

TCORS 2.0

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Center for the  
**A**ssessment of **T**obacco  
**R**egulations  
[CA**s**To**R**]

# The EVALI Outbreak and US Tobacco Sales

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# Conflict of Interest Statement

- I and co-authors of these studies have worked for organizations (American Cancer Society Inc and Truth Initiative) that have adopted positions on the public policies being studied.
- The article presented today (EVALI and US Tobacco Sales) had to clear internal review processes prior to publication
- The opinions expressed here are my own and do not represent those of my employers, my co-authors, or their employers

# What was EVALI?

Vitamin E Acetate containing cannabis vaping products were responsible

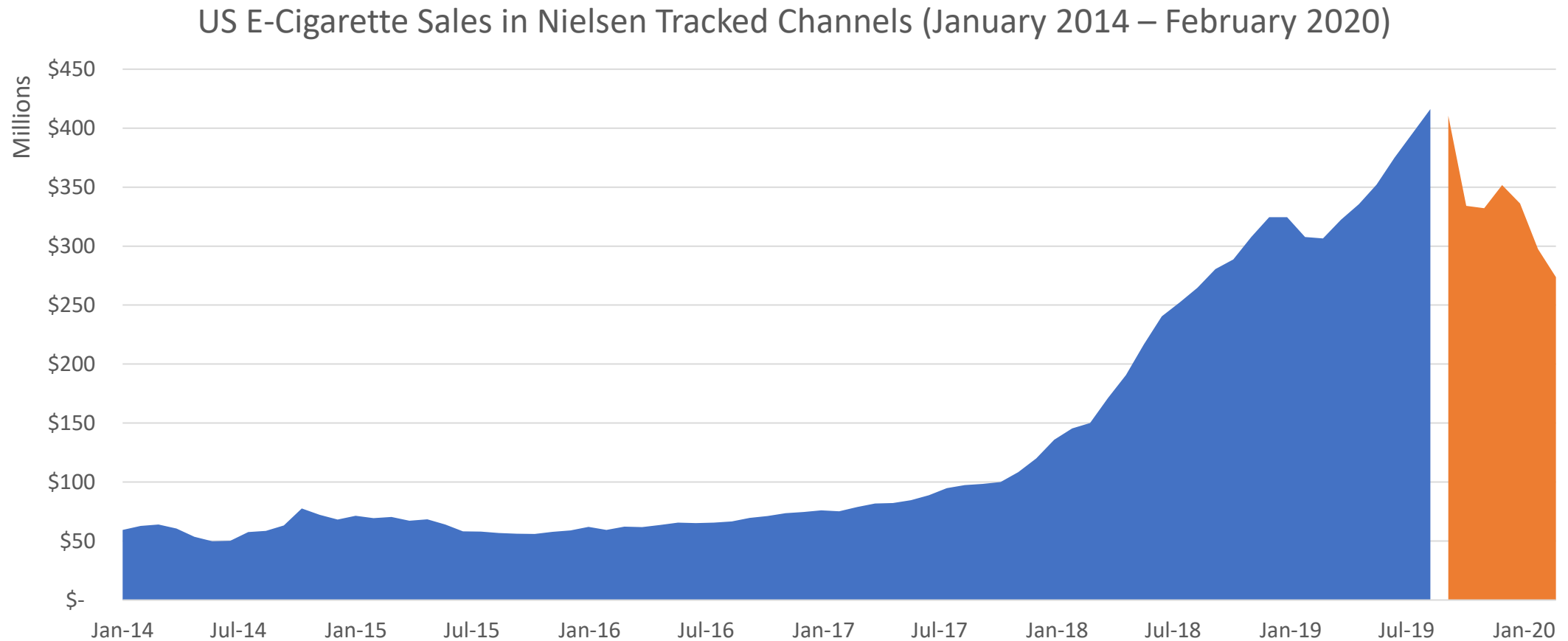
Media attention on e-cigarettes was the strongest ever recorded

2807 hospitalizations and 68 deaths by February 2020



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# E-Cigarette Sales Before and After EVALI



