



## **HOW STATE TAXES ON E-CIGARETTES AFFECT RECREATIONAL USAGE AMONGST TEENS IN THE U.S.**

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### **Introduction**

The use of e-cigarettes amongst teenagers in the United States has become an increasingly common problem. In a cross-sectional survey in 2019, 27.5% of high school students reported using e-cigarettes in the past 30 days, along with 10.5% of middle school students (Cullen et. al, 2019). Although survey data from 2020 revealed a decrease in e-cigarette use, the number of teenagers using e-cigarettes remains a public health concern (FDA 2020). To further this, the significant increase in the use of e-cigarettes amongst youth has erased the recent progress of decreased overall tobacco use (Gentzke et. al, 2019). E-cigarette usage can be addictive to youth, as 99% of e-cigarettes sold in the US contain nicotine, which harms brain development, attention spans, impulse control, and increases the risk for further addiction to drugs (CDC 2020). Due to the increase in usage among youth and the potential negative impacts on health, policymakers have made it a priority to enact change. In December of 2019, federal legislation was passed that raised the minimum age for sale of tobacco products from 18 to 21 (FDA 21). Known as the Tobacco 21 legislation, it immediately came into effect. However, teenagers often obtain their e-cigarettes through family members and friends, so a federal ban on flavored e-cigarettes was passed in February 2020 (Sindelar 2020 ). Despite this, the effects of the ban may be limited because of the exceptions of allowing flavors in disposable e-cigarettes and e-liquids for open-tank-system e-cigarettes in vape shops.

In addition to the Tobacco 21 and flavor bans, some states have used taxation to minimize e-cigarette use. Historically, taxes have been considerably effective in reducing tobacco use in various countries (WHO 2019). As a result, the number of states taxing e-cigarettes nearly doubled from nine states in the beginning of 2019 to 23 states in April 2020 (NCSL 2020). Due to the recent enactment of these taxes, the evidence on their effectiveness is largely unexplored (Sindelar 2020). Various considerations include whether or not price is a significant deterrent for e-cigarette usage amongst teens and if so, by how much? Furthermore, it is important to examine any unintended consequences of e-cigarette taxes, such as an increase in usage of cheaper forms of nicotine, like cigarettes. Thus, the purpose of this research is to determine to what extent state taxes on e-cigarettes deters teenagers from using them and whether or not this deterrent could encourage youth to turn to cheaper forms of tobacco.

### **Methods**

In June 2021, a policy analysis of states with e-cigarette taxes was conducted in order to document when the taxes were made effective, the type of tax (ad valorem or specific), which products were included in the tax, how electronic/vapor products were defined, and any exclusions to the policy. Data were pulled from the Public Health Law Center and Centers for Disease Control and Prevention reports on e-cigarette taxes. Twenty-nine states and the District of Columbia were found to have implemented taxes at the time of the search. The remaining

states were found to have not enacted any form of state taxes on e-cigarettes. State level e-cigarette and cigarette use rates for 2015, 2017, and 2019 were obtained from the Youth Risk Behavior Survey. Demographic information, including age, race, and sex, were obtained from Census data and included as controls in analyses. The American Lung Association’s tobacco tax rankings were included to control for the general effectiveness of tobacco control in each state. Multivariate linear regressions were conducted to determine whether there were statistically significant changes in cigarette or e-cigarette use between states with and without e-cigarette taxes.

## Results

As shown in Table 1 below, three outcomes showed significant change in relation to e-cigarette state taxes. These outcomes showed that states with e-cigarette taxes had an increase in 2019 current cigarette use, an increase in 2019 frequent e-cigarette use, and a lesser decrease in the change in frequent cigarette use from 2017 to 2019.

Table 1: Significance test results for determining the effect of e-cigarette state taxes on change in youth cigarette and e-cigarette use

	2019 Current Cigarette Use	2019 Current E-cigarette Use	2019 Frequent Cigarette Use	2019 Frequent E-cigarette Use	Change in Frequent Cigarette Use 2017-2019	Change in Frequent E-cigarette Use 2017-2019
Use in States With Tax	8.42%	26.3%	2.48%	9.64%	-0.64	+5.58
Use in States Without Tax	6%	24.09%	1.39%	8.43%	-1.15	+6.04
$\beta$ value	2.567	3.2	1.157	2.015	0.507	-0.343
p-value	<b>0.023</b>	0.276	<b>0.007</b>	0.079	<b>0.035</b>	0.627

A p-value of less than 0.05 (shown in bold) indicates the change in the dependent variable is significant after a linear regression analysis controlling for age, race, sex, and the American Lung Association’s State Tobacco Tax Rankings.

## Discussion

Ultimately, the findings indicate that there was no significant change in e-cigarette usage in states with e-cigarette taxes. Thus, the results that policymakers intended for when implementing these taxes did not occur, based on this data set. However, there was an increase in cigarette use in states with the e-cigarette taxes, supporting the hypothesis that teens are more likely to turn to cheaper forms of nicotine if e-cigarette prices rise. Despite this, it is important to note that Tobacco 21 laws prohibit youth from directly purchasing tobacco products. This could indicate that dealers reselling these products to youth are mimicking the increase in prices that taxes have on e-cigarettes and thus encouraging their buyers to resort to cheaper nicotine products.

The results of this paper are further supported by similar results from a study published in 2020 (Pesko et. al, 2020) which revealed that increases in e-cigarette taxes lead to an increase in adult traditional cigarette use. However, the paper also found a reduce in adult e-cigarette use, an effect that may be unique to adult usage rather than youth. Furthermore, the paper found that

higher cigarette taxes lead to an increase in adult e-cigarette use and a decrease in adult traditional cigarette use. These results can be applied to further research on the findings in this paper because they indicated that an increase in cigarette use was accompanied by a decrease in e-cigarette use, and vice versa. However, the statistically significant increase in youth cigarette usage was not accompanied by a significant decrease in youth e-cigarette usage, indicating that more research needs to be done in order to determine why e-cigarette usage did not decrease if teens were using more cigarettes.

Similar results were also found in a paper published in 2021 (Choi et. al, 2021) that examined the YRBS data from 2017 and 2019. The paper found that e-cigarette taxes had no effect on e-cigarette usage amongst youth, supporting the YRBS results of this paper. However, it is also important to note that some studies have found a decrease in e-cigarette usage as a result of e-cigarette excise taxes. A paper published in 2021 (Han et. al, 2021) found that there was lower e-cigarette use in states with e-cigarette taxes. Thus, the prevalence of various results supported by research indicates that results can significantly vary based on data sets and methodology.

Furthermore, since e-cigarette state taxes have only been recently enacted in many states, further research is necessary to establish the long-term effects of these policies. The most recent YRBS results were from 2019 so usage rates after that were unexplored in this research. This greatly limited the multivariate linear regression since only ten of the twenty-nine policies identified were implemented before 2019. It would also be beneficial to explore whether usage of other drugs amongst youth, such as marijuana, were affected by this policy.

The results of this project can help guide conversations considering the effectiveness of state e-cigarette taxes and whether a federal tax could be beneficial to driving down both e-cigarette and cigarette use. This could guide policymakers to reconsider the effectiveness of state taxes on e-cigarettes or combine these measures with policies that limit youth access to cheaper forms of nicotine as well.

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