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California Tobacco Retail Surveillance Study 2022 Results

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Acknowledgments: We are grateful to Ewald & Wasserman Research Consultants, LLC, their staff and the data collectors, who made this research possible.

Submitted to the California Tobacco Prevention Program, California Department of Public Health
Funding: Contract #20-10188 (PI: Lisa Henriksen, PhD)

Disclosure: Views or opinions expressed in this report are solely those of the authors and do not necessarily reflect the policies or official views of the California Department of Public Health or the California Health and Human Services Agency.

Suggested citation: Henriksen L, Voelker DH, Johnson TO, Alam A, Wicks T, Winn L, Hampton J, Gammon DG, Rogers T, Schleicher NC. (2023). California Tobacco Retail Surveillance Study 2022 Results. <<insert website link>>

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ABSTRACT

The 2022 California Tobacco Retail Surveillance Study (CTRSS) characterized the availability and marketing of tobacco products in a stratified random sample of 1350 state-licensed tobacco retailers. Focal products in this report are: (1) any and menthol cigarettes, (2) cigarillos (separately) and a combined category of cigarillos, little filtered cigars, and blunt/cigar wraps (LCCs), (3) nicotine pouches and other smokeless tobacco, (4) hookah pipes and shisha tobacco, (5) and nicotine vape products. With concern for initiation, key findings suggest that stores in neighborhoods with a higher proportion of residents under age 21 were more likely to: advertise menthol cigarettes, sell cigarettes at significantly lower prices, and were more likely to sell cigar products. In addition, the price of one JUUL pod, which contains approximately the same amount of nicotine as a pack of cigarettes, cost considerably less than the average single-pack price of all four cigarette varieties observed. Because youth are known to be price-sensitive, tax and non-tax mechanisms to increase the price of tobacco products are recommended.

EXECUTIVE SUMMARY

This report summarizes findings from the first California Tobacco Retail Surveillance Study (CTRSS) since 2018. The sampling method for CTRSS 2022 differs from previous waves, which were based on a simple random sample of state-licensed tobacco retailers, replacing stores lost to follow-up. Instead, CTRSS 2022 was designed with an oversample of tobacco retailers in three categories: (1) self-identified rural counties, (2) census tracts with greater than or equal to the 90th percentile of non-Hispanic/Latino Black residents, and (3) tobacco specialty shops. Sampling weights were computed and applied to yield results representative of all state-licensed tobacco retailers in California. In this report, the combination of little filtered cigars, cigarillos, and cigar/blunt wraps is referred to as LCCs. Nicotine vape products refers to the combination of electronic smoking devices and e-liquids that contain nicotine. For the first time, CTRSS 2022 reports the availability of hookah pipes, separately from shisha tobacco (previously reported). With concern for health equity, this report also describes place-based differences in product availability, presence of advertising, and cigarette prices, derived from statistical models that included neighborhood (census tract) demographics and controlled for store type.

Availability of nicotine pouches and hookah pipes was recorded for the first time in CTRSS 2022:

- Pouches were available in more than half of stores (55.0 percent), almost as prevalent as other smokeless tobacco (59.8 percent) and nicotine vape products (57.2 percent).
- An estimated 10.7 percent of tobacco retailers sold hookah pipes, 13.0 percent sold shisha tobacco, and hookah pipes and/or shisha tobacco were available in 14.4 percent of stores.

Key findings related to availability, advertising, and price of cigarettes are:

- The likelihood of a store advertising menthol cigarettes was greater in neighborhoods with a higher proportion of underage residents.
- All four cigarette prices studied (Marlboro red, Newport menthol, Camel Crush, and cheapest pack regardless of brand) cost less in neighborhoods with a higher proportion of underage residents.

- A JUUL pod contains approximately the same amount of nicotine as a pack of cigarettes, but cost considerably less than the average single-pack price of all four varieties of cigarettes. The average price for a single JUUL pod from a four-pod pack was \$6.93, and the average price of the cheapest pack of cigarettes was \$8.63.
- Unlike previous research in California, the likelihood of a store selling menthol cigarettes was not related to the percent of non-Hispanic/Latino Black residents in a census tract, and the likelihood of a store selling menthol cigarettes was lower in neighborhoods with a higher proportion of non-Hispanic/Latino Asian Pacific Islander residents.

Place-based differences in the availability of non-cigarette tobacco products were also identified:

- The likelihood of a store selling smokeless tobacco (other than nicotine pouches) and LCCs was greater in neighborhoods with a higher proportion of underage residents.
- Cigarillos were significantly more likely to be sold in stores located in rural census tracts than non-rural tracts.

Unlike previous research in California, the predicted odds of a store selling menthol cigarettes were not greater in neighborhoods with a higher proportions of residents who identify as non-Hispanic/Latino Black and non-Hispanic/Latino Asian Pacific Islander. These results depart from long-standing disparities in California's tobacco retail environment. It is possible that the adoption of local sales restrictions on flavored tobacco, which covered one in four California residents by June 2022, contributed to this change. However, CTRSS 2022 was not designed to evaluate local sales restrictions.

Lower prices for cigarettes, greater availability of LCCs, and greater availability of smokeless tobacco (other than nicotine pouches) in neighborhoods with a higher proportion of underage residents raise concerns about tobacco initiation among youth and young adults. Because youth are particularly price-sensitive, tax and non-tax mechanisms to increase the price of cigarette and non-cigarettes tobacco products are recommended.

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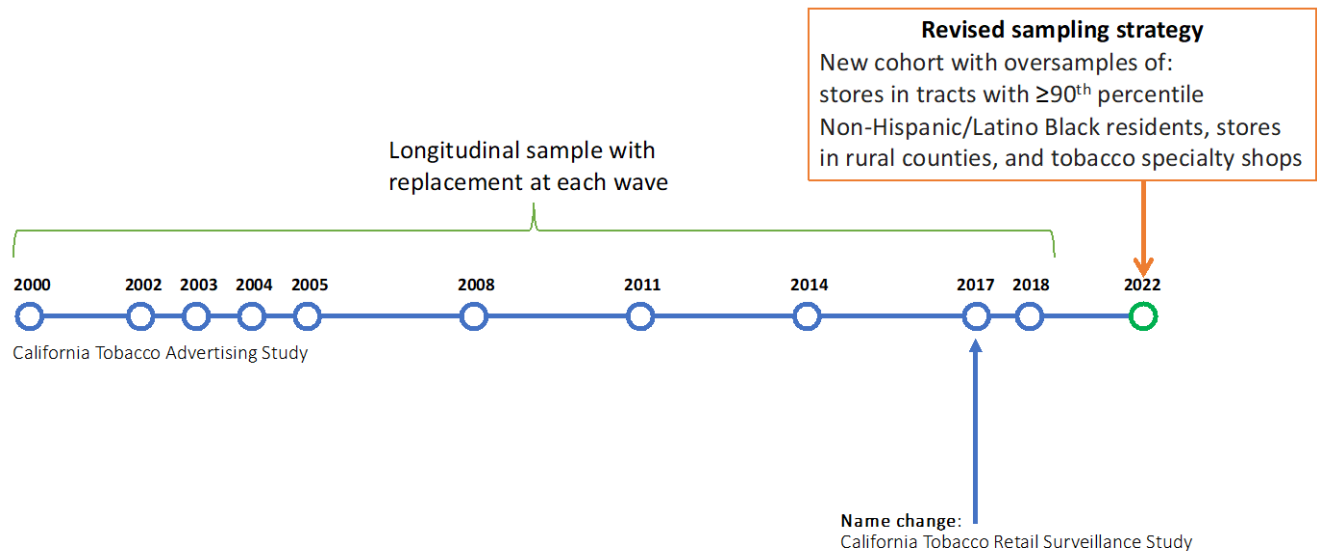
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BACKGROUND

The California Tobacco Retail Surveillance Study (CTRSS), previously known as the California Tobacco Advertising Study (CTAS), is the longest-running tobacco marketing surveillance system in the United States (US). The California Tobacco Prevention Program has funded 11 waves of retail observations since 2000, as shown in Figure 1.

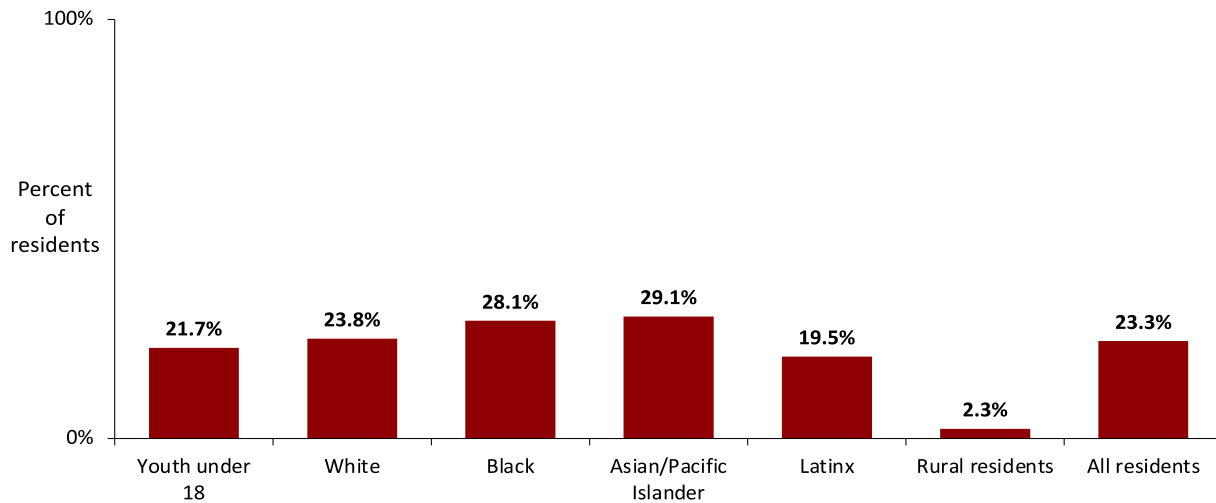
Figure 1. Timeline of retail marketing observations in California since 2000



Last conducted in 2018, CTRSS contains several new features. It assessed the availability and advertising of nicotine pouches. First introduced to the US market in 2016, nicotine pouches are small, permeable, white pouches containing nicotine that may be derived from tobacco plants or synthetically produced.¹ Nicotine pouches are typically marketed as “tobacco-free,” a label that is associated with greater appeal and lower perceived risk among young adults.² Although CTRSS assessed the availability of shisha tobacco previously, new to CTRSS 2022 is the availability of hookah pipes, which were recorded separately from shisha tobacco. CTRSS 2022 data were collected between June and September 2022, approximately two (2) months before the referendum vote on Senate Bill (SB) 793 to restrict the sale of flavored tobacco products in California, with exemptions for large cigars, pipe tobacco, and shisha tobacco for hookah pipes.

