Public Health Promise or Peril?

The Rise of E-Cigarettes and Implications for Tobacco Control Policy and Practice

BRIAN A. KING, PHD, MPH
DEPUTY DIRECTOR FOR RESEARCH TRANSLATION
OFFICE ON SMOKING AND HEALTH

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Overview

1. Background
2. Patterns of Use
3. Health Effects
4. Policy Options
1 Background
Electronic Nicotine Delivery Systems (ENDS)

- E-Cigarettes
- Hookah Pens
- E-Cigars
- Vape Pens
- E-Pipes
- E-Hookahs

At least 450 Brands
Types of E-Cigarette Products

- Mini E-Cig: Smaller/Fixed
- Mid-Sized: Larger/Customizable
- Modified
Anatomy of an E-Cigarette

Battery (power source)

Atomizer (heats the solution)

User inhales aerosol

Liquid Cartridge (holds a liquid nicotine, propylene glycol, and/or glycerin solution)
Emissions from E-Cigarettes

Mainstream Aerosol
Could have negative and positive individual and population health impact

“This shift in patterns of tobacco use could have a number of potential impacts, ranging from the positive effect of accelerating the rate at which smokers quit smoking cigarettes completely to a negative effect of slowing down the decrease in the use of all tobacco products, especially cigarettes”

Chapter 15, Page 859
REPORT RELEASE

Report was released December 8, 2016 in Washington, D.C.
KEY FINDINGS

7 Major Conclusions

E-Cigarette Use Among Youth and Young Adults

A Report of the Surgeon General

Major Conclusions

1. E-cigarettes are a rapidly emerging and diversified product class. These devices typically deliver nicotine, flavorings, and other additives to users via an inhaled aerosol. These devices are referred to by a variety of names, including “e-cigs,” “e-hookahs,” “mods,” “vape pens,” “vapes,” and “tank systems.”

2. E-cigarette use among youth and young adults has become a public health concern. In 2014, current use of e-cigarettes by young adults 18–24 years of age surpassed that of adults 25 years of age and older.

3. E-cigarettes are now the most commonly used tobacco product among youth, surpassing conventional cigarettes in 2014. E-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, including combustible tobacco products.

4. The use of products containing nicotine poses dangers to youth, pregnant women, and fetuses. The use of products containing nicotine in any form among youth, including in e-cigarettes, is unsafe.

5. E-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.

6. E-cigarettes are marketed by promoting flavors and using a wide variety of media channels and approaches that have been used in the past for marketing conventional tobacco products to youth and young adults.

7. Action can be taken at the national, state, local, tribal, and territorial levels to address e-cigarette use among youth and young adults. Actions could include incorporating e-cigarettes into smokefree policies, preventing access to e-cigarettes by youth, price and tax policies, retail licensure, regulation of e-cigarette marketing, and educational initiatives targeting youth and young adults.
Patterns of Use
Ever Use of E-Cigarettes Among U.S. Adults, by Cigarette Smoking Status, Styles, 2010-2014

![Graph showing percentage of current, former, and never cigarette smokers over years from 2010 to 2014.](image)

**Source:** King et al. Nicotine Tob Research. 2015; 17(2):219-27.
Percentage of U.S. Adults who Currently Use E-Cigarettes, by Sex, Age, and Race/Ethnicity, 2014

A majority of adult e-cigarette users also smoke conventional cigarettes: “dual use.”
“Cutting back” is not enough—even a few cigarettes per day is dangerous

<table>
<thead>
<tr>
<th>RISKS FOR DUAL USERS OF CIGARETTES AND E-CIGARETTES</th>
<th>BENEFITS OF QUITTING SMOKING COMPLETELY</th>
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</thead>
<tbody>
<tr>
<td>Smoking just five cigarettes a day doubles the risk of dying from heart disease.</td>
<td>Heart disease risk is cut in half one year after quitting and continues to drop over time.</td>
</tr>
<tr>
<td>Heavy smokers who reduce their cigarette use by half do not reduce their risk of early death by half.</td>
<td>Even quitting at age 50 cuts your risk in half for early death from a smoking-related disease.</td>
</tr>
</tbody>
</table>

Current use of tobacco products by high school students in 2015.

- E-Cigarettes: 16%
- Cigarettes: 9.3%
- Cigars: 8.6%
- Hookahs: 7.2%
- Smokeless: 5.6%

“E-cigarettes are now the most commonly used tobacco product among youth, surpassing conventional cigarettes in 2014. E-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, including combustible tobacco products.”
Figure 2.2. Trends in Past-30-Day E-Cigarette Use Among U.S. Middle and High School Students

Source: Centers for Disease Control and Prevention 2013a, 2014b; unpublished data (data: NYTS 2015)
Percentages of Middle & High School Students Who Reported Ever Using an E-Cigarette, by Type & Sex

Percentages of Middle & High School Students Who Reported Ever Using E-Cigarettes, by Brand of E-Cigarette Used*


*Categories are not mutually exclusive.
Figure 2.5. Past-30-Day Use of Various Tobacco Products Among U.S. Middle & High School Students

Source: National Youth Tobacco Survey (NYTS) 2015
Among Youth, E-Cigarette Use May Lead to Conventional Cigarette Use

- Never smoking high school students who reported *ever using e-cigarettes* at baseline:
  - Were **2.7 times more likely** to report initiation of combustible tobacco use after 1 year compared with *never users of e-cigarettes*

- Never smoking U.S. adolescent and young adult *e-cigarette users* at baseline:
  - Were **8.3 times more likely** to progress to cigarette smoking after 1 year than *non-users of e-cigarettes*

What Factors Lead to Youth Smoking?

