

This document summarizes Dr. Michael Pesko's e-cigarette policy evaluation published papers, working papers, media coverage, and public comments. Dr. Pesko reports no commercial funding, including from tobacco or nicotine companies. This research is made possible thanks to the following grants from the National Institutes of Health.

1. The Impacts of Vaping Regulations on Perceptions, Access, Prices, and Tobacco Use. R01DA045016. National Institute on Drug Abuse, 2018-2022. \$1,423,114. ([press release](#))
2. Evaluating the Effect of E-cigarette Policies on Youth Tobacco Use. 2R01DA045016 (renewal). National Institute on Drug Abuse, 2022-2027. \$2,645,968. ([press release](#))

Among other things, these grants support the creation of longitudinal data on USA population exposure to standardized tobacco policies, such as e-cigarette taxes and indoor air laws. This data is available to the public through [OpenICPSR](#).

Please see the attached [slide deck](#) that provides background information on e-cigarettes, covers economics approaches to e-cigarette policy and regulation, and summarizes many of the papers funded by these grants.

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#### **E-cigarette Tax Papers:**

1. "[Intended and Unintended Effects of E-cigarette Taxes on Youth Tobacco Use](#)." Rahi Abouk, Charles Courtemanche, Dhaval Dave, Bo Feng, Abigail S. Friedman, Johanna Catherine Maclean, **Michael F. Pesko**, Joseph J. Sabia, and Samuel Safford. [Journal of Health Economics](#). 87: 102720. 2023. [[free full text](#)]  
Media: [Washington Post](#), [ABC](#), [Denver Gazette](#), [CNS News](#), [Washington Times](#), [Fox Business](#)

Description: We study the effects of e-cigarette taxes on youth. We apply a continuous treatment difference-in-differences model to two large national datasets (Monitoring the Future and the Youth Risk Behavior Surveillance System) through 2019. We find that e-cigarette taxes reduce youth e-cigarette consumption, with estimated e-cigarette tax elasticities of -0.06 to -0.21. However, we estimate sizable *positive* cigarette cross-tax elasticities, suggesting economic substitution between cigarettes and e-cigarettes for youth. We also find that e-cigarette taxes reduce retail-based purchasing of e-cigarettes and increase the misperception that e-cigarettes are at least as dangerous as cigarettes. Our estimates suggest a proposed national e-cigarette tax of

\$1.65 per milliliter of vaping liquid would cause approximately half a million more teenage smokers.

2. “[Re-exploring the early relationship between teenage cigarette and e-cigarette use using price and tax changes.](#)” **Michael F. Pesko** and Casey Warman. Health Economics. 31(1): 137-153. 2022. [[free full text](#)]  
Media: [Quartz](#), [Medium](#)

Description: We match e-cigarette and cigarette price and tax variation from the Nielsen Retail Scanner data to survey data on current use of e-cigarettes and cigarettes for over 94,000 students between grades 6 to 12 from the National Youth Tobacco Survey for years 2011 to 2015. We find evidence that e-cigarettes and cigarettes are same-period economic substitutes. Coefficient estimates (while imprecisely estimated) also suggest potentially large positive effects of past e-cigarette prices on current cigarette use, indicating intertemporal economic substitution.

3. “[Young Adult Responses to Taxes on Cigarettes and Electronic Nicotine Delivery Systems.](#)” Abigail Friedman and **Michael F. Pesko**. Addiction. 117(12): 3121-3128. 2022. [[free full text](#)]  
Media: [Connecticut Public Radio](#)

Description: We study the effect of e-cigarette and cigarette tax rates on 18-25 year-olds in the Tobacco Use Supplement of the Current Population Survey for years 2010-2019. We find that a \$1 increase in e-cigarette taxes decreases daily e-cigarette use by 2.5 percentage points and increases daily cigarette use by 2.5 percentage points. A \$1 increase in cigarette taxes reduces daily cigarette use by 1.7 percentage points, and raises daily e-cigarette use by 2.5 percentage points. These results suggest that young adults substitute between e-cigarettes and cigarettes nearly interchangeably.