Prior to CTRSS 2022 data collection, 104 California localities restricted the sales of flavored tobacco as of May 2022. As shown in Figure 2, nearly one in four Californians lived in a jurisdiction that restricted sales of flavored tobacco.

Figure 2. Population covered by local sales restriction on flavored tobacco (California, June 2022)



Data sources: Policy Evaluation Tracking System (PETS), California Tobacco Prevention Program, June, 2022; California Tobacco Health Assessment Tool (cthat.org).

The current report characterizes the retail availability of multiple tobacco products, summarized in five sections: (1) any and menthol cigarettes, (2) cigarillos (separately) and a combined category of cigarillos, little filtered cigars, and blunt/cigar wraps (LCCs), (3) nicotine pouches and other smokeless tobacco, (4) hookah pipes and shisha tobacco, (5) and nicotine vape products. Beyond product availability, the current report also describes the presence of advertising for any and menthol cigarettes, LCCs, nicotine pouches, and nicotine vape products. With concern for health equity, this report describes how the availability of these products, presence of any and menthol cigarette advertising, as well as price of cigarettes and JUUL vary by store neighborhood demographics, controlling for store type.

Because CTRSS 2022 was conducted before the December 21, 2022 implementation of SB 793,³ the current report does not summarize availability, advertising, or price of flavored tobacco products, except for menthol cigarettes. The annual report for CTRSS 2023 is planned to characterize changes in availability of flavored tobacco from 2022 to 2023.

METHODS

Sample

The data source for the sample was a list of all state-licensed tobacco retailers obtained by the California Tobacco Prevention Program (CTPP) from the California Department of Tax and Fee Administration (CDTFA) in January, 2022.⁴ However, with concerns over differential attrition for store or neighborhood type, the CTRSS 2022 sample was entirely redesigned and no longitudinal stores were retained for the first time in 20 years. The new 2022 CTRSS sampling design consists of a stratified random sample with an oversample for three criteria: 1) stores located in rural counties; 2) stores located in census tracts with the 90th percentile or higher of percent non-Hispanic/Latino Black residents; and 3) specialty tobacco retailers (smoke/vape shops and hookah bars), as identified by

North American Industry Classification System (NAICS) code and store name. To create the CTRSS 2022 sampling frame for a maximum of 1350 stores, stores were classified into one of six strata and randomly sampled for telephone verification. Too few stores were present in the group combinations of rural county, 90th percentile or higher of population Black, and specialty tobacco retailer (yes or no) to yield separate strata, so these retailers were aggregated with non-rural equivalent strata.

Telephone verifications of stores were performed to fill quotas for each of the six strata. Using a computer-assisted telephone system, trained professionals followed a standard protocol. They asked whether stores sold Natural American Spirit Cigarettes, followed by any other cigarettes, or any other combustible tobacco products like cigars or shisha tobacco. If none were sold, they asked about JUUL pods, followed by Puff Bar or other nicotine vapes. They made as many as three attempts to telephone each store's primary phone number, and any alternate phone numbers found on Google, Yelp or YellowPages.com for stores with numbers that were disconnected, routinely busy, or went straight to voicemail. Repeat calls were attempted at varying times of day to maximize completion. Telephone verifications were performed by Ewald & Wasserman, LLC, (E&W) the same agency that collected the retail surveillance data.

Data collector training

Stanford Prevention Research Center (SPRC) staff conducted a two-day training session in Culver City, CA because facilities located closer to SPRC (Palo Alto) and E&W (San Francisco) were located in jurisdictions with flavor restrictions. The Culver City facility is in a jurisdiction that restricts sales of flavored tobacco and borders the City of Los Angeles, which had not yet enacted its local sales restriction on flavored tobacco. Therefore, the training location provided data collectors with opportunities to see retailers with and without flavored tobacco. Data collectors received both printed and electronic copies of an instruction manual in advance. Training experiences included classroom instruction, reviewing numerous in-store photos, and sorting myriad tobacco products by category. SPRC mapped all tobacco retailers within walking distance of the training facility (1.0 mile) and within a short drive (3.0 miles). On the first day of training, SPRC and E&W staff guided fieldwork experience in 12 stores, with teams of three to four data collectors and staff walking between stores with and without local flavor restrictions. On the second day of training, SPRC and E&W staff drove data collectors to three new clusters of stores (that were not visited the previous day), all in the City of Los Angeles (before flavor restrictions were adopted). Data collectors independently completed the survey in three of nine stores that were previously visited by SPRC staff two or three days prior, for a "gold standard" to assess reliability of measures. These data were compared with that of other data collectors, and with data collected by the SPRC staff one or two days prior. SPRC reviewed the data to identify items with low agreement between data collectors visiting the same stores. SPRC then developed new training slides and an online quiz for an additional hour of data collector training via Zoom approximately two days after the in-person training. At that session, SPRC staff addressed further questions from data collectors and clarified instructions as needed.

Fieldwork

Data were collected between June 14 and September 9, 2022. With concern for inter-rater reliability, second visits were completed by a different data collector than the first visit in randomly selected

stores (n=132). The mean number of days between visits was 8.4 (SD=6.3, Minimum=0.5, Maximum=36.9).

Measures

This section summarizes the major constructs in the retail marketing surveillance survey. The appendix contains the entire text of the survey instrument.

Store type. Data collectors classified stores into one of eight categories: convenience store (with or without gas), small market/deli/produce market (“small market”), liquor store, supermarket/large grocery store, discount store (including Walmart), pharmacy, tobacco specialty shop (vape/smoke/head shop/hookah) and other (e.g., hotel gift shop, gas kiosk). For analysis, convenience stores (which do not sell raw meat) and small market categories (that sell raw meat and have three or fewer cash registers) were combined. Owing to small sample size, discount stores were combined with the “other” category. This yielded six categories: convenience stores and small markets, liquor store, pharmacy, supermarket/large grocery store, tobacco specialty shop, and discount store/other.

Product availability. Data collectors noted the availability of the following products individually: any cigarettes and menthol cigarettes, cigarillos, little filtered cigars, cigar wraps or blunt wraps. Data collectors also recorded the availability of hookah pipes and shisha tobacco (separately). Nicotine pouch availability was assessed by first asking about ZYN, which was the leading brand in March 2022 and remains so as of October 2023.⁵ If ZYN was not available, data collectors answered a question about other brands of nicotine pouches (e.g., On!, Velo). Data collectors noted the availability of other smokeless tobacco (chew/dip or snus). In addition, data collectors noted the availability of nicotine vape products, separately for pods or cartridges, disposables, and e-liquids.

Advertising. Advertisements were defined as branded, professionally produced (not handwritten) signs that intend to sell a product. No minimum size was specified. Signs included neon lights and other three-dimensional objects, such as sandwich boards or signs wrapped around concrete bollards. Branded signs for mobile coupons were also counted as advertisements. Data collectors noted the presence of advertisements by product category for the following: cigarettes (any and menthol), nicotine pouches, and nicotine vape products, separately on the inside and outside of the store.

Discounts. Presence of a discount was assessed for (1) any cigarettes and (2) menthol cigarettes. Discount was defined as a temporary price reduction, such as dollar or cents off, or a reduced price for a two-pack purchase. Data collectors were trained to look for discounts on advertisements, shelf strips, stickers, and product packaging. Discounts could be handwritten or professionally printed. Membership-only, app-only, and mobile coupons were included in the definition of discounts.

Price. Data collectors recorded four single-pack prices of cigarettes: (1) Marlboro red hardpack, (2) Newport menthol hardpack, (3) Camel Crush cigarettes, any variety, and (4) the cheapest pack of cigarettes regardless of brand. New to CTRSS 2022 was the price of Camel Crush, which contains a menthol capsule. If single-pack prices were not advertised, data collectors were trained to request prices from store clerks. For each recorded price, data collectors indicated whether the price included sales tax. Data collectors also recorded the price of tobacco-flavored JUUL four-pod pack and Vuse Alto four-pod pack.

Analyses

Inter-rater reliability. To assess inter-rater reliability, Cohen's Kappa for binary measures (e.g., product availability and advertising presence), and Intraclass Correlation Coefficients (ICCs) for cigarette pack prices (adjusted so all cases include sales tax), were computed using data from the 132 stores with repeat visits.⁶ Inter-rater reliability varied by product category: Kappa ranged from 0.43 for presence of any cigarette discounts to 0.90 for LCC availability (Table 1). Among cigarette prices, the ICC was highest for Marlboro red (ICC= 0.72), identical for Camel Crush and Cheapest Pack (ICC= 0.67), and lower for Newport menthol (ICC= 0.56). For nicotine vape products, price of JUUL four-pod pack was measured reliably (ICC= 0.74), but the reliability of Vuse price was prohibitively low (ICC< 0.40), and therefore descriptive statistics were not reported.⁷ As IRR statistics decrease, results should be interpreted and generalizations made with caution.

