Vaping, JUULing, and E-cigarettes: Public Health Implications

Andrea Villanti, PhD, MPH
Vermont Center on Behavior and Health
University of Vermont
April 2, 2019
Andrea Villanti, PhD, MPH
Associate Professor
Vermont Center on Behavior and Health
Department of Psychiatry
Larner College of Medicine, University of Vermont

• Funding from NIH (R03CA212694; R21DA046333; COBRE P20GM103644; R01CA229082; TCORS U54DA036114) and FDA
• No other financial relationships to disclose.
• No industry funding; no off-label medications use discussed
• The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration.

http://www.med.uvm.edu/behaviorandhealth/home
Areas of focus

Young adult tobacco use and cessation

Tobacco regulatory science

Methods and measures
How to assess impact on public health?

FDA’s “public health standard” calls for the review of the scientific evidence regarding:

1. Risks and benefits of the proposed rule to the population as a whole, including both users and non-users of tobacco products;

2. Whether there is an increased or decreased likelihood that existing users of tobacco products will stop using such products; and

3. Whether there is an increased or decreased likelihood that those who do not currently use tobacco products, most notably youth, will start to use tobacco products.
Overview of Electronic Nicotine Delivery Systems: A Systematic Review

Allison M. Glasser, MPH, Lauren Collins, MPH, Jennifer L. Pearson, PhD, MPH, Haneen Abudayyeh, MPH, Raymond S. Niaura, PhD, David B. Abrams, PhD, Andrea C. Villanti, PhD, MPH
Table 1  Electronic nicotine delivery systems systematic review study categories and outcomes

<table>
<thead>
<tr>
<th>Study category</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Product features | ■ Product design  
|                  | ■ Nicotine, propylene glycol, flavouring, particulate matter and other toxicant content |
| Health effects | ■ Effects of:  
|                | ▶ Nicotine  
|                | ▶ Tobacco-related toxicants  
|                | ▶ Non-tobacco-specific toxicants  
|                | ■ Impact on:  
|                | ▶ Cardiovascular system  
|                | ▶ Lung function  
|                | ▶ Blood count  
|                | ▶ Other physiology  
|                | ▶ Cognition  
|                | ▶ Abuse liability/addictiveness  
| Consumer perceptions | ■ Adverse events  
|                  | ■ Cytotoxicity  
|                  | ■ Awareness  
|                  | ■ Product perceptions  
|                  | ■ Interest  
|                  | ■ Reasons for use  
| Patterns of use | ■ Ever, current and dual use with other tobacco products  
|                 | ■ Initiation/progression  
|                 | ■ Smoking cessation/reduction  
|                 | ■ Use among various groups: general population, youth, young adults, adults, current smokers, former smokers, never-smokers, etc  
| Marketing | ■ Advertisement/promotion prevalence and expenditure  
|             | ■ Claims and depictions  
|             | ■ Receptivity to advertising/promotion  
|             | ■ Marketing channels  
| Sales | ■ Market share/sales volume  
|       | ■ Retail and online availability  
|       | ■ Pricing  
| Policies | ■ Federal, state, local and organisational  
|          | ■ Existing and proposed  
|          | ■ Public support for policy  

687\(^a\) articles included in systematic review  
- Patterns of Use (n=252)  
- Consumer Perceptions (n=188)  
- Health Effects (n=129)  
- Product Features (n=86)  
- Cessation (n=74)  
- Marketing and Communication (n=74)  
- Potential to Induce Dependence (n=54)  
- Policy (n=51)  
- Sales (n=30)
Key questions

• What is the impact of e-cigarettes on initiation of tobacco use (including e-cigarettes)?

• What is the impact of e-cigarettes on cessation of tobacco use?

• What are the overall health risks associated with e-cigarette use?
FDA’s mandate and opportunity

How do we move tobacco users to the least harmful products?

How do we keep people in the least harmful states?

Overview

• What is an e-cigarette?

• Lesson 1: Products matter

• Lesson 2: Context matters

• Lesson 3: Target population matters
WHAT IS AN E-CIGARETTE?
What do you call these devices?
How do these devices work?

