

CAPSTONE PROJECT

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PROJECT TITLE:

Impact of Local Flavored Tobacco Bans and Demographic Factors on Vape Shops' E-Commerce Activity



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BACKGROUND

In 2022, California passed a flavored tobacco ban (SB-793), but it didn't explicitly ban online sales.¹



LIVE WELL
SAN DIEGO

San Diego County prohibits all online and delivery tobacco sales in unincorporated areas.²



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¹ CALIFORNIA LEGISLATURE (2020)

² COUNTY OF SAN DIEGO (2024)

BACKGROUND

Despite these laws, tobacco e-commerce is rapidly growing (\$16.7B in 2023), especially among youth.³

40% of online vape purchases come from youth under 24.⁴

A screenshot of a Google search results page for the query "order vapes online". The search bar shows the query. Below it are several filters: Shopping, Near me, Free shipping, Usa, No ID, Disposable, Images, Reddit, and Fume. The results section starts with a snippet: "About 207,000,000 results (0.41 seconds)". The first result is "Element Vape" with a link to <https://www.elementvape.com>. The description for this result is: "Element Vape - Online Vape Shop - Vape Mods, Kits & E-Liquid". It includes a brief description: "Shop incredible deals at Element Vape, a progressive online retail establishment serving the vaping community with mod kits, pod systems, ... Starter Kits · Devices · E-Liquids · Box Mods". The second result is "Mi-Pod" with a link to <https://mipod.com/collections/disposable-vape>. The description is: "Shop Disposable Vapes Online". It includes: "Shop our great selection of disposables vapes online today. Our online vape store ... Free Shipping on Orders over \$79.99! VAPE KITSVAPE KITS. Shop by Style. BC5000 Sampler Pack · Lost Mary OS5000 Sampler · Draco Sampler Pack". The third result is "VaporFi" with a link to <https://www.vaporfi.com>. The description is: "VaporFi | Online Vape Shop - Vapes, E Juice, Mods, & More". It includes: "Explore the assortment of the best vapes, e-liquids, mods, and more that the VaporFi online store has to offer. Shop great deals including free shipping ...". To the right of this result is a small image of several vape products. The fourth result is "Juicefly" with a link to <https://juicefly.com/collections/vape>. The description is: "Vape Delivery: Order Vapes Online". It includes: "Explore Juicefly, one of the best vapes stores near you. Get Vape Delivery in Los Angeles & Shipping US. Buy vapes online today! Flum Pebble Vapes 6000 Puffs · Vape · California Honey 7000 Puffs 5... · Deliver". To the right of this result is another small image of vape products.



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³ LEAS (2024)

⁴ GAIHA ET AL. (2020)