## E-Cigarette Sales Ban Policies



- FDA combined concern for EVALI with concern over rising youth e-cigarette usage rates to propose federal ban on flavored e-cig sales
- 7 states proposed, 5 implemented temporary bans on sale of nontobacco flavored e-cigs
- Massachusetts banned sales of all e-cigarettes for 90 days, before reverting to a nontobacco flavored e-cig sales ban

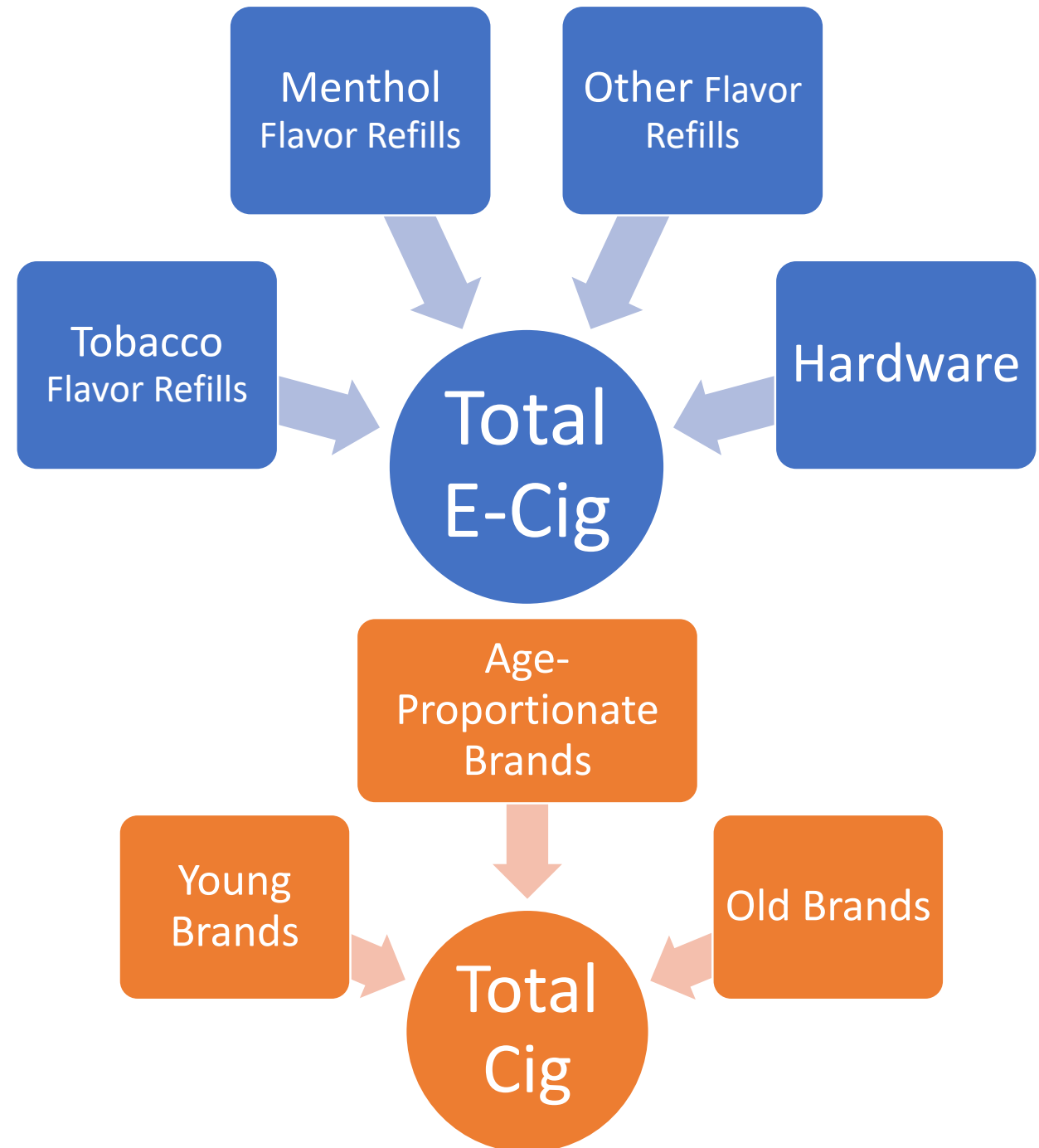
## Research Questions

- How did the EVALI outbreak directly affect sales of e-cigarettes?
- How did the policy changes passed in the wake of EVALI affect sales of e-cigarettes?
- How did the above affect cigarette sales?