Geospatial data. Using ArcMap version 10.6.1, SPRC staff geocoded the surveyed stores with a 100% mapping rate. Using data for public school boundary shapefiles that SPRC created (<https://www.californiaschoolcampusdatabase.org>), proximity of stores to schools was determined by calculating the straight-line distance between each store and the nearest K-12 public school boundary, then categorizing whether stores were within 1000 feet of a public school (yes/no).⁸ For past CTRSS reports, SPRC created half-mile, store-centered buffers to characterize store neighborhoods. However, in the CTRSS 2022 sample, there was sufficient overlap between store buffers that this strategy violated model assumptions. Instead, the current analyses define store neighborhoods using census tracts (stores per tract: Mean= 1.25, SD= 0.61, Minimum= 1, Maximum= 7). The 1277 completed stores were nested in 1023 census tracts and in 52 counties.

SPRC extracted data from the American Community Survey 5-year tract estimates (2017-2021) for each store neighborhood, calculating percent of population measures for: race/ethnicity (Hispanic/Latino; Non-Hispanic/Latino Black; Non-Hispanic/Latino Asian, Non-Hispanic/Latino Pacific Islander; Non-Hispanic/Latino American Indian, Alaskan Native, multiple races, and other (combined); underage residents (under 21 years); and poverty (percent of residents with household income less than 185 percent of the federal poverty level). On average, the census tract demographics were: 40.0% Hispanic/Latino residents (SD= 25.7), 8.5% Non-Hispanic/Latino Black (SD= 12.0), 9.1% Non-Hispanic/Latino Asian Pacific Islander and other (SD= 11.4), 26.7% underage residents (SD= 8.6), and 32.8% with income <185% of the federal poverty level (SD= 16.6). County rurality was classified according to CTPP's Health Jurisdiction Characteristics by Project (2022-2025). Of the 1023 census tracts in CTRSS 2022, 30.9 percent were in rural counties, which is higher than the statewide percent due to the oversampling of rural stores.

With information from geocoding stores to jurisdictions, SPRC obtained the local sales tax rates from CDTFA,⁴ then computed and added local sales tax to cases for which the recorded cigarette prices were advertised "plus tax" (i.e., did not include sales tax). Single-pack prices for non-menthol cigarettes obtained from the 16 stores in San Francisco could not be adjusted to uniformly include or exclude the city's \$1.05 litter mitigation fee.

Descriptive statistics. Descriptive statistics with weights applied were generated for each product availability and advertising item split by store type. Additionally, descriptive statistics for availability of nicotine pouches and other smokeless tobacco products were generated separately for stores located

in rural vs. non-rural counties. Descriptive statistics (mean, standard deviation) were computed for single-pack purchase price including sales tax for each four cigarette varieties (Marlboro red, Newport menthol, Camel Crush, cheapest pack regardless of brand). Sample sizes for descriptive statistics vary based on the number of data collectors who selected “cannot determine” for each item. For product availability, presence of advertising and discounts, “cannot determine” was rarely selected, ranging from zero to 18. Not surprisingly, a greater number of “cannot determine” responses were obtained for prices, ranging from 40 for JUUL to 137 for cheapest cigarette regardless of brand.

Multivariate models. We modeled product availability for menthol cigarettes, cigarillos, LCCs, nicotine pouches, other smokeless tobacco, and nicotine vapes, as a function of store type, school proximity (within 1000 feet of a public school), neighborhood demographics, and census tract rurality as measured by USDA Rural-Urban Commuting Area (RUCA) codes. For models of product availability, price and advertising presence, the data were conceptualized as forming a two-level hierarchy, with stores (Level 1), nested within census tracts (Level 2). Multi-level models were estimated, with random intercepts, normalized weights (scaled weight = weight / mean weight) applied at Level 1, strata entered as a control variable with largest unweighted group as the reference category (not located in rural county, not located in a tract with $\geq 90^{\text{th}}$ percentile of population non-Hispanic/Latino Black, and not a tobacco specialty shop). For all outcomes, generalized linear mixed models were fit in SAS using PROC GLIMMIX, with specifications including sandwich estimators (EMPIRCAL= classical), unstructured covariance structure (TYPE= un), and quadrature (METHOD= quad), with QPOINTS=1 for price models and QPOINTS not specified for binary outcome models.

In the multilevel models, all outcomes were Level-1 measures, and Level-1 predictors included store type, school proximity, and strata. Level-2 predictors included census tract measures (race/ethnicity, residents under 21 years, poverty, and rural status (0= no, 1= yes). For store type, the most prevalent category (convenience store/small market) was the reference group. To yield meaningful coefficients, census-based measures were scaled to ten-percentage point intervals for model entry. Thus, a one-unit increase equated to a ten-percentage point increase (i.e. from 15% to 25%). Initial models conceptualized the data as a three-level hierarchy (stores nested in tracts, nested in counties), and county rural status entered as a predictor. However, the three-level models had poor convergence, so two-level models with rural status measured at the census tract level were fit. When a binary outcome was constant (or nearly constant) within store type categories, the store type was excluded from the model. Data management and descriptive statistics were performed using IBM SPSS Statistics for Windows, V29.0; mixed models were fit using SAS 9.4.

The multilevel models for product availability and advertising presence were specified to include all analysis sample cases ($n= 1277$). However, as with the descriptive statistics, sample sizes for the models vary owing to reduced cases whenever data collectors selected “cannot determine” for specific items, or when store types were excluded owing to lack of within-category variability.

The number of cases in each price model also varied, as not all stores sold all products, and/or data collectors were unable to obtain price for a particular product. Descriptive statistics were generated for measures with IRR statistics ≥ 0.40 , and models used for inference were fit for outcomes with IRR statistics ≥ 0.50 , thus models were not fit for presence of a cigarette discount.

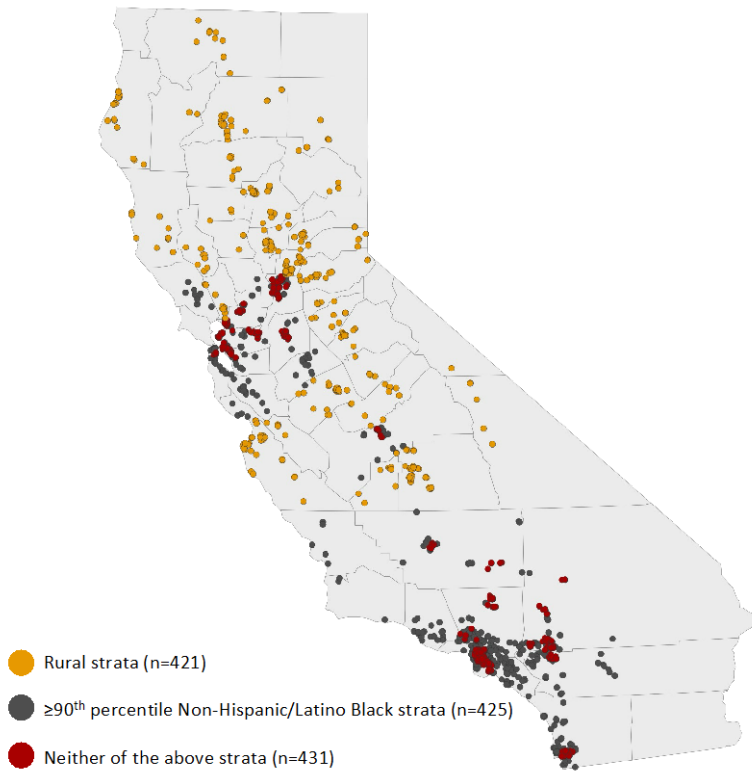
Odds ratios greater than 1.00 indicate greater odds of the outcome of interest when the predictor is present (coded 1= present vs. 0= not present) or increases in value (e.g., from ten to 20 percent of Non-Hispanic/Latino Black residents), while odds ratios less than 1.00 indicate lower odds of the outcome of interest when the predictor is present or increases in value. An odds ratio with a confidence interval that includes 1.00 is not statistically significant (not related to the predictor of interest). In this report, adjusted odds ratios (AOR) are derived from multilevel models with predictors for store type, store neighborhood (census tract) demographics and census tract rurality.

Coefficients from multilevel models of cigarette and JUUL price should be interpreted as the predicted increase in price (positive coefficient) or decrease in price (negative coefficient) for each ten-percentage point increase in a tract-level demographic (e.g., increase or decrease in price as percentage of underage population increases from ten percent to 20 percent). Coefficients for store type represent the estimated average difference in price for a product in a particular store type, compared to the estimated price in a convenience store/small market. In models of price, negative coefficients for store type suggest that price is lower than the price in a convenience store/small market, and positive coefficients suggest that price that is higher than the price in a convenience store/small market.

