

High School Students Rarely Use E-Cigarettes Alone:
A Socio-Demographic Analysis of Poly-Substance Use among Adolescents in the USA

Paul A. Gilbert, PhD,¹ Christine Kava, PhD,² Rima Afifi, PhD¹
¹University of Iowa College of Public Health
²University of Washington School of Public Health

Design: Secondary analysis of 2017 Youth Risk Behavioral Surveillance System data (n=11,244)

Outcomes: Past 30-day use of e-cigarettes, tobacco products, alcohol, and cannabis

Analysis: Multivariable logistic regression

Sample characteristics:

- 49% Male
- 56% White
- 90% Heterosexual
- Approximately equivalent proportions (23%-28%) of 9th-12th graders
- 77% Students reported receiving mostly A's or B's

Results:

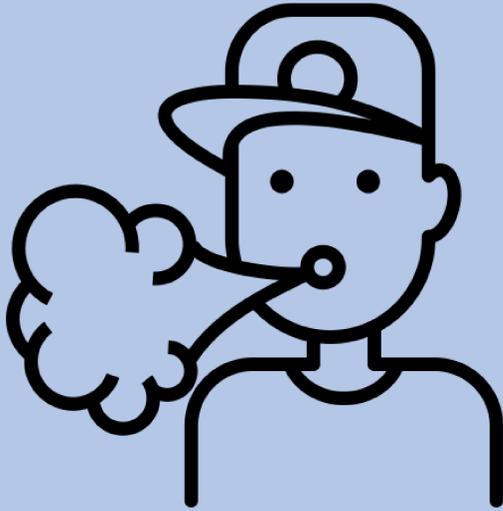
- Only 7% of students who reported using e-cigarettes used the product alone
- Nearly half of all e-cigarette users (48%) reported using all four substances in the past 30 days
- Poly-users reported greater frequency of e-cigarette use than peers who used e-cigarettes only
- Being male, in grades 11 or 12, having a bisexual identity, and reporting poorer academic performance are associated with greater likelihood of e-cigarette poly-substance use

Conclusions:

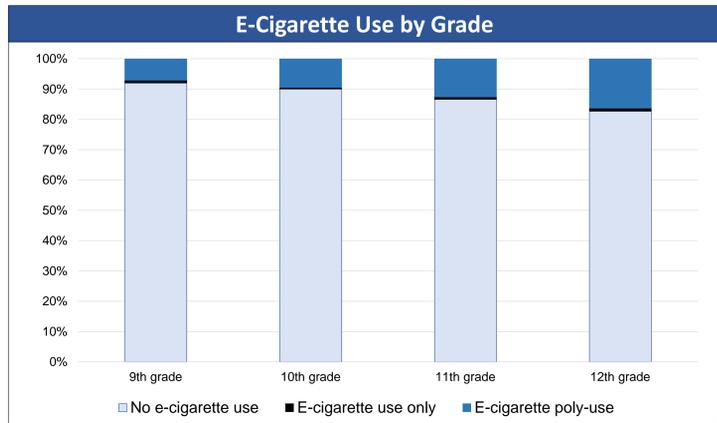
- Poly-substance use is highly prevalent among adolescents who use e-cigarettes and warrants further attention
- We should screen for substance use in multiple venues (e.g., in sports teams, academic advising, social clubs)
- E-cigarette screening may serve as a less-stigmatized entry point for assessment of other substance use

Limitations:

- There may be under-estimates of substance use because of social desirability and other reporting biases
- We could not establish the sequence of poly-substance use because we lacked information on the timing of use
- Some racial/ethnic groups were excluded because of small subgroup sizes, limiting generalizability of findings



Nearly all teenagers who vape also use other substances



Substance Combination	n	%
E-cigarettes + alcohol + tobacco + cannabis	532	48%
E-cigarettes + alcohol + tobacco	203	20%
E-cigarettes + alcohol + cannabis	168	11%
E-cigarettes + alcohol	143	9%
E-cigarettes + tobacco + cannabis	57	4%
E-cigarettes + cannabis	51	4%
E-cigarettes + tobacco	50	5%

Frequency	E-cig only	Poly-use
Infrequent (1-2 days)	56%	33%
Light (3-9 days)	16%	28%
Moderate (10-29 days)	13%	21%
Daily (30 days)	14%	19%

Characteristic	OR	95% CI
Gender (ref=female)		
Male	1.44	1.17, 1.77
Race/ethnicity (ref=White)		
Asian	0.18	0.11, 0.30
Black	0.33	0.21, 0.51
Hispanic	0.47	0.28, 0.80
Multiple	0.61	0.44, 0.83
Sexual orientation (ref=straight)		
Gay/lesbian	1.13	0.72, 1.78
Bisexual	1.62	1.18, 2.22
Grade in school (ref=9th)		
10th	1.35	0.98, 1.84
11th	1.74	1.19, 2.53
12th	2.71	2.02, 3.63
Academic achievement (ref=A's or B's)		
Mostly C's or below	2.09	1.73, 2.52