# Data


- Sales of e-cigarettes and tobacco cigarettes in 23 US states:  
January 2014 – February 2020
- Nielsen Scantrack
  - Convenience, Food, and Drug
  - Excludes Online and Vape Shop
  - Probably >50% E-Cig \$ Sales
  - Certainly >85% Cig \$ Sales



# Universal Product Codes



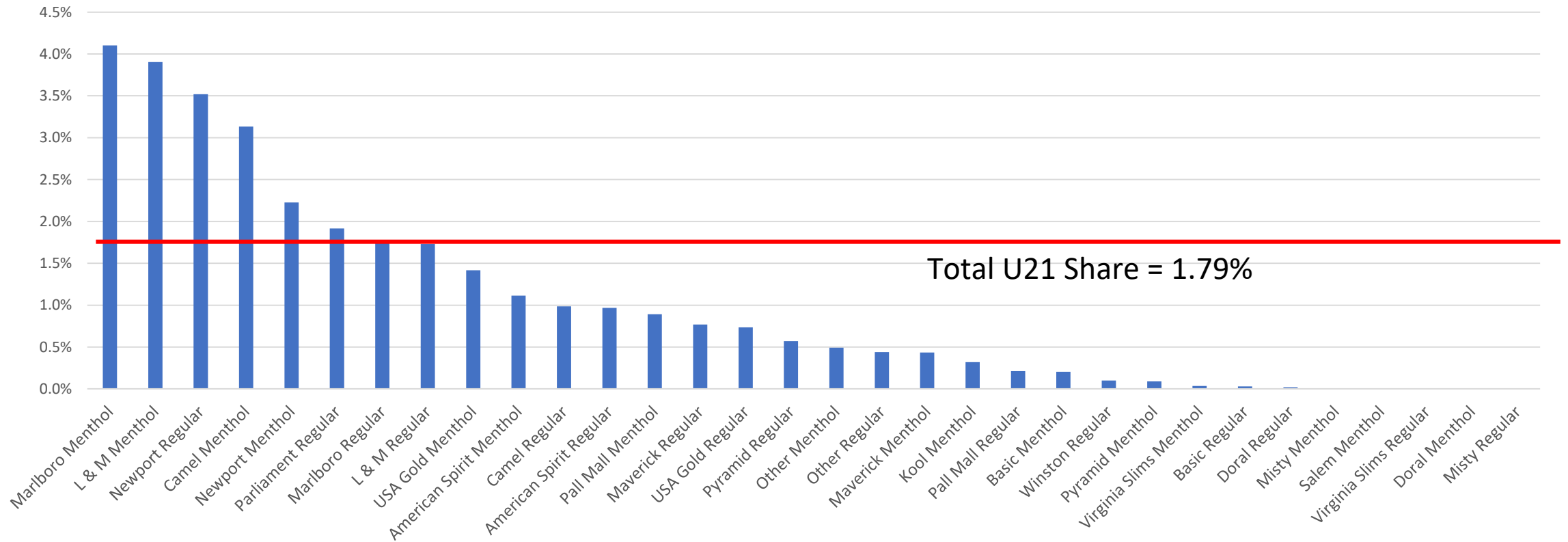
## THE VUSE PORTFOLIO

				
	VUSE Cartridges Berry	VUSE Cartridges Mint	VUSE Cartridges Crema	VUSE Cartridges Chai
Pack UPC	 8 49205 00269 5 VUSE Refill Cartridge - Berry (Cartridge)	 8 49205 00176 0 VUSE Refill Cartridge - Mint (Cartridge)	 8 49205 00170 8 VUSE Refill Cartridge - Crema (Cartridge)	 8 49205 00173 6 VUSE Refill Cartridge - Chai (Cartridge)
Carton UPC	 8 49205 00270 5 VUSE Refill Cartridge - Berry (CTN)	 8 49205 00177 7 VUSE Refill Cartridge - Mint (CTN)	 8 49205 00171 5 VUSE Refill Cartridge - Crema (CTN)	 8 49205 00174 6 VUSE Refill Cartridge - Chai (CTN)
Supplier Item #				



