. The decision to utilize the Mark I antidote is authorized by the State protocol.
3. At a minimum, an EMS provider must be an Illinois EMT at any level including First Responder with additional training in the use of the auto-injector.
4. **The Mark I kit is not to be used for prophylaxis.** The injectors are antidotes, not a preventative device. Mark I kits may be self administered if you become exposed and are symptomatic. Exit immediately to the Safe Zone for further medical attention.
5. **Use of the Mark I kit is to be based on signs and symptoms of the patient. The suspicion or identified presence of a nerve agent is not sufficient reason to administer these medications.**
6. Atropine may be administered IM/IV in situations where Mark I kits are not available and as applicable to the EMTs' scope of practice.
7. Auto-injectors are **NOT** to be used on children under 88 pounds (40 Kg). Pediatric Mark I injectors are currently being reviewed by the FDA.
8. If available, Diazepam (Valium) or Versed may be cautiously given under direct medical control or by standing medical orders if convulsions are not

controlled but only by EMT personnel trained in the use and administration of these medications and in compliance with their scope of practice.

9. When the nerve agents have been ingested, exposure may continue for some time due to slow absorption from the lower bowel and fatal relapses have been reported after initial improvement. Continued medical monitoring and transport is mandatory.
10. If dermal exposure has occurred, decontamination is critical and should be done with standard decontamination procedures. Patient monitoring should be directed to the signs and symptoms as with all nerve and organophosphate exposures. Continued medical monitoring and transport is mandatory.

Personal Protection:

The first priority when encountering a potential nerve agent patient is self protection. Personal protective equipment (PPE) and decontamination are key elements in the successful management of exposed patients. All persons entering a Hot Zone or working a decontamination station must wear full protective ensembles including full body and respiratory protection. Do not cross contaminate yourself when handling patients in triage, treatment and staging areas or if treatment has begun in the Hot Zone.

State of Illinois Protocol For the Use of Mark I Kits

Kit Contents

Atropine (2 mg in 0.7ml total dose per injection)

2 PAM (pralidoxime chloride) 600 mg in 2 ml total dose per injection

Indications For Use of the Mark I Auto-Injectors

The mnemonic SLUDGE and BAM for nerve agent exposure:

Salivation (excessive production of saliva)

Lacrimation (excessive tearing)

Urination (uncontrolled urine production)

Defecation (uncontrolled bowel movements)

Gastrointestinal distress (cramping)

Emesis (excessive vomiting)

Breathing difficulty

Arrythmias

Myosis (pinpoint pupils)

Signs and Symptoms of Nerve Agent Exposure (Mild to Severe)

Mild	Unexplained runny nose
↓	Tightness in the chest
↓	Difficulty breathing
Moderate	Bronchospasm
↓	Pinpoint pupils resulting in blurred vision
↓	Drooling
Severe	Excessive sweating
↓	Nausea and/or vomiting
↓	Abdominal cramps
↓	Involuntary urination and/or defecation
↓	Jerking, twitching and staggering
↓	Headache
↓	Drowsiness
↓	Coma
↓	Convulsions
↓	Apnea

TABLE 1.

EXPOSURE	CLINICAL	TREATMENT
No Signs or Symptoms	None	Removal of the patient to the Safe Zone, decontamination, observation and transport
Mild Exposure	Shortness of breath, wheezing, runny nose	One Mark I Kit <u>or</u> Atropine 2 mg IM/IV and 2 PAM 600 mg (1 gram IV)
Moderate Exposure	Vomiting, diarrhea, pinpoint pupils, drooling	One-Two Mark I Kit(s) <u>or</u> Atropine 2-4 mg IM/IV and 2 PAM 600-1200 mg IM (1 gram IV)
Severe Exposure	Unconsciousness, paralysis, cyanosis, seizures	Three Mark I Kits <u>or</u> Atropine 6 mg IM/IV and 2 PAM 1800 IM <u>or</u> 1 gram 2 PAM IV repeated twice at hourly intervals <u>Valium or Versed per Medical Control</u>

Notes:

If severe signs and symptoms are present; three Atropine auto-injectors and three 2 PAM injectors should be administered in rapid succession (stacked).

1. Remove secretions
2. Maintain an open airway
3. Use artificial ventilation as necessary and as possible
4. Repeat Atropine immediately as directed by Medical Control

Pralidoxime (2 PAM) is most effective if administered immediately after the poisoning but not before Atropine, especially for severe exposures.

If available, Diazepam (Valium) or Versed may be cautiously given, under direct Medical Control, when convulsions are not controlled.

TABLE 2.

