Preventing E-Cigarette Poisoning among Children and Youth

December 11, 2014

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Preventing E-Cigarette Poisoning among Children and Youth

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Presenters

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American Association of Poison Control Centers

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Public Health Law Center
E-cigarettes & Poison Centers

The public health significance of growing e-cigarette prevalence from the perspective of the nation’s poison centers.

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Overview

- About AAPCC, poison centers, and NPDS
- What are e-cigarettes?
  - Key terms
  - FAQs
  - E-cigarettes and youth
- E-cigarettes and poison centers
  - Exposure data
  - Difficulties of managing exposure cases
- E-cigarettes and the AAPCC
  - Two press releases
About AAPCC

- The American Association of Poison Control Centers (AAPCC) is dedicated to actively advancing the health care role and public health mission of our members through information, advocacy, education and research.

- Support 55 member poison centers through:
  - Advocacy
  - Accreditation (centers)
  - Certification (experts)
  - Communication
  - Promotion of local services
  - Public education

- Collate and disseminate national data (NPDS).

- Located in Alexandria, VA

www.aapcc.org
E-Cigarette Devices and Liquid Nicotine

Local poison centers report an uptick in electronic cigarettes and liquid nicotine exposures.

Poison centers are reporting a recent uptick in calls about exposures to e-cigarette devices and liquid nicotine.

A slight more than half of these reported exposures have occurred in young children under the age of one. However, this is consistent with National Poison Data System exposures to all substances combined. Some children and toddlers who are infants with e-cigarette devices or liquid nicotine have been very infrequent requiring ER visits with nausea and vomiting being the most significant symptoms, adults should take care to protect their skin when handling the products and they should be out of sight and out of the reach of children. Additionally, those using these products should dispose of them properly to prevent exposure to pets and children from the residue or liquid left in the container.

The American Association of Poison Control Centers recommends the following steps:

- Protect your skin when handling the products.
- Always keep e-cigarettes and liquid nicotine locked up and out of the reach of children.
- Follow the specific disposal instructions on the label.
- If you think someone has been exposed to an e-cigarette or liquid nicotine, call your local poison center at 1-800-222-1222 immediately.

Through Oct. 31, 2014, AAPCC has received 3,922 e-cigarette device and liquid nicotine reported exposures.
Why do we need poison centers?

Poisoning is now the leading cause of death from injuries in the United States and nearly 9 out of 10 poisoning deaths are caused by drugs.

Figure 1. Motor vehicle traffic, poisoning, and drug poisoning death rates: United States, 1980–2008

NOTE: In 1999, the International Classification of Diseases, Tenth Revision (ICD–10) replaced the previous revision of the ICD (ICD–9). This resulted in approximately 5% fewer deaths being classified as motor-vehicle traffic-related deaths and 2% more deaths being classified as poisoning-related deaths. Therefore, death rates for 1998 and earlier are not directly comparable with those computed after 1998. Access data table for Figure 1 at http://www.cdc.gov/nchs/data/databriefs/db81_tables.pdf#1.


Why do we need poison centers?

About Poison Centers- Video

About Poison Centers

- 55 PCs in the U.S.; provide free, expert information and treatment advice, 24/7/365, through the national Poison Help line: **1-800-222-1222**

- Cover of 100% of U.S. population; 150 languages.

- $1 spent on PCs saves $13.39 in HC costs and lost productivity.¹

- Provide extensive educational and preventive outreach through educators.

- Feed data into the National Poison Data System (NPDS)-the only near real-time comprehensive poisoning surveillance database in the US.²

1. [http://www.aapcc.org/about/lewin-group-report/](http://www.aapcc.org/about/lewin-group-report/)
About NPDS Data

- National Poison Data System (NPDS) is the only comprehensive poisoning exposure surveillance database in the US.

- Contains information from the human poison exposure cases from all 55 poison centers across the country.

- Contains more than 50 million poison exposure case records, with more than two million new records added each year; starting year is 1985.

- Information and human exposure case data are continually uploaded to NPDS from all the poison centers about every 13 minutes, providing a near real-time snapshot of poisoning conditions nationwide.

- Previous year’s data set closes every October; annual report usually available before the following January.

