Vaping: The New Social Phenomenon

Participant Workbook

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Electronic cigarettes (also called e-cigarettes or electronic nicotine delivery systems) are battery-operated devices designed to deliver nicotine with flavorings and other chemicals to users in vapor instead of smoke. They can be manufactured to resemble traditional tobacco cigarettes, cigars or pipes, or even everyday items like pens or USB memory sticks; newer devices, such as those with fillable tanks, may look different. More than 250 different e-cigarette brands are currently on the market.

While e-cigarettes are often promoted as safer alternatives to traditional cigarettes, which deliver nicotine by burning tobacco, little is actually known yet about the health risks of using these devices.

Most e-cigarettes consist of three different components, including:

- a cartridge, which holds a liquid solution containing varying amounts of nicotine, flavorings, and other chemicals
- a heating device (vaporizer)
- a power source (usually a battery)

In many e-cigarettes, puffing activates the battery-powered heating device, which vaporizes the liquid in the cartridge. The resulting aerosol or vapor is then inhaled (called "vaping").
Are E-cigarettes safe?

Although e-cigarette vapor does not contain the tar currently responsible for most lung cancer and other lung diseases, it has been shown to contain known carcinogens and toxic chemicals (such as formaldehyde and acetaldehyde), as well as potentially toxic metal nanoparticles from the vaporizing mechanism. There are currently no accepted measures to confirm their purity or safety, and the long-term health consequence of e-cigarette use remain unknown. NIDA is developing research programs to help answer these questions.

<table>
<thead>
<tr>
<th>Toxic compound</th>
<th>Tobacco cigarette (µg in mainstream smoke)</th>
<th>E-cigarette (µg per 15 puffs*)</th>
<th>Average ratio (conventional vs electronic cigarette)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>1.6–52</td>
<td>0.20–5.61</td>
<td>9</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>52–140</td>
<td>0.11–1.36</td>
<td>450</td>
</tr>
<tr>
<td>Acrolein</td>
<td>2.4–62</td>
<td>0.07–4.19</td>
<td>15</td>
</tr>
<tr>
<td>Toluene</td>
<td>8.3–70</td>
<td>0.02–0.63</td>
<td>120</td>
</tr>
<tr>
<td>NNN**</td>
<td>0.005–0.19</td>
<td>0.00008–0.00043</td>
<td>380</td>
</tr>
<tr>
<td>NNK**</td>
<td>0.012–0.11</td>
<td>0.00011–0.00283</td>
<td>40</td>
</tr>
</tbody>
</table>

* The authors assumed smokers of e-cigarettes would take an average of 15 puffs per vaping session, corresponding to smoking one tobacco cigarette.
** Tobacco-specific nitrosamine, a carcinogenic compound that originates in the curing and processing of tobacco.
Adapted from Goniewicz et al. (2014)4

2016 Monitoring the Future Survey results

A new study finds that the percentage of U.S. teens who vape declined in 2016—the first significant reversal of a rapid rise in adolescent vaping. The rate grew from near-zero levels of use in 2011 to one of the most common forms of adolescent substance use by 2015, researchers said.

From 2015 to 2016, the percentage of adolescents who vaped in the last 30 days declined from 16 percent to 13 percent among 12th-grade students, from 14 percent to 11 percent among 10th grade students, and from 8 percent to 6 percent among 8th grade students. Each of these declines was statistically significant.
2016 Monitoring the Future Survey: Teens More Likely to Use E-Cigarettes than Cigarettes

Past-month e-cigarette versus cigarette use for each grade was:

8th grade:
- cigarette use: 2.6%
- e-cigarette use: 6.2%

10th grade:
- cigarette use: 4.9%
- e-cigarette use: 11.0%

12th grade:
- cigarette use: 10.5%
- e-cigarette use: 12.5%

What did 12th graders think was in the mist they inhaled from an e-cigarette?
- 62.8 percent thought they were inhaling flavoring.
- 24.9 percent thought they were inhaling nicotine.
- 6.8 percent thought they were inhaling marijuana or hash oil.
- 5.6 percent said they didn’t know what they were inhaling.

Despite the belief that the liquid used in e-cigs contains only flavoring, it also might contain nicotine.

**E-Cigarette Ads and Youth**

Tobacco product advertising can entice youth to use tobacco, and spending to advertise e-cigarettes has increased rapidly since 2011. About 69% of middle and high school students were exposed to e-cigarette advertisements in retail stores, on the Internet, in magazines/newspapers, or on TV/movies. Exposure to e-cigarette advertisements may be contributing to increases in e-cigarette use among youth. Efforts by states, communities, and others could reduce this exposure.

