Original Research Article

Evaluation Review
2021, Vol. 45(3-4) 134–165

DOI: 10.1177/0193841X211051873
journals.sagepub.com/home/erx


Are California's Local Flavored Tobacco Sales Restrictions Effective in Reducing the Retail Availability of Flavored Tobacco Products? A Multicomponent Evaluation

Elizabeth Andersen-Rodgers[1], Xueying Zhang[1], Tam D. Vuong[1,2], Liz Hendrix[1], Cheryl Edora[1], Rebecca J. Williams[1], Lauren Groves[1], April Roeseler[1], Todd Rogers[3], David H. Voelker[4], Nina C. Schleicher[4], Trent O. Johnson[4], and Lisa Henriksen[4]

Abstract

Introduction: Flavored tobacco appeals to new users. This paper describes evaluation results of California's early ordinances restricting flavored tobacco sales. **Methods:** A multicomponent evaluation of proximal policy outcomes

[1]California Tobacco Control Program, California Department of Public Health, Sacramento, CA, USA
[2]UC Davis Comprehensive Cancer Center, University of California Davis, Sacramento, CA, USA
[3]Center for Health Analytics, Media, and Policy, RTI International, Research Triangle Park, NC, USA
[4]Stanford Prevention Research Center, Stanford University School of Medicine, Palo Alto, CA, USA

Corresponding Author:
Elizabeth Andersen-Rodgers, California Tobacco Control Program, California Department of Public Health, P.O. Box 997377, MS 7206, Sacramento, CA 95899-7377, USA.
Email: elizabeth.andersen-rodgers@cdph.ca.gov

involved the following: (a) tracking the reach of local ordinances; (b) a retail observation survey; and (c) a statewide opinion poll of tobacco retailers. Change in the population covered by local ordinances was computed. Retail observations compared availability of flavored tobacco at retailers in jurisdictions with and without an ordinance. Mixed models compared ordinance and matched no-ordinance jurisdictions and adjusted for store type. An opinion poll assessed retailers' awareness and ease of compliance with local ordinances, comparing respondents in ordinance jurisdictions with the rest of California. **Results:** The proportion of Californians living in a jurisdiction with an ordinance increased from 0.6% in April 2015 to 5.82% by January 1, 2019. Flavored tobacco availability was significantly lower in ordinance jurisdictions than in matched jurisdictions: menthol cigarettes (40.6% vs. 95.0%), cigarillos/cigar wraps with explicit flavor descriptors (56.4% vs. 85.0%), and vaping products with explicit flavor descriptors (6.1% vs. 56.9%). Over half of retailers felt compliance was easy; however, retailers in ordinance jurisdictions expressed lower support for flavor sales restrictions. **Conclusions:** The proportion of California's population covered by a flavor ordinance increased nine-fold between April 2015 and January 2019. Fewer retailers in ordinance jurisdictions had flavored tobacco products available compared to matched jurisdictions without an ordinance, but many still advertised flavored products they could not sell. Comprehensive ordinances and retailer outreach may facilitate sales-restriction support and compliance.

Keywords
design and evaluation of programs and policies, outcome evaluation (other than economic evaluation), flavored tobacco, tobacco advertising, tobacco marketing, tobacco retailers, policy tracking

Since the launch of the California Tobacco Control Program (CTCP) in 1989, California's cigarette smoking prevalence has declined significantly among both adults and teens (California Department of Public Health California Tobacco Control Program, 2020; Roeseler & Burns, 2010). The state's smoking rates have been consistently lower than in the remainder of the United States (U.S.), which has also seen a sharp decrease in adult and youth smoking (California Department of Public Health California Tobacco Control Program 2020; Vuong TD et al. May 2019), and both cigarette consumption and lung cancer incidence dropped faster in California than in the rest of the United States after the initiation of CTCP (Roeseler and Burns 2010). While only 10.0% of California adults (Centers for Disease Control and Prevention, 2019) and 2.0% of California high school-age youth reported smoking cigarettes in recent years, 12.2% of youth continue to use at least one tobacco

product, such as cigarillos, filtered little cigars, cigarettes, or vaping products like e-cigarettes (Zhu et al. 2019). In addition, between 2016 and 2018, current use of e-cigarettes by California high-school students increased nearly 27% (Zhu et al. 2019). The vast majority (85.8%) of these underage students used flavored tobacco products (Zhu et al. 2019), which have additives to mask the harshness of tobacco, low prices, and colorful packaging that appeal to youth (Ambrose et al. 2015; Cullen et al. 2019; King et al. 2012). Nearly half of the state's high-school students believe that people their age would not use a tobacco product if it was not flavored (Zhu et al. 2019).

In an attempt to curb youth tobacco use, the 2009 federal Family Smoking Prevention and Tobacco Control Act ("Tobacco Control Act") banned the sale of flavored cigarettes except menthol in the U.S., but did not restrict sales of other flavored tobacco products (Family Smoking Prevention and Tobacco Control Act, 2009). Not until 2020 did the U.S. Food and Drug Administration announce that it would begin to exercise its authority to regulate certain flavored e-cigarettes (United States Food and Drug Administration January 2, 2020), and not until another year later did it announce its intent to develop guidance to ban the sale of menthol cigarettes and flavored cigars (United States Food and Drug Administration April 29, 2021). While these latest proposed regulations have the potential to prevent and reduce tobacco use, they are expected to take years to develop, and will likely be delayed by tobacco industry lawsuits ("5 U.S. Code § 553").

The Tobacco Control Act preserves state, local, and tribal authority to place restrictions on the sale of tobacco products, including flavored tobacco ("21 U.S.C. § 387p (a)"; "National Association of Tobacco Outlets, 2013"; "R.J. Reynolds Tobacco Co. v. Cty. of Los Angeles,"; "U.S. Smokeless Tobacco Manufacturing Company LLC v. City of New York,"). In 2010, unincorporated Santa Clara County became the first jurisdiction in California to adopt a local ordinance restricting the sale of some flavored tobacco products, followed by the city of Hayward in 2014. However, both ordinances included exemptions for some retailers and some products.

To inform the adoption and implementation of local ordinances that restrict the sale of flavored tobacco products, particularly comprehensive sales restrictions without exemptions for retailers or products, CTCP was awarded grant funds from the U.S. Centers for Disease Control and Prevention to initiate the *Flavored Tobacco Products Campaign*, which began in April 2015 (Centers for Disease Control and Prevention Office on Smoking and Health 2015). The state campaign provided local health departments and other CTCP-funded projects with tools to educate policymakers about the adoption of local ordinances to restrict the sale of flavored tobacco products ("local flavor ordinances"), provided educational materials

to support implementation, and funded studies to evaluate the effectiveness of these ordinances. The campaign's goals were to reduce the availability of flavored tobacco products, and to thereby reduce tobacco use, particularly among population groups targeted by tobacco industry marketing, such as youth and young adults and racial/ethnic and sexual minority groups (Centers for Disease Control and Prevention Office on Smoking and Health 2015).

Prior evaluations of local flavor sales restrictions have shown that restrictions on flavored tobacco product sales are associated with reduced retail availability and consumption at the population level (as measured by sales volume). Studies conducted in San Francisco; New York City; Providence; Boston; Lowell, Massachusetts; Minneapolis and Saint Paul; and Ontario, Canada found that local flavored tobacco sales restrictions were effective in reducing the retail presence and/or sales of flavored tobacco (Rogers, Brown, et al. 2021). In Ontario, a province-wide ban on the sale of menthol cigarettes was associated with a reduction in sales of both menthol and non-menthol cigarettes (Chaiton et al. 2019). However, a study of Chicago's ban on the sale of menthol cigarette sales within 500 feet of schools found low rates of compliance, suggesting that exemptions for certain retailers may reduce the effectiveness of local flavor laws (Czaplicki et al. 2019).

Previous analyses also found decreased tobacco product use after the implementation of local flavor sales restrictions. Reductions in both flavored and non-flavored tobacco use were observed in New York (Farley & Johns, 2017), Lowell (Kingsley et al. 2019) and San Francisco (Yang et al. 2020) following their local flavor sales restrictions, and declines in cigarette smoking and overall tobacco product use among high school students was documented in Providence after enforcement of its local policy (Pearlman et al. 2019). Additionally, higher rates of quitting among daily and occasional menthol smokers compared with non-menthol smokers was found in Ontario (Chaiton et al. 2020) after the implementation of its menthol ban.

A survey of retailers during and after implementation of Boston's local flavor ordinance found that educational visits and a flavored tobacco product guidance list were the most helpful resources for aiding compliance. Indeed, one of the main concerns of retailers in both Boston and San Francisco was not knowing whether certain products were flavored, and therefore in violation of the local flavor ordinance (Kephart et al., 2019; Vyas et al., 2021).