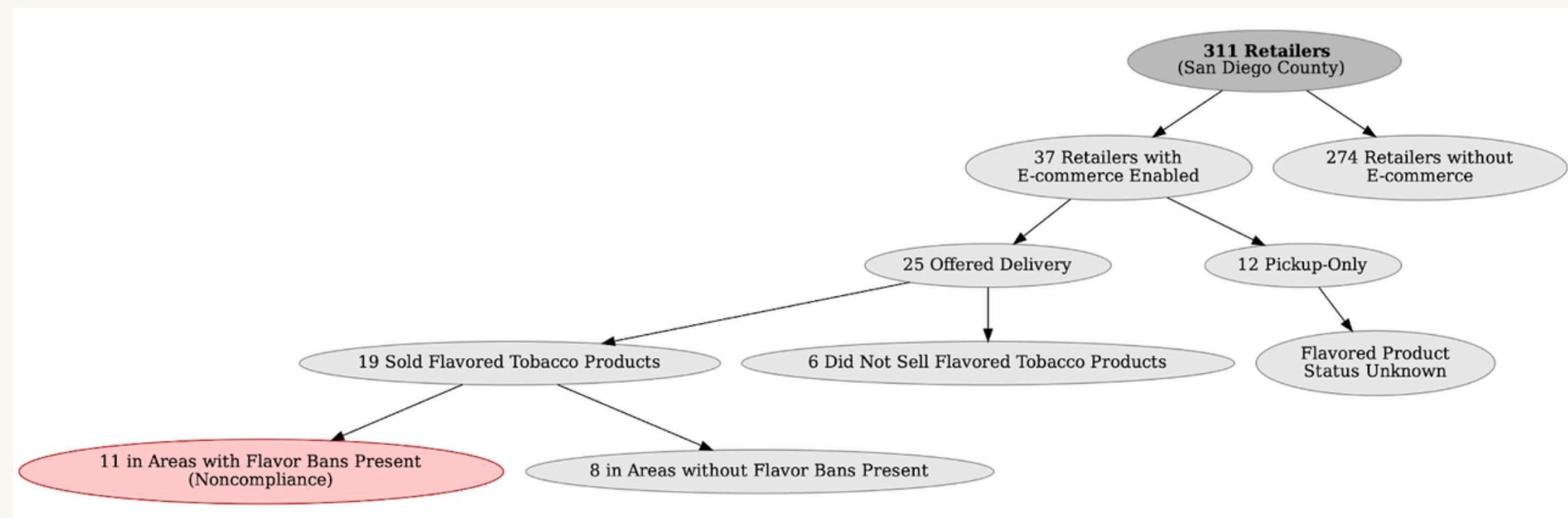
OBJECTIVES

- We hypothesized that:
 - Flavor bans, higher deprivation, and more youth drive vape shops to operate online.
- Exploratory analyses examined differences between racial/ethnic demographics.
- Map-based data dashboard for stakeholders and enforcement



METHODOLOGY

- Vape shops in San Diego County collected via Google Maps & Yelp APIs (n = 311).
- Manually audited for online sales and flavored product availability.
- Merged with census tract data⁵ (income, age, race/ethnicity), alongside the Social Deprivation Index (SDI)⁶, and flavored tobacco ban policy data⁷.
- Wilcoxon tests analyzed differences between tracts.
- Logistic regressions tested associations.



RESULTS

Table 1

Demographics by E-Commerce Presence: Median (IQR) and Wilcoxon Rank Sum Tests

	No E-commerce Present (n = 274)	Yes E-commerce Present (n = 37)	p-value (Wilcoxon)
Median Household Income	\$63,400 (\$49,500-\$76,900)	\$68,700 (\$60,100-\$85,000)	0.039 *
Social Deprivation Index (SDI)	0.636 (0.320-1.131)	0.245 (-0.277-0.864)	0.047 *
Residents Under 21 years	25.7% (19.5%-30.9%)	21.9% (17.4%-26.5%)	0.025 *
African American Residents	3.9% (2.2%-8.3%)	3.4% (1.5%-5.3%)	0.191
Hispanic Residents	29.9% (20.0%-56.9%)	23.9% (16.0%-41.7%)	0.064 .
White Residents	45.1% (18.4%-60.5%)	51.7% (33.6%-69.4%)	0.161
Native American Residents¹	0.0% (0.0%-0.3%)	0.0% (0.0%-0.3%)	0.916

Note. Presented values are medians with interquartile ranges (IQR) in parentheses. Group differences were tested using the Wilcoxon rank sum test. * p < 0.05, . p < 0.10

¹ Native American resident median is 0 due to low representation across census tracts. Mean % Native American was 0.28% and 0.16% for non- and e-commerce tracts, respectively.

- Census tracts with e-commerce enabled vape shops had:
 - a higher median household income (\$68,700 vs. \$63,400)
 - a lower Social Deprivation Index score (0.245 vs. 0.636)
 - a lower proportion of residents under age 21 (21.9% vs. 25.7%)
 - no significant difference in ethnicity



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RESULTS

Table 2
Predictors of E-Commerce Presence in San Diego County Vape Shops

Predictor	OR (95% CI)	p-value
Flavor Ban Present	1.07 (0.5, 2.32)	0.855
Median Household Income (per \$10,000)	1.11 (0.8, 1.55)	0.034 *
Social Deprivation Index (SDI)	0.63 (0.4, 0.99)	0.044 *
Under Age 21 Proportion	0.03 (0.0, 1.14)	0.059 .
Percent White	0.99 (0.96, 1.02)	0.494
Percent Black (African American)	0.93 (0.86, 1.02)	0.119
Percent Hispanic	0.98 (0.95, 1.01)	0.165
Percent Native American	0.65 (0.29, 1.47)	0.303

Note. Odds ratios (ORs), 95% confidence intervals (CIs), and p-values from logistic regression models assessing factors associated with the presence of e-commerce functionality.