LED
Lights up when the smoker draws on the cigarette

Microprocessor
Controls heater and lighter

Battery

Sensor
Detects when smoker takes a drag

Heater
Vaporises nicotine

Cartridge
Holds nicotine dissolved in propylene glycol

https://med.stanford.edu/tobaccopreventiontoolkit/E-Cigs.html
LESSON 1: PRODUCTS MATTER
E-cigarettes are not a single product class

Cigarette ideals:
- Standardized product
- Engineered for nicotine delivery, taste, satisfaction
- Easy to use
Nicotine delivery, by product

E-cigarette nicotine delivery: Device matters

E-cigarette nicotine delivery: Device matters

Circadian rhythms of cigarette use

E-cigarette manufacturers vary
Tobacco giant Altria takes 35% stake in Juul, valuing e-cigarette company at $38 billion

- Altria has taken a 35 percent stake in Juul, the companies announce.
- Juul represents about 75 percent of the e-cigarette market.
Altria launches MarkTen

Reynolds launches Vuse

Lorillard acquires blu eCigs

E-cigarette Advertising Expenditures, U.S.

Year
2010: $5
2011: $12
2012: $22
2013: $76
2014: $115

U.S. Dollars ( Millions )

E-cigarette Advertising Expenditures, U.S.

Table 1  JUUL marketing expenditures in Kantar-tracked channels: 2015–2017

<table>
<thead>
<tr>
<th>Year</th>
<th>B-to-B DOLS (000)</th>
<th>RADIO DOLS (000)</th>
<th>INT DISPLAY DOLS (000)</th>
<th>OUTDOOR DOLS (000)</th>
<th>Total $ (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 (Q3–Q4)</td>
<td>US$23.3</td>
<td>US$538.6</td>
<td>US$1034.6</td>
<td>US$45.1</td>
<td>US$1641.7</td>
</tr>
<tr>
<td>2016</td>
<td>US$57.5</td>
<td>US$388.8</td>
<td>US$0.6</td>
<td>US$78.2</td>
<td>US$525.1</td>
</tr>
<tr>
<td>Total</td>
<td>US$100.4</td>
<td>US$927.4</td>
<td>US$1035.2</td>
<td>US$123.3</td>
<td>US$2186.4</td>
</tr>
</tbody>
</table>

*Due to the lag in data collection and reporting, the marketing expenditure data for the third and fourth quarters of 2017 were not available at the time of this report.

JUUL Total Advertising 2015-2017: $2M

E-cigarette sales by brand: 2011 - 2017

**JUUL** sales as a percentage of all e-cigarette sales

Source: Nielsen: Tobacco “All Channel” Data, August 2017-October 2018

Significant increase in past 30-day e-cigarette use in high school students between 2017 and 2018.

http://www.scholastic.com/youthvapingrisks/
E-cigarettes

1. E-cigarettes are a heterogeneous group of products.
2. These products vary in nicotine delivery and consumer satisfaction – both of which are likely to impact their uptake.
3. Variety of e-cigarette manufacturers, including cigarette companies.
4. Product advertising largely driven by cigarette company products.
5. There are no established quality or safety standards for these products.
LESSON 2: CONTEXT MATTERS
Nicotine & Tobacco

• Nicotine = stimulant

• Other compounds in tobacco smoke (e.g., acetaldehyde) may enhance nicotine’s effects on the brain

• Characteristic response:
  – increases in blood pressure
  – increases in heart rate
  – increases in respiration
  – improved mood
  – better concentration
SMOKING TOBACCO
Tobacco smoking is the act of burning dried or cured leaves of the tobacco plant and inhaling the smoke. Combustion uses heat to create new chemicals that are not found in unburned tobacco, such as tobacco-specific nitrosamines (TSNAs) and benzenepyrene, and allows them to be absorbed through the lungs.

SMOKELESS TOBACCO
Smokeless tobacco is usually consumed orally or nasally without burning or combustion. Smokeless tobacco increases the risk of cancer and leads to nicotine addiction similar to that produced by cigarette smoking. There are different types of smokeless tobaccos: chewing tobacco, snuff, and dissolvables.

Manufactured cigarettes
Karets
Roll-your-own (RYO) cigarettes
Pipes
Bidis
Sticks
Water pipes
Cigars
Chewing tobacco
Moist snuff
Dry snuff
Dissolvable smokeless tobacco products

source: Tobacco Atlas, 4th edition; tobaccoatlas.org
Prevalent products in the U.S.

