

Flavored tobacco sales restrictions and teen e-cigarette use: Quasi- experimental evidence from California

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Flavored Tobacco Sales Restrictions and Teen E-cigarette Use: Quasi-experimental Evidence From California

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Link: <https://pubmed.ncbi.nlm.nih.gov/35983929/>

Outline

- Background
- Aims

- Methods

- Results/conclusions
- Explanation of results
- Next steps

Flavored tobacco sales restrictions (FTSR)

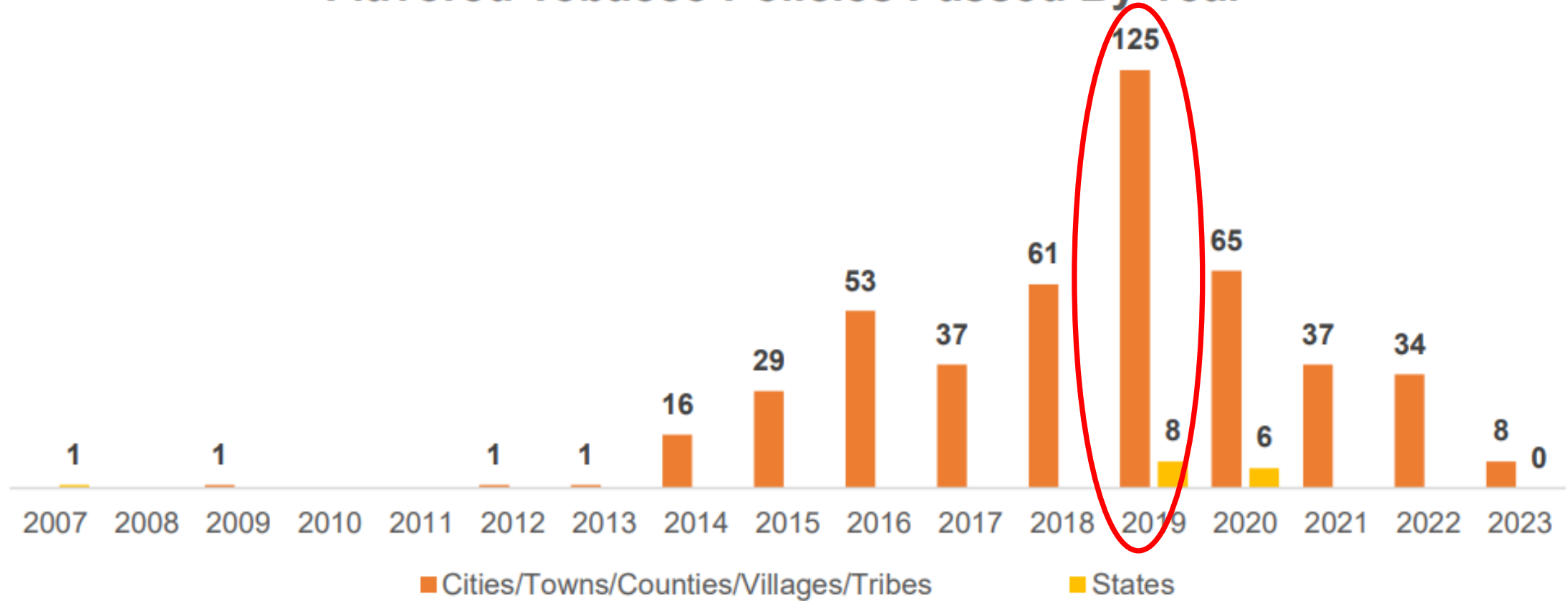


Impact of FTSRs - Roger's systematic review

- **moderate to strong** quality evidence that flavor regulations reduce the **sale and retail availability** of tobacco products
- **moderate** quality evidence that flavor regulations were associated with decreased **tobacco use**



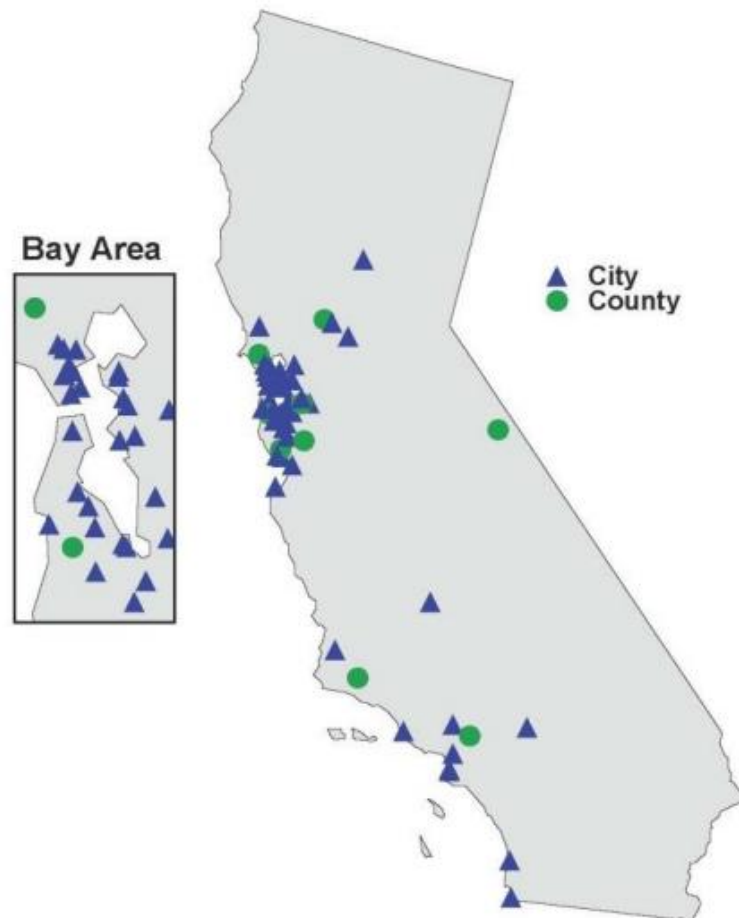
Flavored Tobacco Policies Passed By Year