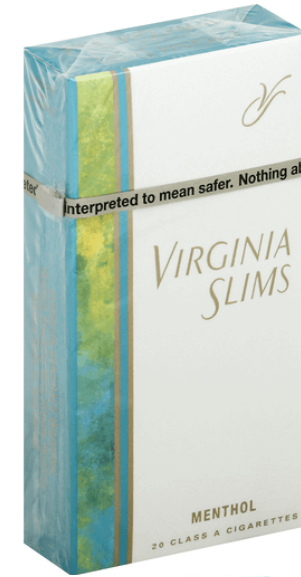
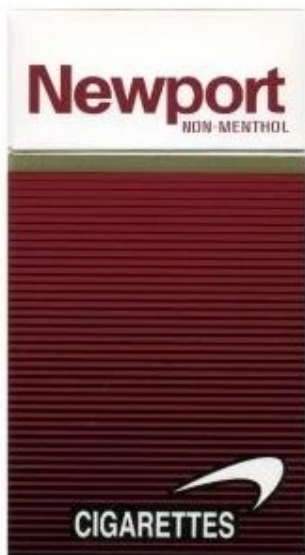
# Data (Continued)

- Outcome Variable:
  - Differenced, Indexed Per-Capita Unit Volumes
- Total E-Cig Sales
  - Split by Refill Category + Hardware
- Total Cigarette Sales
  - Split by Brand Group
- Primary Input Variables (Differenced)
  - State Total Ban Days
  - State Partial Ban Days
  - EVALI Deaths
    - Contemporaneous and Indexed to Maxima