Patient Age	Antidotes 1		Other Treatment
	Mild/Moderate 2	Severe 3	
Infant (0-2 years)	Atropine 0.05 mg/kg IM/IV 2 PAM 15mg/kg IM/IV	Atropine 0.1 mg/kg IM/IV 2 PAM 2 mg/kg IM/IV	Assisted ventilations. Repeat Atropine if patient condition warrants
Child (2-10 years)	Atropine 1mg IM/IV 2 PAM 15mg/kg IM/IV	Atropine 2mg IM/IV 2 PAM 25mg/kg IM/IV	Assisted ventilations Repeat Atropine (2mg IM) at 5-10 minutes intervals until secretions have diminished and breathing is comfortable or airway resistance has returned to near normal
Adolescent (11-17 years)	Atropine 2mg IM/IV 2 PAM 600mg IM/IV	Atropine 4 mg IM/IV 2 PAM 25mg/kg IM/IV	See Above
Adult	Atropine 2-4 mg IM/IV 2 PAM 600mg IM/IV	Atropine 4mg IM/IV 2 PAM 1800mg IM/IV	See Above
Elderly, frail	Atropine 1mg IM/IV 2 PAM 10mg/kg IM/IV	Atropine 2-4mg IM/IV 2 PAM 25mg/kg IM/IV	See Above

- 1 2 PAM solution needs to be prepared from the ampule containing 1 gram of desiccated 1 PAM. Inject 3ml of NS, 5% distilled or sterile water into ampule and shake well. The resulting solution is 3.3ml of 300 mg/ml
- 2 Mild/moderate: localized sweating, muscle fasciculations, nausea, vomiting, weakness, dyspnea.
- 3 Severe: unconscious, seizures, apnea, flaccid paralysis

Procedure:

If you experience any of all of the nerve agent poisoning symptoms, you must **IMMEDIATELY** self administer the nerve gas antidote.

Injection Site Selection

- ▶ The injection site for administration is normally in the **outer thigh muscle**. It is important that the injections be given into a large muscle area.
- ▶ If the individual is thinly built, then the injections should be administered into the upper outer quadrant of the buttocks.

Arming the Auto-Injector

- ▶ Immediately put on your protective mask
- ▶ Remove the antidote kit
- ▶ With your non-dominant hand, hold the auto-injectors by the plastic clip so that the larger auto-injector is on top and both are positioned at eye level
- ▶ With your dominant hand, grasp the atropine auto-injector (the smaller of the two) with the thumb and first fingers. **DO NOT** cover or hold the needle end with your hand, thumb or fingers--- you might accidentally inject yourself. An accidental injection into the hand **WILL NOT** deliver an effective dose of the antidote, especially if the needle goes through the hand
- ▶ Pull the injector out of the clip with a smooth motion. **The auto-injector is now armed**

Self Administration of the Antidote

- 1 Hold the auto-injector with your thumb and two fingers (pencil writing position). Be careful not to inject yourself in the hand!
- 2 Position the green (needle) end of the injector against the injection site (thigh or buttock). **DO NOT** inject into areas close to the hip, knee or thigh bone.
- 3 Apply firm, even pressure (not a jabbing motion) to the injector until it pushes the needle into your thigh or buttocks. Using a jabbing motion may result in an improper injection or injury to the thigh or buttocks.
- 4 Hold the injector firmly in place for at least 10 seconds. Firm pressure automatically triggers the coiled spring mechanism. This plunges the needle through the clothing into the muscle and at the same time injects the antidote into the muscle tissue.
- 5 Carefully remove the auto-injector from your injection site
- 6 Next, pull the 2 PAM auto-injector (the larger of the two) out of the clip
- 7 Inject yourself in the same manner as the steps listed at 3 and 4, holding the black needle end against your outer thigh or buttocks.
- 8 Massage the injection site, if time permits.
- 9 After administering the first set of injections, wait 5 to 10 minutes. After administering one set of injections, you should initiate decontamination procedures, as necessary, and put on any additional protective clothing.
- 10 Once stabilized with Mark I doses, Atropine only may be repeated every 10 to 15 minutes as the condition warrants. (Note: multiple doses of Atropine may be needed).

Administering the Antidote to Another in the Hot Zone

1. Squat, **DO NOT** kneel, when masking the patient or administering the nerve agent antidotes to the patient. Kneeling may force the chemical agent into or through your protective clothing.
2. Mask the patient.
3. Position the patient on his or her side (commonly called the swimmer's position).
4. Position yourself near the patient's thigh.
5. The procedure for site selection and medication administration is the same as listed in Self Administration of the Antidote.
6. Atropine should only be administered as needed.
7. Mark, label or tag the patients who have been given Mark I injector antidote kits in a way that rescuers in the Warm Zone or triage areas can identify medication and dosage amounts given to the patient.