- Interested in learning more about NPDS or submitting a data request? Visit http://www.aapcc.org/data-system/.
Key Terms

**E-cigarette**, a.k.a. “electronic cigarette,” “e-cig,” “personal vaporizer (PV),” or “electronic nicotine delivery system (ENDS)”:  

- Battery-powered vaporizer which simulates tobacco smoking.¹  
- Often resemble cigarettes, cigars or pipes.  
- Deliver a vaporized propylene glycol / nicotine mixture into user’s respiratory system as a vapor (instead of smoke).  
- The vapor comes from heating the mixture. When heated, the cartridge that contains the liquid nicotine converts the contents into a vapor that the user inhales.

About E-Cigarettes

3 Main Components: A lithium battery that is rechargeable, a vaporizing chamber, and a cartridge.

1. **The lithium battery** - Found in the device is responsible for powering the e-cigarette. Users can charge the battery using a charger that is similar to those used for mobile phone batteries. The battery is connected to...

2. **The vaporization chamber** - This is a hollow tube that holds the electronic controls and atomizer. The atomizer is what creates the vapor. Before activating the device, the user attaches...

3. **The Cartridge** - containing the nicotine liquid with the vaporization chamber. The tip of the cartridge is what acts as the mouthpiece of the e-cigarette.

Users of e-cigarettes inhale the vapor in the same way they would with a conventional tobacco cigarette. Inhalation is what activates the atomizer to heat the liquid that is present in the cartridge.

This heating process converts the liquid into vapor. When users inhale the vapor through the mouthpiece, nicotine is delivered to their lungs. The exhaled vapor looks much like a regular cloud of cigarette smoke.

http://1stgenerationff.com/
Key Terms

- **Vaping**: inhaling and exhaling the “vapor” produced by an electronic cigarette or similar device.

- **E-liquid, a.k.a. “e-juice”**: Usually a mixture of propylene glycol, glycerin, nicotine, and flavorings. E-liquids as currently sold are a threat to small children because they are not required to be childproof, and they come in candy and fruit flavors that are appealing to children.

- **Nicotine vs. tobacco**: E-cigs do not contain tobacco, although they do use nicotine from tobacco plants.

- **Exposure**: Term used to distinguish between PC calls where someone is asking for information vs. someone has ingested, inhaled, or absorbed a product through the skin or eyes.


Oxford’s 2014 Word of the Year Is Vape

Katy Steinmetz @katysteinmetz | Nov. 17, 2014

Oxford's editorial staff says the word is tied to this year's big debates about health and society

Oxford’s lexicographers keep watch over billions of words every month—from literary novels to academic journals to blogs—and at the end of the year they put their brainy heads together to select a single word that best embodies the zeitgeist. Out of this year’s haze of nominees and debate emerged four little letters.

Oxford’s word of the year for 2014 is vape.

Vape, a verb meaning to inhale and exhale the vapor produced by an electronic cigarette or similar device, beat out everything from buzz to normcore. It was coined in the late 1980s when companies like RJR

http://time.com/3590093/oxfords-2014-word-of-the-year-is-vape/
About E-Cigarettes

- First invented in the 1960’s, but first entered the marketplace in 2003 in China
- Patented internationally in 2007
- Widespread marketing of e-cigs and the entry of the three big U.S. tobacco companies into the e-cig market have contributed to increased attention to these products.
- Sales of e-cigarettes approached $2 billion in 2013, and are estimated to surpass $10 billion by 2017
- As of early 2014, there were 466 brands and 7764 unique flavors of e-cigarette products

FAQs

How does vaping differ from traditional smoking?

- E-cigs thought to not expose the user to carcinogens in conventional cigarettes. Exhaled vapor, but no secondhand smoke (product of combustion). Has been shown that e-cigs are a source of secondhand exposure to nicotine.¹

FAQs

Is vaping safer than smoking?

E-cigarettes perceived to be less harmful than regular cigarettes by e-cigarette users.¹

**Nicotine addiction**: perhaps safer. Nicotine’s level of addictiveness can vary depending on its mode of delivery. In cigarettes, nicotine is highly addictive. FDA-approved NRTs are minimally addictive and can be used long term. Studies suggest current generation of e-cigs on the market less addictive than combustible cigarettes and closer in profile to NRTs.²,³ Range varies, but less nicotine exposure from the use of e-cigs than the use of regular cigarettes.²

**Cancer risk**: not sure. No tar and fewer carcinogens in e-juice and the vapor, as opposed to the approx. 60 carcinogens in traditional cigarettes. However, new studies are finding that e-cigs do expose users to some carcinogens, such as formaldehyde.⁴

E-cig vapors do contain some **toxic substances**, but in one study the levels of the toxicants were 9-450 times lower than in cigarette smoke.³

American Heart Association considers e-cigs to be safer than regular cigarettes⁵; many researchers agree that e-cigarettes will turn out to be much safer than conventional cigarettes.