4. “[The effect of e-cigarette taxes on prepregnancy and prenatal smoking.](#)” Rahi Abouk, Scott Adams, Bo Feng, Johanna Catherine Maclean, and **Michael F. Pesko**. Journal of Policy Analysis and Management. 42(4): 908-940. 2023. [[free full text](#)]  
Media: [NPR Marketplace \(Radio\)](#), [VoxEU](#)

Description: We examine the effect of e-cigarette taxes on pre-pregnancy and prenatal smoking using the near-universe of births to mothers conceiving between 2013 and 2019. Using fixed effect regressions, we show that e-cigarette taxes increase pre-pregnancy and prenatal smoking. We also find evidence that e-cigarette taxes reduce pre-pregnancy and 3<sup>rd</sup> trimester e-cigarette use. Additionally, we show that e-cigarette taxes increase news coverage of e-cigarettes and raise perceptions of risk of e-cigarettes.

5. “[The effect of traditional cigarette and e-cigarette taxes on adult tobacco product use.](#)” **Michael F. Pesko**, Charles Courtemanche, and Johanna Catherine Maclean. Journal of Risk and Uncertainty. 60(3): 229-258. 2020. [[free full text](#)]  
Media: [Wall Street Journal](#), [MarketWatch](#), [RealClearPublicAffairs](#), [Atlanta Journal Constitution](#), [New York Post](#)

Description: We use data from the Behavioral Risk Factor Surveillance System and National Health Interview Survey from 2011 to 2018 to evaluate the effect of traditional cigarette and e-cigarette tax rates on use of both products. We find evidence that higher e-cigarette tax rates reduce adult e-cigarette use and increase adult traditional cigarette use (i.e. economic substitution). We also find symmetrical effects using traditional cigarette tax rates. Our results suggest that a proposed national e-cigarette tax of \$1.65 per milliliter of vaping liquid would raise the proportion of adults who smoke cigarettes daily by approximately one percentage point, translating to 2.5 million extra adult daily smokers compared to the counterfactual of not having the tax.

6. “[The Effects of E-cigarette Taxes on E-cigarette Prices and Tobacco Product Sales: Evidence from Retail Panel Data.](#)” Chad D. Cotti, Charles J. Courtemanche, Johanna Catherine Maclean, Erik T. Nesson, **Michael F. Pesko**, and Nathan Tefft. *Journal of Health Economics*. 86: 102676. 2022. [\[free full text\]](#)  
Media: [Washington Post](#), [National Review](#), [Forbes](#), [Capitol Hill Times](#), [Fox-11 News \(Green Bay\)](#), [WISH-TV \(Indianapolis\)](#), [WSAW-TV \(Wausau, WI\)](#), [Inside Indiana Business](#), [StreetInsider](#), [Morning Consult](#)

Description: We estimate the effect of e-cigarette tax rates on e-cigarette prices, e-cigarette sales, and sales of other tobacco products using NielsenIQ Retail Scanner data from 2013 to 2019. We find that 90% of e-cigarette taxes are passed on to consumer retail prices. We then estimate reduced form and instrumental variables regressions to examine the effects of e-cigarette and cigarette taxes and prices on sales. We calculate an e-cigarette own-price elasticity of -2.2 and particularly large elasticity of demand for flavored e-cigarettes. Further, we document a cigarette own-price elasticity of -0.4 and positive cross-price elasticities of demand between e-cigarettes and cigarettes, suggesting economic substitution.

7. “[The Effect of E-Cigarette Taxes on E-Cigarette and Cigarette Retail Prices and Sales, United States, 2014 – 2019.](#)” Megan C. Diaz, Emily Donovan, John A. Tauras, Daniel K. Stephens, Barbara A. Schillo, Serena Phillips, Frank J. Chaloupka, and **Michael F. Pesko**. *Tobacco Control*. 34: 34-40. 2025. [\[free full text\]](#)

Description: We used State Line versions of NielsenIQ Retail Scanner data from quarter 4 of 2014 through quarter 4 of 2019 for 23 states to find that a real \$1 increase in the e-cigarette standardised tax increases the price of 1 milliliter of e-liquid between \$0.43 and \$0.59 depending on specification. Our preferred results find that a 10% increase in e-cigarette taxes reduces e-cigarette sales by 0.5% and increases cigarette sales by 0.1%.