NSDUH 2015—2018 Share of  
Brands Consumed by  
Respondents Under 21





Disproportionately  
Young

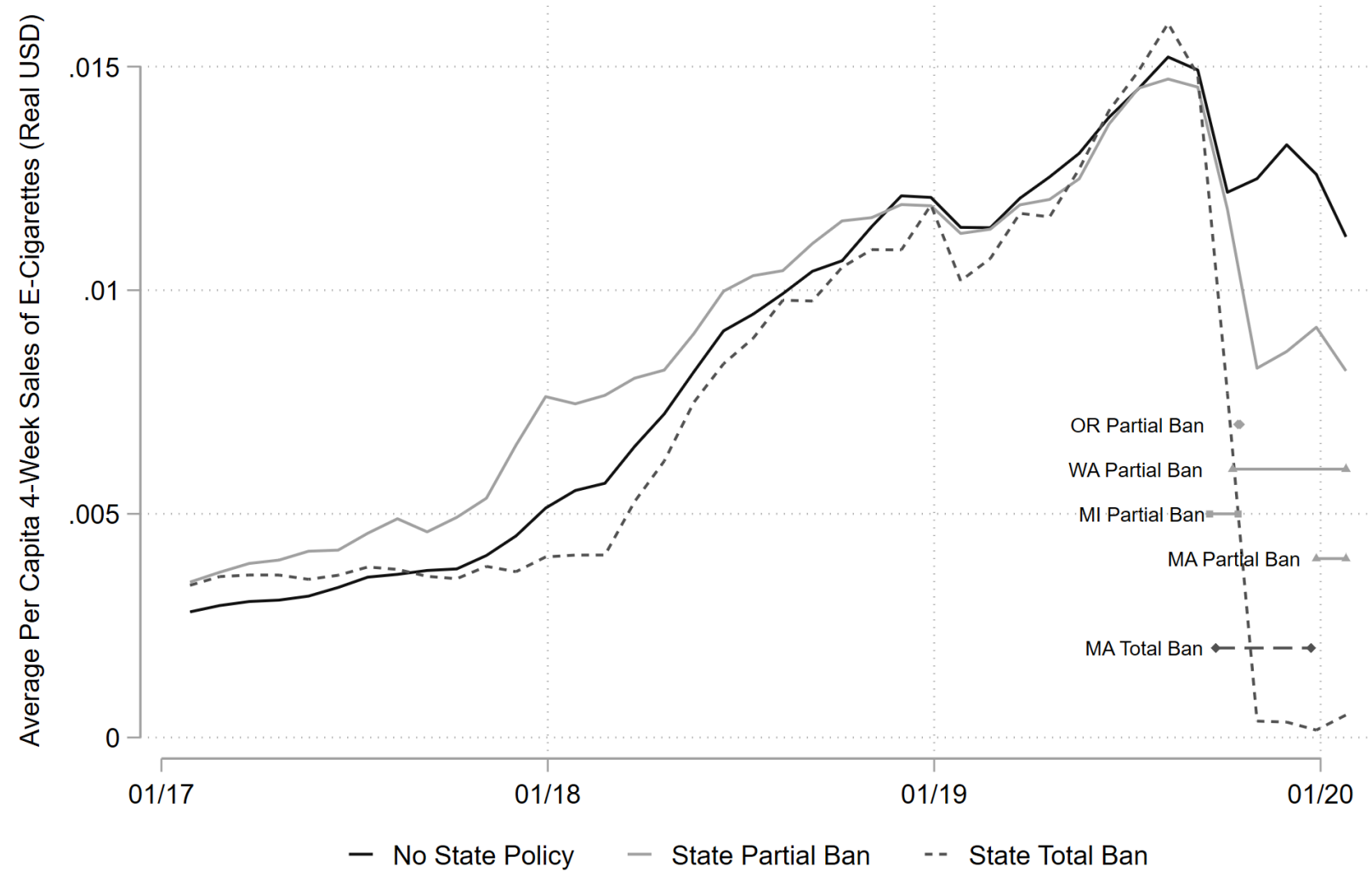
Age-Proportionate

Disproportionately  
Old

# Descriptive Analyses

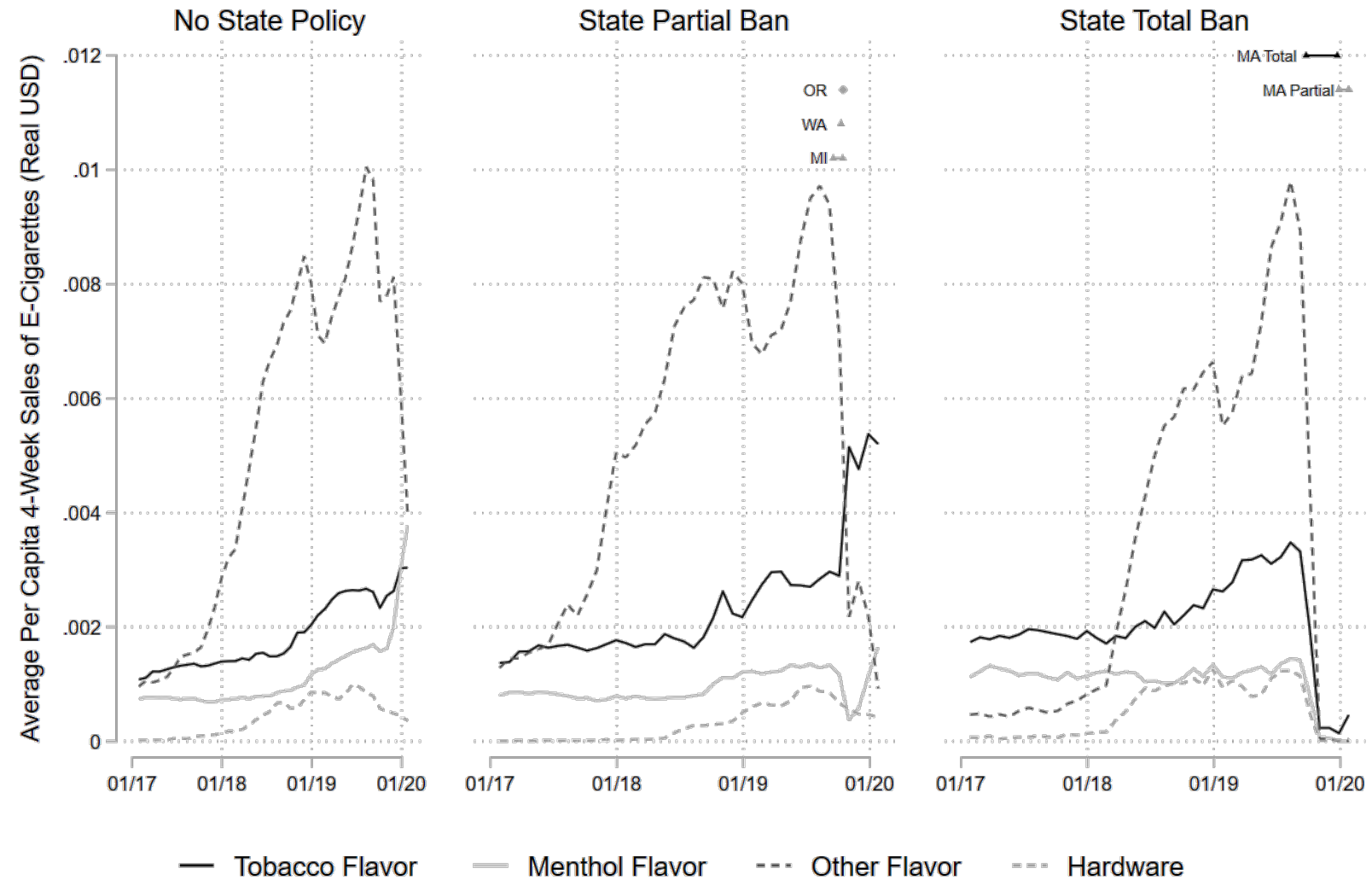