Long-term studies are needed to truly assess whether vaping is safer than smoking.

⁵ Electronic Cigarettes - A Policy Statement From the American Heart Association  (2014)
Nicotine is also a psychoactive and addictive substance that directly acts on brain areas involved in emotional and cognitive processing. Early exposure to nicotine during the transition from child to adult may be harmful, since it may derange the normal course of brain maturation and have lasting consequences for cognitive ability, mental health, and even personality.
E-cigarettes & Youth

- Teens may be more susceptible to nicotine addiction\(^1\), mounting evidence that nicotine’s adverse effects on adolescent brain development could result in lasting deficits in cognitive function\(^2,3\).
- Some evidence suggests vaping leads to smoking in young adults\(^3,4\).
- Ever use of e-cigs more than doubled from 3.3% in 2011 to 6.8% in 2012 among U.S. middle and high school students.\(^5\).
- The majority of youth e-cig users are current smokers; 2012 data showed that 80.5% of high school students who were past 30-day e-cigarette users were also past 30-day regular cigarette smokers.\(^5\).
- Dual use of e-cigs and regular cigarettes increased from 0.8% to 1.6% among middle school students from 2011-2012 and from 0.8% to 1.9% among high school students from 2010-2011.\(^5,6\).
- Current data insufficient to determine whether e-cigs are a gateway to cigarette use, a gateway out of cigarette use or have no influence on cigarette use. More data is needed in this area.
- Youth who have tried e-cigarettes also indicate greater motivation to quit smoking, suggesting they may want to stop using combustible cigarettes.\(^7\).
E-cigarettes & Youth (sources)


FAQs

- Are e-cigarettes currently regulated by the Food and Drug Administration?
  - No. An April 2014 proposal from the Food and Drug Administration would require most e-cigs to undergo an agency review.
  - States and localities have pursued their own legislation in the absence of federal regulation.
E-Cigarette devices and liquid nicotine exposures reported to Poison Centers: Jan. 1, 2010 through Oct. 31, 2014

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<tr>
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<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td>Child (&lt;=5 years)</td>
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<td>87</td>
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<tr>
<td>Older child (6-12)</td>
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<td>3</td>
<td>12</td>
<td>32</td>
<td>79</td>
</tr>
<tr>
<td>Teen (13-19)</td>
<td>4</td>
<td>11</td>
<td>20</td>
<td>85</td>
<td>192</td>
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</table>
E-cigarette and liquid nicotine exposures reported to poison centers by year, as of Oct. 31, 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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</thead>
<tbody>
<tr>
<td>Cases</td>
<td>31</td>
<td>271</td>
<td>460</td>
<td>1543</td>
<td>3353</td>
</tr>
</tbody>
</table>
Calls to PCs for exposures to e-cigs--United States, September 2010-February 2014 (CDC, April 2014)

- PCs reported 2,405 e-cig and 16,248 cigarette exposure calls from September 2010 to February 2014.
- Total number of poisoning cases is likely higher than reflected in this study because not all exposures are reported to PCs.
- Number of calls to PCs involving e-cig liquids containing nicotine rose from 1/month in September 2010 to 215/month in February 2014.
- 51.1% of the calls to PCs due to e-cigs involved young children <5y, and about 42% of the poison calls involved people age 20 and older.
- Comparing total monthly PC calls involving e-cigs and conventional cigarettes, proportion of e-cig calls jumped from 0.3% in September 2010 to 41.7% in February 2014.
- Poisoning from conventional cigarettes generally due to young children ingesting them. Poisoning related to e-cigs involves the liquid containing nicotine used in the devices.
- Exposure occurs via ingestion, inhalation or absorption through the skin or eyes.
- E-cig calls were more likely than cigarette calls to include a report of an adverse health effect following exposure. The most common- vomiting, nausea and eye irritation.
Calls to PCs for exposures to e-cigs--United States, September 2010-February 2014 (CDC, April 2014)


How Poison Centers Manage Exposures

- When SPIs (Specialists in Poison Information) at PCs manage cases they use a products database* to classify what substances are involved in each case.
- Products database contains entries for several hundred thousand products ranging from viral and bacterial agents to commercial chemical and drug products.
- PCs keep appropriate cases out of EDs by using information about the products in the database to establish thresholds for sending to an exposed individual to the ED vs. treating at home with follow up.