8. “[The effect of cigarette and e-cigarette taxes on prescriptions for smoking cessation medications.](#)” Johanna Catherine Maclean, Tamkeen Khan, Stavros Tsipas, and **Michael F. Pesko**. *Health Services Research*. 58(6): 1245-1255. 2023. [\[free full text\]](#)  
Media: [American Lung Association \(Podcast\)](#)

Description: We test the effect of state-level cigarette and e-cigarette tax rates on prescriptions for smoking cessation medications (Chantix, Zyban, and their generics) using Symphony Health, IDV® all-payer prescription claims data for the United States over the period 2009 to 2017. We use two-way fixed effect modified difference-in-differences regressions and a multiperiod

difference-in-differences estimator robust to bias from dynamic and heterogeneous treatment effects. We observe no statistically significant change in prescription fills following an increase in the e-cigarette tax rate, though we are unable to rule out potentially large effects. However, following a \$1.00 increase in the cigarette tax rate, we observe a 4.2% increase in prescription fills. The effect of cigarette taxes on prescription fills was particularly large for 18-34 year-olds.

9. “[Standardising the Measurement of E-cigarette Taxes in the United States, 2010-2020.](#)” Chad Cotti, Charles J. Courtemanche, Erik T. Nesson, **Michael F. Pesko**, Serena Phillips, and Nathan Tefft. Tobacco Control. 32: e251-e254. 2023. [\[free full text\]](#)

Description: We create and publish a database of state and local quarterly e-cigarette taxes from 2010 to 2020, standardized as the rate per milliliter of fluid. We use UPC-level e-cigarette sales from the NielsenIQ Retail Scanner Dataset along with e-cigarette product characteristics collected from internet searches and visits to e-cigarette retailers. In 2020, the average American resided in a location with \$3.08 in cigarette taxes and \$0.34 in e-cigarette taxes (assuming 1 pack = 0.7 fluid milliliters).

10. “[Standardising the Measurement of E-cigarette Tax Rates in the USA \(2nd edition\): 2010-2023.](#)” Chad Cotti, Erik T. Nesson, **Michael F. Pesko**, and Serena Phillips.\* Tobacco Control. 35: 173-178. 2026. [\[free full text\]](#)

Description: This paper updates our previously mentioned standardized e-cigarette tax database by adding three years of data (thus extending the database through 2023) and providing separate standardized taxes for closed system and open system e-cigarettes.

11. “[E-cigarettes and Planned Smoking Cessation.](#)” Rachel Y.L. Fung and **Michael F. Pesko**.\* American Journal of Health Economics. 12(2). 2026.

Description: We study the effect of e-cigarette taxes, as a proxy for e-cigarette accessibility, on sales of over-the-counter nicotine replacement therapies (NRTs), prescriptions for smoking cessation pills, calls to state quitlines, and survey data on smoking cessation. Using data from 2010-2022 and difference-in-differences methods, our findings imply that e-cigarettes do not crowd out NRTs in planned smoking cessation efforts.

### **E-cigarette Minimum Legal Sale Age Papers:**

12. “[Effects of E-Cigarette Minimum Legal Sales Ages on Youth Tobacco Use in the United States.](#)” **Michael F. Pesko**. Journal of Risk and Uncertainty. 66(3): 261-277. 2023. [\[free full text\]](#)

Media: [Tobacco Reporter](#)

Description: This paper uses National Youth Tobacco Survey data to estimate the effect of the gradual roll-out of e-cigarette minimum legal sales ages (MLSAs) in the United States between 2010 to 2016 on youth e-cigarette use, cigarette use, and cigar use (i.e., cigars, cigarillos, or little cigars). Using an estimator designed to correct for dynamic heterogeneity in treatment effects, e-cigarette MLSAs are estimated to reduce lifetime e-cigarette use by approximately 25% and increase daily cigarette use and daily cigar use by approximately 35%.

13. “[E-Cigarette Minimum Legal Sale Age Laws and Traditional Cigarette Use among Rural, Pregnant Teenagers.](#)” **Michael F. Pesko** and Janet M. Currie. [Journal of Health Economics](#). 66: 71-90. 2019. [[free full text](#)]  
Media: [Daily Mail](#), [Newsweek](#)

Description: We investigate the effect of e-cigarette minimum legal sale age laws on prenatal cigarette smoking and birth outcomes for underage rural teenagers using data on all births from 2010 to 2016 for 32 states. We find that the laws increased prenatal smoking within a given trimester by 0.6 percentage points and had no effect on birth outcomes.