- Youth-appealing flavors
- Youth-resonating themes
- Low prices/price promotions
- Ease of access & product use
- Exposure to ads
- Health claims

E-cigarettes are marketed by promoting flavors and using a wide variety of media channels and approaches that have been used in the past for marketing conventional tobacco products to youth and young adults.”
A Majority of Current Youth E-Cigarette Users Report Using Flavored E-Cigarettes

In 2014, among U.S. middle and high school students who used an e-cigarette in the past 30 days, 63.3% (1.58 million) had used a flavored e-cigarette.

Source: Corey et al. Flavored Tobacco Product Use Among Middle and High School Students—United States, 2014. MMWR October 2, 2015 / 64(38):1066-1070
Figure 4.5. Quarterly Promotional Spending for E-Cigarettes, 2010-2014

Source: Data for 2010-2013 (Q2) from Kornfield and colleagues (2015, p.110) and adapted with permission from BMJ Publishing Group Limited. Data for 2013 (Q3) – 2014 from Kantar Media (unpublished data).
Youth are exposed to e-cigarette advertisements from multiple sources.

Sources of e-cigarette advertisement exposure

- **14.4 MILLION** youth are exposed at retail stores
- **10.5 MILLION** youth are exposed through the internet
- **9.6 MILLION** youth are exposed through TV/movies
- **8 MILLION** youth are exposed through magazines/newspapers

US students exposed to e-cigarette advertisements, by school type and number of sources of exposure

*Percentages may not add up exactly to any source due to rounding.*

E-cigarette Marketing Uses Traditional Tactics

1940’s / 1950’s

- Philip Morris advertisement
- Chesterfield advertisement

2010’s

- Modern e-cigarette advertisement

Source: www.tobaccodocuments.org.
E-cigarette Advertising Via Television
Text on patch: "I wear it because I'm a 69-year old basketball player. And I plan on being an 80-year old basketball player."

Marketing for E-cigarettes

Sources: Sports Illustrated; Blu eCigs; NJOY.
Is there a potential benefit for E-cigarettes? 

Answer: Under certain circumstances

- Complete long term substitution by established smokers
- Assist in rapid transition to a society with little or no use of combustible products
- Short-term use if shown to produce successful & permanent cessation of combustible products
E-Cigarette Use As A Smoking Cessation Tool in Adults

“The long-term safety of e-cigarettes is unknown.”

“There is evidence from two trials that e-cigarettes help smokers to stop smoking in the long term compared with placebo e-cigarettes. However, the small number of trials, low event rates and wide confidence intervals around the estimates mean that our confidence in the result is rated 'low' by GRADE standards.”

“Overall, the USPSTF found the evidence on the use of ENDS as a smoking cessation tool in adults, including pregnant women, and adolescents to be insufficient.”

E-Cigarettes Potential for Harm if:

1. Leads to initiation of combustible tobacco use among non-smokers, particularly children.
2. Leads to relapse among former smokers.
3. Diminishes the chances that a smoker will quit.
4. Discourages smokers from using proven quit methods.
5. Exposes children, pregnant women, and non-users to secondhand aerosol.
6. Glamorizes or renormalizes tobacco use.
7. Results in poisonings among users or non-users.
E-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.
E-Cigarette Aerosol Harmful & Potentially Harmful Ingredients

- Heavy Metals
- Nicotine
- Fine Particulate
- Other Compounds
- Volatile Organic Compound

E-Cigarette Aerosol Harmful & Potentially Harmful Ingredients
Nicotine Poses Unique Dangers to Young People

Chapter 3 Conclusion 1, 2, & 5

1. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.

2. Nicotine can cross the placenta and has known effects on fetal and postnatal development. Therefore, nicotine delivered by e-cigarettes during pregnancy can result in multiple adverse consequences, including sudden infant death syndrome, and could result in altered corpus callosum, deficits in auditory processing, and obesity.

5. Ingestion of e-cigarette liquids containing nicotine can cause acute toxicity and possibly death if the contents of refill cartridges or bottles containing nicotine are consumed.
Public Service Announcement

E-cigarettes.SurgeonGeneral.gov
• Some e-cigarette manufacturers claim flavorings are safe because they meet the FDA definition of “Generally Recognized as Safe ("GRAS")

• GRAS status does not apply to products that are not food

• 75% of the flavors tested contained diacetyl, according to recent studies

• Diacetyl is associated with bronchiolitis obliterans and other severe respiratory diseases known as “popcorn lung”

Chapter 2
Conclusion 8.