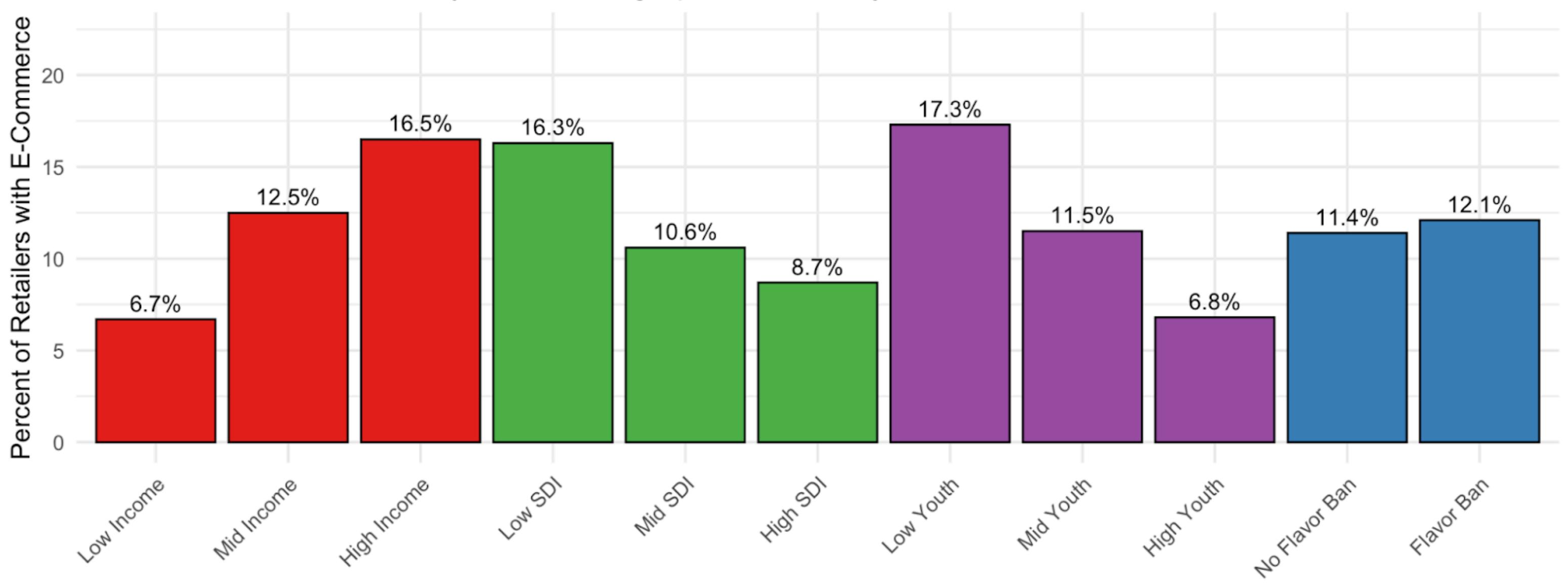
* $p < 0.05$, . $p < 0.10$

- What predicted e-commerce presence?
 - income = positive predictor
 - youth proportion = negative predictor
 - deprivation levels = negative predictor
 - flavor bans = no significant impact
 - race/ethnicity = no significant impact