This multicomponent evaluation assesses proximal policy outcomes in California by comparing jurisdictions with a local flavor ordinance to those without such an ordinance. The three studies described here assessed: (a) ordinance characteristics and coverage of California's diverse population through January 2019; (b) retail availability and advertising of flavored tobacco; and (c) tobacco retailers' self-reported awareness of and support for

local flavor ordinances and perceived ease of compliance. The goal of this evaluation was to understand facilitators and barriers to local flavor ordinance implementation from multiple vantage points, by examining: (a) the comprehensiveness and reach of local flavor ordinances across demographic groups, (b) the effectiveness of ordinances in reducing retail availability of flavored tobacco products, and (c) retailer experiences and attitudes toward local flavor ordinances. A separate evaluation component described elsewhere (Feld et al. 2021) compared youth and young adult attitudes and perceived access to flavored tobacco products in jurisdictions with a local flavor ordinance to the rest of California. This evaluation adds to the existing literature by using a multifaceted approach to assess immediate outcomes associated with implementation of local flavor ordinances. This is the first study to evaluate numerous local flavor ordinances, both comprehensive and with exemptions, across jurisdictions statewide. It is also the only thus far to examine retail employees' support for flavored tobacco sales restrictions and attitudes toward flavored tobacco in jurisdictions with a local flavor ordinance, to assess the advertising for flavored tobacco products that stores cannot sell, and to evaluate the implementation of local flavor ordinances that were supported by a coordinated statewide campaign.

Methods

This evaluation involved three independent components: (a) the Flavored Tobacco Policy Evaluation Tracking System; (b) the Retail Observation Survey in Matched Communities; and (c) the California Tobacco Retailer Poll. The methods and results of the three evaluation components are described in the sections that follow.

Flavored Tobacco Policy Evaluation Tracking System

We obtained information about local flavor ordinances from local health departments and other funded projects during monthly calls and through submission by email or to CTCP's online content management system, and from local online news stories, which we recorded in the Flavored Tobacco Policy Evaluation System database. The database characterized whether ordinances were comprehensive without any exemptions and (if not) recorded exemptions for menthol, for specific products (e.g., vaping products), and for retailers defined by store type (e.g., adult-only stores), existence at the time of enactment (i.e., grandfathering), or location (e.g., outside of buffer zones around schools or other youth-sensitive areas). The database also included dates of ordinance adoption and implementation. To quantify and characterize the coverage of local flavor ordinances around the time of the Retail Observation Survey and Retailer Poll, we computed

total population living in a jurisdiction with a local flavor ordinance as well as categories defined by age, race/ethnicity, living at or below the federal poverty level, and education level. To do this, we linked data for jurisdictions with local flavor ordinances through January 2019 to population estimates for localities and unincorporated counties obtained from the California Department of Finance, which were derived from the American Community Survey (ACS) 2013–2017 (United States Census Bureau 2018). Rural jurisdictions were defined as those situated in counties classified by local health departments as rural (Henriksen et al. 2020). We calculated the proportion of the population covered by a local flavor ordinance for each category as the sum of the population for the category living in a jurisdiction with an ordinance, divided by the total statewide population for that category.

Retail Observation Survey in Matched Communities

We designed the Retail Observation Survey to compare retail availability and advertising in licensed tobacco retailers ("retailers") in matched jurisdictions with and without a flavor ordinance. Eligibility criteria for jurisdictions were: (a) flavor ordinance adoption date prior to May 2018 and an effective date of August 2018 or earlier; (b) no exemptions for existing retailers or retailers far from schools; and (c) no exemptions for product category (e.g., conventional tobacco or vape products) or pack size (e.g., flavored cigarillos sold in packs of 5 or more). Among the eight eligible jurisdictions, we excluded San Francisco City and County because active enforcement was delayed until after data collection, and we excluded the only southern California location for travel-related budget constraints. Among the six remaining eligible jurisdictions, one had a comprehensive ordinance, one had an ordinance that exempted all menthol tobacco, one exempted menthol cigarettes only, and three had ordinances that contained exemptions for adult-only stores (see Table 1).

We derived the sample of stores within each study jurisdiction from a state tobacco retail licensing list obtained from the California Department of Tax and Fee Administration (CDTFA) in October 2017. For two jurisdictions where ordinances applied to unincorporated county areas (Santa Clara County and Yolo County), we sampled comparison stores from the incorporated county area. For the remaining jurisdictions with a local flavor ordinance (El Cerrito, Los Gatos, Oakland, San Leandro), we sampled stores from matched jurisdictions (Albany, Menlo Park, Vallejo, and Fairfield, respectively) without an ordinance by comparing population demographics (e.g., race/ethnicity and median household income) for the jurisdictions using data from the California Tobacco Health Assessment Tool (Stanford Prevention Research Center & GreenInfo Network) (see Table A1 in the

Table 1. Number and Type of California Local Ordinances to Restrict Sales of Flavored Tobacco and Inclusion in Evaluation Studies, Through January 1, 2019.

Variable	Flavored Tobacco Policy Evaluation Tracking System	Retail Observation Survey in Matched Communities		California Tobacco Retailer Poll	
Data collection period	7/2014–1/2019	6/2018–9/2018		1/2019–2/2019	
Policy characteristics	Included[a]	Eligible[b]	Included	Eligible[c]	Included
Comprehensive (no exemptions)	6	2	1	6	5
Exempt menthol flavoring	11	4	2	9	8
Exempt some product categories (e.g., vaping products)	5	2	2	8	8
Exempt some store types (e.g., adult-only or other)	7	4	3	5	4
Limited to buffer zones around schools or youth-sensitive areas	4	0	0	2	2
Total	24	8	6	21	19

Source: Flavored Tobacco Policy Evaluation Tracking System. *Note.* Cell entries are number of local flavor ordinances.
[a]Ordinances to restrict sales of flavored tobacco adopted from 7/2014 to 1/2019 were included.
[b]Eligibility criteria were as follows: (a) adoption date prior to 5/2018 and effective date of 8/2018 or earlier, (b) no exemptions for existing retailers or retailers far from schools, and (c) no exemptions for product category (e.g., conventional tobacco or vape products).
[c]Eligibility criteria were as follows: (a) adoption date prior to 10/2018 and effective date of 1/2019 or earlier, and (b) no exemption of existing retailers (grandfathering clauses).

Appendix). Regardless of ordinance condition, we attempted to visit all stores in six jurisdictions with fewer than 28 retailers. For the remaining sample, we randomly selected approximately the same number of retailers in the flavor ordinance and matched jurisdictions without an ordinance to reach a goal of 150 complete observations in each condition.

Questionnaires and Outcomes. Four graduate students programmed and pretested a marketing surveillance survey in Qualtrics and used iPads or mobile phones for data collection. They were trained to assess whether stores sold non-menthol or menthol cigarettes, and little cigars/cigarillos and vaping products, to record the presence of products with explicit flavor names (i.e., those labeled with characterizing flavor descriptors, such as menthol, cherry, or wine) separately from products with ambiguous flavor descriptors

(i.e., those labeled with "concept" descriptors, such as Jazz or Tropical Twist). Data collectors also classified store type following a standard protocol (Schleicher NC et al. 2019). We included as secondary outcomes the presence of any (interior or exterior) advertising for flavored tobacco because local ordinances that restrict sales could have an ancillary impact on the visibility of marketing for those products. From June to September 2018, data collectors attempted observations in 341 retailers (flavor ordinance jurisdictions: $n = 170$, matched no-ordinance jurisdictions: $n = 171$).

Data Analysis. The main outcome was retail availability, defined as the percent of retailers within each jurisdiction that were observed to have for sale at least one tobacco product in a relevant category. We aggregated questions about retail availability to create dichotomous composite measures by flavor name ("any" or "menthol" for cigarettes; "any," "explicit," "mint/menthol," or "ambiguous" for cigar and vaping products). Because not all ordinances were comprehensive, availability in ordinance jurisdictions was not always a violation. For flavor ordinance jurisdictions, we therefore calculated retailer violation rates (RVRs) as the proportion of retailers covered by the ordinance that sold restricted products, excluding retailers by store type (e.g., smoke/vape shops) that were exempt from the flavor ordinance in some jurisdictions. We calculated a product-specific violation rate for menthol (RVR-menthol) which excluded data from the two jurisdictions with menthol product exemptions. To compare the proportion of stores that sold flavored products in ordinance and matched no-ordinance jurisdictions, we fit a series of generalized linear mixed models with a random intercept and controlled for store type using the GENLINMIXED procedure in IBM SPSS statistics version 27. The models accounted for nesting of stores within jurisdictions. Due to small cell sizes, store type was collapsed to compare tobacco shop, vape shop, head shop (combined) with all other store types (reference category). We estimated equivalent models for the presence of tobacco advertising.

California Tobacco Retailer Poll

We conducted a statewide opinion poll via telephone from January to February 2019 to assess tobacco retail employee (store owner, manager, supervisor, or clerk) attitudes toward flavored tobacco products as well as their awareness of and ease of compliance with local flavor ordinances. We derived the sample of stores using a stratified simple random sample, selecting retailers from a state tobacco retail licensing list that contained applicant-provided telephone numbers obtained from the California Department of Tax and Fee Administration in October 2018. Retailers were then geocoded to latitude/longitude and jurisdiction using ArcGIS (ESRI).