14. “[The Effects of E-Cigarette Minimum Legal Sale Age Laws on Youth Substance Use.](#)” Dhaval Dave, Bo Feng, and **Michael F. Pesko**. [Health Economics](#). 28(3): 419-436. 2019. [[free full text](#)]  
Media: [MarketWatch](#)

Description: We use survey data from the Youth Risk Behavior Surveillance System to find that e-cigarette minimum legal sale age laws increased youth smoking participation by about one percentage point and approximately half of the increase in smoking participation is attributed to smoking initiation. We find little evidence of higher cigarette smoking persisting beyond the point at which youth age out of the laws. We also find preliminary evidence of the laws reducing youth e-cigarette use.

15. “[The Influence of Electronic Cigarette Age Purchasing Restrictions on Adolescent Tobacco and Marijuana Use.](#)” **Michael F. Pesko**, Jenna Hughes, and Fatima Faisal. [Preventive Medicine](#) 87: 207-212. 2016.  
Media: [Washington Post](#), [New York Post](#), [Daily Caller](#), [Washington Examiner](#), [Tech Times](#), [Headlines & Global News](#), [Winston-Salem Journal](#)

Description: Using survey data on youth tobacco use from the Youth Risk Behavior Surveillance System, we find that enacting e-cigarette minimum legal purchase age laws increase youth regular cigarette smoking by 0.8 percentage points, but not use of cigars, smokeless tobacco, or marijuana.

16. “[Estimating the Effects of Tobacco-21 on Youth Tobacco Use and Sales.](#)” Rahi Abouk, Prabel De, and **Michael F. Pesko**.\* [Journal of Health Economics](#). 94: 102860. 2024. [[free full text](#)]

Description: We estimate the effects of Tobacco-21 laws, which raise the minimum legal sales age for tobacco products to 21, on youth tobacco use and retail sales. Using national survey data and retail scanner data from 2012 to 2019, we find sizable reductions in e-cigarette and cigarette use among 12th graders, along with large sales declines in counties with the highest share of residents under 21 (cigarette sales fell 12.4% and e-cigarette sales fell 69.3%).

### **E-cigarette Flavor Restriction Papers:**

17. “[E-cigarette Flavor Restrictions’ Effects on Tobacco Product Sales.](#)” Abigail Friedman, Alex

C. Liber, Alyssa Crippen, **Michael F. Pesko**. American Journal of Health Economics. Available online, in press. 2024. [[free full text](#)]  
Previously: [SSRN Working Paper #4586701](#)  
Media: [Regulator Watch \(USA\)](#), [Regulator Watch \(Canada\)](#), [Slate](#)

Description: We estimate the effects of local and state tobacco sales flavor policies on cigarette and e-cigarette sales between January 2018 through March 2023. Flavor restrictions lead to a reduction in e-cigarette sales, and a tradeoff of 12 additional cigarettes for every 1 fewer cigarette-pack equivalent of e-cigarettes sold. Further, cigarette sales increase even among brands disproportionately used by underage youth.

18. “[Flavored E-cigarette Sales Restrictions and Young Adult Tobacco Use in the United States](#).” Abigail S. Friedman, **Michael F. Pesko**, Travis R. Whitacre. JAMA Health Forum. 5(12): e244594. 2024. [[free full text](#)]  
Media: [The Detroit News](#)

Description: We use Behavioral Risk Factor Surveillance System data from 2016-2023 and find that e-cigarette flavor restrictions increase young adult daily smoking (18-29 year olds) by 2.2 percentage points and reduce daily vaping by 3.6 percentage points.

19. “[Population Coverage and Comprehensiveness of Flavored Tobacco Sales Restrictions in the United States, 2010–2023](#).” Emily M. Donovan, Karl Braganza, Megan C. Diaz, Andrew B. Seidenberg, Jennifer Kreslake, and **Michael F. Pesko**. Tobacco Control. Available online, in press. 2025. [[free full text](#)]

Description: This database paper provides panel data on the percentage of the US population (national and state levels) covered by state and local FTP sales restrictions of different comprehensiveness levels.