Truth Initiative: <https://truthinitiative.org/sites/default/files/media/files/2023/09/Flavored-tobacco-policy-restrictions-6.30.23.pdf>

45.6% of California's population was covered by a flavor regulation, as of November 2022

California Jurisdictions with Policies Prohibiting the Sale of Flavored Tobacco Products, Including Menthol, without Exception



SB 793 – bans sale of flavored tobacco products in California- December 2022

Study Aims

To examine if local FTSRs were associated with a change in e-cigarette use among high school students in California.

We also examined ease of access to e-cigarettes and use of marijuana in an e-cigarette.

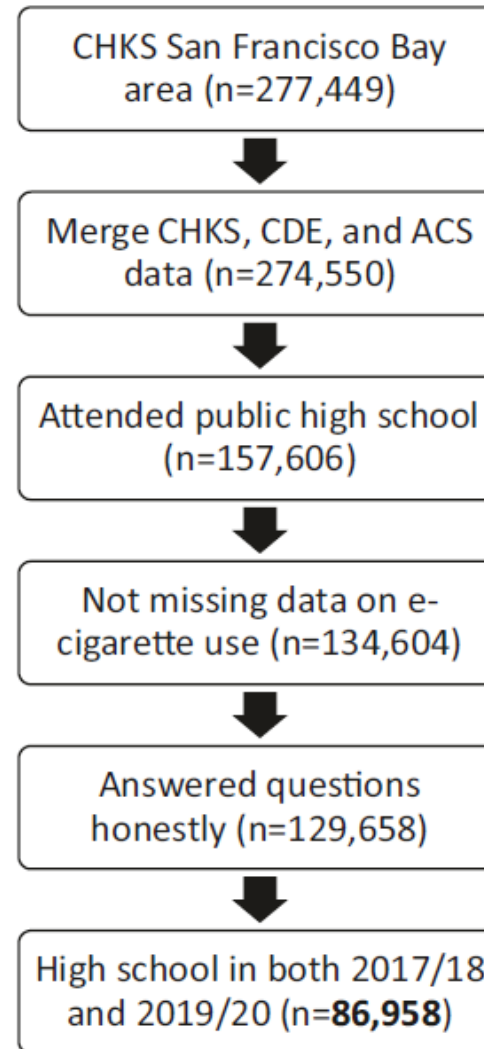
Methods



Data sources

- 2017/18 and 2019/20 **California Healthy Kids Survey (CHKS)**
 - Before COVID-19
 - 75% response rate
- Public Health Law Center: City-level FTSR policies and dates
- 2020 California Department of Education: City and school size
- 2015 to 2019 American Community Survey: Population density
- 2018 California Department of Tax and Fee Administration: Tobacco retailer data

Sample size



Footnote: CHKS = California Healthy Kids Survey,
CDE = California Department of Education,
ACS = American Community Survey