RESULTS

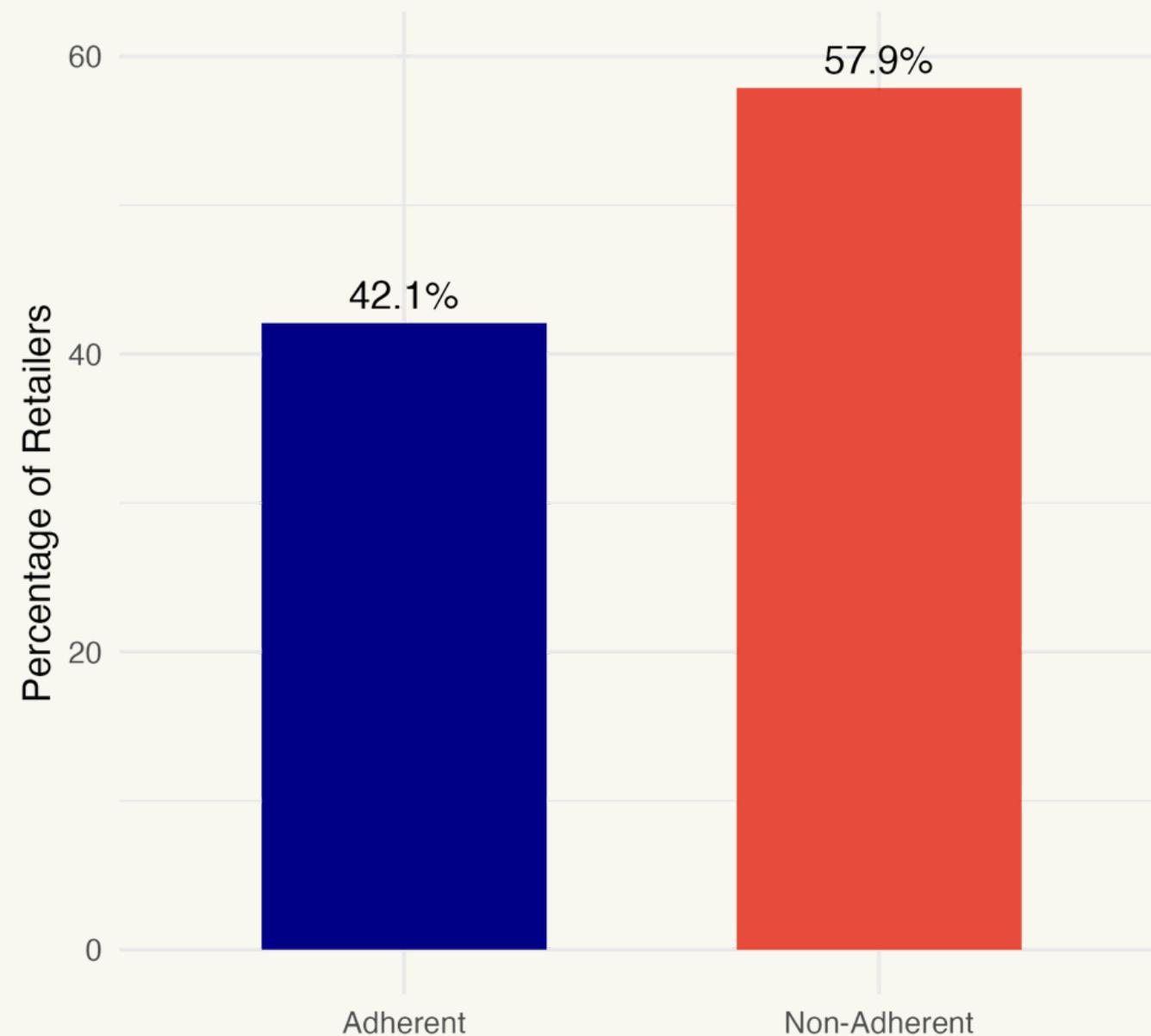
E-Commerce Prevalence by Sociodemographic and Policy Factors



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RESULTS

Flavor Ban Nonadherence amongst Delivery-Based Retailers Selling Flavored Products