E-cigarette products can be used as a delivery system for cannabinoids and potentially for other illicit drugs.
Approximately 1/3 of students who had ever used an e-cigarette (32.5%) reported having used (at least once) an e-cigarette for a substance other than nicotine.

Use of e-cigarettes for a substance other than nicotine was higher among males compared with females, & non-Hispanic white and Hispanic students compared with non-Hispanic black students.

The proportion of e-cigarette users who used an e-cigarette for a substance other than nicotine was similar among middle (33.7%) & high (32.2%) school students.

4 Policy Options
Barriers to Reducing Tobacco Use

- Tobacco easily accessible
- Smoking in public legal
- Unfettered advertising
- Poor access to cessation help
“Tobacco Control Vaccine”

- Tobacco Price Increases
- Cessation Access
- 100% Smoke-Free Policies
- Hard Hitting Media Campaigns

“Action can be taken at the national, state, local, tribal, and territorial levels to address e-cigarette use among youth and young adults. Actions could include incorporating e-cigarettes into smoke-free policies, preventing access to e-cigarettes by youth, price and tax policies, retail licensure, regulation of e-cigarette marketing likely to attract youth, and educational initiatives targeting youth and young adults.”
Call to Action

The Surgeon General issues this Call to Action on e-cigarettes, specifically focusing on youth and young adults, to accelerate policies and programs that can reduce e-cigarette use among young people.

It highlights the need to implement proven strategies that will prevent potentially harmful effects of e-cigarette use among young people.
### Stakeholders Who Can Take Action

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals, parents, and families</td>
<td>![People Icon]</td>
</tr>
<tr>
<td>Teachers, coaches, and other youth influences</td>
<td>![Teacher Icon]</td>
</tr>
<tr>
<td>Civic and community leaders</td>
<td>![Government Building Icon]</td>
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<tr>
<td>Public health and health care professionals</td>
<td>![Medicine Icon]</td>
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<tr>
<td>Researchers</td>
<td>![Book Icon]</td>
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<tr>
<td>Federal government</td>
<td>![Government Building Icon]</td>
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<tr>
<td>State, local, tribal, and territorial governments</td>
<td>![Map Icon]</td>
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<tr>
<td>E-cigarette manufacturers, distributors, and retailers</td>
<td>![E-Cigarette Icon]</td>
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<tr>
<td>Voluntary health agencies, non-governmental organizations, and other community and faith based organizations</td>
<td>![Voluntary Icon]</td>
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</tbody>
</table>
Public Health Actions to Address E-Cigarettes

**Federal Regulation**

*Family Smoking Prevention and Tobacco Control Act*

- Signed into law on June 22, 2009
- Granted FDA the authority to regulate tobacco products
- Enhances the ability to intensify policy to reduce tobacco industry influence
  - Manufacturing
  - Marketing
  - Sale

**State, Local, Tribal**

*Potential Sub-National Action:*

- Including e-cigarettes in smokefree indoor air policies
- Restricting youth access to e-cigarettes in retail settings
- Licensing retailers
- Establishing specific package requirements
- Setting price policies
Family Smoking Prevention and Tobacco Control Act (2009)

- Further limits youth access;
- Bans tobacco company sponsorship of sporting and entertainment events;
- Prohibits the sale of tobacco-branded merchandise such as clothing and jewelry;
- Prohibits false and misleading advertising and labels, such as “light” and “mild”.

New Regulatory Framework
New FDA Manufacturer Requirements:

- Registering manufacturing establishments and providing product listings to the FDA
- Reporting ingredients, and harmful and potentially harmful constituents
- Requiring premarket review and authorization of new tobacco products by the FDA
- Placing health warnings on product packages and advertisements
- Not marketing newly deemed tobacco products (including e-cigarettes) with modified risk claims unless authorized by the FDA.
States with & without laws prohibiting smoking & use of e-cigarettes in indoor areas of private worksites, restaurants, & bars - United States, December 2016

Minimum Age of Sale for Tobacco Products, January 2017

Local Momentum:

Tobacco 21 Population Covered: 62,906,223
Tobacco 21 Cities and Counties Covered: 212

Source: http://tobacco21.org/  (As of 1/9/2017)
Summary

- E-cigarettes are now the most commonly used tobacco product among U.S. youth.
- Youth use of tobacco products in any form, including e-cigarettes, is unsafe.
- Adults must quit smoking cigarettes completely to realize potential benefits of e-cigarettes. However, e-cigarettes are not currently an FDA-approved quit aid.
- The tobacco product landscape continues to diversify, and it’s critical to modernize tobacco control strategies to adapt to these changes.
- Multiple different stakeholders can take action to implement policies and strategies that can clearly reduce the public health threat posed by tobacco use, including e-cigarettes.
The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.