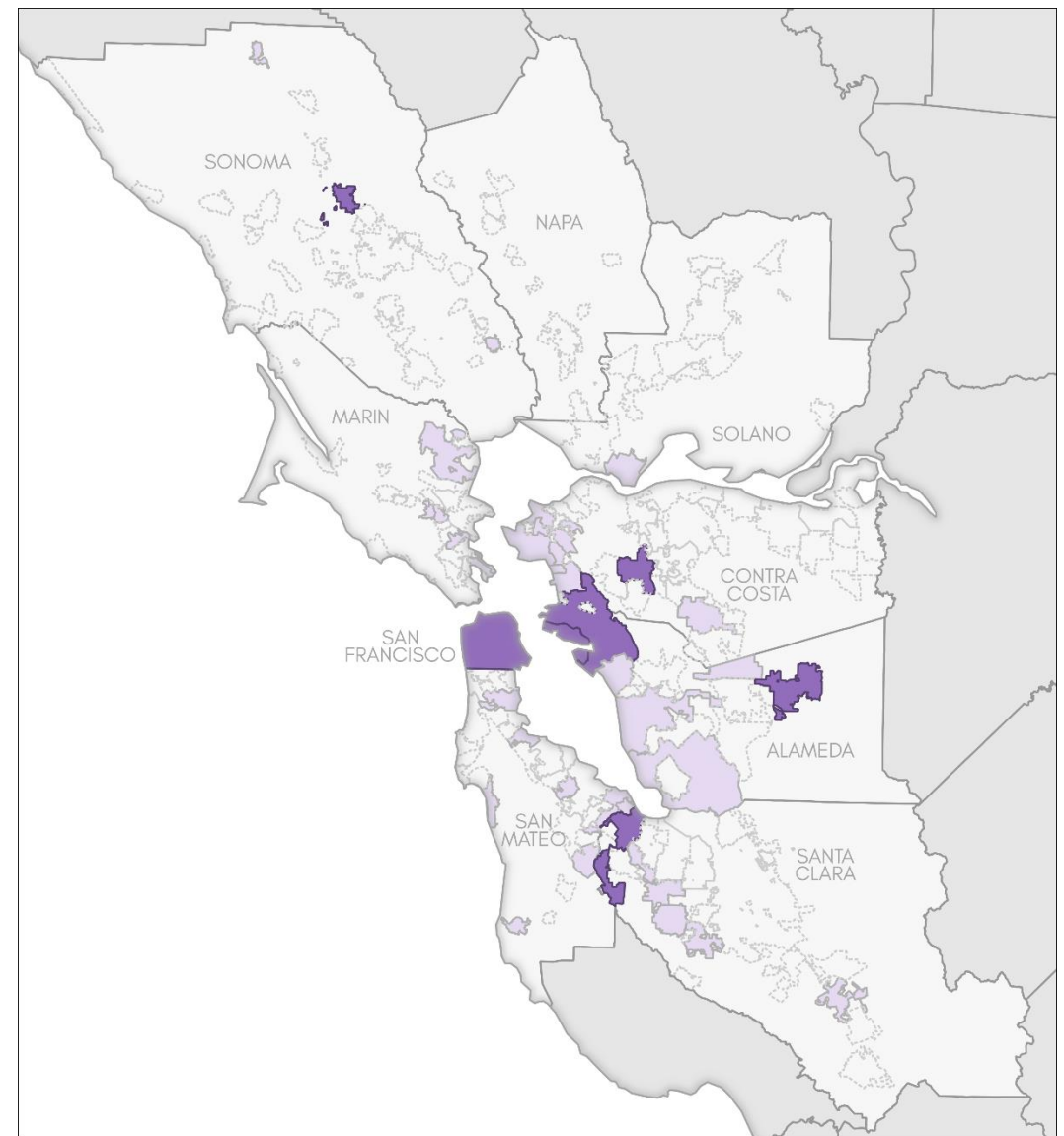
Figure 1. Analysis sample accrual flowchart.

Exposure

Exposed: Students attending school in a city **with** a FTSR

Unexposed: Students attending school in a city **without** a FTSR

Note: Exposure status based on where the student attends school (not home address)

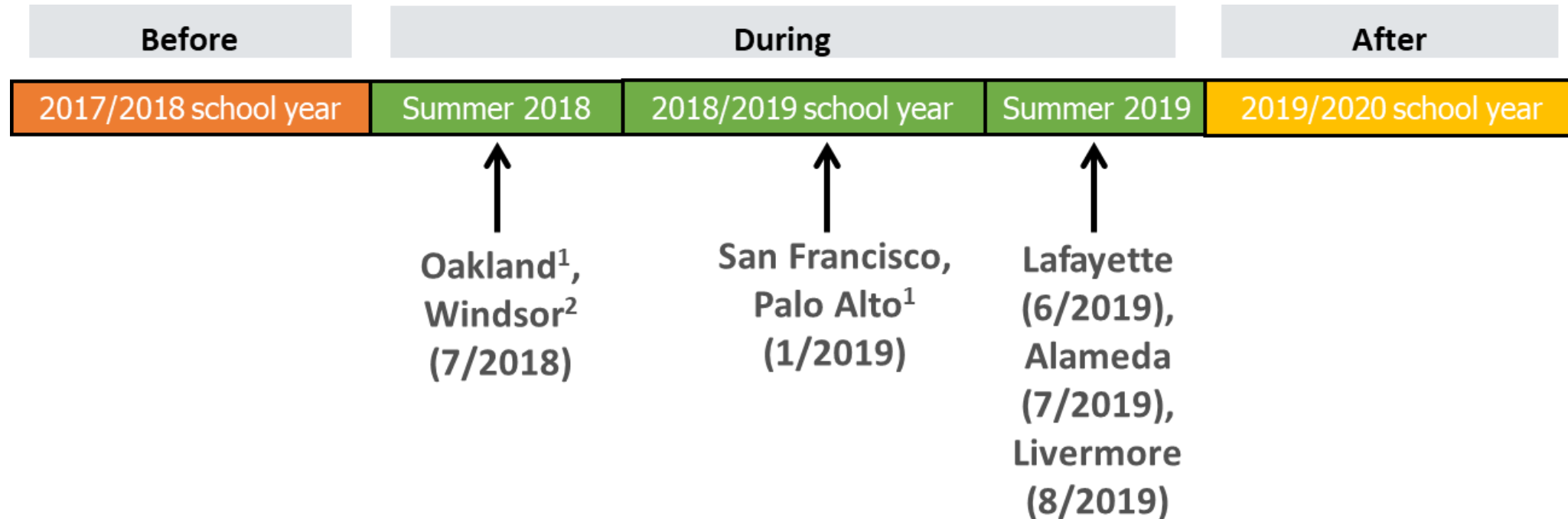


Cartography by Michele M. Tobias

Exposure – 2 sensitivity analyses

1. Do exemptions matter?
 - comprehensive FTSRs or
 - FTSR with an exemption or not exposed to a FTSR
2. students exposed to FTSRs with exemptions were excluded from the unexposed group:
 - comprehensive FTSRs or
 - not exposed to a FTSR

Timeline of flavor regulations



Policy dates are enforcement or effective dates.

