The Latest on Vaping Among U.S. Teens

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Presentation Outline

• Overview of Electronic Nicotine Delivery Systems (ENDS)
• New Prevalence Data
• Review of Recent Research
• FDA Actions
• Q & A
Say What?

- Vaping
- E-Cigarettes
- E-Hookahs
- Juuling & JUUL pods
- ENDS
Electronic Nicotine Delivery Systems (ENDS)
Electronic Nicotine Delivery Systems (ENDS)
JUUL and JUUL pods
How they work

• Most have a battery, a heating element, and a place to hold a liquid
• Produce an aerosol by heating the liquid that usually contains nicotine, flavorings, and other chemicals that help to make the aerosol
• Users inhale this aerosol into their lungs
Health Effects of ENDS Use

• Long-term effects are unknown
• But nicotine has known health effects:
  • Nicotine is highly addictive
  • Nicotine can harm adolescent brain development, which continues into the early to mid-20s
• The aerosols in ENDS can contain harmful substances
The Great Vaping Debate

• There may be a public health benefit if current cigarette smokers switch to e-cigarettes or use them to cut down or quit.

• The public health benefit will be diminished if e-cigarette use leads to initiation of combustible cigarette smoking.
Public Health Communication Challenge

To Current Adult Smokers:
“You should switch to e-cigarettes because they are not as harmful.”

To Adolescents:
“You should not use e-cigarettes because you might someday switch to combustible cigarettes.”
New Preliminary Data from CDC

- 75% increase in number of high school students who have used e-cigarettes in past 30 days
- 3 million (20%) high school students are using e-cigarettes
Cigarette & E-Cigarette Use Rates Among High School Students, 2011 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Cigarettes</th>
<th>E-Cigarettes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>15.8</td>
<td>1.5</td>
</tr>
<tr>
<td>2012</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>2013</td>
<td>9.3</td>
<td>4.5</td>
</tr>
<tr>
<td>2014</td>
<td>9.2</td>
<td>13.4</td>
</tr>
<tr>
<td>2015</td>
<td>9.3</td>
<td>16</td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
<td>11.3</td>
</tr>
<tr>
<td>2017</td>
<td>11.7</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>7.6</td>
<td>20.5</td>
</tr>
</tbody>
</table>

Preliminary data
Market Share Data, September 2018

Sales

- Juul: 72.8%
- British American Tobacco: 9.5%
- Altria: 7.2%
- Imperial Tobacco: 5.4%
- Other: 5.1%

Source: Nielsen data, Wells Fargo
RECENT RESEARCH ON ENDS USE AMONG TEENS AND YOUNG ADULTS

Watkins, Glantz, & Chaffee
2018

*JAMA Pediatrics*
Study 1: Baseline non-smoking teens
initiation of cigarette smoking after using non-cigarette tobacco products

- 10,000 youth (12 to 17) who reported never smoking at baseline and reported their smoking 1 year later
- Tested whether those who used non-cigarette tobacco products at baseline were more likely to start smoking cigarettes a year later
Study 1, results

• Baseline ever use:
  • E-cigarettes – 4.2%
  • Hookah – 3.3%
  • Other combustibles – 2.3%
  • Smokeless – 1.6%

• Follow-up ever use:
  • Cigarettes – 4.6%
Study 1, adjusted odds of past 30-day cigarette use at follow-up

<table>
<thead>
<tr>
<th>Baseline use</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-cigarettes</td>
<td>1.87</td>
<td>1.15, 3.05</td>
</tr>
<tr>
<td>Hookah</td>
<td>1.92</td>
<td>1.17, 3.17</td>
</tr>
<tr>
<td>Other combustibles</td>
<td>1.78</td>
<td>1.00, 3.19</td>
</tr>
<tr>
<td>Smokeless</td>
<td>2.07</td>
<td>1.10, 3.87</td>
</tr>
<tr>
<td>More than 1 type</td>
<td>3.81</td>
<td>2.22, 6.54</td>
</tr>
</tbody>
</table>
Study 1, take home points

• E-cigarettes are the most common type of non-cigarette tobacco used by youth
• Any use of all forms of tobacco was associated with greater risk of future cigarette smoking
• Risk was greatest among youth who used multiple products
Study 2: Electronic Cigarette Use and Progression from Experimentation to Established Smoking

Chaffee, Watkins, & Glantz

2018

Pediatrics
Study 2: Progression from experimentation to established cigarette smoking

- 1,300 youth (12 to 17) who had smoked < 100 cigarettes at baseline and reported their smoking 1 year later
- Examined 3 outcomes
  1. Smoked 100 or more cigarettes (established smoking)
  2. Past 30 day smoking (current)
  3. Both 1 & 2 (current established)
Study 2, results (unadjusted)