We divided the state into 20 geographic sampling strata: the 19 jurisdictions with a local flavor ordinance adopted by October 1, 2018 and effective on January 1, 2019 or earlier (n = 1397), and the Rest of California (ROC) (n = 6603). In two jurisdictions where a local flavor ordinance only applied to jurisdictions near school, we used the geocoded retailer data and school boundaries from the California School Campus Database to determine whether retailers should be sampled with the local flavor ordinance group or ROC. Retailers located within 600 feet of schools in Berkeley and within 1000 feet of schools in unincorporated Contra Costa County were sampled with the local flavor ordinance group; retailers in Berkeley or unincorporated Contra Costa County that were not located near schools were sampled with the ROC. We attempted to survey all retailers in the 19 jurisdictions with a local flavor ordinance and conducted a random sample of retailers for the ROC. One jurisdiction, Sausalito, was excluded because the effective date of the ordinance was uncertain at the time of sampling. The response rate (the number of completed interviews out of all eligible retailers) was 31.7% and the cooperation rate (the number of completed interviews of all eligible retailers that were successfully contacted) was 53.0%. By geographic strata, the response rate and cooperation rate ranged from 25.7% to 63.0% and 37.5% to 100.0%, respectively, (see Table A2 in the Appendix).

Questionnaires and Outcomes. Trained interviewers from the California State University, Sacramento (CSUS) conducted the poll in English and Spanish using computer-assisted telephone interviewing software. After explaining that they were from CSUS, were contacting retailers about recent laws affecting their business, and that all responses would remain confidential, interviewers requested permission to ask questions and proceeded only with verbal approval. To prevent bias, interviewers did not state that the California Department of Public Health funded the survey. One respondent per retailer was interviewed; the priority order for participation was the store owner, then a manager or supervisor, then a store clerk. Interviewers asked a qualifying question to confirm that the retailers currently sold tobacco products and explained that flavored tobacco includes menthol cigarettes, as well as cigars, hookah, dip, chew, pipe tobacco, e-cigarettes, JUUL, and e-liquids with ingredients that make tobacco taste like menthol/mint, fruit, chocolate, alcohol, coffee, spice, or another flavor.

We used four-point Likert scales (strongly agree/support to strongly disagree/oppose) to assess level of agreement with statements about flavored tobacco products ("Flavored tobacco products appeal to youth," "Flavored tobacco products should only be sold in stores that require you to be at least 21 to enter," "Flavored tobacco products are intended to get youth addicted to

nicotine," and "Eliminating the sale of flavored tobacco will prevent youth use of tobacco"). The same response scale was used to measure support for flavored tobacco sales restrictions ("How strongly do you support or oppose laws banning the sale of flavored tobacco products?"). In the subsample of ordinance jurisdiction respondents, we assessed awareness ("Before this call, were you aware of the local law passed by [retailer's jurisdiction] that restricts the sale of flavored tobacco products?") as "yes" or "no" and ease of compliance ("How difficult was it for you to comply with the law restricting the sale of flavored tobacco products?") using a four-point Likert scale (very easy to very difficult).

Data Analysis. Weights were applied during data analysis to be representative of CDTFA's October 2018 list of retailers. Weights were based on inverse probability weights and were adjusted only for non-response by geographic strata. Of 1712 retailers surveyed, we excluded 9 retailers in 19 jurisdictions with a local flavor ordinance because the respondents indicated that their store was exempt from the ordinance. This yielded an analytic sample of 1703 retailers with 315 retailers located in one of 19 jurisdictions with a local flavor ordinance.

We fit a series of multivariable generalized linear models in SAS version 9.4 (SAS Institute) controlling for retailer characteristics (store type) and respondent characteristics (job title, past 30-day tobacco use status) to detect significant differences in attitudes about and support for flavored tobacco sales restrictions between retailers in ordinance jurisdictions and the ROC. The models also allowed us to detect differences between retailers in jurisdictions with comprehensive flavored tobacco ordinances covering all stores and tobacco products, and those with ordinances that exempted some store types, certain tobacco product categories or menthol products. These models accounted for the sample design and clustering of retailers by jurisdictions. Likert-type responses on agreement and ordinance support were dichotomized as agree/support or strongly agree/support = 1 ("agree"/"support") and disagree/oppose or strongly disagree/oppose = 0 ("disagree"/"oppose"). Due to small sample size, store type was collapsed to compare a combined tobacco store, vape shop, and head shop with all other store types in the models.

A fourth component of California's *Flavored Tobacco Products Campaign* policy evaluation, an online survey of youth and young adults to assess attitudes toward flavored tobacco sales restrictions and perceived access to flavored tobacco products, reported that most respondents supported the sales restrictions and vape users in jurisdictions with a local flavor ordinance were more likely to perceive difficulty accessing flavored tobacco products (Feld et al. 2021).

Results

Flavored Tobacco Policy Evaluation Tracking System

Of 539 local jurisdictions in California, 24 cities or counties had adopted a local flavor ordinance by January 1, 2019, which represents an 11-fold increase from two jurisdictions that adopted ordinances prior to the April 2015 campaign start. The first comprehensive flavor ordinance was adopted by Unincorporated Yolo County in October 2016. By the end of 2017, only two comprehensive flavor ordinances had been adopted in California. In 2018, four more comprehensive ordinances passed, so that by January 1, 2019, one in four local flavor ordinances were comprehensive (see Table 2).

In January 2019, jurisdictions with local flavor ordinances were primarily located in the San Francisco Bay Area. The most common exemptions were for menthol (11 of the 18 ordinances with exemptions). Five flavor ordinances exempted sales of certain tobacco product categories (such as vaping products, cigars, and small package sizes). Seven ordinances included exemptions for certain store types, such as tobacco retailers that limit entrance to adults only, and one (West Hollywood) also exempted existing retailers. Four ordinances were limited to tobacco retailers located in school buffers (e.g., within 1000 feet of schools) and/or near other youth-sensitive areas (e.g., parks, playgrounds, and libraries).

Table 3 summarizes change over time in the proportion and characteristics of the state population that were covered by a local flavor ordinance. Both comprehensive ordinances and those with exemptions, such as menthol, were included in this analysis. In January 2019, local flavor ordinances protected 2,269,172 Californians (5.82%), which represents a nine-fold increase over the 242,820 (0.62%) residents covered at the start of the California's Flavored Tobacco Products campaign. Among racial/ethnic groups, African American/Black and Asian/Pacific Islander residents were covered at the highest rates by local flavor ordinances at 8.62% and 9.88%, respectively, as well as by the subset of 13 flavor ordinances that included menthol, at 7.77% and 8.41%, respectively. Residents with lower levels of income (i.e., living below the federal poverty level or at 100–200% of the poverty level), those with lower levels of education (high school or less), as well as rural residents, Hispanic residents and youth were covered by local flavor ordinances at rates lower than the overall population.

Retail Observation Survey in Matched Communities

Convenience stores comprised approximately half of the sample for the Retail Observation Survey (Table 4) and the completion rate was 95.0%. We observed an average of 26.2% (SD = 21.8) of tobacco retailers in the five jurisdictions with

Table 2. Ordinances That Restrict Sales of Flavored Tobacco in California and Exemptions Through January 1, 2019.

Jurisdiction	Adopted (month/year)	Effective[a] (month/year)	Retail Observation Survey in Matched Communities (7/18–9/18)	California Tobacco Retailer Poll (1/19–2/19)
Comprehensive (no exemptions)				
Yolo County Unincorporated	10/2016	5/2017	✓	✓
San Francisco	6/2017	1/2019[b]		✓
San Mateo County Unincorporated	6/2018	7/2018		✓
Sausalito	7/2018	11/2018		
Beverly Hills	8/2018	9/2018		✓
Portola Valley	9/2018	10/2018		✓
Menthol Flavoring Exemption				
Hayward[d,c]	7/2014	8/2014		
Sonoma[e]	6/2015	9/2015		✓
El Cerrito	10/2015	1/2016	✓	✓
Manhattan Beach[c]	12/2015	1/2016		
Novato[e]	1/2017	1/2018		✓
San Leandro	10/2017	8/2018	✓	✓
Cloverdale	11/2017	12/2017		✓
Fairfax[e]	12/2017	1/2019		
Windsor[e]	3/2018	4/2018		✓
Mono County Unincorporated[e]	4/2018	5/2018		✓
Saratoga	10/2018	11/2018		
Store Exemptions (but include menthol)				

(continued)

Table 2. (continued)

Jurisdiction	Adopted (month/year)	Effective[a] (month/year)	Retail Observation Survey in Matched Communities (7/18–9/18)	California Tobacco Retailer Poll (1/19–2/19)
Berkeley[d]	9/2015	1/2017		✓
Santa Clara County Unincorporated[c]	10/2016[f]	7/2017	✓	✓
West Hollywood[d,c]	10/2016	11/2016		
Los Gatos[c]	5/2017	1/2018	✓	✓
Contra Costa County Unincorporated[d]	7/2017	8/2017		✓
Oakland[c]	9/2017	7/2018	✓	✓
Palo Alto[c]	10/2017	1/2019		✓

Source: Flavored Tobacco Policy Evaluation Tracking System.

