

# E-CIGARETTE HEALTH CRISIS: WHAT DO WE KNOW ABOUT THE RISK PERCEPTIONS, ATTITUDES, NORMS, AND USE OF E-CIGARETTES AMONG COLLEGE STUDENTS

Dr. Taejin Jung, Dr. Minhao Dai, and Dr. Katherine Thweatt, State University of New York at Oswego

## E-cigarette use and its averse consequences

E-cigarettes have rapidly become the most common tobacco products used by youth, exceeding the prevalence of combustible tobacco. 3.62 million high and middle school students (20.8% among high school students and 4.9% among middle school students) were current users of e-cigarettes and other Electronic Nicotine Delivery Systems (ENDS) (Walley, Wilson, Winickoff, & Groner, 2019).

E-cigarette use increases risk for cough, wheezing, asthma exacerbations, and severe pulmonary disease (Report, 2018).

The purpose of this research is to understand college students' perception and use e-cigarette, main reasons and influencers of (not) using e-cigarette, and main situations of prompting e-cigarette use.

## Research Questions

- RQ1. How do college students perceive and use e-cigarettes?
- RQ2. What are the reasons (not) of using e-cigarettes?
- RQ3. What are the situations prompting e-cigarette use?
- RQ4. Who are the influencers of using e-cigarettes?
- RQ5. Are there differences of perceptions, uses, situations and influencers of e-cigarette use between non-smokers and non-smokers?

## Research Methods

Data collection: Online survey through Qualtrics with the survey distribution support by the Institute of Research and Assessment of SUNY Oswego.

Measurement: Standardized survey questionnaire to measure demographic and e-cigarette perception and use related variables.

Sampling: Convenient sampling from SUNY Oswego students.

Data collection period: December 2019.

Sample size: 879 (About 10% response rate)

Incentive: \$10 cash rewards for 25 randomly selected respondents.

Data analysis: SPSS was used to do descriptive and analytical analysis (e.g., Chi-square test and t-test).

Table 1. Descriptive statistics of demographic information and e-cigarette use related questions (N = 879)

Demographic Information	N (%)	Mean (SD)
Age	21.4 (5.5)	
Gender		
Male	37.4%	
Female	61.0%	
Race		
White	75.5%	
Black	6.4%	
Hispanic	8.2%	
Asian	6.1%	
Multiracial	3.6%	
School Year		
Freshmen	17.4%	
Sophomores	18.1%	
Junior	26.5%	
Senior	29.7%	
Graduate	7.9%	
Residence		
Residence Hall	49.2%	
Privately-owned apartment or house	44.1%	
Solely/fraternity house	1.7%	
University owned apartment or house	4.9%	

- Respondents' average age is 21.4 years old.
- Among respondents, majority of them are female (61%) and white (75.5%).
- Students of all four undergraduate years and graduates responded. Among them, seniors responded most (29.7%).
- Most students live at residence hall (49.2%) and privately-owned apartment or house (44.1%).

Table 2. Descriptive statistics of e-cigarette consumption characteristics of the college sample (N = 879)

Variables	N (%) or Mean (SD)
Age of first used e-cigarette	18.1(4.8)
Length of using e-cigarette	
Less than 1 month	2.8%
1-3 months	9.0%
4 months - 1 year	15.2%
1-3 years	57.3%
4 or more years	15.7%
Do you live with (e-cigarette) smoker(s)?	
Yes	37.7%
No	62.3%
Do you permit to smoke inside your residency?	
Yes	34.7%
No	65.3%
How much nicotine do you think e-cigarette contains?	
Not at all	0.9%
Less than traditional cigarette/tobacco	8.1%
As much as traditional cigarette/tobacco	32.3%
More than traditional tobacco	58.6%
Current e-cigarette smoking status	
I haven't used an e-cigarette in my lifetime	43.0%
I have only used e-cigarette once or twice in my lifetime	26.7%
I had been an ex-e-cigarette smoker and didn't smoke for the past 3 months	8.0%
I have used e-cigarette within the past 30 days and no intention to quit	13.5%
I have used e-cigarette within the past 30 days and decide to quit	8.8%
E-cigarette flavor smoked within 30 days	
Menthol/Mint	60.8%
Fruit	14.6%
Tobacco	5.5%
Cocktail of multiple flavors	10.1%
Others	9.0%
Co-use with alcohol while using e-cigarette	
No	12.7%
Yes, sometimes	55.3%
Yes, always	32.0%
Co-use with marijuana while using e-cigarette	
No	48.8%
Yes, sometimes	36.5%
Yes, always	14.8%