¹ Adult-only stores excluded

² Menthol flavor, premium cigars (priced over \$5), large packs of cigars and smokeless tobacco (5 units or more), and pipe tobacco excluded.

Outcomes – current e-cigarette use

*During the past 30 days, on how many **days** did you use ...*

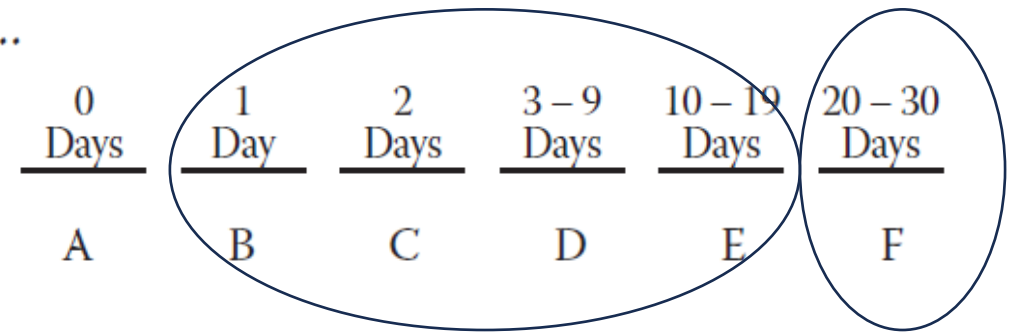
69. **electronic cigarettes, e-cigarettes, or other vaping device such as e-hookah, hookah pens, or vape pens?**

<u>0</u> Days	<u>1</u> Day	<u>2</u> Days	<u>3 – 9</u> Days	<u>10 – 19</u> Days	<u>20 – 30</u> Days
A	B	C	D	E	F

Outcomes – Frequent e-cigarette use (*among current users*)

During the past 30 days, on how many days did you use ...

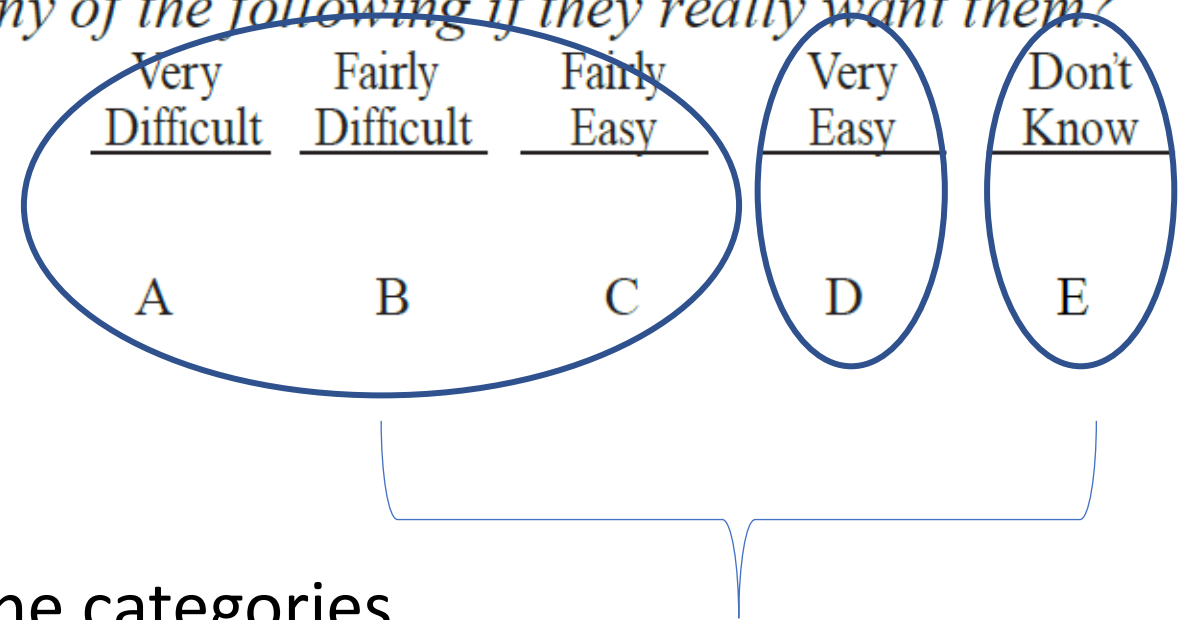
69. **electronic cigarettes, e-cigarettes, or other vaping device such as e-hookah, hookah pens, or vape pens?**



Outcomes – Access to e-cigarettes

How difficult is it for students in your grade to get any of the following if they really want them?

