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

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

Almost all teenagers who vape also use other substances

Nearly all teenagers who vape also use other substances

E-Cigarette Use by Grade

Combinations of Substance Use among E-Cigarette Poly-Users

Frequency of E-Cigarette Use

Odds of E-Cigarette Poly-Use

Gender (ref=female) 1.44 1.17, 1.77
Male 1.44 1.17, 1.77
Race/ethnicity (ref=White) 0.18 0.11, 0.30
Asian 0.33 0.21, 0.51
Black 0.47 0.28, 0.80
Hispanic 0.61 0.44, 0.83
Multiple 0.13 0.72, 1.78
Sexual orientation (ref=straight) 1.13 1.18, 2.22
Gay/lesbian 1.13 1.18, 2.22
Bisexual 1.74 1.19, 2.53
Grade in school (ref=9th) 2.71 2.02, 3.63
10th 2.71 2.02, 3.63
11th 2.71 2.02, 3.63
12th 2.71 2.02, 3.63
Academic achievement (ref=A's or B's) 2.09 1.73, 2.52
Mostly C's or below 2.09 1.73, 2.52