- Average age of the first e-cigarette use is 18.1 years old. The typical age of incoming freshmen in U.S. college is 18 or 19.
- Most current e-cigarette smokers use e-cigarette for "1-3 years (57.3%)", followed by "1-3 months (15.2%)" and "less than 3 months (11.8%)."
- About one out of three respondents live with e-cigarette smokers (37.7%) and allow smoking inside their residency (34.7%).
- About six out of ten (58.6%) respondents think e-cigarettes contain more nicotine than traditional tobacco products, while about three out of ten think about the same level of nicotine was included (32.3%).
- 22.3% of respondents are current e-cigarette smokers and 8.8% of them was ex-e-cigarette smokers and didn't smoke for the past three months.
- Menthol/Mint is the most favored e-cigarette flavor (60.8%) followed by fruit (14.6%) and cocktail of multiple flavors (10.1%).
- Nine out of ten respondents use e-cigarette with alcohol sometimes (55.3%) or always (32.0%).
- About half of respondents use e-cigarette with marijuana sometimes (36.5%) or always (14.8%).

Table 3. Descriptive statistics and the comparisons between non-smokers vs. smokers of reasons, situations and influencers of smoking among the college

Variables	Non-Smokers	Smokers	Differences (Chi-square)
<b>Reasons to use e-cigarette products (n=740)</b>			
<b>Easy to use</b>	6.00†	5.93 vs. 6.26 (t = 3.109)*	
Variety of flavors	5.98		
<b>Friends use them</b>	5.76	5.83 vs. 5.53 (t = 2.091)*	
<b>Get a buzz</b>	5.74	5.67 vs. 5.99 (t = 2.282)*	
<b>Lack of bad smell</b>	5.72	5.65 vs. 6.01 (t = 3.001)*	
Greater social acceptability than tobacco products	5.54		
<b>Relieve stress</b>	5.34	5.23 vs. 5.71 (t = 3.593)*	
Sleek design	5.22		
Curiosity	5.11		
Less harmful than other forms of tobacco	4.86		
Relieve boredom	4.85		
<b>Peer pressure</b>	4.77	4.98 vs. 4.01 (t = 5.606)*	
Help to quit traditional cigarette	4.15		
Less second-hand smoke	4.00		
<b>Less addictive than traditional cigarettes</b>	3.84	4.03 vs. 3.15 (t = 4.932)*	
Cost reason	3.81		
<b>Reasons not to use e-cigarette products (n=740)</b>			
E-cigarette causes vaping-related respiratory illnesses	5.26	5.43 vs. 4.04 (t = 4.378)*	
E-cigarette increases the likelihood of cancer/heart disease	5.15	5.31 vs. 4.58 (t = 4.115)*	
E-cigarette is as harmful as other forms of tobacco	5.11	5.30 vs. 4.38 (t = 4.906)*	
E-cigarette has as much nicotine as combustible cigarettes	4.82	5.03 vs. 4.04 (t = 5.091)*	
E-cigarette increases the risk of early skin aging and yellow teeth	4.74	4.88 vs. 4.21 (t = 4.584)*	
Addition to e-cigarette makes you lose control of your life	4.16	4.32 vs. 3.53 (t = 3.986)*	
<b>Situations that make you and people of your age to smoke e-cigarette more (n=728)</b>			
Social gathering	5.30	5.18 vs. 5.84 (t = 4.756)*	
Being with friends who vape	5.03	5.15 vs. 5.84 (t = 3.402)*	
Being other vapers	3.92		
Being an indoor space (e.g., friend's house, home, dorm room)	3.79		
Being in a car	3.71		
<b>Who motivate you and people of your age "not" to use e-cigarette? (n=725)</b>			
Parents	4.80	4.73 vs. 5.04 (t = 1.541)	
Partners	4.62	4.23 vs. 3.81 (t = 2.175)*	
Siblings	4.15	4.81 vs. 3.94 (t = 4.452)*	
Friends	4.02	4.25 vs. 3.19 (t = 3.596)*	

\*: p < .05: Comparison between non-smokers and smokers

†: Mean value of 7 point Likert scale (1-not at all, 7-very much)

- "Easy to use", "variety of flavors", "friends use them", "get a buzz", "lack of bad smell", "greater social acceptability", "relieve stress", "sleek design" and "curiosity" are main reasons to use e-cigarette products among other reasons.
- When comparing smokers and non-smokers, more smokers use e-cigarette because it is "easy to use", "get a buzz", "lack of bad smell", "relieve stress" while non-smokers consider to use e-cigarette because "friends use them", "peer pressure" and "less addictive than traditional cigarette."