E-cigarette

Cigarettes & cigars

Hookah

Tobacco bowl
Ashtray
Neck
Mouthpiece
Water bowl
Hose
Tobacco use among high school students, NYTS 2011-2018

https://www.cdc.gov/mmwr/volumes/68/wr/mm6806e1.htm
Youth frequency of product use, 2014 NYTS

Cigarette use

Polyuse: 81%

Poly-use in past 30 days
Exclusive use in past 30 days

1-2 days 3-5 days 6-9 days 10-19 days 20-29 days All 30 days

Smokeless tobacco use

Polyuse: 74%

Poly-use in past 30 days
Exclusive use in past 30 days

1-2 days 3-5 days 6-9 days 10-19 days 20-29 days All 30 days

Cigar use

Polyuse: 77%

Poly-use in past 30 days
Exclusive use in past 30 days

1-2 days 3-5 days 6-9 days 10-19 days 20-29 days All 30 days

E-cigarette use

Polyuse: 64%

Poly-use in past 30 days
Exclusive use in past 30 days

1-2 days 3-5 days 6-9 days 10-19 days 20-29 days All 30 days

Tobacco and Substance Use in Past 30-Days among Youth

Monitoring the Future 2018 (Table 3); http://www.monitoringthefuture.org//pubs/monographs/mtf-overview2018.pdf
Percent of youth aged 12–21 years whose first drug use was marijuana, cigarettes, alcohol, other tobacco, other drugs, or no drug use

Vaping in Past 30-Days among Youth

- Any vaping: 12.0% (2017), 19.2% (2018)
- Vaping nicotine: 7.5% (2017), 14.2% (2018)
- Vaping marijuana: 3.6% (2017), 5.7% (2018)
- Vaping just flavoring: 8.0% (2017), 11.5% (2018)

Monitoring the Future 2018 (Table 3);
Context matters

• Youth e-cigarette use increased from 2017-2018.
• Any tobacco product and polytobacco use increased from 2017-2018.
• Polytobacco use is highly prevalent in youth.
• E-cigarette and tobacco product use occurs in the context of:
  – Other substance use
  – Marketing
Why might JUUL be different?

- ALL commercially-available JUUL pods contain nicotine liquid; available in a range of flavors.

- Nicotine salts
  - More stable
  - More efficient nicotine delivery
  - Higher nicotine concentration
  - Easier to inhale

- IT product design
  - Easier to use

- To be marketed next to Marlboro cigarettes in stores around the country
  - Cost of JUUL starter kit: $30
  - Cost of pack of Marlboro: $11
MYTH: JUUL cannot be refilled

Google search for "hack juul"

About 640,000 results (0.52 seconds)

Videos

- **How to Hack Your JUUL Pod in Two Minutes**
  - My Vaping Goodies
  - YouTube - Nov 20, 2017

- **SUPER EASY JUUL HACK! GET A BETTER THROAT HIT**
  - FordFanBoy
  - YouTube - Oct 3, 2018

- **MAKE YOUR JUUL PODS LAST LONGER (juul hack)**
  - Caleb Rivers
  - YouTube - Oct 3, 2017
LESSON 3:
TARGET POPULATION MATTERS
FDA’s mandate and opportunity

Preventing tobacco use

Supporting tobacco cessation

Main concerns re: youth e-cigarette use

• **Nicotine exposure**
  – Nicotine exposure during the teen years can disrupt normal brain development and alter the physical structure of the brain, creating permanent changes.

• **Nicotine dependence** (addiction)
  – Vaping delivers nicotine to the brain in as little as 10 seconds, and a teen’s brain is still developing, making it more vulnerable to nicotine addiction.

http://www.scholastic.com/youthvapingrisks/
How does nicotine addiction happen?

Release of dopamine

Produces feelings of pleasure

Teaches/reinforces behavior

Creates a cycle of: Craving → Reward → Withdrawal

What does nicotine dependence look like?