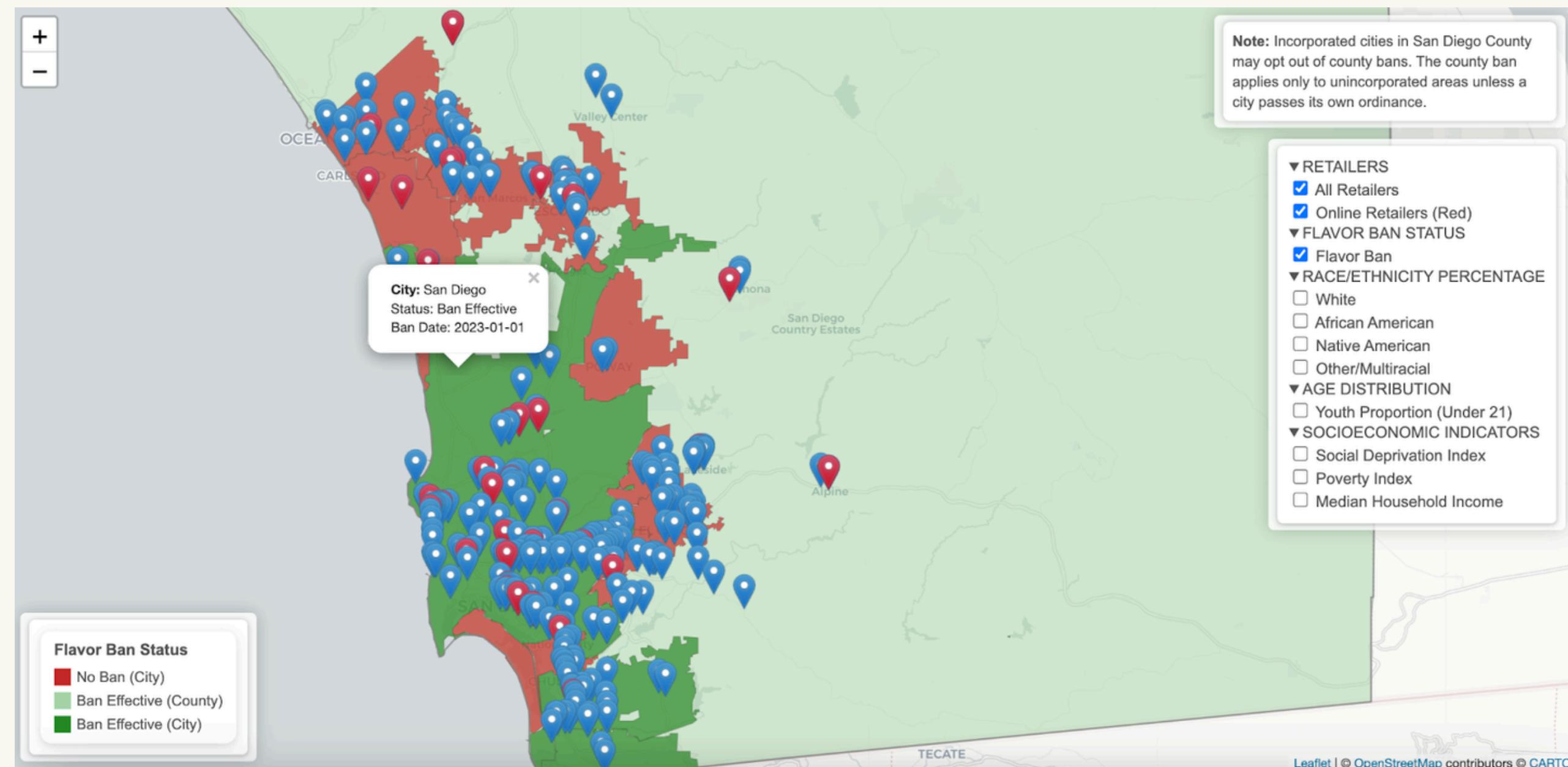


The majority of vape shops offering delivery through e-commerce (57.9%) appeared to not adhere to CA legislation regarding prohibition of flavored tobacco product sales.