[a]The effective date is the date that the ordinance would be enforced according to the ordinance. If the ordinance did not include an enforcement date, the effective date is used instead.

[b]The ordinance was suspended before it went into effect due to a referendum petition. After the ordinance was affirmed by voters, the enforcement date was set to 1/2019.

[c]Policy exempts some stores (e.g., adult-only, or existing retailers).

[d]Policy exempts stores outside a certain distance of schools and/or youth sensitive areas (buffer-zone ordinance).

[e]Policy exempts some tobacco product categories (e.g., vaping products, single cigars, or pipe tobacco).

[f]Santa Clara County Unincorporated strengthened their original ordinance that exempted menthol flavoring. The original ordinance was adopted 11/2010 and enforced 2/2011. Santa Clara County Unincorporated removed this exemption in 10/2016.

Table 3. Estimated Population Covered by Local Ordinances Regulating the Sale of Flavored Tobacco From the Start of California's Flavored Tobacco Products Campaign Through January 1, 2019.

	April 2015	January 2019	January 2019
Population Characteristic	All Ordinances, Regardless of Exemptions[a] (n = 2)	All Ordinances, Regardless of Exemptions (n = 24)	Ordinances that do not Exclude Menthol (= 13)
Proportion of total California population			
All residents	0.62%	5.82%	4.96%
Youth under 18	0.56%	4.44%	3.54%
Proportion of population, by race/ethnicity			
White	0.46%	6.39%	5.63%
Hispanic/ Latino	0.59%	3.18%	2.46%
African American/ Black	0.77%	8.62%	7.77%
Asian/Pacific Islander	1.04%	9.88%	8.41%
Proportion of population, by poverty level			
Less than 100%	0.38%	4.55%	4.24%
100% to 200%	0.50%	4.35%	3.60%
Greater than 200%	0.68%	6.55%	5.48%
Proportion of population, by education level			
Less than high school	0.58%	4.72%	3.89%
High school	0.56%	4.71%	3.62%
Some college	0.49%	5.24%	4.26%
College and above	0.46%	9.78%	8.88%
Proportion of rural residents	0.21%	0.21%	0.00%

Source: Flavored Tobacco Policy Evaluation Tracking System, American Community Survey 2013-2017. *Note*. Unless otherwise noted, race/ethnicity includes only non-Hispanics. Some ordinances include exemptions, such as for: adult-only, or existing retailers; or stores outside a certain distance of schools and/or youth sensitive areas (buffer-zone ordinance).

[a]Both flavor ordinances enacted prior to April 2015, Hayward and Santa Clara County Unincorporated, exempted menthol. Santa Clara County Unincorporated removed this exemption in October 2016.

Table 4. Retail Observation Survey in Matched Communities Sample: California, July–September 2018.

	Flavor Ordinance		Matched No-Ordinance	
Store Type	*n*	Percent, %	*n*	Percent, %
Convenience	87	52.7	78	48.8
Liquor	20	12.1	26	16.3
Pharmacy	5	3.0	8	5.0
Small market	18	10.9	11	6.9
Supermarket	12	7.3	13	8.1
Tobacco-vape-headshop	7	4.2	18	11.3
Other	16	9.7	6	3.8
Total	165	100.0	160	100.0

Note. Stores were clustered in six jurisdictions with and six without a local flavor ordinance.

a sample. Table 5 summarizes retail availability of flavored tobacco (percent of stores that sold) in matched jurisdictions with and without a local flavor ordinance and RVR in flavor ordinance jurisdictions (taking into account exemptions for products and store types). Compared to stores in matched no-ordinance jurisdictions, a significantly lower proportion of stores in flavor ordinance jurisdictions sold menthol cigarettes (40.6% vs. 95.0%), cigarillos/cigar wraps with explicit flavor names (56.4% vs. 85.0%) and vaping products with explicit flavor names (6.1% vs. 56.9%) (see Table 5). Accounting for nesting of stores within jurisdiction and controlling for store type, the odds that a store sold each product remained significantly lower in flavor ordinance jurisdictions compared with matched no-ordinance jurisdictions (menthol cigarettes: AOR = 0.04, 95% CI = 0.00, 0.43; cigarillos/cigar wraps with explicit flavor names: AOR = 0.23, 95% CI = 0.13, 0.39; vaping products with explicit flavor names: AOR=0.04, 95% CI = 0.02, 0.11). While products with ambiguous flavor names were also significantly less prevalent in flavor ordinance jurisdictions compared to matched no-ordinance jurisdictions (cigarillo/cigar wraps: 53.9% vs. 78.1%), more than half of stores covered by a local flavor ordinance (54.6%) still sold cigarillos/cigar wraps with ambiguous package descriptors, such as Jazz. Although such products likely contain characterizing flavors (Farley et al. 2018), we cannot be certain that their presence indicated a violation of a local sales restriction. In the subset of stores in jurisdictions that restricted menthol, RVR for these products were 12.9% for menthol cigarettes, 2.5% for menthol/mint cigarillo/cigar wraps, and 5.9% for menthol/mint vaping products. Non-menthol cigarettes were

Table 5. Proportion of Stores That Sold Flavored Tobacco and Retail Violation Rates (RVRs), by Product Category and Jurisdiction Ordinance: Retail Observation Survey in Matched Communities, California, July–September 2018.

Tobacco Product Type	Matched No-Ordinance (n = 160)	Flavor Ordinance (n = 165)	RVR (n = 163)	RVR menthol (n = 119)
Cigarettes (any)	96.9%	95.2%	—	—
Menthol cigarettes	95.0%	*40.6%	—	*12.9%[1]
Cigarillos/blunt/cigar wraps (any)	86.9%	77.0%	—	—
Menthol/mint	38.8%	*1.8%	—	*2.5%
Other explicit flavor-named (excl. Menthol)	85.0%	*56.4%	*57.1%	
Ambiguously named (e.g., Jazz, Tropical Twist)	78.1%	*53.9%	*54.6%	—
Vaping products (any, including cartridges/pods)	65.6%	*27.9%	—	—
Menthol/mint	61.9%	*7.9%		*5.9%
Other explicit flavor-named (excl. Menthol)	56.9%	*6.1%	*6.1%	—
Ambiguously named (e.g., Jazz, Tropical Twist)	15.6%	6.1%	5.5%	—

Note. RVR = Retail violation rate, excluding tobacco/vape shops in three flavor-ordinance jurisdictions with exemptions. RVR menthol also excludes two ordinance jurisdictions that exempt menthol cigarettes, and one jurisdiction that exempts menthol-flavored non-cigarette tobacco products, as applicable[1] (n = 101). Statistical significance* at $p < .05$ comparing no-ordinance with ordinance stores in generalized linear mixed models, nesting stores within jurisdictions and controlling for store type (tobacco shop, vape shop, head shop vs. all other store types).

omnipresent at stores in ordinance (95.2%) and no-ordinance jurisdictions (96.9%). The few stores that did not sell non-menthol cigarettes likely sold other tobacco products or vaping products exclusively.

After accounting for nesting of stores within jurisdiction and controlling for store type, the presence of advertising for menthol cigarettes (AOR = 0.28, 95% CI = 0.09, 0.84) and flavored cigars (AOR = 0.39, 95% CI = 0.18, 0.89) was significantly lower in flavor-ordinance jurisdictions. In jurisdictions that restricted the sale of menthol cigarettes in addition to other flavored tobacco products, nearly half of stores (46.2%) still advertised menthol cigarettes even though they could not sell them.

Table 6. California Tobacco Retailer Poll Sample: California, January–February 2019.

	Flavor Ordinance		Rest of California	
Variable	Unweighted *n*	Weighted Percent, %	Unweighted *n*	Weighted Percent, %
Respondent job title*				
Owner	127	40.9	496	35.7
Manager	104	33.0	576	41.5
Clerk	84	26.1	316	22.8
Respondent past 30-day tobacco use*	87	27.8	326	23.5
Store type*				
Convenience	120	37.4	566	40.8
Liquor	64	21.3	204	14.7
Pharmacy	1	0.3	20	1.4
Small market	49	15.5	157	11.3
Supermarket	22	6.9	114	8.2
Tobacco-vape-headshop	28	9.1	185	13.3
Other	31	9.4	142	10.2
Total	315	100.0	1388	100.0

Note. Statistical significance for weighted percentages* at $p < .05$ determined by chi-square tests to comparing sample characteristics in flavor ordinance jurisdictions versus in Rest of California.

