

To: ALL HEALTH CARE PROFESSIONALS  
From: Ron Kirschner, MD  
Medical Director, Nebraska Regional Poison Center  
Subject: Electronic cigarette refill solutions  
Date: 5/9/14

- Electronic cigarettes (e-cigs) are battery-powered devices used to aerosolize nicotine solutions for inhalation.
  - Nicotine solutions are available in many flavors. The packaging, aroma, and flavorings added to these e-cig refill liquids may make them more attractive to small children than cigarettes.
  - The nicotine content of most refill liquids ranges from 6 to 36 mg/mL (some may contain up to 85 mg/mL), and products may not be supplied in child-resistant containers. Systemic absorption is expected to be rapid following ingestion of nicotine liquids.
  - Less than a swallow of the more concentrated liquids would be enough to produce signs of nicotine toxicity in a child.
- Signs of toxicity include vomiting, hypersalivation, agitation, lethargy, tachy- or bradycardia, and tremors.
  - Coma, seizures, and muscle weakness can be seen with severe toxicity.
- Treatment of nicotine toxicity is primarily supportive care that includes monitoring of airway status, IV fluids, antiemetics, and benzodiazepines for tremor or seizures.
  - Activated charcoal is likely to provide minimal benefit after ingestion of nicotine solution
- Parents should be warned that all nicotine containing products, especially refill solutions for e-cigarettes and other smokeless tobacco products, should be secured so as not to be accessible by children.

#### References

Basset RA *et al.* Nicotine poisoning in an infant. *N Eng J Med* 2014, epub ahead of print.

Kirschner RI *et al.* Nicotine content of liquid for electronic cigarettes. *Clin Toxicol* 2013; 51: 684 (abstract 240).

Vakkalanka JP *et al.* Epidemiological trends in e-cigarette exposures reported to US Poison Centers, *Clin Toxicol* 2014, early online



**This 10 mL vial (36 mg/mL) contains the nicotine equivalent of 24 cigarettes.**

**Our trained staff of nurse specialists in poison information and physician toxicologists is available 24 hours a day to answer your questions.**



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