96. Vape products



Compared “Very Easy” to the rest of the categories.

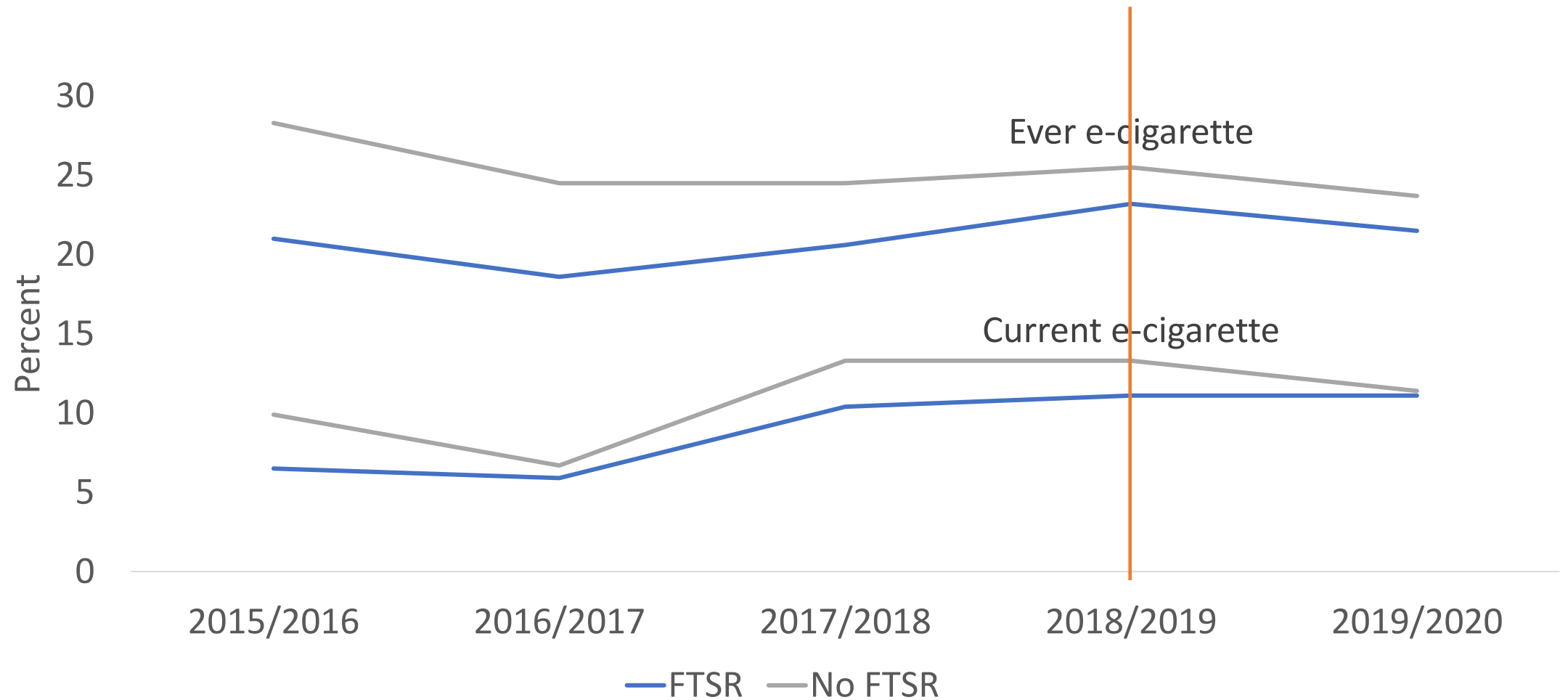
Outcomes

- Ever (lifetime) e-cigarette use
- Ever using marijuana in an e-cigarette

Data analysis

- A difference-in-difference analysis
 - compared pre-post policy change in exposed students to a change in unexposed students
- Adjusted logistic regression models
 - D-I-D odds ratio: interaction term between year (2019/2020 compared with 2017/2018) and exposure group (FTSR: yes or no)
- SAS survey procedures were used to account for students clustered within schools

Data analysis – parallel trends assumption



Data analysis – parallel trends assumption

- Included an interaction term (year \times FTSR) in logistic regression models for ever and current e-cigarette use (*before policy implementation – 2015/16, 2016/17, 2017/18*).
- Marijuana use in an e-cigarette and ease of access to e-cigarettes, was not available until 2017
- Interaction term p-value was >0.05 , indicating assumption held.

Results



Characteristics of cities with and without a FTSR

Characteristic	FTSR	No FTSR
Number of students	20,832	66,126
Number of cities	7	33
Number of high schools	26	53
City-level:		
Median population	425,097	69,567
Median land area (square miles)	46.9	14.4
Median number of tobacco retailers within 1000' of a public school	20	5

Results- current e-cigarette use

	Current e-cigarette use			
	Pre-policy (2017/2018)	Post-policy (2019/2020)	Pre- to post policy adjusted OR (95% CI)	DID adjusted OR (95% CI)
FTSR	10.5%	11.1%	1.12 (0.86, 1.45)	1.25 (0.95, 1.65)
No FTSR	12.8%	11.4%	0.90 (0.81, 1.00)	ref

Adjusted for gender, grade, race/ethnicity, sexual orientation, parent education, type of home, home language, term, school size, percent of school eligible for Free or Reduced Price Meals, population density, and the number of tobacco retailers within 1000' of a school.

