

# Review of: "Youth Patterns of Use of Electronic Nicotine Delivery Systems (ENDS) Use, Population Assessment of Tobacco and Health (PATH) Waves 4 – 5.5"

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Potential competing interests: No potential competing interests to declare.

## **"Youth Patterns of Use of Electronic Nicotine Delivery Systems (ENDS) Use, Population Assessment of Tobacco and Health (PATH) Waves 4-5.5"**

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### **Summary**

The "Youth Patterns of Use of Electronic Nicotine Delivery Systems (ENDS) Use, Population Assessment of Tobacco and Health (PATH) Waves 4-5.5" study is a descriptive analysis aiming to estimate temporal trends in past 30-day use of electronic nicotine delivery systems (END) between 2017 through 2020 among youth. Of the Population Assessment of Tobacco and Health (PATH) study's target population of nationally representative, non-institutionalized US civilians, the analytic sample was based on participants aged 13 to 17 years in Waves 4, 4.5, 5, and 5.5. Analyses included survey-weighted prevalence estimates stratified by wave, device type, brand, and flavor with Rao Scott Chi-Square to test for differences in weighted proportions across strata. In line with other national youth surveys, results demonstrated ENDS use increased between 2018 and 2019, followed by a decline in 2020. Likewise, the prominent device type shifted from pod-based to disposables ENDS between 2019 and 2020, while flavored ENDS were consistently popular across all waves.

Authors are commended for detailing descriptive statistics on ENDS use among youth, a vulnerable population, who may be at increased risk for adverse health outcomes with early exposure to the market of tobacco products.

### **Feedback**

1. A table describing the demographic characteristics (e.g., age-bins, race/ethnicity, family poverty/income) of the analytic sample overall and stratified by PATH Wave, with both unweighted and weighted frequencies and proportions, would be helpful in providing the reader context as to the sample's demographic composition.
2. While Rao Scott Chi-Square is useful in determining overall differences across variable strata, analyses would be strengthened by including 95% confidence intervals with prevalence point estimates. Large samples, such as PATH, are more likely to produce statistically significant p-values. The addition of confidence intervals would allow for more appropriate evaluation of whether individual point estimates truly differ from each other.

3. Methods could be clarified in terms of the longitudinal nature of the analytic sample. It is unclear if authors provided cross-sectional analyses of all youth surveyed in each included wave or if a cohort of Wave 4 respondents were followed across waves. This distinction in methods has implications in the interpretation of results. Given the authors aim to produce trends of general ENDS prevalence among youth, repeated cross-sections would be more appropriate, as sample attrition and survival bias may limit findings. Likewise, varying trends could reflect changes in preferences of aging participants.
4. Current analyses do not support authors statement on page 10, “The declining cigarette smoking during a period of increasing ENDS use can help alleviate concerns that ENDS are a ‘gateway’ or catalyst to smoking.” Descriptive statistics cannot speak to whether ENDS users are of increased or decreased risk of future cigarette smoking. A different study design, with regression and adjustment for potential confounding, is needed to answer this question. Further, the statement regarding “...declining ENDS use” is not appropriate as one data point does not signify a change in trend.
5. Authors should refrain from using causal language (page 12) as the study design does not support these conclusions (similar to comment #4).
6. Lastly, I am curious as to authors’ hypotheses on the potential impact of increased prevalence of disposable devices. May this make ENDS use more available, affordable, convenient? Similarly, what are the public health implications of the observed ENDS trends? Given the involvement of Juul Labs, Inc. in the manuscript preparation, a concern is that more effort could have been taken to interpret findings in the context of public health impact rather than the focus on flavor and brand popularity and availability.