California Tobacco Retailer Poll

Among the analytic sample of 1703 tobacco retail employees, 36.6% were owners, 39.9% were managers, and 23.5% were clerks. As in the retail observation survey, convenience stores comprised the majority of the sample (see Table 6). Overall, 315 retail employees (18.5% of all sampled) were in 19 flavor ordinance jurisdictions. Compared to retail employees in ROC, a significantly lower proportion of retail employees in ordinance jurisdictions agreed that flavored tobacco products are intended to get youth addicted to nicotine (39.4% vs. 48.1%) (see Table 7). Similarly, a significantly lower percent of retail employees in ordinance jurisdictions: (a) agreed that flavored tobacco products should only be sold in stores that require customers to be at least 21 to enter (55.2% vs. 61.8%), (b) agreed that flavored tobacco products appeal to youth (52.1% vs 58.2), and (c) supported banning the sale of flavored tobacco products (32.1% vs 37.4%). Regardless of location, a majority of retail employees agreed that flavored tobacco products appeal to youth (ordinance = 52.1%, ROC = 58.2%), and approximately one third agreed that eliminating the sale of flavored tobacco will prevent youth use of tobacco (ordinance = 31.6%, ROC = 35.9%).

Table 7. Tobacco Retail Employee Attitudes Toward Ordinances Regulating the Sale of Flavored Tobacco, by Location: California Tobacco Retailer Poll, January–February 2019.

	Flavor Ordinance Jurisdictions (n = 315)	Rest of California (n = 1388)	Overall (n = 1703)
Survey Item	Support/Agree	Support/Agree	Support/Agree
Flavored tobacco products are intended to get youth addicted to nicotine	39.4% (34.8%–43.9%)	*48.1% (45.2%–50.9%)	47.7% (44.9%–50.4%)
Flavored tobacco products should only be sold in stores that require you to be at least 21 to enter	55.2% (52.3%–58.1%)	*61.8 (59.2%–64.4%)	61.5% (59.0%–64.1%)
Flavored tobacco products appeal to youth	52.1% (48.0%–56.2%)	*58.2% (55.5%–60.9%)	58.0% (55.4%–60.5%)
Eliminating the sale of flavored tobacco will prevent youth use of tobacco	31.6% (26.1%–37.1%)	35.9% (33.1%–38.7%)	35.7% (33.0%–38.4%)
How strongly do you support or oppose laws banning the sale of flavored tobacco products?	32.1% (29.1%–35.2%)	*37.4% (34.8%–40.0%)	37.2% (34.7%–39.7%)

Note. Cell entries are point estimates and 95% confidence intervals. Statistical significance* at $p<.05$ comparing flavor ordinance jurisdictions with Rest of California in multivariable generalized linear models accounting for the sample design and clustering of retailers by jurisdictions and controlling for store type, respondent's job title, and respondent's past 30-day tobacco use status. Data were weighted with inverse sampling probabilities and adjusted for non-response to be representative of California's retailer population.

After controlling for retailer and respondent characteristics, the odds that a retail employee would agree or support the statements on flavored tobacco remained significantly lower in flavor ordinance jurisdictions compared to ROC for four of the five statements (intended to get youth addicted to nicotine: AOR = 0.68, 95% CI = 0.55, 0.83; sold in stores that require you to be at least 21: AOR = 0.80, 95% CI=0.68, 0.94; appeal to youth: AOR = 0.77, 95% CI = 0.63, 0.94; banning the sale of flavored tobacco: AOR = 0.79, 95% CI = 0.66, 0.95).

Among the subset of 315 retail employees in 19 flavor ordinance jurisdictions, nearly all (97.1%) of those in jurisdictions with comprehensive ordinances were aware of the local law. By comparison, a lower proportion of retail employees in jurisdictions with exemptions for menthol, product

Table 8. Tobacco Retail Employee Awareness of and Perceptions About Compliance With Local Flavor Ordinances, by Policy Category: California Tobacco Retailer Poll, January–February 2019.

Survey Item (Response)	Comprehensive ordinance (n = 170)	Ordinance with Exemptions (n = 145)	Overall (n = 315)
Before this call, were you aware of the local law…that restricts the sale of flavored tobacco products? (Yes)	97.1% (93.3%–100.0%)	86.9% (77.7%–96.5%)	92.9% (85.9%–99.8%)
How difficult was it for you to comply with the law restricting the sale of flavored tobacco products? (Easy or very easy)	60.6% (56.3%–64.8%)	56.1% (50.8%–61.4%)	58.8% (55.5%–62.1%)

Note. Cell entries are point estimates and 95% confidence intervals. Statistical significance* at $p<.05$ comparing comprehensive ordinance with ordinance with exemption in multivariable generalized linear models accounting for the sample design and clustering of retailers by jurisdictions and controlling for store type, respondent's job title, and respondent's past 30-day tobacco use status. Data were weighted with inverse sampling probabilities and adjusted for nonresponse to be representative of California's retailer population.

types, or store types were aware of their local law (86.9%). However, this difference was not significant after controlling for retailer and respondent characteristics (AOR = 0.20, 95% CI = 0.04, 1.01). Excluding retailers who were exempt from the local ordinance, more than half of retail employees (58.8%) in flavor ordinance jurisdictions felt it was easy or very easy to comply with the local sales restriction (see Table 8). Those who reported that compliance was difficult or very difficult cited a lack of clarity regarding which tobacco products can be sold (48.6%) as one of the top reasons (data not shown).

Conclusions

The landscape of local flavored tobacco sales restrictions in California changed substantially during the early years of the *Flavored Tobacco Products Campaign*. From April 2015 to January 2019, the number of jurisdictions with local flavor ordinances increased from two to 24, yielding a nine-fold increase in the population covered by these ordinances (over 2.2 million Californians in January 2019). Policy tracking suggests that the adoption of local flavor ordinances gained momentum in the state, which saw an increasing number of comprehensive local ordinances that may have

a greater potential to protect public health. As a result of these local ordinances, California's African American residents were covered by flavored tobacco sales restrictions at a rate higher than the state's general population, a move toward health equity for a group that is specifically targeted by the tobacco industry (Lee et al. 2015; Ribisl et al. 2017). As was observed with prior statewide and national tobacco control legislation, these local ordinances laid the groundwork for California legislators to pass a 2020 state law prohibiting the sale of flavored tobacco ("Chapter 34 Statutes of 2020") (excluding hookah, premium cigars, and loose-leaf tobacco) (Florey & Doan, 2018; Francis et al., 2010). However, the tobacco industry qualified a referendum to repeal the law before it went into effect. If Californians uphold the law in the November 2022 vote, the state will be the second in the nation to restrict the sale of almost all flavored tobacco products (Truth Intitive 2021).

Consistent with prior studies on the retail availability or sales of flavored tobacco after enactment of a local flavored tobacco sales restriction (Rogers, Brown, et al. 2021), our findings demonstrate that California's local flavor ordinances were associated with a decrease in the retail availability of these products. Further, we found that the ordinances were also associated with reduced retail advertising. Taken together, the results of the study components suggest that, while the ordinances were successful in achieving policymakers' goal of reducing the proportion of stores that sold flavored tobacco in California communities, more work is needed to improve compliance with local flavored tobacco sales restrictions. In the retail observation survey, retailer compliance with cigarillos/cigar wraps appeared deficient: more than half of retailers sold cigarillos or cigar wraps with explicit flavor names and more than half sold those with ambiguous names. By comparison, less than one in ten sold explicitly named flavored vaping products and a similar proportion sold ambiguously named vaping products. In the tobacco retailer opinion poll, while nearly all retail employees were aware of the local ordinance, only slightly more than half reported that it was easy or very easy to comply. As was found in Boston (Kephart et al. 2019) and San Francisco (Vyas et al. 2021), uncertainty about which tobacco products can be sold was cited in this study as a barrier to compliance. Notably, this lack of clarity may apply less to vaping products, which are widely understood to be nearly universally flavored, and more to cigarillos/cigar wraps, which have many unflavored and ambiguous varieties. Potentially adding to the compliance challenges for these products, tobacco companies may have introduced a greater variety of cigarillos with ambiguous flavor names after the local flavors ordinances went into effect, as was documented following the flavored tobacco sales restriction in Providence (Rogers, Gammon, et al. 2021).

San Francisco's retailer-outreach approach may be a model for local health agencies hoping to promote compliance with a local flavor ordinance. Environmental Health inspectors in the city provided educational materials and

in-person training to retailers on how to comply with local flavor ordinances, including information to help identify flavored products that are prohibited for sale (Vyas et al. 2021). In order to further reduce the burden on retailers and clarify which products with ambiguous names are prohibited for sale, manufacturers could be compelled to provide merchants and enforcement agencies with a registry that contains non-flavored tobacco products reflecting those products that can be legally sold (Bonorris et al. 2019). In addition, compliance could be improved by designating sufficient funds for enforcement activities within the ordinance.

