

Atropine Autoinjector Use in Children

Atropine is now available in autoinjector form for use in children with nerve agent or organophosphate poisoning. In 2003, the FDA approved Meridian Medical Technologies' 0.5mg and 1.0mg Atropens. In 2005, an additional 0.25mg Atropen received FDA approval. Some Florida First Responders and First Receivers are receiving the 0.5mg and 1.0mg Atropens in pharmacy caches being distributed at the direction of the Florida Disaster Preparedness Working Group. A summary of the current FDA dosage recommendations follows:

<u>Child's weight (lbs)</u>	<u>Child's weight (kg)</u>	<u>Recommended Atropen dose</u>
< 15lbs	<7kg	0.25mg
15- 40lbs	7-18kg	0.5mg
40-90lbs	18-41kg	1.0mg
>90lbs	>41kg	2.0mg

Note that the dose may be repeated as needed up to three times. Obviously, higher doses can be made by combining lower-dose Atropens, however, partial-dosing is not possible with correct autoinjector use.

For purposes of simplification by agencies using dosing based on kilogram weights (the gold standard for pediatric dosing), I'd suggest simplifying the weight ranges above to <7kg, 7-20kg, 20-40kg and >40 kg. This simplification may lead to slight underdosing.

Another alternative is to utilize the Broselow Resuscitation Tape/Color Coding System, in which case the dosing would be:

<u>Broselow Color</u>	<u>Atropen dose (repeat up to 3 times)</u>
Grey	
<u>Pink</u>	0.25mg
Red	
Purple	
Yellow	
<u>White</u>	0.5mg
Blue	
Orange	
Green (30-36kg)	
<u>Just longer than Green</u>	1.0mg
Significantly longer than the tape	2.0mg

The Pediatric Expert Advisory Panel (PEAP) of Columbia University's Program for Pediatric Preparedness at the National Center for Disaster Preparedness has published

their own guidelines for use of the Mark I kit in the event that pediatric Atropens are not available for a child with life-threatening symptoms and there is no immediate access to more exact dosing with IV atropine and pralidoxime. In cases of life-threat, both the 2.0mg atropine and 600mg pralidoxime autoinjectors should be used.

3-7yrs (approx 13-25 kg)	May use one Mark I kit as maximum dose
8-14yrs (approx 26-50 kg)	May use a total of two kits
>14yrs (approx >51kg)	May use a total of three kits

Upon review of the pharmacology and available studies, the PEAP recommended against the use of either Mark I autoinjector in children less than three years of age, unless the child is significantly symptomatic and no other treatment options are available. In these cases, one Mark I kit may be administered.

Note that scientific literature addressing the treatment of children with nerve agent exposure or organophosphate poisoning is limited. Available studies indicate that atropine doses much higher than those used for traditional cholinergic poisoning have not been shown to induce toxicity in infants and small children. There is very little experience with the use of pralidoxime in children.

In mass casualty events, IV access for each patient will be logistically improbable. This is even truer for very sick children with difficult IV access. Therefore, the availability of IM autoinjectors is crucial in the initial treatment phase for patients of all ages. For those providers (usually hospital-based) with access to the various parenteral formulations of atropine and pralidoxime, weight-based pediatric IV and IM dosing can be quite complicated. Fortunately, Jim Broselow and Bob Luten, developers of the Broselow Resuscitation Tape, have developed yet another tool to enhance pediatric care. The *Chemical Warfare involving Kids (CWIK) Response Project* utilizes the Color Coding approach in a length/weight-based guide to drawing up and administering the various antidotes and other treatments for agents of chemical warfare, including atropine and pralidoxime. For additional information and materials about the *CWIK Response Project*, please contact the Florida EMSC Program staff at the Florida Bureau of EMS at (850) 245-4440, email Karen Wiggins at karen_wiggins@doh.state.fl.us or go to the FL EMSC and CWIK Response websites (see links below).

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References:

Prescribing information for Atropens
<http://www.indianaemsc.org/AtroPen%20for%20Infants.pdf>

Meridian Medical Technologies

<http://www.meridianmeds.com/atropen.html>

Atropine Use in Children After Nerve Gas Exposure, Guidelines from the National Center for Disaster Preparedness

<http://www.ncdp.mailman.columbia.edu/AtropineAutoInjectorVIN1.pdf>

The CWIK Response Project

<http://www.cwikresponse.com>

Florida EMSC Program website

<http://www.fl-ems.com/EMSC/EMSCHome.html#EMSCpublications>