- Going out of way to obtain or use
  - Altering one’s routines

- Withdrawal symptoms
  - Negative mood
  - Boredom
  - Stress/anxiety

- Hard to stop

Criteria for nicotine addiction (tobacco use disorder)

1. Tobacco taken in larger amounts or over longer periods of time.
2. Persistent desire or unsuccessful efforts to cut down or control use.
3. A great deal of time is spent on activities necessary to obtain or use tobacco.
4. Craving or a strong desire or urge to use tobacco.
5. Recurrent tobacco use resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued tobacco use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by effects of tobacco (e.g., arguments with others about tobacco use).
7. Important social, occupational, or recreational activities are given up or reduced because of tobacco use.
8. Recurrent tobacco use in situations in which it is physically hazardous (eg, smoking in bed).
9. Tobacco use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by tobacco.
10. Tolerance, as defined by either the need for markedly increased amounts of tobacco to achieve the desired effect or a markedly diminished effect with continued use of the same amount of tobacco.
11. Withdrawal, as manifested by either the characteristic withdrawal syndrome or the use of tobacco to relieve or avoid withdrawal symptoms.

https://emedicine.medscape.com/article/287555-clinical#b1
Main concerns re: e-cigarette use

• Transition to combusted tobacco products

At the end of 3 years, compared to youth who had not tried any tobacco product, youth who first tried e-cigarettes or other tobacco products had...

- **4x higher odds of ever trying cigarettes**
- **3x higher odds of having used cigarettes in the past 30 days**

**Ever cigarette use**
- E-cigarettes, 29
- Other tobacco products, 17
- No tobacco, 54

**Past 30-day cigarette use**
- E-cigarettes, 24
- Other tobacco products, 19
- No tobacco, 57

Health effects of cigarette smoking

- Smoking accounts for 480,000 deaths annually in the U.S.
  - ~1,300 smoking-related deaths per day

- 5.6 million of today’s youth expected to die prematurely from smoking

https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/index.htm
Tobacco use:
Leading cause of preventable death in the U.S.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Outcomes Addressed</th>
<th>CPSTF Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehensive Tobacco Control Programs</strong></td>
<td>Cessation Initiation Secondhand Smoke Exposure</td>
<td><strong>Recommended August 2014</strong></td>
</tr>
<tr>
<td><strong>Smoke-Free Policies</strong></td>
<td>Cessation Initiation Secondhand Smoke Exposure</td>
<td><strong>Recommended November 2012</strong></td>
</tr>
<tr>
<td><strong>Interventions to Increase the Unit Price for Tobacco Products</strong></td>
<td>Cessation Health Disparities Initiation</td>
<td><strong>Recommended November 2012</strong></td>
</tr>
<tr>
<td><strong>Mass-Reach Health Communication Interventions</strong></td>
<td>Cessation Initiation</td>
<td><strong>Recommended April 2013</strong></td>
</tr>
<tr>
<td><strong>Reducing Out-of-Pocket Costs for Evidence-Based Cessation Treatments</strong></td>
<td>Cessation</td>
<td><strong>Recommended August 2012</strong></td>
</tr>
<tr>
<td><strong>Quitline Interventions</strong></td>
<td>Cessation</td>
<td><strong>Recommended August 2012</strong></td>
</tr>
<tr>
<td><strong>Mobile Phone-Based Cessation Interventions</strong></td>
<td>Cessation</td>
<td><strong>Recommended December 2011</strong></td>
</tr>
<tr>
<td><strong>Internet-Based Cessation Interventions</strong></td>
<td>Cessation</td>
<td>Insufficient Evidence December 2011</td>
</tr>
<tr>
<td><strong>Mass Media - Cessation Contests</strong></td>
<td>Cessation</td>
<td>Insufficient Evidence May 2000</td>
</tr>
</tbody>
</table>

https://www.thecommunityguide.org/
## Vermont laws re: e-cigarettes

<table>
<thead>
<tr>
<th></th>
<th>Prohibits e-cigarette use in worksites, restaurants, and bars</th>
<th>Retail license required to sell e-cigarettes over the counter</th>
<th>Self-service displays of e-cigarettes prohibited</th>
<th>Sales of tobacco products including e-cigarettes to persons aged &lt;21 yrs prohibited</th>
<th>E-cigarette tax (tax rate)</th>
<th>Summary of laws enacted as of September 30, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermont</td>
<td>Jul 1, 2016</td>
<td>Jul 1, 2013</td>
<td>Jan 1, 2017</td>
<td>—</td>
<td>—</td>
<td>EF, RL, SS</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8 states, DC, and Puerto Rico</strong></td>
<td><strong>16 states, DC, and U.S Virgin Islands</strong></td>
<td><strong>26 states</strong></td>
<td><strong>5 states, DC, and Guam</strong></td>
<td><strong>8 states, DC, Puerto Rico and U.S. Virgin Islands</strong></td>
<td><strong>—</strong></td>
</tr>
</tbody>
</table>