A majority of tobacco retail employees agreed that flavored tobacco appeals to youth and supported limiting the sale to adult-only stores, although these attitudes were less prevalent in jurisdictions with flavor ordinances than in the rest of the state. There was, however, comparatively low agreement that eliminating the sale of flavored tobacco will prevent youth use of tobacco, and limited support for comprehensive laws that end the sale of flavored tobacco entirely. Lack of support for the ordinance and disagreement with its justification to protect youth may have reduced some retailers' motivation to comply and may be another factor influencing the higher retailer violation rates for some products found in the retail observations. Lower support among these retailers may have been influenced by the strenuous opposition to comprehensive sales restrictions by the tobacco industry and its front groups (Henriksen and Mahoney 2018). In addition, retailer support may be expected to develop gradually, as restricting the sale of flavored tobacco products represents a substantial policy change similar in scope to the changes faced by business owners when California's statewide smokefree bars law was enacted in 1998. Following implementation, acceptance and compliance among bar patrons and bar workers improved over time (Tang et al. 2003; 2004). The momentum surrounding the passage of local flavor ordinances in California may also contribute to normalizing flavor sales restrictions and diminish opposition. Interventions that aid retailers with transitioning from tobacco to alternative product lines may alleviate some of their economic concerns (Ribisl et al. 2016). With this assistance, the expected economic benefits to the community—including increased jobs, economic activity, and reduced healthcare costs (Chaloupka & Glantz, 2021)—as well as concern for the health of their customers (Chavez et al. 2019) may outweigh any short-term financial losses that lessen retail employees' support for local flavor ordinance.

This study did not directly assess the effect of flavor ordinances on consumer behavior. However, the impact of local flavored tobacco ordinances may be limited by cross-locality purchasing or other alternative sources: an individual living in a jurisdiction with a local flavor ordinance can obtain flavored tobacco from a neighboring community without such an ordinance, get the products through social sources who purchased the tobacco products in another town, or obtain them online. The effects of the limitations of local-level sales restrictions have been observed in California. While an evaluation found that San

Francisco's flavor ordinance virtually eliminated flavored tobacco sales and decreased total tobacco sales in mainstream retailers (Gammon et al. 2021), others observed that the ordinance was associated with an increase in purchasing tobacco online or in another city (Rogers, Brown, et al. 2021) and that Californians living in jurisdictions with a local flavor ordinance were less likely to obtain flavored e-cigarettes from retailers than those in the rest of the state, but were more likely to obtain them from social sources (Gaiha et al. 2021).

Nonetheless, research suggests that the overall impact of cross-border purchasing and internet sales may be relatively small. Few California high school students who purchase their own e-cigarettes (8.7%) or cigarettes (2.3%) buy them online (Zhu et al. 2019) and delivery options for tobacco products purchased through the internet are highly restricted by state and federal law, which may discourage many from switching to buying tobacco online. The U.S. Postal Service is prohibited by federal law from delivering cigarettes, smokeless tobacco, and vaping products, and California law imposes labeling requirements for packages containing tobacco and age verification at the time of both purchase and delivery for all tobacco products ("2021 Omnibus Appropriations Bill H.R. 133 section 601"; "California Business and Professions Code Section 22963"; "Prevent All Cigarette Trafficking Act"). Furthermore, tobacco purchase modeling found that tobacco retailer reduction laws have the potential to decrease the accessibility of tobacco products by driving up search and purchase costs (Luke et al., 2017), which may also be expected to apply to flavored tobacco sales restrictions. Finally, while the public health impact of each individual local flavored tobacco sales restriction may have limitations, local tobacco control laws that demonstrate feasibility and effectiveness often lay the groundwork for the passage of broader-reaching state and federal laws (Florey & Doan, 2018; Francis et al., 2010). A statewide comprehensive law restricting the sale of flavored tobacco would eliminate opportunities for cross-border purchasing within the state, which might also allay concerns of retailers affected by local ordinances that do not cover nearby but out-of-jurisdiction competitors and would provide more equitable coverage for California's diverse populations. Public health agencies working to support local ordinances and reduce demand for flavored tobacco products may also consider strategies to further denormalize tobacco use through media campaigns and community education.

While this evaluation did not assess the impact of flavored tobacco sales restrictions on tobacco use prevalence, studies in other states found that local flavor ordinances were associated with curbing youth tobacco use (Farley & Johns, 2017; Kingsley et al., 2019; Pearlman et al., 2019) and early findings of youth and young adult tobacco use following San Francisco's flavor ordinance have been mixed. A study of high school students surveyed the spring following the ordinance's January 2019 enactment found that the odds of recent smoking was higher in San Francisco compared to other school districts (Friedman, 2021) but a study of San Francisco young adults surveyed in

November 2019 showed that current overall and flavored tobacco use decreased after the ordinance, though smoked tobacco use remained stable (Yang et al. 2020). While in the aggregate, studies offer evidence that the implementation of local flavored tobacco sales restrictions is associated with decreased tobacco use prevalence, further research is needed to evaluate the effect of the sales restrictions on young people's access, initiation, and progression to established use of tobacco products (Rogers, Brown, et al. 2021).

Strengths of this evaluation include use of three independent data sources (ordinance coverage, store observations and retailer perceptions), standardized measures in survey instruments, and relatively large sample sizes with high completion/response rates. One limitation is that cross-sectional study designs limit the ability to rule out alternative explanations for observed differences between stores and respondents from jurisdictions with and without a flavored tobacco ordinance. Second, variation in provisions of flavored tobacco ordinances—with some jurisdictions exempting menthol, exempting adult-only or other store types, or restricting sales only among retailers located near schools—increases the within-group variability and reduces the statistical power to detect between-group differences. These differences were accounted for by limiting the samples to only affected retailers whenever possible; however, without knowledge from local enforcement agencies of which retailers are adult-only or otherwise exempt, we cannot confirm that all unaffected retailers were removed from ordinance jurisdictions in the store observations and the retailer poll. It was not possible to sample according to store type or to control for chain versus independent retailers because the state licensing list did not contain store type information nor indicate which retail chains operate as independently owned franchises. In addition, the analyses did not control for strength of enforcement provisions (such as civil action, administrative citation, criminal prosecution, and nuisance abatement), variations in aggressiveness in local enforcement of ordinance provisions (such as graduated fines, graduated license suspension, and license revocation), or the length of time since ordinance implementation. Moreover, the retail observation study did not assess all categories of flavored tobacco product, such as smokeless tobacco and hookah. Finally, the studies were designed independently of one another and did not lend themselves to directly linking results across components. Future research should look at outcomes for priority populations and further evaluate potential unintended consequences of flavored tobacco ordinance exemptions for menthol, product and store types, including their impact on tobacco-related disparities. Further studies are also needed to test for differences in availability by product category and store type and to investigate advertising for flavored tobacco products that stores cannot sell.

In the early years of California's *Flavored Tobacco Products Campaign*, the state saw a sizable increase in the population covered by local flavor ordinances. Jurisdictions with flavor ordinances had lower availability of these products, fewer tobacco advertisements, and high awareness of the ordinance among retailers. CTCP continues to support local projects to increase the reach of flavored tobacco sales restrictions to rural areas, Hispanic/Latino communities, and jurisdictions with more people with low socioeconomic status and youth; address the continued availability of flavored cigar products in many stores in jurisdictions with a flavor ordinance; and close the gap on ordinance exemptions for menthol flavoring, specific products, and certain types of stores.

Appendix

Additional Information on Study Population Representation

Table A1. Demographics of Flavor-Ordinance Jurisdictions (Gray) and Matched No-Ordinance Jurisdictions (White): Retail Observation Survey in Matched Communities, California, July–September 2018.

	% Hispanic	%NH Black	%NH Asian/ Pacific Islander	%NH White	Median Household Income
El Cerrito	12%	7%	25%	51%	$88,380
Albany	12%	5%	29%	48%	$78,769
Los Gatos	5%	1%	13%	77%	$122,860
Menlo Park	16%	5%	13%	63%	$126,045
Oakland	26%	26%	17%	27%	$52,962
Vallejo	24%	21%	25%	25%	$58,472
San Leandro	28%	11%	33%	24%	$64,279
Fairfield	27%	15%	16%	35%	$66,190
Santa Clara County, unincorporated	31%	2%	14%	49%	$103,121
Santa Clara County, incorporated	27%	2%	35%	32%	$93,854
Yolo County, unincorporated	34%	3%	13%	47%	$59,553
Yolo County, incorporated	31%	2%	14%	49%	$55,508

Note. NH = Non-Hispanic.

Table A2. Response and Cooperation Rate by Geographic Strata: California Tobacco Retailer Poll, January–February 2019.