RESULTS

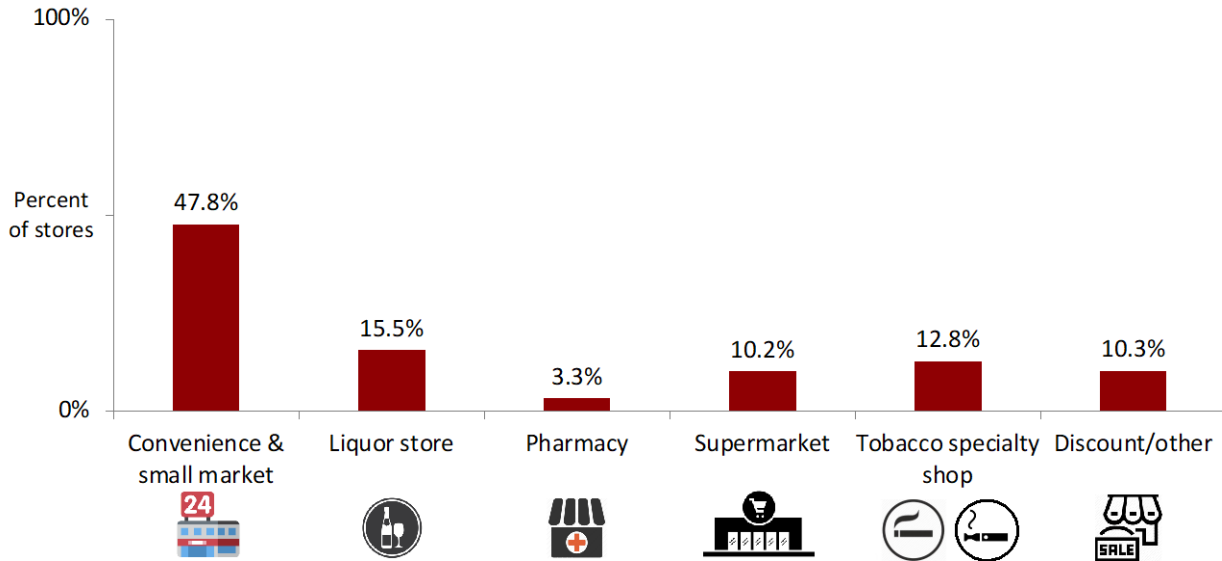
Of the 1350 unique retailers attempted, retail marketing surveillance was completed in 1277 stores. Data collectors were rarely asked to leave stores (n= 32). Other reasons for incomplete attempts were: permanently closed (n= 13), temporarily closed (n= 14), membership or fee required for entry (n= 2), environment unsafe (n=2), and tobacco not sold (n= 10). Excluding the 39 ineligible stores, the completion rate (number of complete surveys divided the number of eligible stores) was 97.4 percent. Figure 3 illustrates the location of the final sample relative to counties and two of the strata for oversampling.

Figure 3. CTRSS 2022 Sample ($n_{\text{unweighted}}= 1277$)



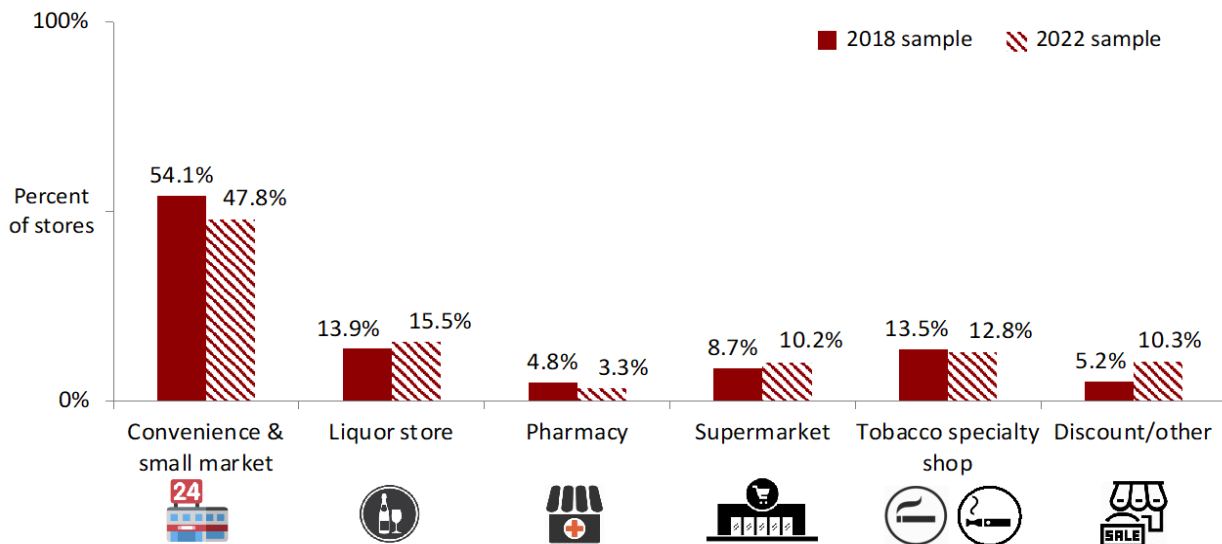
Convenience stores and small markets represented nearly half (47.8 percent) of state-licensed tobacco retailers in the 2022 sample, followed by liquor stores, tobacco specialty shops, discount/other and supermarkets (see Figure 4). Pharmacies were the smallest category, comprised almost entirely of Walgreens and Rite Aid, the last remaining tobacco-selling pharmacy chains in California.

Figure 4. Store type distribution in CTRSS 2022 (weighted percentages, n_{weighted}= 29,882)



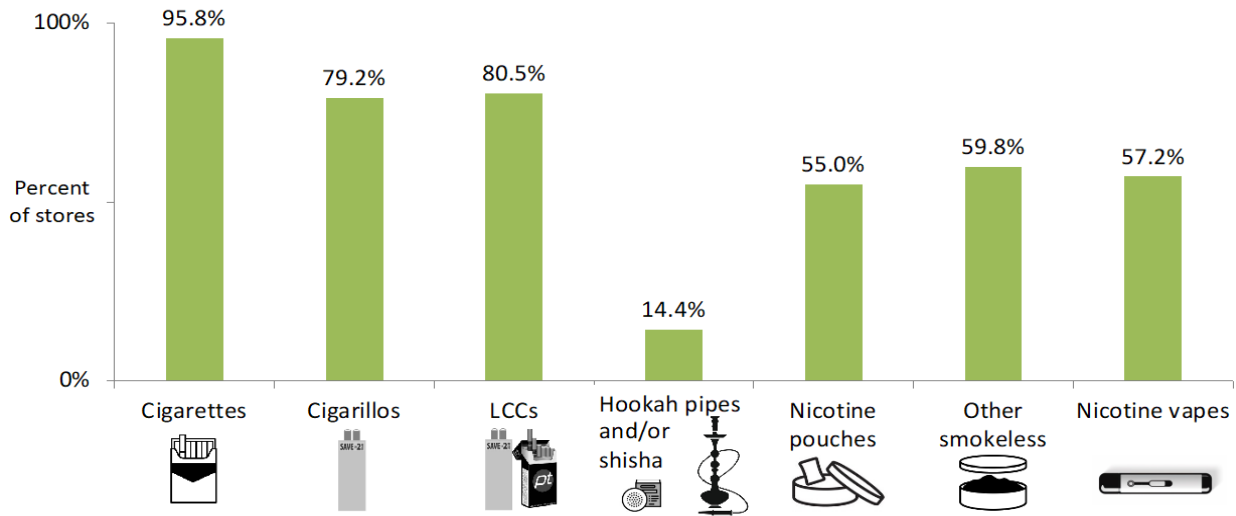
Despite the new sampling method, the distribution of store types in 2022 was comparable to the distribution in 2018 (see Figure 5). In 2022, 14.2 percent of stores were located within 1000 feet of a K-12 public school and 12.2 percent of stores were located in a rural county.

Figure 5. CTRSS store type: 2018 vs. 2022



As shown in Figure 6, cigarettes remain the most widely available tobacco product, found in 95.8 percent of state-licensed tobacco retailers overall. Approximately eight in ten stores sold cigarillos alone or LCCs. Hookah pipes and/or shisha tobacco were sold in 14.4 percent of stores. Nicotine pouches were available in more than half of stores (55.0 percent), almost as prevalent as other smokeless tobacco (59.8 percent) and nicotine vape products (57.2 percent). Nicotine vape products were available in more than half of stores (57.2 percent), a slight decrease from 2018 (61.5 percent).⁹

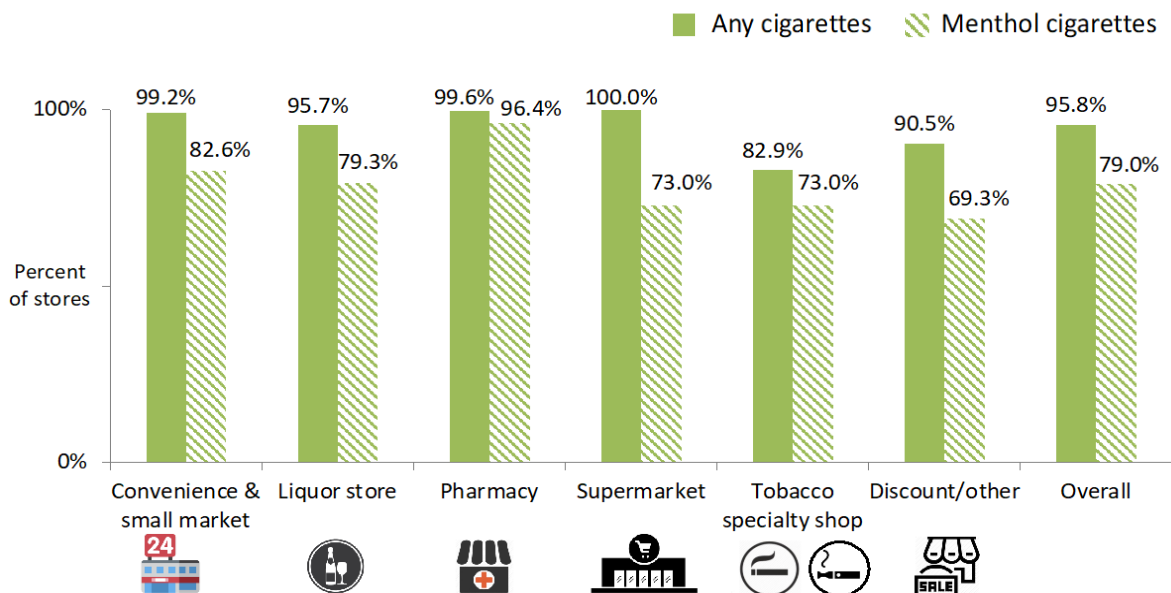
Figure 6. Retail availability of tobacco products in 2022 (maximum n_{weighted}= 29,773)



Section 1: Cigarette availability and advertising

This section describes the availability and advertising of any cigarettes and menthol cigarettes, separately, presenting results overall and by store type. It also characterizes the single-pack price of three premium brands: Marlboro red (Philip Morris), Newport menthol (Lorillard), and Camel Crush (R. J. Reynolds) containing a menthol-flavored capsule, as well as the cheapest cigarette pack regardless of brand.