- 18 million youth were exposed to e-cigarette ads in 2014.
- More than 10 million high school students and nearly 8 million middle school students were exposed to e-cigarette ads in 2014.
- More than half of high school students (about 8 million) saw e-cigarette ads in retail stores, and more than 6 million saw them on the Internet.
- More than half of middle school students (6 million) saw e-cigarettes ads in retail stores, and more than 4 million saw them on the Internet.
- About 15% of all students reported seeing e-cigarette ads from all four sources, including retail stores, the Internet, magazines/newspapers, and TV/movies.
• E-cigarette companies have rapidly increased advertising spending, from $6.4 million in 2011 to $115 million in 2014.

• Many of the themes used in advertising for cigarettes are also now used to advertise e-cigarettes – including sex, independence, and rebellion.

• During the time e-cigarette ads have increased, there are also increases in e-cigarette use among US youth. From 2011-2014, e-cigarette use in the past 30 days increased from less than 1% to almost 4% among middle school students and from less than 2% to 13% among high school students.

New Trends in Cannabis Use

Cannabis Oil

• Cannabis oil is the extracted THC (Tetrahydrocannabinol) from the bud and vegetable matter of the flowering female cannabis plant. It is typically extracted using some sort of solvent, usually either high-pressure butane gas forced through the material or by a process of washing the material in isopropanol.

• It comes in a variety of colors and textures from a dark molasses type tar to a golden light honey kind of oil, all depending on the quality of herb and the process that was used to extract the oil.

• Basically it is a concentrated extract, normally between 60% and 90% THC. This compares favorably to herbal cannabis, which has an average THC content of 12-20% and commercial grade hashes with an average THC content of 35-40%.

Vaporizing Dry Herbs

• Vaporizers designed to heat the cannabis in its raw, bud form are known as dry herb vaporizers. Dry herbs of all sorts have been used for centuries for meditation, relaxation and medicinal purposes. Certain flowers and herbs (including cannabis) can dried, crushed and then inserted into a vape pen that is dry-herb capable. The vape's oven chamber will heat up the dry herbs which will release a vapor which can then be inhaled. To get the most out of your vaporization experience, be sure to grind your material using an herb grinder to break your material down to create more surface area for the heat to reach.

Vaporizing Concentrates

• Waxes, shatters, crumbles, and oils are a concentrated form of cannabinoids and terpenes and are therefore referred to as cannabis concentrates. Due to these products
being a concentrated mix, you have the benefit of only needing a very small amount to get the same effect as you would with larger amounts of a less concentrated mix. If you are looking to vape concentrates you will need a vapor pen that is capable of doing so as not all vaporizers have this functionality. In fact, many vaporizer manufacturers now offer special attachments to convert standard ovens to be compatible with concentrates but it often costs extra.

**What Can Be Done?**

The Federal government is

- Supporting state tobacco prevention and control programs to prevent any youth use of tobacco products, including e-cigarettes.
- Tracking e-cigarette use; supporting research on the health effects and factors contributing to youth e-cigarette use; and providing information to the public, including health care providers.
- Developing regulations for e-cigarettes and other currently unregulated tobacco products to reduce the disease and death from tobacco use, including by preventing youth tobacco use.
- Funding and promoting campaigns that inform people about the dangers of tobacco use, such as FDA’s *The Real Cost and Fresh Empire* for youth and CDC’s *Tips From Former Smokers* for adults.

States and communities can

- Fund tobacco prevention and control programs at CDC-recommended levels to prevent youth use of all tobacco products, including e-cigarettes.
- Work to limit where and how all tobacco products, including e-cigarettes, are sold to reduce youth e-cigarette use, as well as ad exposure. This may include:
  - Requiring age verification to enter e-cigarette vendors' websites, make purchases, and accept deliveries of e-cigarettes.
  - Restricting the number of stores that sell tobacco and how close they can be to schools.
  - Requiring that e-cigarettes be sold only through face-to-face transactions, not on the Internet.
  - Limiting tobacco product sales to facilities that never admit youth.
- Support efforts to implement and continue proven youth tobacco prevention approaches, including tobacco price increases, comprehensive smoke-free laws, and high-impact mass media campaigns.
Pediatricians, nurses, and other health care providers can

- Ask about youths’ e-cigarette use and counsel them about the dangers of nicotine, e-cigarettes, and all other tobacco use.
- Ask all patients whether they use tobacco products, encourage those who do to quit, and provide help with quitting.
- Ask about youths’ media and Internet use. Advise parents and caregivers to take an active role in deciding which websites and media children may view and teaching critical viewing skills.

Parents and caregivers can

- Set a positive example by being tobacco-free. For free help, call 1-800-QUIT-NOW or visit www.smokefree.gov
- Talk to youth about why they shouldn’t use any tobacco products, including e-cigarettes.
- Know what media their children are viewing, and decide what programs and websites are appropriate for their age. Watch programs together and discuss content.
References

Arnold, Carrie (2014). "Vaping and Health: What Do We Know about E-Cigarettes?". Environmental Health Perspectives. 122 (9): A244–A249.