Geographic Strata	Response Rate, %	Cooperation Rate, %
1. Beverly Hills	42.9	60.0
2. Portola Valley	50.0	50.0
3. San Francisco	33.0	57.4
4. Unincorporated San Mateo County	50.0	80.0
5. Unincorporated Yolo County	31.8	55.6
6. Los Gatos	46.7	50.0
7. Oakland	39.5	65.8
8. Palo Alto	58.7	78.6
9. Unincorporated Santa Clara County	51.0	75.0
10. Berkeley	60.6	83.3
11. Unincorporated Contra Costa County	29.6	66.7
12. Cloverdale	25.7	37.5
13. El Cerrito	49.2	80.0
14. Fairfax	33.3	100.0
15. Unincorporated Mono County	63.0	72.7
16. Novato	42.0	56.3
17. San Leandro	34.3	53.6
18. Sonoma	47.7	75.0
19. Windsor	31.7	42.9
20. Rest of California	30.6	51.4
Overall	31.7	53.0

Acknowledgments

The authors would like to thank Amna Ali, MPH, Bonnie Halpern-Felsher, PhD, Monika Vishwakarma, MPH, at Stanford University School of Medicine, Ashley Feld, MPH, and Jennifer Gaber, MPH, at RTI International, as well as Shannon Williams, PhD, Jessica Newham, data collectors from the Institute for Social Research at the California State University, Sacramento, and data collectors from San Jose State Mai Chee Lor, MPH, Abneet Gill, MPH, Mamaye Kebede, MPH and Evelyn Garcia, MPH for their contributions.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the Centers

for Disease Control and Prevention Grant #5 NU58DP005969-04-00 and California Department of Public Health (CDPH), Contract #17-10041.

ORCID iDs

Elizabeth Andersen-Rodgers https://orcid.org/0000-0002-4126-6564
Tam D. Vuong https://orcid.org/0000-0003-0596-3300
Todd Rogers https://orcid.org/0000-0002-1592-2150

References

5 U.S. Code § 553.

21 U.S.C. § 387p (a).

2021 Omnibus Appropriations Bill H.R. 133 section 601

Ambrose, B. K., Day, H. R., Rostron, B., Conway, K. P., Borek, N., Hyland, A., & Villanti, A. C. (2015). Flavored tobacco product use among US youth aged 12-17 years, 2013-2014. *Journal of the American Medical Association*, *314*(17), 1871–1873. 10.1001/jama.2015.13802

Bonorris, S., Salerno, M., Shanske, D., Waldron, M., Ball, L., Filippi, L., Hendrickson, L., & Lo, A. (2019). *Challenges in enforcing local flavored tobacco restrictions*. https://www.cdph.ca.gov/Programs/CCDPHP/DCDIC/CTCB/CDPH%20Document%20Library/Policy/FlavoredTobaccoAndMenthol/ChallengesinEnforcing_LocalFlavoredTobaccoRestrictions.pdf

Brock, B., Carlson, S. C., Leizinger, A., D'Silva, J., Matter, C. M., & Schillo, B. A. (2019). A tale of two cities: Exploring the retail impact of flavoured tobacco restrictions in the twin cities of Minneapolis and Saint. Paul, Minnesota. *Tobacco Control*, *28*(2), 176–180.

California Business and Professions Code Section 22963.

California Department of Public Health California Tobacco Control Program. (2020). *30 Years of success and innovation: Celebrating the past, present, and future of tobacco control in California*. https://www.cdph.ca.gov/Programs/CCDPHP/DCDIC/CTCB/CDPH%20Document%20Library/ResearchandEvaluation/FactsandFigures/30YearsOfSuccessAndInnovation.pdf

Centers for Disease Control and Prevention. (2019). *Behavioral risk factor surveillance system survey data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention Office on Smoking and Health (2015). Grant Number IU58DP005969-01 [Grant].

Chaiton, M. O., Nicolau, I., Schwartz, R., Cohen, J. E., Soule, E., Zhang, B., & Eissenberg, T. (2020). Ban on menthol-flavoured tobacco products predicts cigarette cessation at 1 year: A population cohort study. *Tobacco Control*, *29*(3), 341–347.

Chaiton, M. O., Schwartz, R., Tremblay, G., & Nugent, R. (2019). Association of flavoured cigar regulations with wholesale tobacco volumes in Canada: An interrupted time series analysis. *Tobacco Control*, *28*(4), 457–461.

Chaloupka, F. J., & Glantz, S. A. (2021). *Potential effects of a ban on the sale of flavored tobacco products in California*. Chicago: University of Illinois.

Chapter 34 Statutes of 2020.

Chavez, G., Minkler, M., McDaniel, P. A., Estrada, J., Thayer, R., & Falbe, J. (2019). Retailers' perspectives on selling tobacco in a low-income San Francisco neighbourhood after California's $2 tobacco tax increase. *Tobacco Control*, *28*(6), 657–662.

Cullen, K. A., Liu, S. T., Bernat, J. K., Slavit, W. I., Tynan, M. A., King, B. A., & Neff, L. J. (2019). Flavored tobacco product use among middle and high school students—United States, 2014–2018. *Morbidity and Mortality Weekly Report*, *68*(39), 839.

Czaplicki, L., Cohen, J. E., Jones, M. R., Smith, K. C., Rutkow, L., & Owczarzak, J. (2019). Compliance with the city of Chicago's partial ban on menthol cigarette sales. *Tobacco Control*, *28*(2), 161–167.

Family Smoking Prevention and Tobacco Control Act, Pub. L. No. 111-31, H.R. 1256 § 387 (2009). https://www.govinfo.gov/content/pkg/PLAW-111publ31/pdf/PLAW-111publ31.pdf

Farley, S. M., & Johns, M. (2017). New York City flavoured tobacco product sales ban evaluation. *Tobacco Control*, *26*(1), 78–84.

Farley, S. M., Schroth, K. R., Grimshaw, V., Luo, W., DeGagne, J. L., Tierney, P. A., Kim, K., & Pankow, J. F. (2018). Flavour chemicals in a sample of non-cigarette tobacco products without explicit flavour names sold in New York City in 2015. *Tobacco Control*, *27*(2), 170–176.

Feld, A. L., Rogers, T., Gaber, J., Pikowski, J., Farrelly, M. C., Henriksen, L., Johnson, T. O., Halpern-Felsher, B., Andersen-Rodgers, E., & Zhang, X. (2021). Impact of local flavored tobacco sales restrictions on policy-related attitudes and tobacco product access. *Health Education and Behavior*.

Florey, K., & Doan, A. (2018). A successful experiment: California's local laboratories of regulatory innovation. *UCLA Law Review*, 66, 80.

Francis, J. A., Abramsohn, E. M., & Park, H.-Y. (2010). Policy-driven tobacco control. *Tobacco Control*, *19*(Suppl 1), i16–i20.

Friedman, A. S. (2021). A difference-in-differences analysis of youth smoking and a ban on sales of flavored tobacco products in San Francisco, California. *JAMA Pediatrics*, *175*(8), 863–865.

Gaiha, S. M., Henriksen, L., Halpern-Felsher, B., Rogers, T., Feld, A. L., Gaber, J., & Andersen-Rodgers, E. (2021). Sources of flavoured e-cigarettes among California youth and young adults: Associations with local flavoured tobacco sales restrictions. *Tobacco Control*.

Gammon, D. G., Rogers, T., Gaber, J., Nonnemaker, J. M., Feld, A. L., Henriksen, L., Johnson, T. O., Kelley, T., & Andersen-Rodgers, E. (2021). Implementation of a comprehensive flavoured tobacco product sales restriction and retail tobacco sales. *Tobacco Control*.

Henriksen, L., & Mahoney, M. (2018). Tobacco industry's T.O.T.A.L. interference. *Tobacco Control*, *27*(2), 234–236.

Henriksen, L., Schleicher, N. C., Johnson, T. O., Roeseler, A., & Zhu, S.-H. (2020). Retail tobacco marketing in rural versus nonrural counties: Product availability, discounts, and prices. *Health Promotion Practice*, *21*, 27S–36S.

Kephart, L., Setodji, C., Pane, J., Shadel, W., Song, G., Robertson, J., Harding, N., Henley, P., & Ursprung, W. W. S. (2019). Evaluating tobacco retailer experience and compliance with a flavoured tobacco product restriction in Boston, Massachusetts: Impact on product availability, advertisement and consumer demand. *Tobacco Control*, *29*(e1), e71–e77.

King, B. A., Dube, S. R., & Tynan, M. A. (2012). Flavored cigar smoking among US adults: Findings from the 2009–2010 National Adult Tobacco Survey. *Nicotine and Tobacco Research*, *15*(2), 608–614.

Kingsley, M., Setodji, C. M., Pane, J. D., Shadel, W. G., Song, G., Robertson, J., Kephart, L., Henley, P., & Ursprung, W. S. (2019). Short-term impact of a flavored tobacco restriction: Changes in youth tobacco use in a Massachusetts community. *American Journal of Preventive Medicine*, *57*(6), 741–748.

Lee, J. G., Henriksen, L., Rose, S. W., Moreland-Russell, S., & Ribisl, K. M. (2015). A systematic review of neighborhood disparities in point-of-sale tobacco marketing. *American Journal of Public Health*, *105*(9), e8–e18.

Luke, D. A., Hammond, R. A., Combs, T., Sorg, A., Kasman, M., Mack-Crane, A., Ribisl, K. M., & Henriksen, L. (2017). Tobacco town: Computational modeling of policy options to reduce tobacco retailer density. *American Journal of Public Health*, *107*(5), 740–746.

Prevent All Cigarette Trafficking Act Pub. L. 111-154, sec.2, § 2A, 124 Stat. 1087, 1091-2 (2010) (codified at 15)U.S.C. § 376a(b)(4).