### **E-cigarette Indoor Vaping Restriction Papers:**

20. “[The Effect of E-cigarette Indoor Vaping Restrictions on Adult Prenatal Smoking and Birth Outcomes](#).” Michael T. Cooper and **Michael F. Pesko**. Journal of Health Economics. 56: 178-190. 2017. [[free full text](#)]  
Media: [Medical XPress](#)

Description: We estimate the effect of county-level e-cigarette indoor vaping restrictions on adult prenatal smoking and birth outcomes using United States birth record data for 7 million pregnant women from 2010 to 2015. We find that indoor vaping restrictions increased prenatal smoking by approximately 0.8 percentage points and had no effect on birth outcomes.

21. “[Impact Of Vaping Restrictions In Public Places On Smoking And Vaping In The US – Evidence Using A Difference-In-Differences Approach](#).” Kai-Wen Cheng, Feng Liu, **Michael F. Pesko**, David T. Levy, Geoffrey T. Fong, and K. Michael Cummings. Addiction. 118(1): 160-166. 2023. [[free full text](#)]

Description: We estimate whether and to what extent adding indoor vaping restrictions to counties with comprehensive indoor smoking restrictions impacts the use of e-cigarettes and cigarettes among adults in the United States, using Tobacco Use Supplement of the Current Population Survey data for adults 18-54 years of age. We do not find evidence of indoor vaping restrictions affecting adult e-cigarette use or cigarette use, including for subgroups.

22. “[The Effect of E-Cigarette Indoor Vaping Restrictions on Infant Mortality.](#)” Michael Cooper and **Michael F. Pesko**. *Southern Economic Journal*. 91(1): 278-321. 2024. [[free full text](#)]

Description: We estimate the effect of county-level e-cigarette indoor vaping restrictions on infant mortality using United States birth record data linked to death certificate data for 7 million live births from 2010 to 2015. We find that e-cigarette indoor vaping restrictions increased infant mortality by 0.38 infants per 1,000 live births (12.6%).

23. “[Coverage of Indoor Smoking and Vaping Restrictions in the US, 1990-2021.](#)” Andrew B. Seidenberg, Karl Braganza, Maxwell Chomas, Megan C. Diaz, Abigail S. Friedman, Serena Phillips, and **Michael F. Pesko**. *American Journal of Preventive Medicine*. 67(4): 494-502. 2024. [[free full text](#)]

Description: We create and publish a database of bar, restaurant, and workplace indoor air laws for tobacco smoking (from 1990 to 2021) and vaping (from 2006 to 2021). We use policy data from the American Nonsmokers Rights’ Foundation and population data from U.S. Census. Between 1990 and 2021, national coverage of comprehensive ISR increased for bars (0% to 67.3%), restaurants (0%–78.2%), and workplaces (0%–77.5%). From 2006 to 2021, comprehensive IVR coverage increased for bars (0%–43.5%), restaurants (0%–51.5%), and workplaces (0%–53.2%).

### **E-cigarette Discrete Choice Experiment Papers:**

24. “[Mostly Harmless Regulation? Electronic Cigarettes, Public Policy and Consumer Welfare.](#)” Donald S. Kenkel, Sida Peng, **Michael F. Pesko**, and Hua Wang. *Health Economics*. 29(11): 1364-1377. 2020. [[free full text](#)]

Description: We fielded a discrete choice experiment to estimate the effect of potential e-cigarette regulations on adult smokers, including increasing taxes, reducing flavor availability and adding warning labels communicating various levels of risk. We find that potential policies like strong warning labels and e-cigarette taxes that further discourage use of e-cigarettes could move consumers away from optimal choices and lead to potentially large consumer welfare losses.

25. “[The Effect of Potential Electronic Nicotine Delivery System Regulations on Nicotine Product Selection.](#)” **Michael F. Pesko**, Donald S. Kenkel, Hua Wang, and Jenna Hughes. *Addiction* 111(4): 734-744. 2016. [[free full text](#)]  
Media: [WABE-Atlanta \(Radio\)](#)

Description: We fielded a discrete choice experiment to estimate the effect of potential e-cigarette regulations on adult smokers, including increasing taxes, reducing flavor availability and adding warning labels communicating various levels of risk. We found taxes and risk level

to be particularly salient predictors of purchasing an e-cigarette. We estimated an e-cigarette price elasticity of -1.8 among adult smokers.