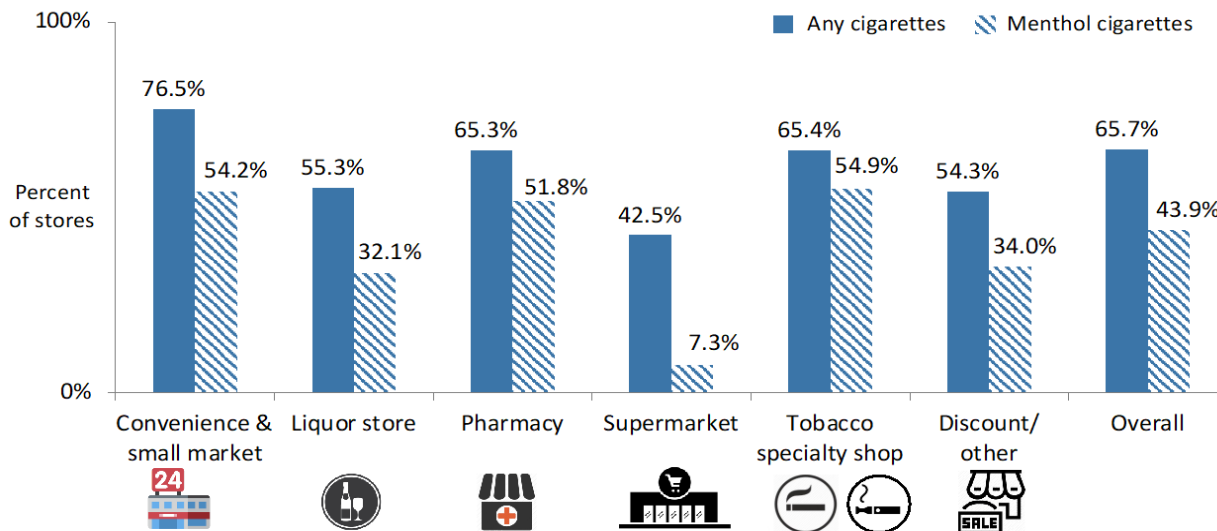
As shown in Figure 7, cigarettes were available in all supermarkets and nearly all convenience/small markets and pharmacies. Cigarettes being least available in tobacco specialty shops likely reflects a growing prevalence of stores that sell nicotine vape products but not other tobacco products (i.e., vape-only stores).



Notably, menthol cigarettes were omnipresent in pharmacies (96.4 percent). Otherwise, the lower availability of menthol cigarettes (in 79.0 percent of stores overall) likely reflects the prevalence of local sales restrictions on flavored tobacco prior to SB 793 (See Figure 7).

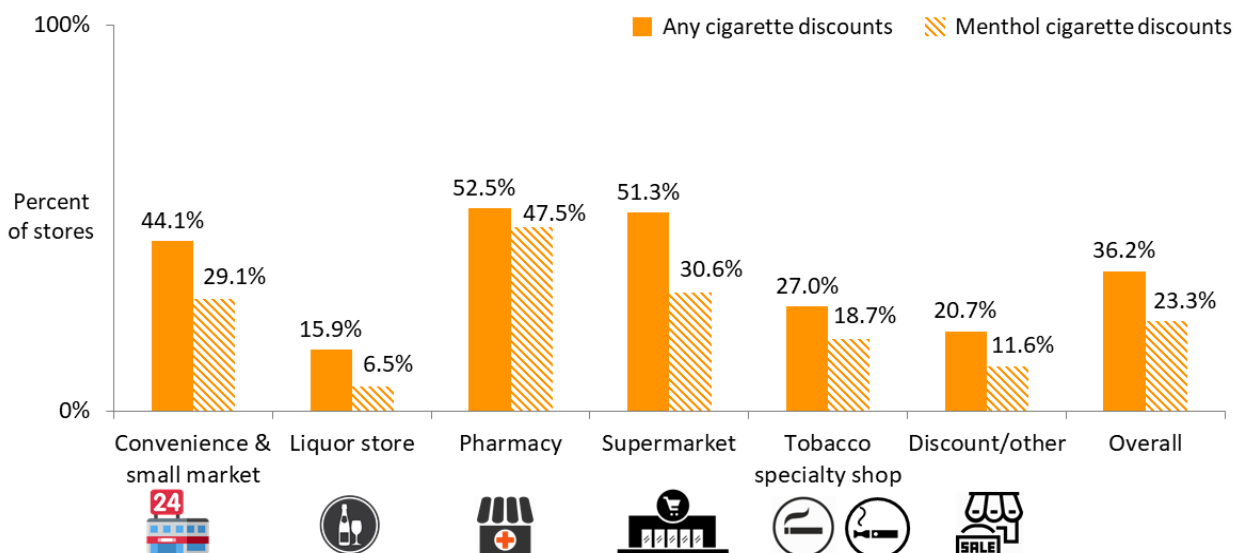
As shown in Figure 8, two-thirds of stores (65.7 percent) advertised any cigarettes, but less than half of stores (43.9 percent) advertised menthol cigarettes. Advertising for any and menthol cigarettes was more commonly found in convenience/small markets, tobacco specialty shops, and pharmacies.

Figure 8. Any/menthol cigarette advertising by store type (weighted percentages, $n_{\text{weighted}}=29,873$)



As shown in Figure 9, 36.2 percent of stores overall advertised at least one cigarette discount either inside or outside, and 23.3 percent of stores overall advertised at least one discount for menthol cigarettes, with considerable variation by store type.

Figure 9. Any/menthol cigarette discounts by store type (weighted percentages, $n_{\text{weighted}}=29,672$)



Cigarette availability, advertising, and discounts by store type and neighborhood demographics

Unlike previous research in California tobacco retailers,^{10,11} the odds of a store selling menthol cigarettes decreased as the proportion of non-Hispanic/Latino Asian Pacific Islander residents in the census tract increased (AOR= 0.53, 95% CI= 0.36, 0.79). In addition, menthol cigarette availability was not related to the proportion of non-Hispanic/Latino Black residents (see Table 2).

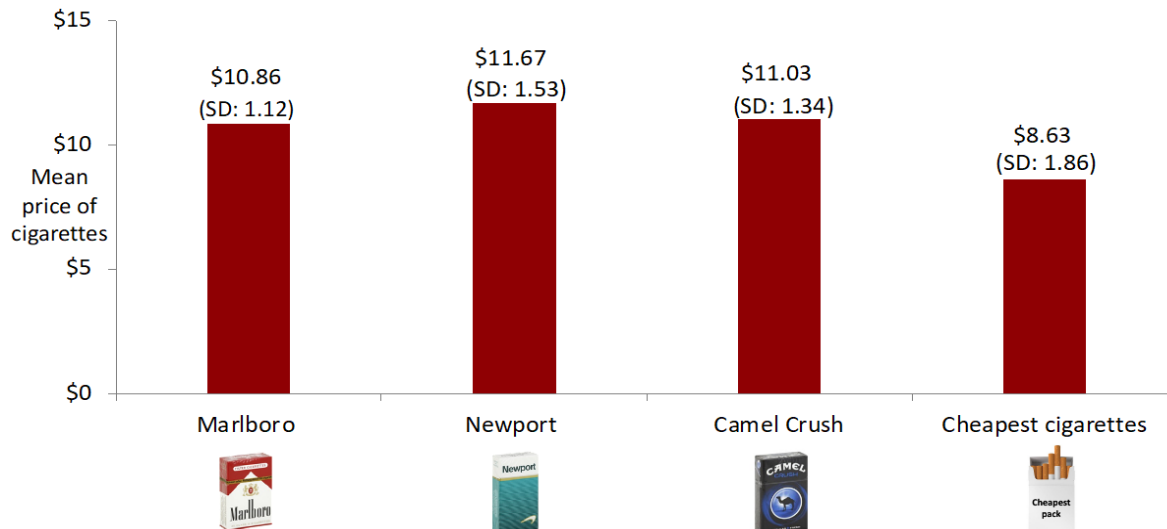
Controlling for store type, the odds that a store advertised any cigarettes increased as the percent of underage residents in the census tract increased (AOR= 2.11; 95% CI= 1.30, 3.45) (see Table 3). Compared to convenience stores/small markets, the odds of selling any cigarettes were lower for all other store types: from AOR= 0.03; 95% CI=0.01, 0.09 (supermarket) to AOR= 0.21; 95% CI=0.06, 0.73 (liquor store).

Controlling for store type, the odds that a store advertised menthol cigarettes increased as the percent of underage residents in the census tract increased (AOR= 2.33, 95% CI= 1.45, 3.75) (see Table 3). However, the odds that store advertised menthol cigarettes decreased as the percentage of Hispanic/Latino residents increased (AOR= 0.81, 95% CI= 0.67, 0.98).

Single-pack cigarette prices

As shown in Figure 10, the observed average price for Newport (menthol) was higher than for Marlboro (red), and Camel Crush, which contains a menthol capsule and is new to cigarette prices in CTRSS 2022. The observed average price of Camel Crush was closer to the price Marlboro (red) than to Newport (menthol). Based on observed average price, all three premium cigarette brands cost substantially more than the cheapest pack regardless of brand. Priced at \$2.23 - \$3.04 less than the three premium-brand cigarettes, the cheapest pack regardless of brand represented a savings of approximately 20 to 26 percent.