Results- frequent e-cigarette use (among current users)

	Frequent e-cigarette use			
	Pre-policy (2017/2018)	Post-policy (2019/2020)	Pre- to post policy adjusted OR (95% CI)	DID adjusted OR (95% CI)
FTSR	20.8%	22.7%	1.27 (0.91, 1.79)	1.01 (0.71, 1.46)
No FTSR	21.2%	24.3%	1.25 (1.10, 1.42)	ref

Adjusted for gender, grade, race/ethnicity, sexual orientation, parent education, type of home, home language, term, school size, percent of school eligible for Free or Reduced Price Meals, population density, and the number of tobacco retailers within 1000' of a school.

Results- ever e-cigarette use

	Ever e-cigarette use			
	Pre-policy (2017/2018)	Post-policy (2019/2020)	Pre- to post policy adjusted OR (95% CI)	DID adjusted OR (95% CI)
FTSR	20.8%	21.5%	1.08 (0.91, 1.27)	1.06 (0.89, 1.26)
No FTSR	24.0%	23.8%	1.02 (0.94, 1.09)	ref

Adjusted for gender, grade, race/ethnicity, sexual orientation, parent education, type of home, home language, term, school size, percent of school eligible for Free or Reduced Price Meals, population density, and the number of tobacco retailers within 1000' of a school.

Results- ever used marijuana in an e-cigarette

	Ever used marijuana in an e-cigarette			
	Pre-policy (2017/2018)	Post-policy (2019/2020)	Pre- to post policy adjusted OR (95% CI)	DID adjusted OR (95% CI)
FTSR	16.9%	20.6%	1.35 (1.19, 1.53)	1.05 (0.91, 1.21)
No FTSR	17.6%	20.8%	1.29 (1.20, 1.39)	ref

Adjusted for gender, grade, race/ethnicity, sexual orientation, parent education, type of home, home language, term, school size, percent of school eligible for Free or Reduced Price Meals, population density, and the number of tobacco retailers within 1000' of a school.

Results- access to e-cigarettes

	Easy to obtain e-cigarettes			
	Pre-policy (2017/2018)	Post-policy (2019/2020)	Pre- to post policy adjusted OR (95% CI)	DID adjusted OR (95% CI)
FTSR	30.6%	39.2%	1.57 (1.27, 1.95)	1.02 (0.81, 1.29)
No FTSR	34.6%	43.5%	1.54 (1.39, 1.70)	ref

Adjusted for gender, grade, race/ethnicity, sexual orientation, parent education, type of home, home language, term, school size, percent of school eligible for Free or Reduced Price Meals, population density, and the number of tobacco retailers within 1000' of a school.