Percent Smoking at Follow-up

- Ever used e-cigarettes
- Never used e-cigarettes

Established Smoking
Past 30-day smoking
Current established smoking

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## Study 2, results (adjusted)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current established smoking</td>
<td>1.80</td>
<td>1.04, 3.12</td>
</tr>
<tr>
<td>Established smoking</td>
<td>1.57</td>
<td>0.99, 2.49</td>
</tr>
<tr>
<td>Past 30-day smoking</td>
<td>1.32</td>
<td>0.99, 1.76</td>
</tr>
</tbody>
</table>
Study 2, take home points

- Among youth who had experimented with smoking, using e-cigarettes was independently associated with onset of current established smoking
Study 3: Electronic Cigarette Use and Uptake of Cigarette Smoking: A Longitudinal Examination of U.S. College Students

Spindle et al.
2017

Addictive Behaviors

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Study 3: E-cigarette use leads to uptake of cigarette smoking among college students

• 3,757 college students surveyed in 2014 and again in 2015
• Tested whether e-cigarette use among never cigarette smokers in 2014 predicted cigarette smoking status one year later
### Study 3, results

<table>
<thead>
<tr>
<th></th>
<th>Time 2 ever cigarette use AOR (95% CI)</th>
<th>Time 2 current cigarette use AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever e-cigarette use</td>
<td>3.37 (1.91, 5.94)*</td>
<td>3.30 (1.20, 9.05)*</td>
</tr>
<tr>
<td>Current e-cigarette use</td>
<td>3.41 (1.57, 7.41)*</td>
<td>1.15 (0.15, 9.06)</td>
</tr>
</tbody>
</table>

*p < .05
Study 3, take home points

- Both ever and current e-cigarette use increased non-smoking college students’ odds of trying e-cigarettes one year later
- Ever e-cigarette use increased non-smokers’ odds of current cigarette use one year later
Study 4: Exclusive E-cigarette Use Predicts Cigarette Initiation Among College Students

Loukas et al.
2018

Addictive Behaviors
Study 4: Exclusive e-cigarette use predicts cigarette initiation among college students

- 2,500 never-smoking students from Texas colleges
- Tested whether:
  1. Ever using ENDS increased odds of starting to smoke 1.5 years later
  2. The odds of starting to smoke differed between exclusive ENDS users and users of ENDS + other tobacco product(s)
Study 4, results

• Baseline ever ENDS use associated with 1.36 greater odds of cigarette initiation (after accounting for all other study variables)

• This effect was significant only among exclusive ENDS users
Study 4, take home points

- College students reporting exclusive ENDS use had increased risk of cigarette smoking initiation up to 1.5 years later
- ENDS use is a specific, unique risk factor for subsequent smoking
Study 5: Prevalence and Correlates of JUUL use Among a National Sample of Youth and Young Adults

Vallone et al.
2018
Tobacco Control
Study 5: JUUL use among youth and young adults

- 14,379 participants (15 to 34) surveyed to estimate prevalence of JUUL use and demographic and psychosocial correlates of use
Study 5, results

- 6.0% reported ever JUUL use
- 3.3% reported current JUUL use
- Among current users 15 to 17, 56% reported use on 3 or more out of the past 30 days and over 25% reported use on 10-30 days
Study 5, results

Factors associated with JUUL use:
• Younger age
• White race
• Greater financial comfort
• Perceived ENDS as less harmful than cigarettes
• Household ENDS use
• High sensation seeking
• Current combustible tobacco use
Study 5, take home points

- JUUL use was higher among those less than 21
- Patterns suggest youth may be JUULing regularly rather than experimenting
What are the data suggesting?

• ENDS use has risen rapidly in a relatively short amount of time
• JUUL is currently dominating the market
• Prospective studies indicate that ENDS use increases the risk for future onset of cigarette smoking among adolescents and college students
FDA Regulation of ENDS (Brief History)

- 2009: FDA granted regulatory authority over tobacco products
- 2016: FDA finalized a rule extending regulatory authority to cover all tobacco products, including ENDS, that meet the definition of a tobacco product
Warning Statements

2018: All "covered" tobacco products must bear the required nicotine addictiveness warning statement on product packages and advertisements

WARNING: This product contains nicotine. Nicotine is an addictive chemical.
Campaign messages focus on educating youth that using e-cigarettes, just like cigarettes, puts them at risk for addiction and other health consequences.
Recent FDA Actions

• Placing ads in 10,000 school bathrooms and on websites
• Sent 1,300 warning letters to retailers about selling to minors
• 131 of the retailers to pay a fine
FDA Actions

• Sept. 24: Commissioner Scott Gottlieb said FDA is considering banning online e-cigarette sales
• FDA threatening to pull flavored e-cigarettes off the market
FDA Actions

Five nicotine vaping brands must submit plan to FDA detailing how they will prevent teens from using their products

- Juul
- Vuse (British American Tobacco)
- MarkTen (Altria)
- Blu E-cigs (Imperial Brands)
- Logic (Japan Tobacco)
FDA Actions

- November 2: Commissioner issued a statement on “efforts to address growing epidemic”
- December 5: public hearing to “discuss (FDAs) efforts to eliminate youth e-cigarette use”
QUESTIONS?