- Vaping related negative health consequences (e.g., respiratory diseases, cancer/heart diseases, skin aging) are the main reasons of not using e-cigarette products. When comparing smokers and non-smokers
- When comparing smokers and non-smokers, non-smokers concern more on these negative health consequences than smokers.

- "Social gathering" and "being with friends who vape" are the two main situations that make people to smoke e-cigarette more.
- When comparing smokers and non-smokers, smokers are more susceptible to smoke e-cigarettes under these circumstances.

- Parents followed by partners, siblings and friends are the main influencers of not using e-cigarette.
- Compared with non-e-cigarette smokers, smokers are more susceptible of these influencers. However, parents are the main influencer to both non-smokers and smokers without statistically significant difference.

## [Conclusions and Discussions]

- The average age of the first e-cigarette use is 18.1 years old and average age of e-cigarette smokers and younger than non-e-cigarette smokers. Most college students began e-cigarette use at the time of high school senior or college freshman. People who start smoking at an early age are more likely to develop a severe addiction to nicotine than those who start at later age. So, it is critical to make early age anti-smoking initiation campaign and education.
- 27% of current e-cigarette smokers use e-cigarette product less than 1 year and 84.3% of them use it less than 3 years. So, it is critical to help short-term e-cigarette users to quit smoking.

Table 4. Comparison of e-cigarette smoking status based on smoking environment in the living quarter and perception on the c-cigarette nicotine level

	Non-smokers (yes)	Smokers (yes)	Differences (Chi-square)
Living with smokers	27.9%	72.0%	$\chi^2 = 119.97^*$
Permission to smoke in the living quarter	30.6%	48.9%	$\chi^2 = 21.53^*$
E-cigarette has same or lesser level of nicotine than traditional tobacco	42.8%	36.6%	$\chi^2 = 2.317$

\*: p < .05

Table 5. Comparison of e-cigarette smoking status based on age, feeling of financial security, number of close friends who smoke, and support for the current e-cigarette smoking policy.

	Non-smokers (Mean)	Smokers (Mean)	Differences (Chi-square)
Age	21.68	20.69	t = 2.354*
Feeling of financial security	4.02†	4.05†	t = 0.214
Number of closest friends who smoke	2.39	4.16	t = 13.758*
Support for the current e-cigarette smoking policy like e-cigarette flavor ban	5.03†	2.61†	t = 12.606*

\*: p < .05

†: Mean value of 7 point Likert scale (1-not at all, 7-very much)

- E-cigarette smokers are more likely to live with smokers (72% vs. 27.9%).
- E-cigarette smokers are more likely to allow other smokers to smoke in the living quarter (48.9% vs. 30.6%).
- Non-smokers are more like to think that e-cigarette has same or lesser level of nicotine than traditional tobacco (42.8% vs. 36.6%).
- E-cigarette smokers are younger than non-e-cigarette smokers (20.69 vs. 21.68 age old).
- Feeling of financial security is not a meaningful factor of using e-cigarette.
- E-cigarette smokers have more close friends who smoke than non-e-cigarette smokers (4.16 vs. 2.39 people).
- More non-e-cigarette smokers support for the current e-cigarette smoking policy like the e-cigarette flavor ban than e-cigarette smokers.

## [Conclusions and Discussions]

- While about one out of five college students (22.3%) are current e-cigarette smokers, 8.8% of them was ex-e-cigarette smokers and didn't smoke for the past three months, which implies the importance of smoking cessation campaign and education.
- 87.3% and 51.3% of college students answered that they co-use alcohol or marijuana sometimes or always when they smoke e-cigarettes. E-cigarettes could actually serve as a gateway drug to users which will make them more likely to use other illicit drugs like cocaine.
- It is critical to understand the main reasons of using (or not using) e-cigarettes. Peer pressure is the main reason of non-smokers to become to use e-cigarettes, while current smokers continue to use e-cigarettes because of their positive functionalities such as easy to use, lack of bad smell and relieving stress. While e-cigarette smokers are more susceptible of peer pressure, parents are the most important influencer to both smokers and non-smokers on their smoking decision.
- E-cigarette smokers (compared to non-smokers) are more likely to live with smokers and allow other smokers to smoke in the living quarters. Smoke-free legislation is one of the most effective environmental smoking control strategies along with regulations on sales and marketing and taxation.
- It is always true that peer-pressure is one of the biggest predictors of beginning an use of e-cigarettes. E-cigarette smokers have more close friends who smoke than non-e-cigarette smokers (4.16 vs. 2.39 people).