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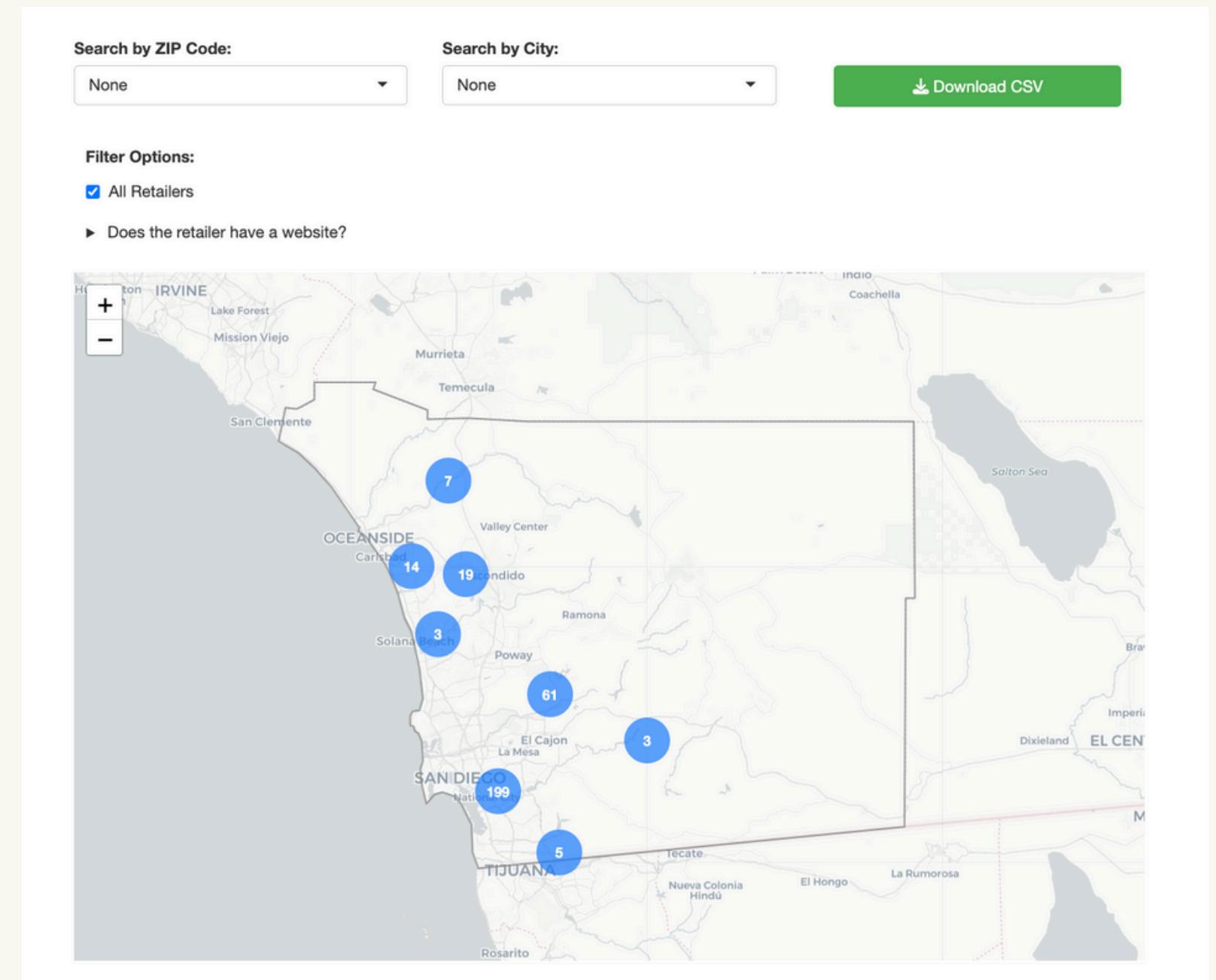
THE DASHBOARD



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[HTTPS://WWW.TOBACCOECOMMERCELAB.COM/DASHBOARD](https://www.tobaccoecommercelab.com/dashboard)



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CONCLUSION

- Flavor bans alone aren't enough.
- We were surprised that our results showed generally opposite effects as our hypotheses.
- Socioeconomic status/demographics may still somewhat drive e-commerce presence.
 - These could be examined further within a larger sample.
- A gap in policy enforcement is clear, and our dashboard bridges this gap.

FUTURE DIRECTIONS

The Tobacco E-commerce lab is currently working on expanding a similar study and dashboard implementation of vape shop e-commerce to the entire state of CA.



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REFERENCES

- California Legislature. (2020). Senate Bill No. 793: Flavored Tobacco Products Ban.
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THANK YOU