Potential Consequences of E-Cigarette Use: Is Youth Health Going Up in Smoke?
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Research question and main findings

• **Question**: Are electronic cigarettes (e-cigarettes) a substitute for adolescent traditional tobacco product use, or are e-cigarettes a gateway for adolescent traditional tobacco product use?

• **Findings**: The study results provide compelling evidence that e-cigarettes could be a gateway to adolescent traditional tobacco use
  – Youth who vape are more likely to smoke than expected
  – Youth who vape smoke traditional cigarettes on more days than expected
  – Youth who vape smoke a greater number of cigarettes per day than expected
Data

• Center for Disease Control’s (CDC’s) National Youth Tobacco Survey (NYTS)
  – Various waves from 2002-2014
  – About 20,000 students in each wave during this time period have answered the survey questions necessary for our study

• E-cigarettes introduced to U.S. in 2007
  – 2002-2006 survey respondents are considered the “before” e-cigarette sample
  – 2011-2014 survey respondents are considered the “after” e-cigarette sample

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Proportion of Vapers</th>
<th>Compared to the full sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades 6-8</td>
<td>17.5%</td>
<td></td>
</tr>
<tr>
<td>Grades 9-10</td>
<td>37.7%</td>
<td></td>
</tr>
<tr>
<td>Grades 11-12</td>
<td>44.9%</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>51.5%</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>5.5%</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>16.2%</td>
<td></td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>8.5%</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>80.3%</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>20.2%</td>
<td></td>
</tr>
<tr>
<td>Lives with a smoker</td>
<td>51.1%</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2,641</td>
<td>67,431</td>
</tr>
</tbody>
</table>
Methodology

• Step 1: Use 2002-2006 data (≈ 61,000 respondents) to estimate the probability of smoking
  – Example: We estimate that, in 2004, a white (non-Hispanic) female junior in high school who was 17 years old and did not live with a smoker had about a 17% chance of smoking

• Step 2: Use 2002-2006 estimates to predict the number of smokers in our 2011-2014 data
  – We predict that ≈13% of 2011-2014 female respondents like the one described above will smoke

• Step 3: Divide 2011-2014 data into two groups: nonvapers and vapers

• Step 4: Compare predictions to actual outcomes for each group in the 2011-2014 data
  – Nonvapers: 6.9% of females matching the above description actually report smoking
  – Vapers: 43% of females matching the above description actually report smoking
Aggregate results: Predicted vs. actual percentages of smokers
Aggregate results: Predicted vs. actual percentages of smokers

50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%

predicted
Nonvapers
Aggregate results: Predicted vs. actual percentages of smokers

- Predicted: 10% nonvapers
- Actual: 5% nonvapers
Aggregate results: Predicted vs. actual percentages of smokers

- **Nonvapers**
  - Predicted: 10%
  - Actual: 5%

- **Vapers**
  - Predicted: 16%
Aggregate results: Predicted vs. actual percentages of smokers

![Bar graph showing predicted and actual percentages of smokers.](image-url)
Aggregate results: Predicted vs. actual smoking frequency and intensity

• Frequency – The number of days during which one has smoked over the past 30 days

• Intensity – The average number of cigarettes smoked per day on days that one has smoked

• Nonvapers smoke less frequently and less intensely than expected
  – Ex: 57% fewer nonvapers smoke cigarettes every day than we expect
  – Ex: Among nonvapers who smoke, 20% fewer smoke more than a pack per day than we expect

• Vapers smoke more frequently and more intensely than expected
  – Ex: 205% more vapers smoke cigarettes every day than expected
  – Ex: Among vapers who smoke, 18% more smoke more than a pack per day than we expect
Conclusions

• Not just a concern for the health of adolescents, but for the health of military personnel since these youth are our next generation of recruits

• Vaping might be a gateway to traditional tobacco use
  – Youth who vape are more likely to smoke than expected
  – Youth who vape smoke traditional cigarettes on more days than expected
  – Youth who vape smoke a greater number of cigarettes per day than expected

• First study to our knowledge to explore this question with a nationally representative sample of youth over such a long timespan

• Results highlights the importance for more data collection on youth e-cigarette use and more research on this topic
Questions?