Figure 10. Cigarette price, by brand (mean and standard deviation) (Maximum $n_{\text{weighted}}= 26,833$)



Cigarette prices by store type and neighborhood demographics

Across all three premium brands of cigarettes, prices were significantly cheaper in pharmacies than in convenience stores/small markets (the reference category) (see Table 4). The average difference in price at pharmacies ranged from \$0.36 less (95% CI= -0.72 to -0.001) for Newport (menthol) to \$0.90 less (95% CI= -1.20, -0.60) for Camel Crush. However, the price of the cheapest cigarette pack in pharmacies did not significantly differ from the price in convenience stores.

Controlling for store type, the price of Marlboro decreased as the percent of residents under 21 in the census tract increased (Coef= -\$0.22, 95% CI= -0.36, -0.09) (see Table 4). Marlboro price increased as the percent of residents who identified as Non-Hispanic/Latino Asian Pacific Islander increased (Coef= \$0.13, 95% CI= 0.05, 0.21).

As shown in Table 4, price of Newport (menthol) decreased as the percent of underage residents increased (Coef= -\$0.20, 95% CI= -0.37, -0.04). Different from previous studies,^{10,12} nearness to school was not significantly related to price for Newport menthol (Coef= \$0.32, 95% CI= -0.05, 0.70).

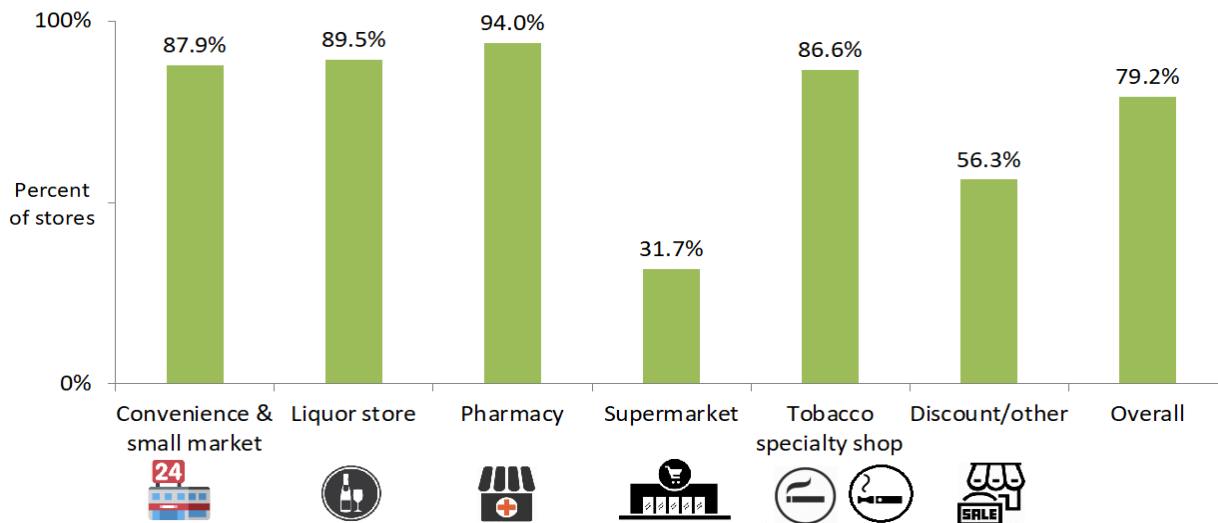
As shown in Table 4, price of Camel Crush decreased as the percent of underage residents increased (Coef= -\$0.22, 95% CI= -0.36, -0.09). Higher prices for Camel Crush were predicted as the percent of residents who identified as Hispanic/Latino increased (Coef= \$0.06, 95% CI= 0.01, 0.12).

Also shown in Table 4, price of cheapest cigarette pack regardless of brand decreased as the percent of residents with income below 185% of the federal poverty level increased (Coeff= -\$0.14, 95% CI= -0.23, -0.04) and as the percent residents under 21 increased (Coeff= -\$0.28, 95% CI= -0.49, -0.08). Thus, on average, price of the cheapest cigarettes decreases as the percent of underage residents and population in poverty increases. Table 4 presents results from models of all four single-pack prices.

Section 2: Cigarillos, little filtered cigars, and cigar/blunt wraps (LCCs)

This section characterizes the availability of cigarillos (alone) as well as the availability of a combined category of LCCs. As shown in Figure 11, a vast majority of stores (79.2 percent) sold cigarillos in 2022. Cigarillos were widely available in pharmacies, liquor stores, convenience/small markets, and tobacco specialty shops.

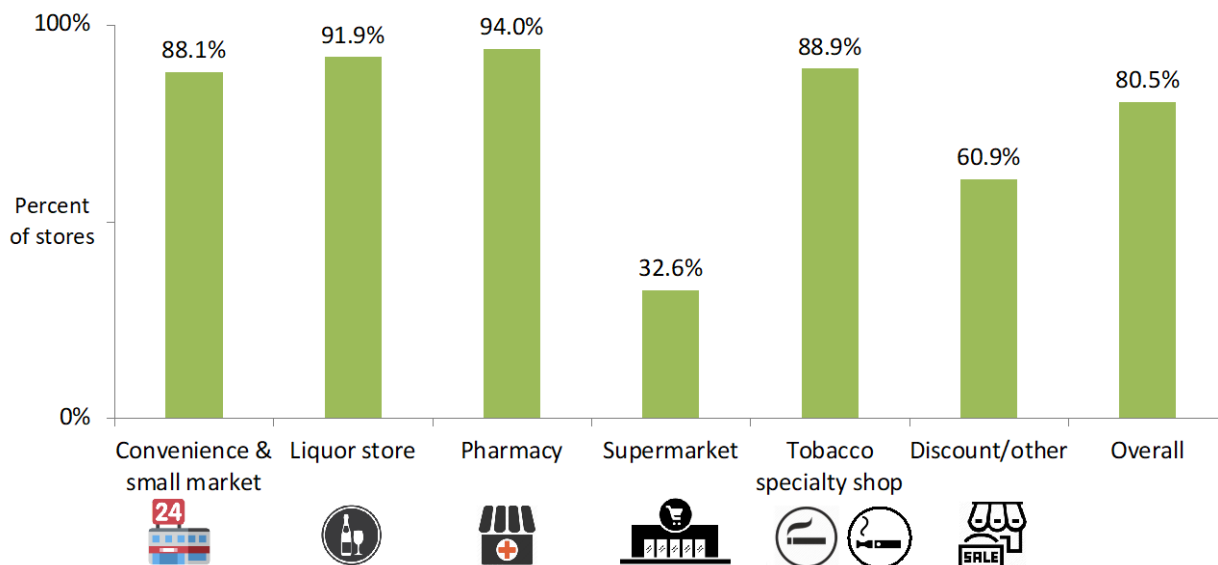
Figure 11. Cigarillo availability, by store type (weighted percentages, $n_{\text{weighted}}= 29,647$)



Controlling for store type, tobacco retailers in rural census tracts were significantly more likely to sell cigarillos than stores in non-rural tracts (AOR= 4.83, 95% CI= 1.15, 20.35) (see Table 5). With the exception of liquor stores and pharmacies, adjusting for neighborhood demographics and sampling strata, all other store types had significantly lower odds of selling cigarillos than convenience stores/small markets.

LCC availability was similar to cigarillo availability, overall and by store type (see Figure 12).

Figure 12. LCC availability, by store type (weighted percentages, $n_{\text{weighted}}= 29,882$)



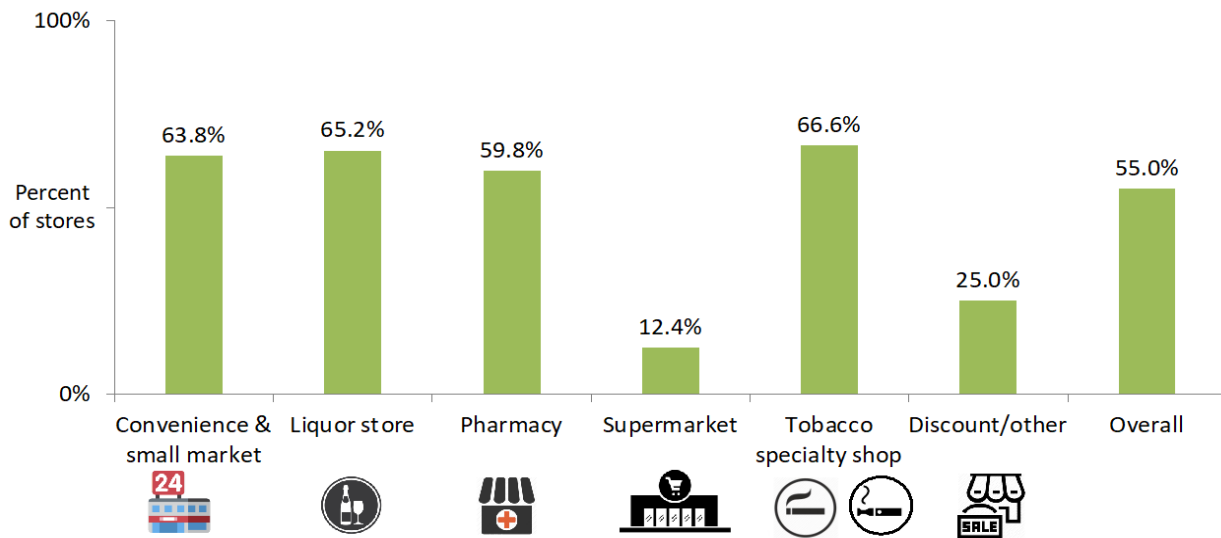
Different from selling cigarillos alone, the odds of selling LCCs increased as the percent of residents under 21 increased (AOR= 2.69, 95% CI= 1.26, 5.73) (see Table 5).