EF: state law prohibits e-cigarette use in indoor areas of private worksites, restaurants, and bars; RL: state law requires retailer to purchase a license to sell e-cigarettes; SS: state law prohibits self-service displays of e-cigarettes; T: state law applies tax to e-cigarettes; T-21: state law prohibits sales of tobacco products, including e-cigarettes, to persons aged <21 years.

[https://www.cdc.gov/mmwr/volumes/66/wr/mm6649a1.htm](https://www.cdc.gov/mmwr/volumes/66/wr/mm6649a1.htm)
National E-cigarette Prevention Campaigns

**FACT:**
1 JUUL POD = 20 CIGARETTES WORTH OF NICOTINE

truth ad (October 2018)

FDA ad (October 2017)
VT – E-cigarette Prevention Campaign

https://unhypedvt.com/
FDA’s mandate and opportunity

Preventing tobacco use

Supporting tobacco cessation

Aids used in most recent quit attempt, United Kingdom

N=14289 adults who smoke and tried to stop or who stopped in the past year; method is coded as any (not exclusive) use

http://www.smokinginengland.info/latest-statistics/
E-cigarettes and cessation: TUS-CPS

• The overall rate of smoking cessation for the US population was significantly higher in 2014-15 than in 2010-11, as well as than in all previous survey years.

• Past-year e-cigarette users in 2014-15 were more likely than non-users to make a quit attempt and succeed in quitting smoking.

• “E-cigarettes appear to have helped to increase smoking cessation at the population level.”

E-cigarettes and cessation: NHIS

Giovenco DP, Delnevo CD. Addict Behav. 2018;76:129-134.
## Reach x efficacy = impact

<table>
<thead>
<tr>
<th>Treatment modality</th>
<th>Estimated reach</th>
<th>Effectiveness</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone quitlines</td>
<td>325,000</td>
<td>12.7%</td>
<td>41,275</td>
</tr>
<tr>
<td>Brief advice from health care provider</td>
<td>20,878,000</td>
<td>13.4%</td>
<td>2,797,652</td>
</tr>
<tr>
<td>OTC NRT</td>
<td>10,950,000</td>
<td>21.3%</td>
<td>2,332,350</td>
</tr>
<tr>
<td>Internet interventions</td>
<td>12,434,691</td>
<td>12.8%</td>
<td>1,591,640</td>
</tr>
<tr>
<td>E-cigarettes*</td>
<td>15,254,499</td>
<td>8.2%**</td>
<td>1,250,870</td>
</tr>
</tbody>
</table>

*Adults who looked for information on using e-cigarettes to quit or reduce smoking (HINTS Cycle 2, FDA 2017)

**Annual cessation rate among those who had used e-cigarettes in the past year

Graham AL, Amato MS. *Nicotine Tob Res.* 2018;
How do we determine the impact of e-cigarettes on cigarette smoking cessation or reduction? Review and recommendations for answering the research question with scientific rigor

Andrea C. Villanti¹,²,³, Shari P. Feirman¹, Raymond S. Niaura¹,², Jennifer L. Pearson¹,², Allison M. Glasser¹, Lauren K. Collins¹ & David B. Abrams¹,²,⁴
E-cigarettes and cessation: Intervention studies

- Only four papers from three RCTs meet all six recommended criteria.
- These studies suggest that e-cigarettes are effective in helping adult smokers to quit or to reduce their cigarette consumption, and that rates of smoking cessation with e-cigarettes are similar to rates of cessation with NRT.