Ribisl, K. M., D'Angelo, H., Evenson, K. R., Fleischhacker, S., Myers, A. E., & Rose, S. W. (2016). Integrating tobacco control and obesity prevention initiatives at retail outlets. *Preventing Chronic Disease*, *13*, 150426.

Ribisl, K. M., D'Angelo, H., Feld, A. L., Schleicher, N. C., Golden, S. D., Luke, D. A., & Henriksen, L. (2017). Disparities in tobacco marketing and product availability at the point of sale: Results of a national study. *Preventive Medicine*, *105*, 381–388.

R.J. Reynolds Tobacco Co. v. Cty. of Los Angeles (2020). (471 F. Supp. 3d 1010 (C.D. Cal. 2020)).

National Association of Tobacco Outlets, Inc. v. (731 City of Providence, R.I. F.3d 71 (1st Cir. 2013).

Pearlman, D. N., Arnold, J. A., Guardino, G. A., & Welsh, E. B. (2019). Advancing tobacco control through point of sale policies, Providence, Rhode Island. *Preventing Chronic Disease*, *16*, E129.

Roeseler, A., & Burns, D. (2010). The quarter that changed the world. *Tobacco Control*, *19*(Suppl 1), i3–i15.

Rogers, T., Brown, E. M., Siegel-Reamer, L., Rahman, B., Feld, A. L., Patel, M., Vallone, D., & Schillo, B. A. (2021). A comprehensive qualitative review of studies evaluating the impact of local US laws restricting the sale of flavored and menthol tobacco products. *Nicotine and Tobacco Research*.

Rogers, T., Gammon, D. G., Coats, E. M., Nonnemaker, J. M., & Xu, X. (2021). Changes in cigarillo availability following implementation of a local flavoured tobacco sales restriction. *Tobacco Control*.

Schleicher, N. C., Ali, A., Winn, L., Vishwakarma, M., & Henriksen, L.. (2019). *California Tobacco Retail Surveillance Study, 2018*.

Stanford Prevention Research Center, & GreenInfo Network. California Community Health Assessment Tool.

Tang, H., Cowling, D. W., Lloyd, J. C., Rogers, T., Koumjian, K. L., Stevens, C. M., & Bal, D. G. (2003). Changes of attitudes and patronage behaviors in response to a smoke-free bar law. *American Journal of Public Health*, *93*(4), 611–617.

Tang, H., Cowling, D., Stevens, C., & Lloyd, J. (2004). Changes of knowledge, attitudes, beliefs, and preference of bar owner and staff in response to a smoke-free bar law. *Tobacco Control*, *13*(1), 87–89.

Truth Intitive (2021). Flavored Tobacco Policy Restrictions as of March 31: 2021.

U.S. Smokeless Tobacco Manufacturing Company LLC v. City of New York, (708 F.3d 428 (2d Cir. 2013)).

United States Census Bureau. (2018). *American Community Survey.*

United States Food and Drug Administration (2021). *FDA commits to evidence-based actions aimed at saving lives and preventing future generations of smokers*.

United States Food and Drug Administration (2020). *FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint*.

Vuong, TD, Zhang, X, & Roeseler, A (2019). *California tobacco facts and figures 2019*. California Tobacco Control Program. https://www.cdph.ca.gov/Programs/CCDPHP/DCDIC/CTCB/CDPH%20Document%20Library/ResearchandEvaluation/FactsandFigures/CATobaccoFactsandFigures2019.pdf

Vyas, P., Ling, P., Gordon, B., Callewaert, J., Dang, A., Smith, D., Chan, B., & Glantz, S. (2021). Compliance with San Francisco's flavoured tobacco sales prohibition. *Tobacco Control*, *30*(2), 227–230.

Yang, Y., Lindblom, E. N., Salloum, R. G., & Ward, K. D. (2020). The impact of a comprehensive tobacco product flavor ban in San Francisco among young adults. *Addictive Behaviors Reports*, *11*, 100273.

Zhu, S.-H., Zhuang, Y.-L., Braden, K., Cole, A., Gamst, A., Wolfson, T., Lee, J., Ruiz, C., & Cummins, S. (2019). *Results of the statewide 2017-18 California student tobacco survey.*

Author Biographies

Elizabeth Andersen-Rodgers is a Research Scientist Supervisor and the Chief of the Evaluation Unit at the California Tobacco Control Program within the California Department of Public Health. She received her Master of Science in Society, Human Development and Health from the Harvard School of Public Health in 2010, where she focused on program evaluation and the social determinants of health. As a Research Scientist with the California Tobacco Control Program, she led the evaluation of the Healthy Stores for a Healthy Community Campaign from 2011-2020, and she currently oversees the evaluation of the program's flavored tobacco and End Commercial Tobacco campaigns.

Xueying Sherry Zhang is Chief of the Surveillance Unit at the California Tobacco Control Program within the California Department of Public Health. Ms. Zhang is the subject matter expert for statewide tobacco use surveillance and program evaluation, including study design, instrument development, and data collection strategies. She oversees statewide surveillance and evaluation activities to assess the effectiveness of California Tobacco Control Program overall and its individual components. Ms. Zhang received her Master in Biostatistics from the University of Minnesota. She obtained her Medical Degree and Master in Epidemiology in China.

Tam D. Vuong, MPH, is a research scientist with the Office of Population Health at the UC Davis Comprehensive Cancer Center and contracted out to the California Tobacco Control Program with the California Department of Public Health. His primary research interests include population-based studies with applications in public health.

Liz Hendrix is the Chief of the Strategic Planning and Policy Unit with the California Tobacco Control Program, California Department of Public Health. In this role, she oversees the management of policy operations for the California Tobacco Control Program and conducts analyses of state and local tobacco policies. She serves as a technical consultant on tobacco-related policies, coordinates policy direction for the Tobacco Control Branch, and provides oversight of the Strategic Planning and Policy Unit. Liz earned a Master of Public Policy (MPP) Degree from Duke University where she focused on obesity and tobacco prevention.

Cheryl Edora has five years of experience working at the California Tobacco Control Program within the California Department of Public Health where she is the Project Officer for the Tobacco Control Evaluation Center at the University of California, Davis and the Policy Evaluation Tracking System contracted with the American Nonsmokers' Rights Foundation. Cheryl received an MPH from Drexel University and completed her Certificate in

Global Health at La Universidad de Cienfuegos, Cuba, in partnership with Drexel University.

Rebecca Williams received a Doctorate of Public Health (DrPH) in Community Based and Translational Research and an MPH in Social and Behavioral Health from the University of Hawaii. She worked as a Research Professor with a focus on tobacco control research and evaluation with a joint appointment at the University of Hawaii Office of Public Health Studies and the University of Hawaii Cancer Center. She has been involved in tobacco research, enforcement operations, and policy in Hawaii and California for over a decade.

Lauren Groves completed her Master's in Public Health, Health Policy, Administration, and Management, at the University of Texas and her Bachelor's in Community Health Education at the University of West Florida. During her time at the California Tobacco Control Program, California Department of Public Health, Lauren has led the Flavored Tobacco Campaign and is a lead member of the End Commercial Tobacco Campaign initiative. Lauren has worked on multiple community engagement initiatives at the local, state, and national level and she now supervises and leads the Community Engagement and Local Programs Unit to implement federal and state-funded public health interventions to prevent and reduce tobacco use and tobacco related disease in California.

April Roeseler worked for the California Tobacco Control Program, California Department of Public Health since its launch in 1989 and served as the Branch Chief from 2014-2021. She received her Master of Science in Public Health (MSPH) from the University of Missouri, Columbia, School of Medicine, and a Bachelor of Science in Nursing (BSN) from California State University, Fresno.

Todd Rogers, PhD, is a senior scientist in the Center for Health Analytics, Media, and Policy at RTI International. Dr. Rogers has led or contributed to dozens of tobacco control research, surveillance, and evaluation projects, technical assistance and training programs, and dissemination/implementation initiatives with funding from U.S. federal, state and local health agencies, and private foundations. Dr. Rogers has published widely on tobacco use prevention and control, has been on the editorial board of several scientific journals, including Tobacco Control (Statistics and Methodology Editor, 1997-date), and has served on various scientific review and advisory committees for state and national organizations.

David H. Voelker, PhD, is a Research Analyst at the Stanford Prevention Research Center.

Nina Schleicher, PhD, is a Statistician at the Stanford Prevention Research Center. She specializes in the evaluation of community-based interventions and analysis of longitudinal data. Dr. Schleicher received her PhD in Educational Psychology (Quantitative Methods) from the University of California, Santa Barbara.

Trent O. Johnson, MPH, is a Program Manager at the Stanford Prevention Research Center. He directs several projects about tobacco retail marketing, density, and policies, as well as their impact on tobacco use by adolescents and adults.

Lisa Henriksen, PhD, is a Senior Research Scientist at the Stanford Prevention Research Center. She is Principal Investigator of several NIH-funded grants to study place-based disparities in tobacco retail marketing and density, to inform policy solutions, and to evaluate their impact on tobacco sales and use.