



To: Physicians, Nurses, and Other Health Care Providers in the Federated States of Micronesia  
From: Ron Kirschner, MD  
Medical Director, Nebraska Regional Poison Center  
Subject: Electronic cigarette refill solutions  
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- 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. In the Federated States of Micronesia, health care professionals and the public can reach the Poison Center by calling 288, wait for an automated operator, then 888-222-4516.**