

# Tobacco purchases rise following restrictions on e-cigarette sales, study finds

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The immense popularity of electronic cigarettes, or e-cigarettes, among young people has led many policymakers to restrict the sale of flavored varieties. But rather than nudging people away from "vapes," as these e-

cigarettes are called, such measures could backfire by driving users to instead buy conventional cigarettes, a much more dangerous product, according to researchers at the Yale School of Public Health (YSPH).

In a large-scale, [long-term analysis](#) of policies and sales data, the researchers found that for every 0.7 milliliters of "e-liquid" (the consumable content inside e-cigarettes, also known as vape juice) that goes unsold due to flavor restrictions, 15 additional traditional cigarettes are sold. The substitution was especially evident among cigarette brands popular with [young people](#) aged 20 and under, suggesting that flavor restrictions may increase smoking among youth as well as adults.

The results suggest that this type of [policy](#), which is intended to curb nicotine-related harms, may instead magnify them.

"While neither smoking nor vaping is entirely safe, current evidence indicates substantively greater health harm from smoking than vaping nicotine products," said first author Abigail S. Friedman, an associate professor in the YSPH Department of Health Policy & Management. "These policies' public health costs may outweigh their benefits."

The study appears online as a preprint prior to peer review at *Social Science Research Network (SSRN)*.

## **Tempting flavors**

While randomized clinical trials show that e-cigarettes can be effective tools for quitting smoking, their availability in a wide range of flavors such as strawberry banana, breakfast cereal, lemonade, bubblegum, and cheesecake can make them especially tempting to youth.

A 2019 outbreak of vaping-associated lung injuries led to thousands of hospitalizations and at least 68 deaths. While the outbreak's primary

cause was eventually identified as an additive most common in cannabis vaping products, its initial attribution to e-cigarettes—as well as worries that nicotine e-cigarettes may be an on-ramp to youth tobacco use—led hundreds of localities in the U.S. to restrict the sale of flavored vapes.

Previous studies of such policies have mostly examined local or temporary post-2019 state policies. The Yale study was the first to assess how flavor restrictions across most of the United States influence sales of both vapes and cigarettes.

## Laws and consequences

The authors used rigorous statistical tools to estimate long-term effects of [e-cigarette](#) flavor restrictions on electronic and conventional cigarette sales in jurisdictions across 16 states. They also examined how these effects varied between brands disproportionately used by underage youth versus adults.

The authors first created a comprehensive database of tobacco product flavor prohibition and restriction laws across the United States, including both state and local statutes. They reviewed each policy to identify which tobacco products were covered—including vapes, cigars, and [conventional cigarettes](#)—which flavors were restricted, when the policies would take effect, and any exemptions for certain types of businesses, such as adult-only tobacco stores.

They compared this information against vape and cigarette sales data over four-week intervals from January 2018 through March 2023, a period during which flavor restrictions went from affecting 1.3% of the U.S. population to affecting 38%. The sales data came from ordinary brick-and-mortar establishments like gas stations, groceries, and convenience stores. Statistical analyses took into account a host of other factors that may affect tobacco product sales, such as concurrent

restrictions on flavored cigar and menthol cigarette sales, tax rates, cannabis availability, and unemployment rates.

The primary outcome of interest was volume sales of conventional cigarettes and e-cigarettes per capita, during each four-week period, both overall and by type of flavor. Cigarette volumes are measured in packs, while e-cigarettes are standardized to 0.7-milliliter units, given past industry claims that one 0.7-milliliter vape pod is equivalent to 20 conventional cigarettes, or one pack.

These methods had limitations. Sales data did not include e-cigarette sales made online, in vape shops, or via illicit markets. However, the data did capture most sales of conventional cigarettes. While the study was not a randomized experiment, the analytical methods used were robust enough to identify causal relationships.

## **Swapping cigarettes for vapes**

During the study period, hundreds of localities and seven states restricted or prohibited flavored e-cigarette sales. While these policies did reduce per-capita vape sales, they also substantially boosted cigarette sales.

For each 0.7 milliliters of e-cigarette e-liquid not sold due to these policies, the authors calculated that 15 additional cigarettes were purchased. Similar results emerged when they excluded individual states with statewide policies from the analysis, showing that no one state was driving this effect. Bans on all vapes, including both flavored and unflavored, also resulted in more cigarette sales.

Of the increase in cigarette sales, 71% were of non-menthol cigarettes, suggesting that restrictions on menthol cigarettes would not counteract this effect.

Where e-cigarette [flavor](#) restrictions had been in effect for at least a year, sales of cigarette brands favored by adults went up by 10%, while sales of cigarette brands that disproportionately attract underage smokers saw a 20% bump.

In light of these results, policymakers might want to consider other approaches to protect public health where tobacco is concerned, the authors wrote in the study.

"Some leading scholars have advocated for regulating [tobacco products](#) proportionate to their risk," they wrote. "This approach would avoid giving more lethal combustible products [such as cigarettes] a competitive advantage over less lethal alternatives...[and] could mean more flavors being available in [vapes] than cigarettes."

**More information:** Friedman, Abigail and Liber, Alex C. and Crippen, Alyssa and Pesko, Michael, E-cigarette Flavor Restrictions' Effects on Tobacco Product Sales (September 26, 2023). Available at SSRN: [papers.ssrn.com/sol3/papers.cfm ... ?abstract\\_id=4586701](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4586701)

Provided by Yale University

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