

Exposure to Metals
Among ENDS Users in
the PATH Study: A
Longitudinal Analysis

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Background

Electronic nicotine delivery system (ENDS) are engineered products containing and emitting metals. Few studies have evaluated ENDS as a potential source of toxic metal exposure in human populations. This study evaluated metal body burden by ENDS use status in a longitudinal population-based national survey.

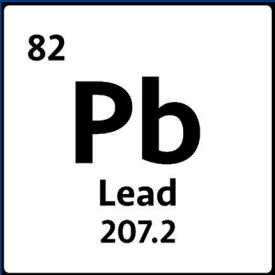
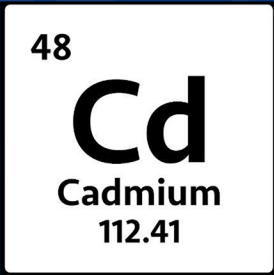
Methods

- We used the Population Assessment of Tobacco and Health (PATH) Study wave 1 (2013-2014), wave 2 (2014-2015), and wave 3 (2015-2016) adult data to assess urinary metal concentrations of seven metals among: 1) ENDS only users who were former users of any nonelectronic tobacco products (n=123), 2) ENDS only users who never used any nonelectronic tobacco products (n=50), 3) Never users (n=1501) of any tobacco product.
- We used multivariable mixed effect linear regression models on log10 transformed metal concentrations to examine the association of ENDS use status and metal exposure.



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Cadmium and lead concentrations in urine were 25% and 19% higher among lifetime exclusive ENDS users, compared to lifetime never users of any tobacco product.



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Results

- Among all ENDS only users in wave 1 (n=173) who remained ENDS only users in PATH Study wave 2 and 3, the geometric mean ratios (GMRs) of urine Cd and Pb were 1.26 (95%CI: 1.11-1.42) and 1.17 (95%CI: 1.04-1.32), respectively, compared to never users of any tobacco product after adjustment for the survey waves, age, sex, race/ethnicity, education, region, secondhand smoke at home and work, cannabis, and other substance use.
- The GMRs of urine Cd and Pb were 1.48 (95%CI: 1.32-1.67) and 1.43 (95%CI: 1.28-1.60) for ENDS only users who were former users of any nonelectronic tobacco products (n=123), and 1.25 (95%CI: 1.09-1.42) and 1.19 (95%CI: 1.05-1.34) for ENDS only users who never used any other tobacco product (n=50) after adjustment.
- No difference observed in urinary concentrations of beryllium, cobalt, manganese, strontium, and thallium comparing ENDS users to never users of any tobacco product
- Nickel, chromium, and some other metals in ENDS coils are not analyzed in PATH.

Conclusion

ENDS are potentially contributing to the body burden of harmful metals among its users who never used any tobacco products and formerly used nonelectronic tobacco products.

Authors

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