# EVALI and E-Cigarette Sales

- Average Per Capita Sales of E-Cigarettes By State E-Cigarette Policy Group
- January 2017 – January 2020



# Category-Level Sales of E-Cigarettes

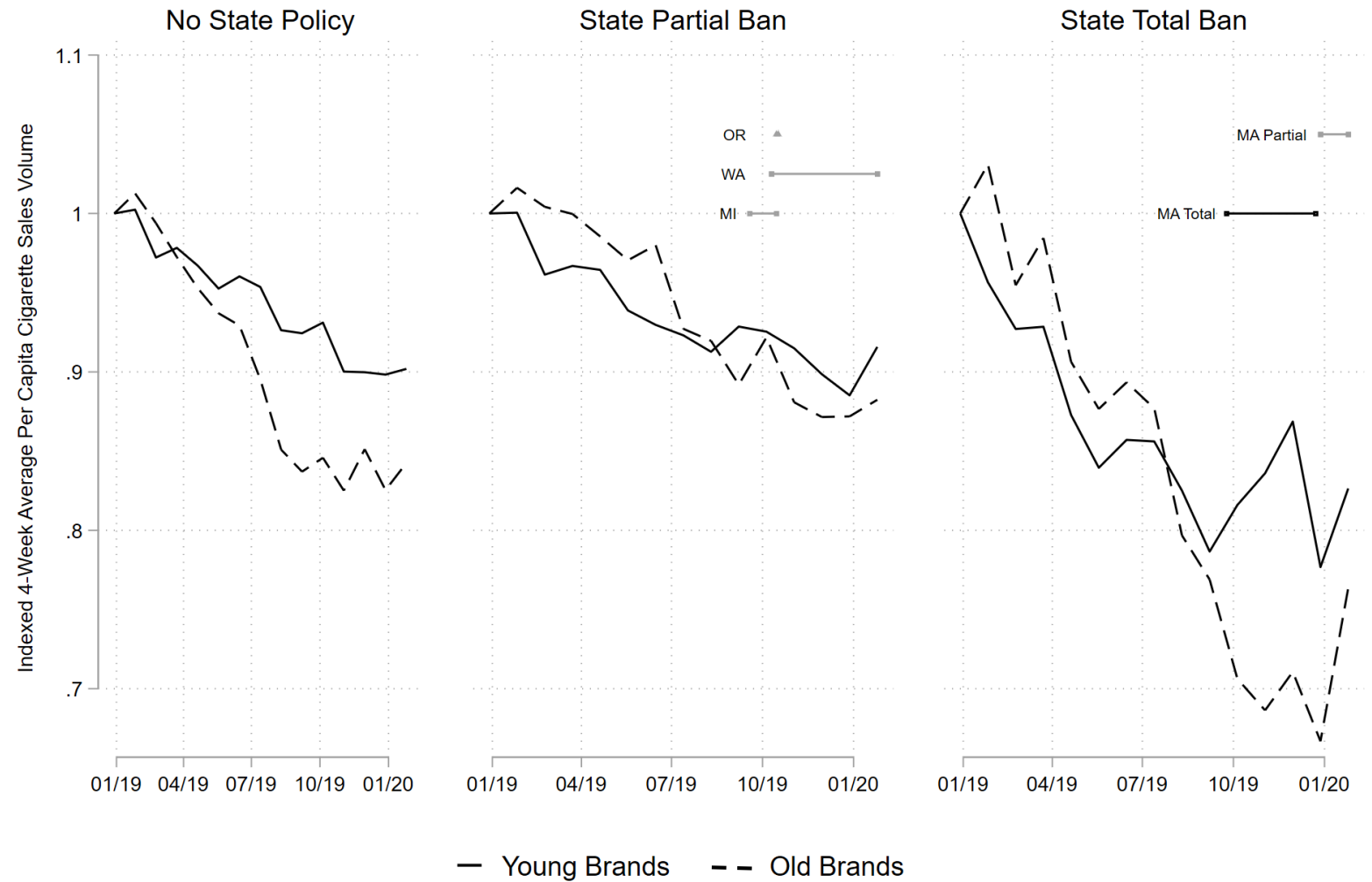
- Average Per Capita Sales of E-Cigarettes By State E-Cigarette Policy Group
- January 2017 – January 2020