### **E-cigarette Retail Access Papers:**

26. “Patterns of Specialty Tobacco Retail Locations and Visitor Counts in the United States.” Austin Landini, Christopher Lowenstein, and **Michael F. Pesko**. Tobacco Control. Accepted, in press. 2026.

Description: We develop the first reproducible, national database of specialty tobacco retailers—vape shops, smoke shops, and cigar shops—by combining Google Maps business listings with Advan visitor-count data, cross-verifying roughly 20,000 businesses and observing about 50 million monthly visits. We find strong clustering of specialty retailers including vape shops in low-income areas and fewer shops per capita in rural areas, with smoke and vape shop density negatively correlated with educational attainment and the population share of racial and ethnic minorities.

### **E-cigarette Editorials:**

27. “[United States Public Health Officials Need to Correct E-cigarette Health Misinformation](#).” **Michael F. Pesko**, K. Michael Cummings, Clifford Douglas, Jonathan Foulds, Thomas Miller, Nancy A. Rigotti, and Kenneth E. Warner. Addiction. 118(5): 785-788. 2023.

Description: This editorial provides examples of e-cigarette misinformation promoted by the United States public health officials, which have persisted despite new data challenging the validity of the original assertions.

28. “[Combustible Tobacco Age-of-Sale Laws: An Opportunity?](#)” **Michael F. Pesko**. Addiction. 117(3): 514-516. 2022. [[free full text](#)]

Description: This editorial argues for the benefits of raising age-of-sale laws for combustible tobacco only, such as through a Combustible 21 law that would prohibit the sale of combustible tobacco to individuals under 21 years of age but leave open the opportunity to legally purchase e-cigarettes and smokeless tobacco products.

29. “[How Data Security Concerns Can Hinder Natural Experiment Research: Background and Potential Solutions](#).” **Michael F. Pesko**. Journal of the National Cancer Institute Monographs. 2022(59): 89-94. 2022. [[free full text](#)]

Description: This paper explains how natural experiments provide an improvement over longitudinal cohort studies for examining the relationship between e-cigarettes and cigarettes, and shows how this research was hindered by security concerns in particular pertaining to Population Assessment of Tobacco and Health (PATH) and National Youth Tobacco Survey (NYTS) data.

30. “[E-cigarettes in Historical Context: Innovation, Risk, and Regulation](#).” **Michael F. Pesko**, Jamie Hartmann-Boyce, Rachel Y.L. Fung, and Neal Benowitz. JAMA Health Forum. 6(10): e254629. 2025. [[free full text](#)]

Description: This editorial discusses the historical context of e-cigarettes, and why public health was likely to benefit, and has, from their emergence.

## **Public Comments:**

### **United States**

E-cigarette Taxes: [Israel Ministry of Health \(2023\)](#); [Israel Knesset Finance Committee \(2021\)](#); [US Congress Select Members \(2021\)](#); [US Senate Budget Committee \(2021\)](#); [US House of Representatives Ways and Means Committee \(2021\)](#); [Washington HB1550 \(2021\)](#); [Texas HB1552 \(2021\)](#); [Alaska HB 110 \(2021\)](#); [Alaska SB 45 \(2021\)](#); [Minnesota HF991 \(2021\)](#)

E-cigarette Flavor Ban: [FDA \(2021\)](#) [[FDA response](#)]; [Kansas City, MO \(2024\)](#)

Vaping Lung Injuries / Centers for Disease Control and Prevention: [CDC \(2021\)](#) [[CDC response](#)]; [Energy and Commerce Committee \(2023\)](#)

General: [Department of Health and Human Services \(2023\)](#), [Food and Drug Administration \(2025\)](#)

### **Other Countries**

Canada: [Legislative Review of the Tobacco and Vaping Products Act \(2021\)](#)

United Kingdom: [Youth Vaping: Call for Evidence \(2023\)](#)