*Products database is maintained and continuously updated by data analysts at the Micromedex Poisindex System (Micromedex Healthcare Series [Internet database]. Greenwood Village, CO: Truven Health Analytics).
Products Database & Nicotine

- One regular cigarette contains 15 to 30 mg nicotine
- One low nicotine cigarette contains 3 to 8 mg nicotine
- One cigarette butt contains 3.75 to 7 mg nicotine
- One cigar contains 15 to 40 mg nicotine
- One gram snuff (wet) contains 12 to 16 mg nicotine
- One gram chewing tobacco contains 6 to 8 mg nicotine
- One piece of nicotine chewing gum contains 2 or 4 mg nicotine
- One nicotine patch contains 8.3 to 22 mg nicotine
- One nicotine nasal spray contains 0.5 mg nicotine

- Nicotine levels in e-liquids varies. Most range 1.8-2.4%, concentrations that can cause sickness, but rarely death, in children. But higher concentrations are widely available on the Internet.1

- Children who ingest 0.5mg/kg will likely remain asymptomatic.
- Children who ingest 0.8mg/kg will likely develop mild symptoms.
- Severe toxicity has been seen in children ingesting 14-19mg/kg.
- The window between “safe” and “unsafe” exposure is very small.
- For example, a small child weighing 25 lbs would only need to ingest 9mg of nicotine to fall into the “mild tox” category. The case would jump to the “severe tox” category if they ingest 15mg of nicotine.

Many thanks to Angel Bivens at the Maryland Poison Center (http://mdpoison.com/) for her help obtaining this information and the example.
PCs and E-cig Exposures

difficult for PCs to assess the danger when a child is exposed to e-juice because we don’t know how much nicotine or what other chemicals are in each type of e-juice.

Some PCs report that none of the brand names they have looked for are in the products database, so SPIs are at the mercy of the package or website when trying to figure out nicotine content.

often the package is vague; might say it contains 24mg of nicotine, but is that in the whole cartridge or is that 24mg/ml?

In one study that looked at the nicotine content and vapor delivery of e-juice cartridges and refill solutions, nicotine amounts in 9 out of 20 of the analyzed cartridges differed by more than 20% from values declared by their manufacturers. The differences of the same magnitude were detected among 3 out of 15 nicotine refill solutions.1

Poison Centers and E-cigs: Public Education Efforts

- Many fact sheets, newsletters, and posts on social media.
- Press conferences, and television, radio, and print interviews.
- Working with state and local health departments and other organizations.
- Development of public education materials like posters.
- Examples:
  - [http://poisoncontrol.uchc.edu/pdfs/flyer_liquid_nicotine_facts.pdf](http://poisoncontrol.uchc.edu/pdfs/flyer_liquid_nicotine_facts.pdf)

- Call 1-800-222-1222 to get in touch with your local poison center. Ask for an educator if you’re interested in helping with his or her regional poison prevention awareness efforts.
AAPCC and E-cigarettes

Thank you!

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Road Map for this Presentation

• My Organization
• Federal Regulation of E-Cigarettes and E-Liquid (Liquid Nicotine)
• Policy Considerations
• State and Local Regulation of E-Liquid
• Other Policy Options
Tobacco Control Legal Consortium

The legal network for tobacco control policy change.

Public Health Law Center

at William Mitchell College of Law
Healthy Eating & Active Living

- Playground Safety in Child Care Licensing Laws
- Active Recreation and Transportation
- Liability and Risk Management
Tobacco Control Legal Consortium

The legal network for tobacco control policy change.
What is Legal Technical Assistance?