Section 3: Nicotine pouches and other smokeless tobacco

This section characterizes retail availability and advertising of nicotine pouches separately from other smokeless tobacco, including chewing tobacco/dip and snus. Availability and advertising are reported separately for stores in rural and non-rural counties. In addition, results from multi-level models (controlling for store type) identify which neighborhood demographics were associated with greater availability and advertising of nicotine pouches and other smokeless tobacco (separately).

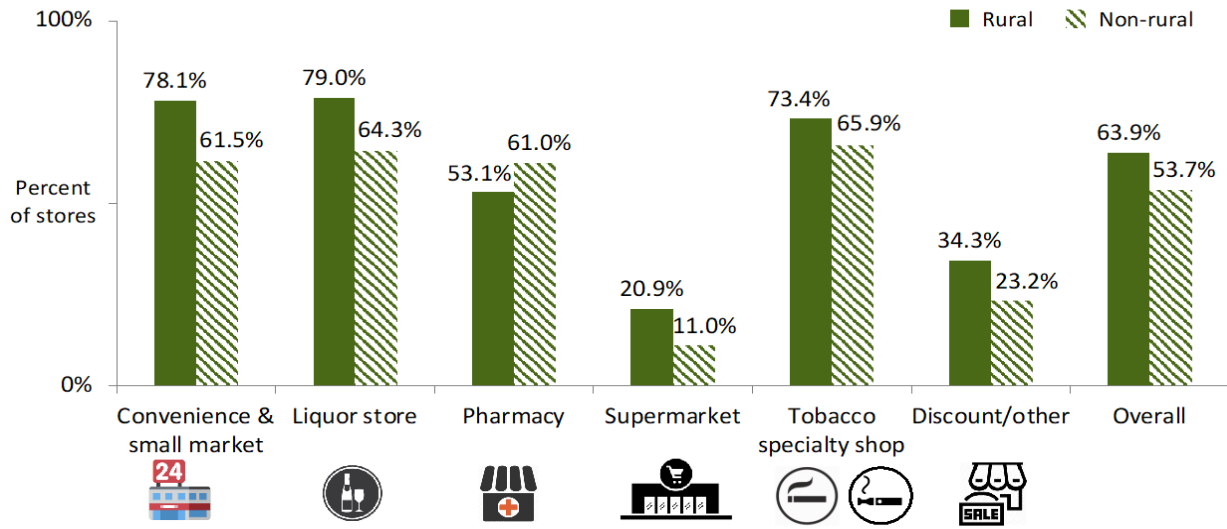
In 2022, ZYN or other nicotine pouches were available in more than half (55.0 percent) of tobacco retailers overall. Nicotine pouches were as widely available in convenience stores/small markets, liquor stores and pharmacies as in tobacco specialty shops (see Figure 13).

Figure 13. Nicotine pouch availability, by store type (weighted percentages, $n_{\text{weighted}}=29,588$)



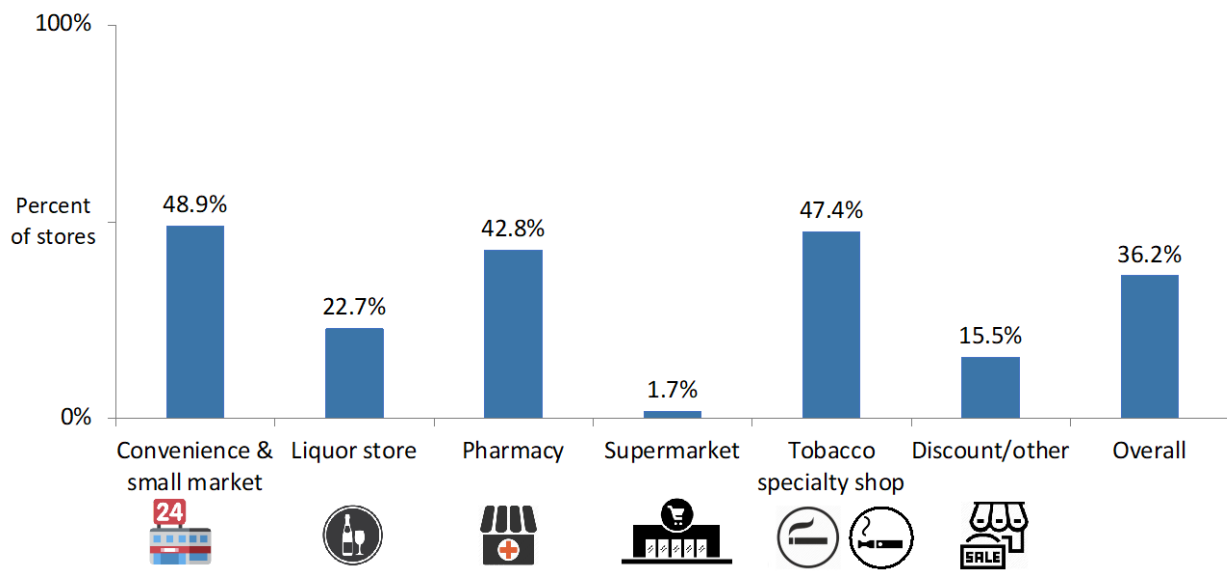
Availability of nicotine pouches differed by store type in both rural and non-rural counties (see Figure 14).

Figure 14. Nicotine pouch availability, by store type and rurality (weighted percentages, $n_{\text{weighted}}=29,588$)



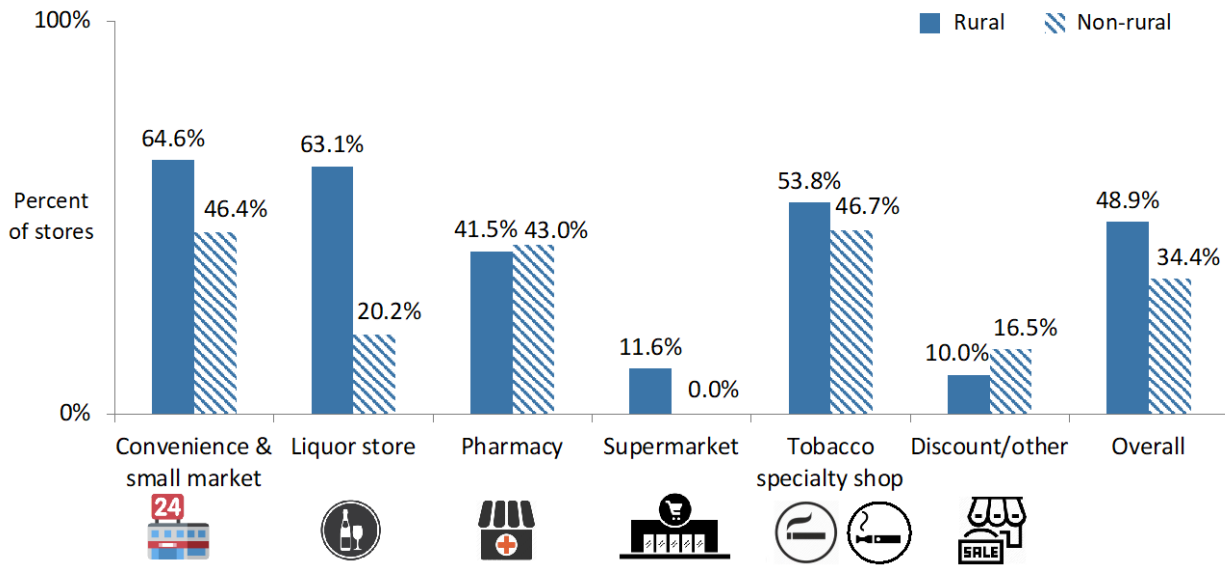
Not all stores that sold nicotine pouches advertised them. Overall, 36.2 percent of all stores contained at least one advertisement for nicotine pouches (see Figure 15).

Figure 15. Nicotine pouch advertising, by store type (weighted percentages, $n_{\text{weighted}}=29,637$)



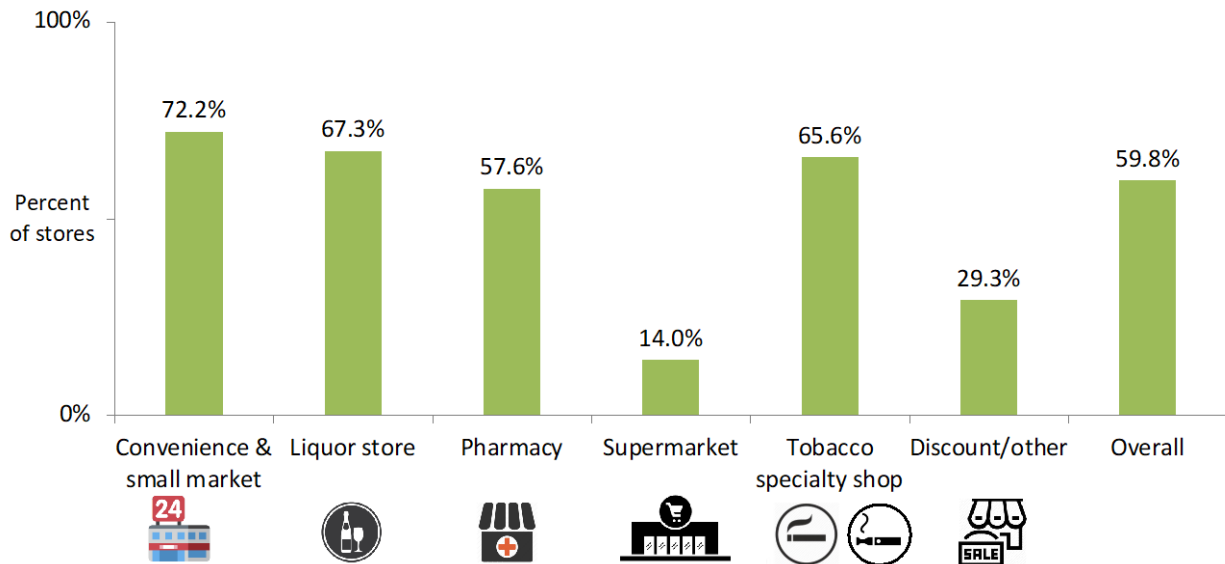
Overall, there appeared to be a greater presence of advertising for nicotine pouches in rural-county stores than non-rural county stores (see Figure 16).