# EVALI and Cigarette Sales

- Average Per Capita Cigarette Sales by E-Cigarette Policy and Brand Age Category
- Adjusted for Seasonal Consumption Patterns
- December 2018 – January 2020



# Multivariate Analyses

## Data (Continued)

Secondary Input Variables (All Differenced):

- **Time**
- **Price** – Inflation-adjusted average unit price
- **Tobacco 21** – Coverage (% of Population)
- **Weather** – Heating Degree Days (HDD), Differenced Proportion of Days Where Heat Must be Turned On
- **HDD \* HDD Mean** – Unseasonably Cold Weather
- **Distribution** – Weighted proportion of stores reporting sales of a given category
- **JUUL Fruit and Mint Distribution** – Differenced, Distribution of JUUL's Fruit and Mint Flavored Pods

# First-Differenced Results for Log-Differenced TOTAL E-Cigarette Sales and by Product Category

	Total	Hardware	Other Flavors	Menthol Flavor	Tobacco Flavor
<b>EVALI Deaths</b>	-0.106*	-0.381*	-0.321*	0.00153	-0.0299
<b>State Total Ban Days</b>	-2.343*	-2.786*	-1.252	-0.473	-1.489*
<b>State Partial Ban Days</b>	-0.830	-0.542	-2.987	-2.400*	0.196
<b>Population Mean</b>	0.0193	0.0111	0.0315	0.0158	0.0132
<b>Population Std Dev</b>	0.1189	0.2358	0.2667	0.2023	0.1063

Note: \*  $p < 0.05$ , All 23 panels except Michigan (n=68, starting in November 2014) have 78 observations. Covariate results are not displayed. Standard errors are clustered at the state level.

# First-Differenced Results for Log-Differenced TOTAL E-Cigarette Sales and by Product Category (WITHOUT MASSACHUSETTS)

	Total	Hardware	Other Flavors	Menthol Flavor	Tobacco Flavor
<b>EVALI Deaths</b>	-0.0578 <sup>*</sup>	-0.343 <sup>*</sup>	-0.181 <sup>*</sup>	0.0907 <sup>*</sup>	0.0133
<b>State Partial Ban Days</b>	-0.226 <sup>*</sup>	-0.152 <sup>*</sup>	-1.282 <sup>*</sup>	-1.305 <sup>*</sup>	0.751 <sup>*</sup>
<b>Population Mean</b>	0.0211	0.0124	0.0365	0.0200	0.0144
<b>Population Std Dev</b>	0.0886	0.2243	0.2072	0.1435	0.0893

Note: <sup>\*</sup>  $p < 0.05$ , All 22 panels except Michigan (n=68, starting in November 2014) have 78 observations. Covariate results are not displayed. Standard errors are clustered at the state level.

