



Latest Trends on Teen Vaping

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Presentation Outline

- Overview of Electronic Nicotine Delivery Systems (ENDS)
- Prevalence Data
- Review of Studies on Teen and Young Adult Vaping



Say what?

- Vaping
- E-cigarettes
- E-hookahs
- Juuling & JUULpods
- ENDS



Electronic Nicotine Delivery Systems (ENDS)



Electronic Nicotine Delivery Systems (ENDS)



JUUL and JUULpods



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
- User inhales 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.”

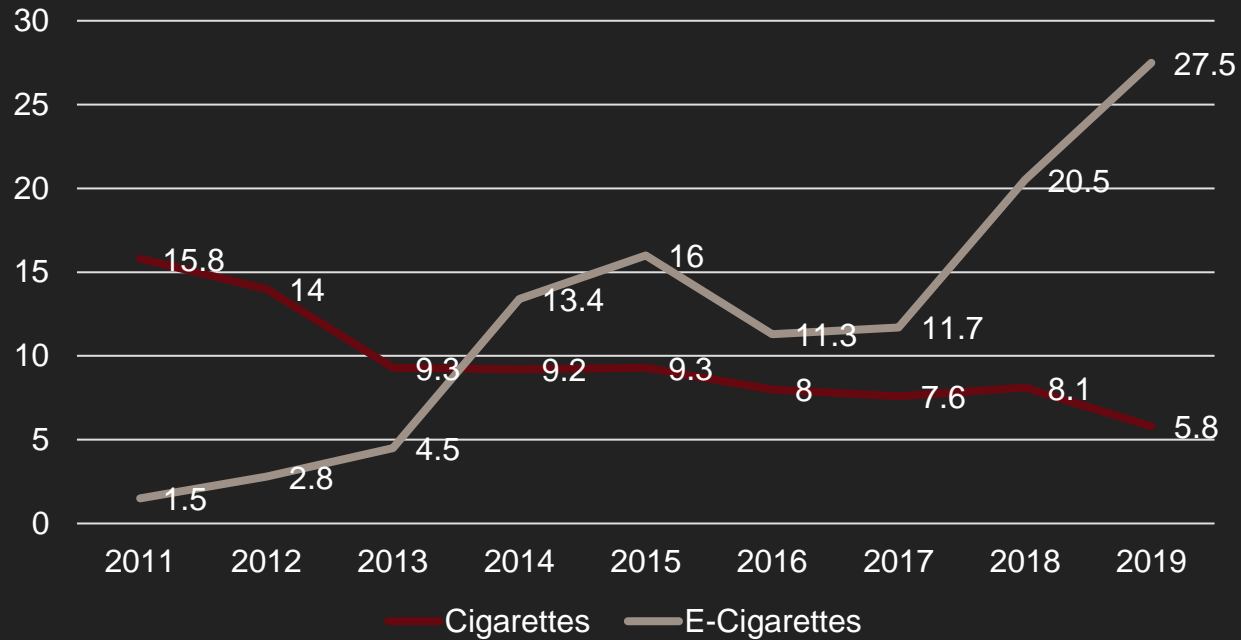


Data from CDC

- 75% increase in number of high school students who have used e-cigarettes in the past 30 days from 2017 to 2018
 - 1.5% of students in 2011 to 27.5% in 2019
- 3 million (20%) high school students are using e-cigarettes



Cigarette & E-Cigarette Use Rates Among High School Students, 2011 to 2019



JUUL has dominated the market in recent years

- 73% of the market share 2018
- 64% of the market share in 2019



Summary of Select Studies on ENDS Use Among Teens and Young Adults



Study 1: Association of Noncigarette Tobacco Product
Use With Future Smoking Among Youth in the
Population Assessment of Tobacco and Health (PATH)
Study, 2013-2015

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

Baseline use	Adjusted OR	95% CI
E-cigarettes	1.87	1.15, 3.05
Hookah	1.92	1.17, 3.17
Other combustibles	1.78	1.00, 3.19
Smokeless	2.07	1.10, 3.87
More than 1 type	3.81	2.22, 6.54



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

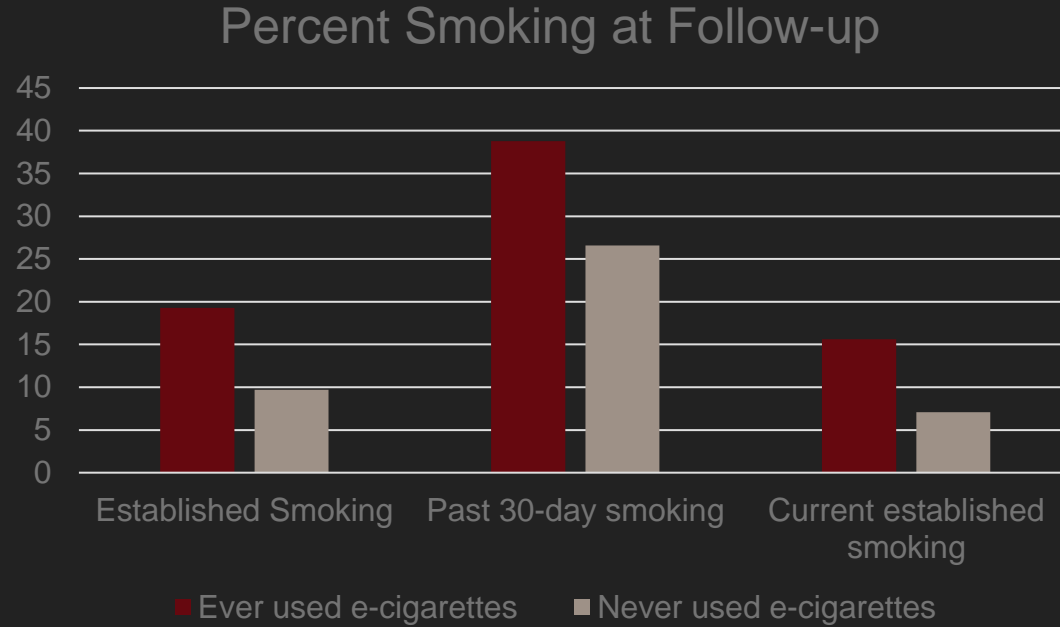


Study 2: Progression from experimentation to established cigarette smoking

- 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)



Study 2, results (adjusted)

Outcome	Adjusted OR	95% CI
Current established smoking	1.80	1.04, 3.12
Established smoking	1.57	0.99, 2.49
Past 30-day smoking	1.32	0.99, 1.76



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



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

Time 1 never smokers	Time 2 ever cigarette use AOR (95% CI)	Time 2 current cigarette use AOR (95% CI)
Ever e-cigarette use	3.37 (1.91, 5.94)*	3.30 (1.20, 9.05)*
Current e-cigarette use	3.41 (1.57, 7.41)*	1.15 (0.15, 9.06)

* $p < .05$



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



Three Take Home Messages

- ENDS use has risen rapidly in a relatively short amount of time
- JUUL has dominated the market recently
- Prospective studies indicate that ENDS use increases the risk for future onset of cigarette smoking among adolescents and college students