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  www.publichealthlawcenter.org
- Legal Research, Analysis and Interpretation
- Policy Development
- Litigation Support

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What isn’t Legal Technical Assistance?
Who We Serve

- Advocacy Organizations and Coalitions
- Federal, State, & Local Gov’t Attorneys
- Private Attorneys and Individual Citizens
- CDC Grantees and Project Officers
- Other Public Health Professionals
Federal Regulation of E-Cigarettes

- *Sottera v. FDA* (D.C. Cir. 2010)
- Family Smoking Prevention and Tobacco Control Act of 2009

“This chapter shall apply to all cigarettes, cigarette tobacco, roll-your-own tobacco, and smokeless tobacco and to any other tobacco products that the Secretary by regulation deems to be subject to this chapter.” 21 U.S.C. § 387a(b)

- Proposed Deeming Regulation (April 25, 2014)

  Doesn’t address e-liquid packaging
Federal Regulation of E-Cigarettes

• December 10-11, 2014: FDA Workshop on e-cigarettes, focusing on product science, product packaging, constituent labeling, and environmental impact.

• Docket for public comments (Docket No. FDA-2014-N-0001-0079), closing April 15, 2015
Federal Regulation of E-Cigarettes

In June 2009, President Obama signed the Family Smoking Prevention and Tobacco Control Act, giving the Food and Drug Administration unprecedented authority to protect the public health by regulating tobacco products. The ultimate success of the law will depend on an active and engaged public health community that works to support the FDA with the best evidence and input available.

Inform Future FDA Regulation of E-Cigarettes

FDA is accepting public comments in conjunction with a public workshop to gather scientific information about e-cigarettes and public health. Submit your comments by April 15, 2019.

Tell the FDA to Address Illicit Trade

Public health groups are advocating the FDA to implement a trace-and-verify program to combat illicit trade.
Federal Regulation of E-Cigarettes
Policy Considerations

• Know Your Authority (Preemption)
• Definitions
• Exemptions
• Penalties and Enforcement
• Rulemaking
• Non-preemption
SECTION 1. SHORT TITLE. This Act may be cited as the "Child Nicotine Poisoning Prevention Act of 2014 … A BILL … To require the Consumer Product Safety Commission to promulgate a rule to require child safety packaging for liquid nicotine containers, and for other purposes.

The term "special packaging" means packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. 15 U.S.C. § 1471(4).

The term "liquid nicotine container" means a … container that: (A) has an opening that is accessible through normal and reasonably foreseeable use by a consumer; and (B) is used to hold liquid containing nicotine in any concentration.

Savings clause.--Nothing in this section shall be construed to limit or diminish the authority of the Food and Drug Administration to regulate the manufacture, marketing, sale, or distribution of liquid nicotine, liquid nicotine containers, electronic cigarettes, or similar products that contain or dispense liquid nicotine.
Electronic cigarette liquids sold and marketed for the refilling of e-cigarettes may be sold only in special packaging. The Department of Public Health shall adopt rules establishing the standards for special packaging to be used for e-cigarette liquids.

"Special packaging" means packaging that is designed or constructed to be significantly difficult for children under 5 years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time.

This Section does not apply to electronic cigarette products sold in sealed, pre-filled, or disposable replacement cartridges.

Effective Date: January 1, 2015
Minnesota

(a) For purposes of this section, "child-resistant packaging" is defined as set forth in Code of Federal Regulations, title 16, section 1700.15 (b)(1), … when tested in accordance with the method described in Code of Federal Regulations, title 16, section 1700.20 …

(b) The sale of any liquid, whether or not such liquid contains nicotine, that is intended for human consumption and use in an electronic delivery device, … that is not contained in packaging that is child-resistant, is prohibited. All licensees under this chapter must ensure that any liquid intended for human consumption and use in an electronic delivery device is sold in child-resistant packaging.

(c) A licensee that fails to comply with this section is subject to administrative penalties …

Effective date: January 1, 2015
Liquids or gels containing nicotine and “nicotine liquid containers” must be in child-resistant packaging.

“Child-resistant packaging” means packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time.

Exempts containers “containing nicotine in a cartridge that is sold, marketed, or intended for use in a tobacco substitute if the cartridge is prefilled and sealed by the manufacturer and not intended to be opened by the consumer.”

Effective date: January 1, 2015
5.1 E-LIQUID FOR SALE IN DAVIS COUNTY

5.1.1 Packaging – All containers must:

(1) Have child-proof caps;

(2) Be leak-proof at the time of sale;

(3) Be tamper-evident
Other Policy Options

- Youth Access / Smoke-Free / Tax
- Flavor Ban
- Licensing
- Vape Shop Moratorium
Questions and Answers

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Questions? Please use the Q & A pod on the left.
Evaluation

Please fill out our evaluation:
https://www.surveymonkey.com/r/2GN2DC2