# First-Differenced Results for Log-Differenced TOTAL Cigarette Sales AND by Brand Group

	Total	Young Brands	Age-Proportional Brands	Old Brands
<b>EVALI Deaths</b>	-0.00460*	-0.00686*	-0.00352*	-0.00754*
<b>State Total Ban Days</b>	0.0414*	0.0813*	0.0274*	0.00960
<b>State Partial Ban Days</b>	-0.0115	-0.0144	-0.00972	-0.0382*
<b>Population Mean</b>	-0.0026	-0.0010	-0.0030	-0.0092
<b>Population Std Dev</b>	0.0388	0.0442	0.0372	0.0638

Note: \*  $p < 0.05$ , All 23 panels except Michigan (n=68, starting in November 2014) have 78 observations. Covariate results are not displayed. Standard errors are clustered at the state level.

# Limitations

- Limited Nielsen channel coverage
- No accounting for cross-border sales
- Temporary flavored e-cigarette sales restrictions may not have the same effects as permanent restrictions

# Conclusions

- E-cigarette sales declined in response to the EVALI outbreak, and in response to policy-response measures limiting the sale of e-cigarettes
- Sales of cigarettes rose during MA's total ban on e-cigarette sales
- No rise in cigarette sales could be observed in reaction to the EVALI outbreak or partial e-cigarette sales bans
- ***Policies restricting e-cigarette sales may not always generate the worst-possible outcomes of substitution toward cigarettes***



# See the full paper!



► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/tobaccocontrol-2021-056807>).




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## Original research

### The EVALI outbreak and tobacco sales in the USA, 2014–2020

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#### ABSTRACT

**Background** The E-cigarette, or Vaping Product-Use Associated Lung Injury (EVALI) Outbreak of 2019 hospitalised thousands and killed dozens of people in the USA and raised perceptions of the dangers posed to health by electronic cigarettes (e-cigarettes). These illnesses along with continued increases in youth vaping rates lead to the passage of many state and federal laws intended to curtail the sale of flavoured e-cigarettes. Little is known about the impact of these events on US e-cigarette and cigarette retail sales.

**Methods** Using Nielsen Scantrack sales data from January 2014 to January 2020 for 23 US states, we evaluate the effect of the EVALI outbreak. First-differenced state-panel regressions tracking unit sales of total-level and category-level e-cigarettes and cigarette sales controlling for price, Tobacco 21 policy coverage, product distribution, seasonality, EVALI-attributable deaths, and state-level e-cigarette policies affecting the availability of e-cigarettes (non-tobacco flavoured and total) were employed.

**Results** Dollar sales of e-cigarettes declined 29% from

primarily use e-cigarettes flavoured to taste like fruit and mint.<sup>7</sup> While e-cigarette use is likely to be less hazardous than smoking for adult smokers who switch completely,<sup>8</sup> these high levels of e-cigarette use among US youth pose a significant public health threat. Concerns stem from the evidence demonstrating the risks associated with youth exposure to nicotine, its high addiction potential, and the associations between youth e-cigarette use and future cigarette smoking.<sup>9–11</sup> In response to these rising youth prevalence figures and increasing hospitalisations and deaths, federal and state governments issued a series of regulatory policy responses that attempted to control and contain the e-cigarette market, including temporary bans of some or all flavoured e-cigarettes in four states.

In October 2019, the US Centers for Disease Control and Prevention (CDC) named the new syndrome, ‘E-cigarette, or Vaping Product-Use Associated Lung Injury’, or EVALI, although the exact cause of the outbreak remained unclear.<sup>12–13</sup> By November 2019, the CDC

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