Quitting e-cigarettes/vaping/JUULing

Borrowing from tobacco cessation research:

• Set a quit date!
• Make it hard to access a vape.
• Identify high risk for vaping situations and be prepared.
• Wait out cravings by distracting with other activities, especially those incompatible with vaping.
• Keep your hands busy; keep your mouth busy (e.g., gum).

• Review quit reasons frequently.
• Avoid others while they are vaping.
• Reach out to family, friends and physician for support.
• For adults (18+), use FDA-approved medications (nicotine replacement therapy, bupropion, varenicline).
Quitting e-cigarettes/vaping/JUULing

- Practical counseling (problem solving/skills training)
  - strengthen the patient’s skills in coping with situations associated with a high risk of smoking; can be specific to certain high-risk situations or involve general social skills

- Social support
  - encouragement and positive reinforcement of quit attempts by family, friends, coworkers, etc.

These are approaches used by most state quit lines (1-800-QUIT-NOW) and online resources (e.g., smokefree.gov).

https://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/clinicians/presentations/2008update-full/index.html
Quitting resources

• Vermont:
  – https://802quits.org/

• National:
  – https://smokefree.gov/
  – https://teen.smokefree.gov/
  – https://www.becomeanex.org/
  – https://truthinitiative.org/quitecigarettes
FDA’s mandate and opportunity

E-cigarettes: Health effects

- E-cigarette liquids typically contain nicotine, flavorings, and humectants (to retain moisture).
  - Overall, e-cigarette aerosol contains fewer numbers and lower levels of toxicants than smoke from combustible tobacco cigarettes.
  - Nicotine exposure can mimic that found with use of combustible tobacco cigarettes, but it is highly variable.
  - The exposure to nicotine and toxicants from the aerosolization of flavorings and humectants depends on device characteristics and how the device is used.

https://www.nap.edu/resource/24952/012318ecigaretteHighlights.pdf
E-cigarettes: Health effects

• E-cigarettes have short-term negative effects on health.
  – Cell dysfunction, tissue injury, increased heart rate, DNA damage, injury, poisoning, nicotine dependence.
  – Implications for long-term effects on morbidity and mortality are not yet clear.

• Evidence suggests that while e-cigarettes might cause youth who use them to transition to use of combustible tobacco products, they might also increase adult cessation of combustible tobacco cigarettes.

https://www.nap.edu/resource/24952/012318ecigaretteHighlights.pdf
FDA’s mandate and opportunity

Preventing tobacco use

Supporting tobacco cessation

Novel intervention points

Prevention

Experimentation

Prevescalation

Regular use

Cessation

Never use

To understand the impact of state-level policies and communication campaigns on substance use beliefs and behaviors in young Vermonters.
Nicotine beliefs

4,091 participants aged 18-40 completed Wave 10 of the Truth Initiative Young Adult Cohort Study

Nicotine is a cause of cancer.

- True: 54.8%
- False: 21.0%
- Don’t know: 24.2%

Villanti AC, Naud S, West JC, et al., under review.
Nicotine beliefs

Nicotine perceptions re: health risks

According to you, how large a part of the cancer caused by cigarette smoking comes from the nicotine itself?

- A very large part or all of the health risks: 60.4%
- A relatively large part: 25.0%
- A relatively small part: 8.7%
- None or a very small part: 6.5%

According to you, how large a part of the health risks of cigarette smoking come from the nicotine itself?

- A very large part or all of the health risks: 65.8%
- A relatively large part: 24.6%
- A relatively small part: 27.8%
- None or a very small part: 6.5%
Nicotine beliefs

Chemicals in cigarette smoke, not nicotine, largely cause cancer, heart disease, and other health problems related to smoking.
Summary

• Lesson 1: Products matter
• Lesson 2: Context matters
• Lesson 3: Target population matters
Resources

• Vermont Department of Health “E-cigarettes, Vaping and Juul Resources: 2019”
  – http://www.healthvermont.gov/sites/default/files/documents/pdf/Health%20Department%20E-Cigarette%20Resources%202019%202.5.19_0.pdf

• National Academy of Sciences, Engineering and Medicine Consensus Study Report “Public Health Consequences of E-Cigarettes”

• Office of the U.S Surgeon General and the U.S. Centers for Disease Control and Prevention
  – https://e-cigarettes.surgeongeneral.gov/