Results – sensitivity analysis with different exposure groups

- Consistent with main results

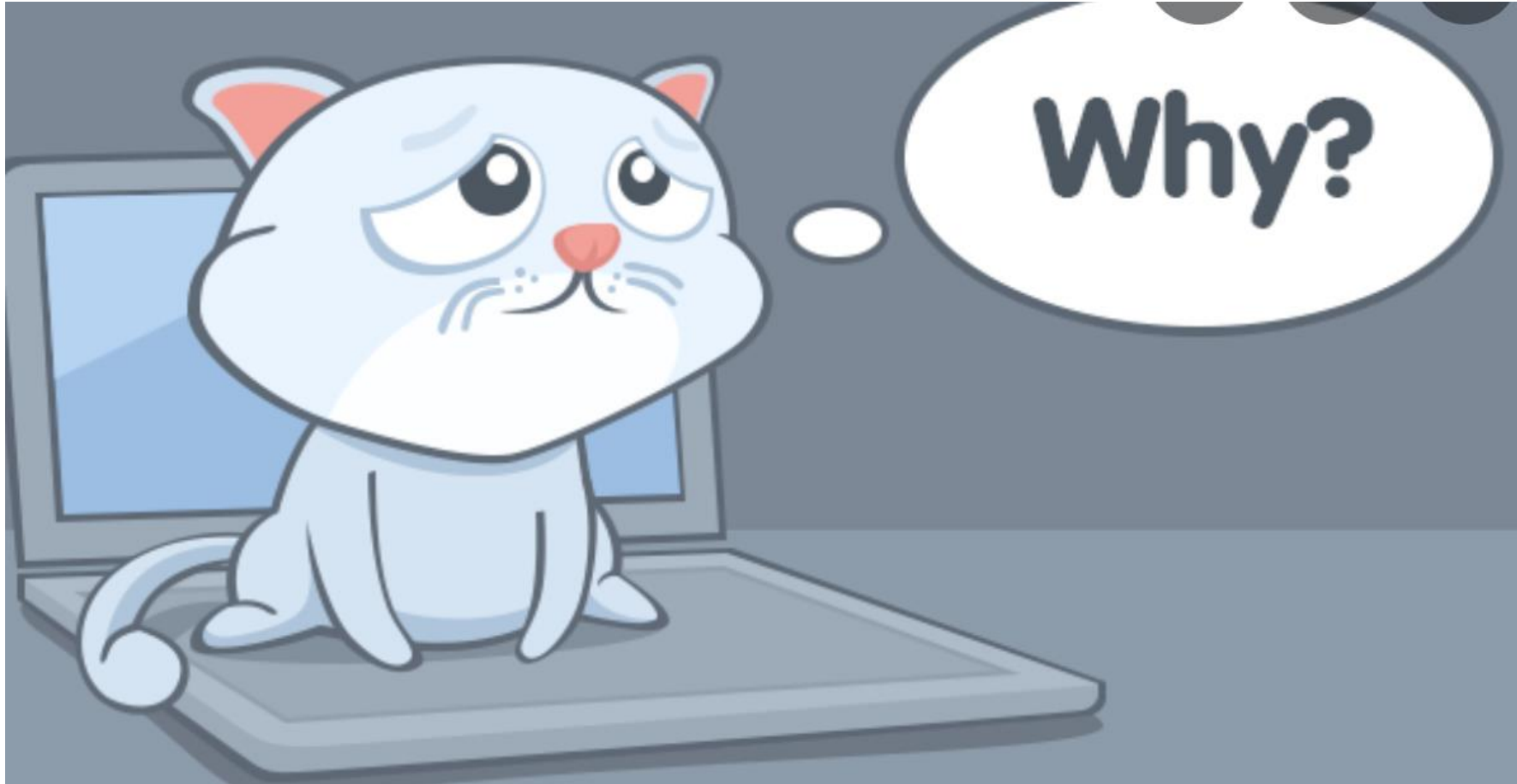
Summary/ conclusions

- No association between FTSRs and e-cigarette use (current, ever, or frequent) one-year post-implementation in the Bay Area.
- Overall increase in ease of access and using marijuana in an e-cigarette.
- FTSRs are *one* part of a broader plan to reduce youth e-cigarette use:
 - e-cigarette inclusive smoke-free policies,
 - media campaigns,
 - education programs, and
 - cessation tools targeted to youth.

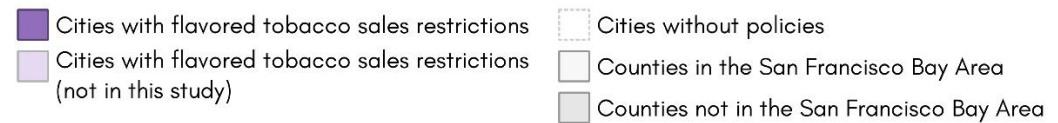
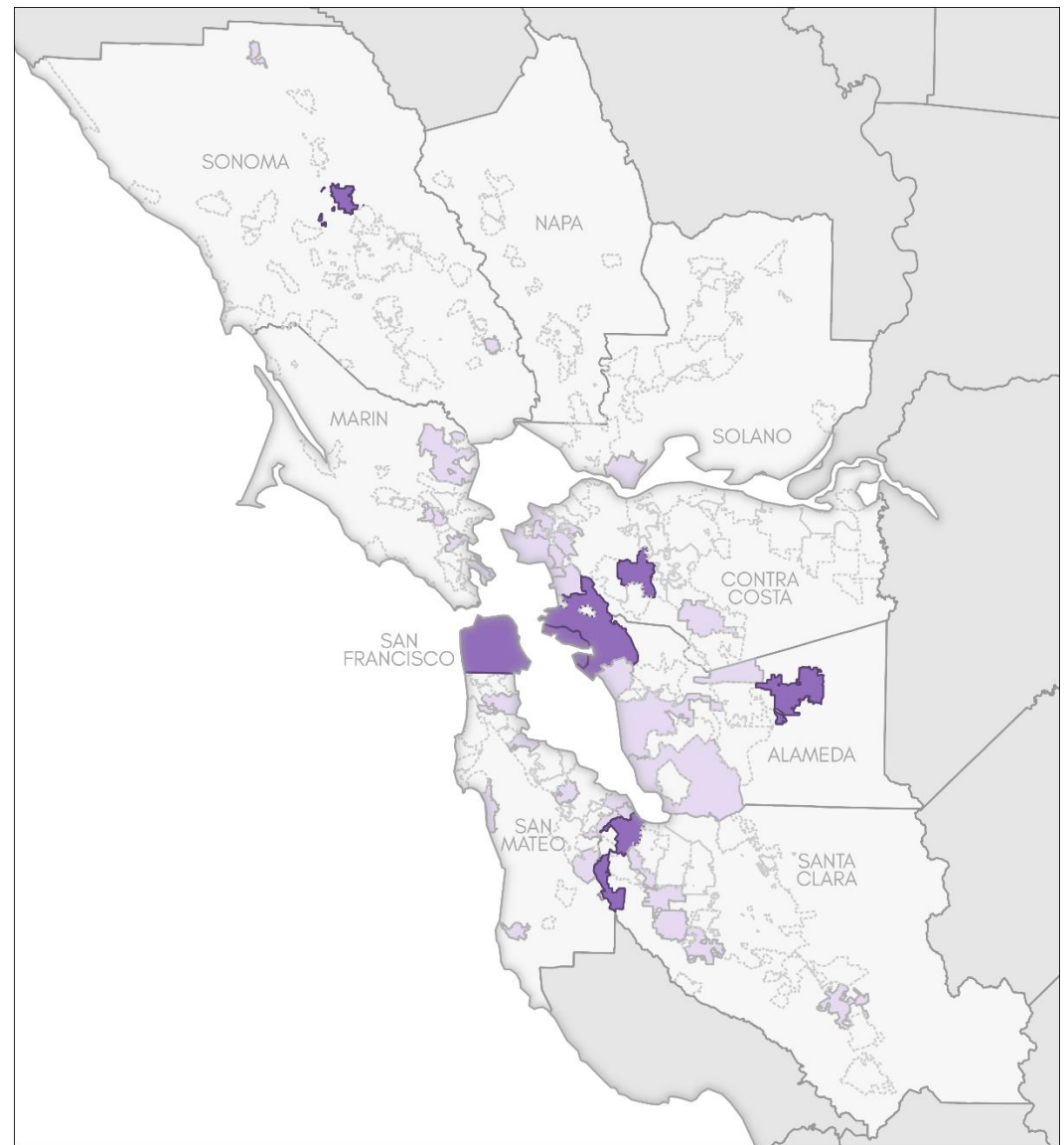
Limitations

