The Decline in e-Cigarette Use Among Youth in the United States—An Encouraging Trend but an Ongoing Public Health Challenge

Briana M. Choi, PharmD; Ivo Abraham, PhD

The 2014 Surgeon General’s report The Health Consequences of Smoking—50 Years of Progress warned that given the then-current rate of cigarette smoking among US youth, 5.6 million individuals younger than 18 years would die prematurely from smoking-related illness, ie, 1 of every 13 youth aged 17 years or younger. Preventing young people from smoking and protecting them from the dual health dangers of nicotine and combustion hinge in good part on disrupting the developmental, familial, social, environmental, and economic pathways that lead youth to start smoking and join the ranks of the addicted.

One pathway that has become evident over the past decade is the epidemic of e-cigarette use among middle and high school–aged youth, as documented in the National Youth Tobacco Survey (NYTS) ever since it first assessed e-cigarette use in the 2011 to 2012 cycle. Elsewhere in JAMA Network Open, Wang and colleagues report on the 2020 NYTS cycle, which ended early because of the COVID-19 pandemic but nevertheless presents solid statistical results. Encouragingly, the proportion of youth reporting e-cigarette use on at least 1 day in the past 30 days declined from 2019 to 2020 by approximately one-quarter (from 27.5% to 19.6%) in high school students and by approximately half (from 10.5% to 4.7%) in middle school students. Less encouraging are the use patterns. Among high school students who used e-cigarettes, 38.9% had used them on 20 or more days in the past 30 days, including the 22.5% who reported daily e-cigarette use. The corresponding rates among middle school students were 20.0% and 9.4%. Of note, 84.7% of high school students and 73.9% of middle school students preferred flavored, and especially fruit-flavored, e-cigarettes. Of concern, 63.2% of high school students and 51.0% of middle school students who used e-cigarettes used them exclusively, with the remaining 36.8% and 49.0%, respectively, also using other combustible or smokeless tobacco products.

The year-on-year decline among youth may be explained by changes in how they perceive the accessibility of e-cigarettes and the risk of great harm from vaping. Studying those who used e-cigarettes in the 10th to 12th grades, Miech et al found that the perception of e-cigarettes being easily accessible decreased from 92% in 2019 to 85% in 2020. Importantly, students’ perception of great harm from occasional nicotine vaping increased from 21% in 2019 to 27% in 2020, while the perception of great harm from regular nicotine vaping increased from 39% to 49%. Because the decline in e-cigarette use among youth reported by Wang et al included survey results from before the COVID-19 pandemic, the pandemic cannot explain the decline reported by Miech et al.

This is not to say that the pandemic may not have accelerated this decline. Gaiha et al reported a substantial drop in e-cigarette use in the early months of the COVID-19 pandemic among 2167 individuals aged 13 to 24 years: 32.4% had quit, while 35.3% reduced the amount of nicotine, for a combined 56.4% of respondents changing their e-cigarette use patterns. Reasons included having to stay at home and being afraid of parents finding out about e-cigarette use, less access to products, and the fear of weakened lungs from e-cigarette use. Unfortunately, some of this was countered by individuals who increased the amount of nicotine (17.6%) or cannabis/tetrahydrocannabinol (THC) (7.8%) in their e-cigarettes or switched to other forms of nicotine or cannabis/THC (3.8%), citing boredom (20.9%), stress (19.7%), needing distraction (8.3%), or, concerninglly, any combination thereof (47.7%) as reasons.

Despite the encouraging decline in e-cigarette use, it is premature to speak of a trend. The decline from 2015 to 2016 was not sustained in subsequent cycles of the NYTS until the most recent
results. Moreover, longitudinal assessments will likely be affected by the disruptive effect of the pandemic. The prevalence of e-cigarette use among youth still remains high and continues to be an unrelenting public health problem that may well go beyond nicotine. A US study of 2155 hospitalized or deceased patients with e-cigarette or vaping product–use associated lung injury (EVALI) included 360 adolescents aged 13 to 17 years.5 Of these, 62.4% had used nicotine-containing substances, and 81.7% had used THC-containing substances, with more than half (50.8%) using both—rates well exceeding those seen in those aged 18 to 24 years and those aged 25 to 49 years. Vogel et al6 found that 11.7% of youth aged 16 to 18 years with past-year e-cigarette use reported e-cigarette dependence symptoms. E-cigarette dependence was positively associated with vaping continuation, frequency, and intensity 6 months later.6

The issue of e-cigarettes being a pathway to cigarettes and other combustion-based tobacco products—and all its consequences—remains. Berry et al7 observed that youth aged 12 to 17 years who used e-cigarettes had a 4-fold increased risk of ever smoking cigarettes compared with youth without prior tobacco use. Youth whose first tobacco exposure was an e-cigarette were more likely to initiate cigarettes within 2 years compared with those who never used e-cigarettes.7 Taking a long-term view, this may well indicate that the Surgeon General's 2014 warning about 1 in 13 young persons being likely to die prematurely of smoking-related causes might prove to be true—or, more likely, may prove to be an underestimation. It only takes a look at the 2015 study by Carter et al8 on smoking-associated diseases and excess mortality to suspect the latter. While confirming the known excess smoking-related mortality associated with 21 diseases, this study also identified an additional 13 disease categories associated with smoking and mortality.8 Only the (far) future will tell us whether the mortality rate exceeds 1 in 13, how e-cigarette use is a pathway to tobacco use, and how this translates into both morbidity and mortality.

As the US tackles the challenge of e-cigarette and combustion tobacco/cannabis use—whether declining, rising, or cyclical—a note on racial/ethnic differences, if not disparities, is in order. While these findings are anecdotal at best, the 6 e-cigarette studies cited herein2-7 show a concerning pattern. The percentage of non-Hispanic White participants ranged from 20.0% to 54.1% across all but 1 study; the latter was the investigation of hospitalized or deceased patients with EVALI, in which the percentage was 74.5%. The proportion of Hispanic participants ranged from 19.2% to 42.9% (5 studies reporting), that of African American participants was between 3.2% and 14.7% (4 studies), and that of Asian American or Pacific Islander participants was 6.7% in 1 study and 17.4% in another study. The definition of other race/ethnicity may have been inconsistent across studies, but percentages between 8.0% and 16.5% were reported (4 studies). The hypothesis that e-cigarette use is distributed disproportionately across the racial/ethnic make-up of the US population merits formal investigation. African American, Hispanic, Asian American or Pacific Islander, and American Indian or Native Alaskan individuals may indeed be at much higher risk of short- and long-term e-cigarette and tobacco-associated health problems—and death.

It is an encouraging sign that e-cigarette use among youth declined from 2019 to 2020. As the perception of the risk of e-cigarette use and accessibility to e-cigarettes were key drivers of this decline, public health programs that increase the awareness of e-cigarettes' harmful effects and ensure the enforcement of age restrictions on e-cigarette sales are crucial. With the COVID-19 pandemic having discouraged e-cigarette use among youth, this is a great opportunity to further decrease e-cigarette use among middle and high school students, extend this into the young adult population, and emphasize it in the general adult population.
Corresponding Author: Ivo Abraham, PhD, Center for Health Outcomes and PharmacoEconomic Research, University of Arizona, 1295 N Martin, Drachman Hall B-306H, Tucson, AZ 85721 (abraham@pharmacy.arizona.edu).

Author Affiliations: Center for Health Outcomes and PharmacoEconomic Research, University of Arizona, Tucson (Choi, Abraham); Department of Pharmacy Practice and Science, College of Pharmacy, University of Arizona, Tucson (Abraham); University of Arizona Cancer Center, Tucson (Abraham); Department of Family and Community Medicine, College of Medicine–Tucson, University of Arizona (Abraham).

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REFERENCES