- No information on *flavored* e-cigarette use
- City where students live may be different than the city where they attend school
- Only included 7 cities with flavor regulations - all from the San Francisco Bay Area

Explanatory factors for no association

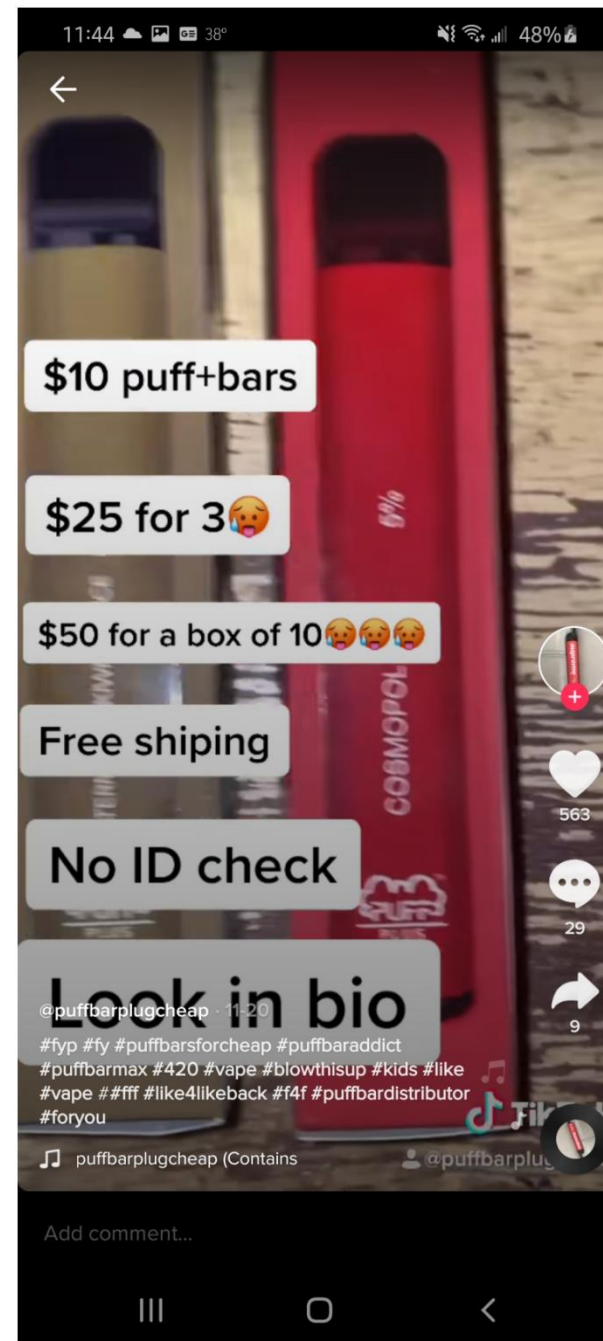


1. Youth traveling to nearby cities to obtain flavored tobacco products



Cartography by Michele M. Tobias

2. Youth obtaining tobacco products online or through social media (i.e. tik tok, snapchat)



3. Retail stores not complying with the policy

Flavored e-cigarettes were still available to purchase in approximately 20% of retail stores one year after San Francisco's FTSR.



Substitution?

- Students may switch to flavored marijuana products in an e-cigarette if flavored e-cigarettes are no longer available.
- Among high school students in Northern and Central California, 58% of those who smoked marijuana in an e-cigarette used a flavored product.

Next steps

- Stratify results by tobacco retailer density
- TRDRP New investigator grant to continue this research with more FTSRs and extended follow-up time
- UC Davis Tobacco Cessation Policy Center

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- CHKS: Ben Trigg