Figure 16. Nicotine pouch advertising by store type and rurality (weighted percentages, $n_{\text{weighted}}=29,637$)



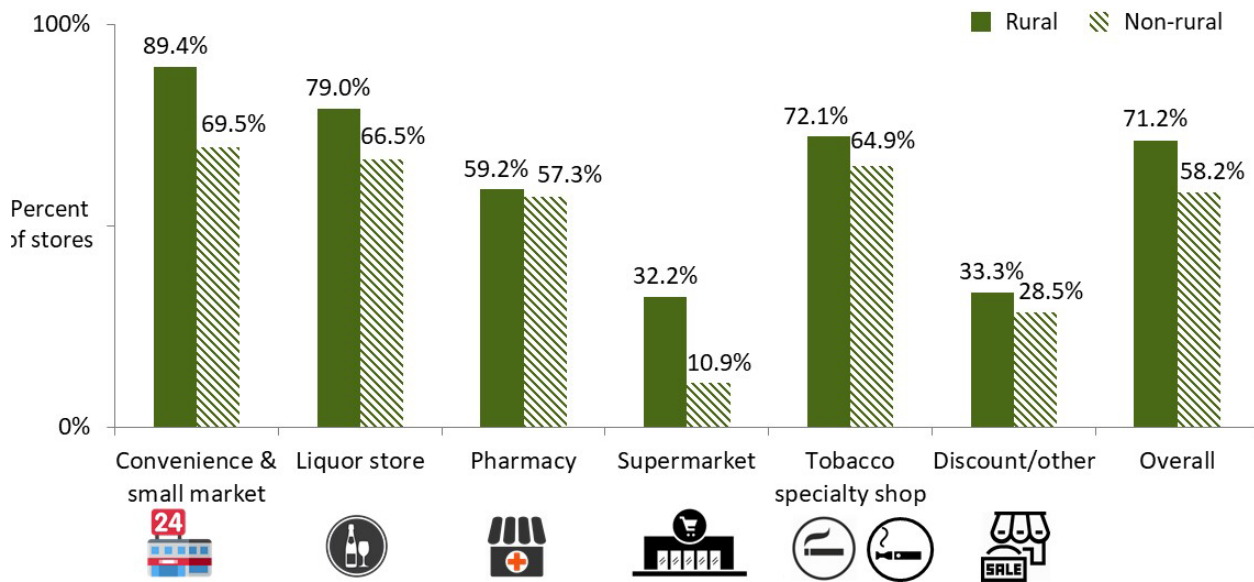
Other smokeless tobacco products were available in 59.8 percent of tobacco retailers overall, and available in the majority of convenience stores/small markets, liquor stores, pharmacies, and tobacco specialty shops (see Figure 17).

Figure 17. Other smokeless availability by store type, (weighted percentages, $n_{\text{weighted}}=29,647$)



As was true for nicotine pouches, there was greater availability of other smokeless tobacco products in rural-county stores than stores in non-rural counties (see Figure 18). For other smokeless tobacco products, this differential pattern was evident across all store types.

Figure 18. Other smokeless availability by store type and rurality (weighted percentages, $n_{\text{weighted}}=29,647$)



Neighborhood demographics associated with availability of nicotine pouches, other smokeless tobacco

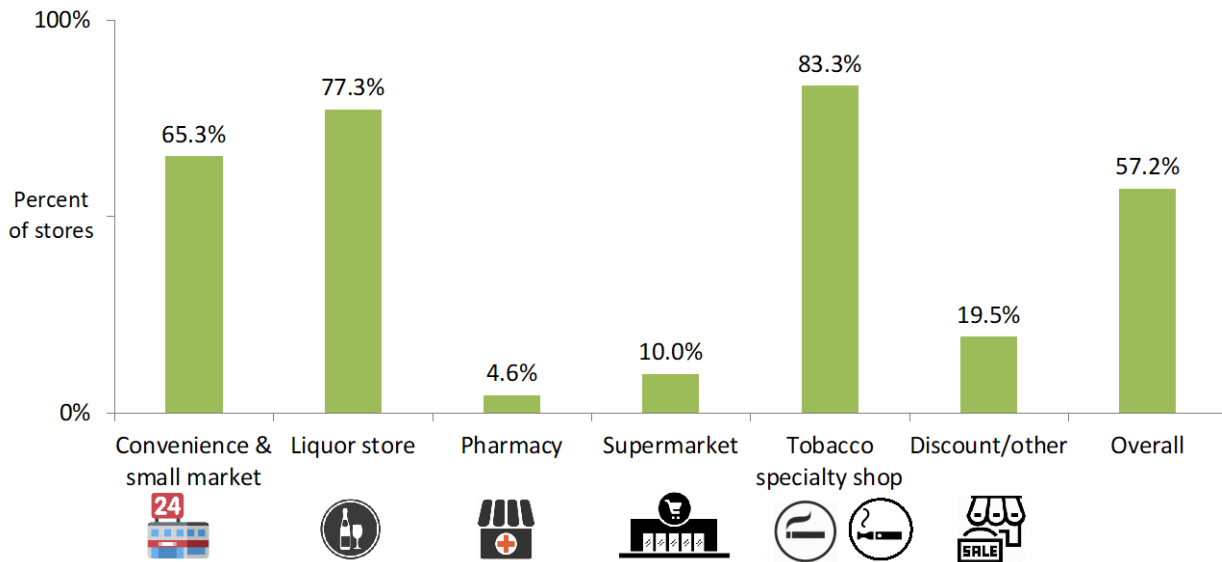
Controlling for store type, the odds of a store selling nicotine pouches decreased as the percent of Hispanic/Latino residents increased (AOR= 0.71, 95% CI= 0.58, 0.88) as did the odds of selling other smokeless tobacco (AOR= 0.74, 95% CI= 0.59, 0.92) (see Table 6). However, the odds of a store selling other smokeless tobacco increased as the percent of residents under 21 increased (AOR= 2.04, 95% CI 1.25, 3.33). In addition, the odds of selling other smokeless tobacco were significantly greater in stores in rural census tracts than non-rural tracts (AOR= 6.31, 95% CI= 1.83, 21.70) (see Table 6). Although greater availability of nicotine pouches was observed in rural-county stores than others, rural tract was not a significant predictor of availability in models that adjusted for store type and neighborhood demographics (see Table 6).

Section 4: Nicotine vape products

This section summarizes the retail availability of nicotine vape products, by product category and store type, as well as the presence of advertising for nicotine vape products. Place-based differences in the availability of nicotine vape products and price of tobacco-flavored JUUL pod four-packs are summarized from multilevel models.

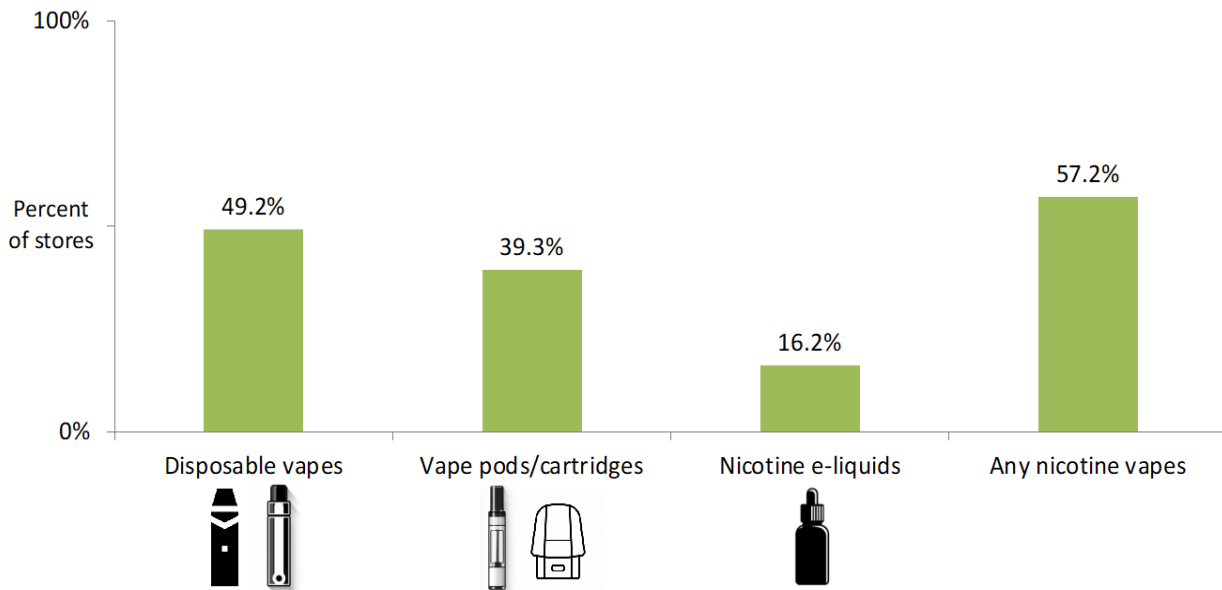
As shown in Figure 19, more than half of stores (57.2 percent) sold nicotine vape products in 2022.

Figure 19: Nicotine vape availability, by store type (weighted percentages, $n_{\text{weighted}}= 29,681$)



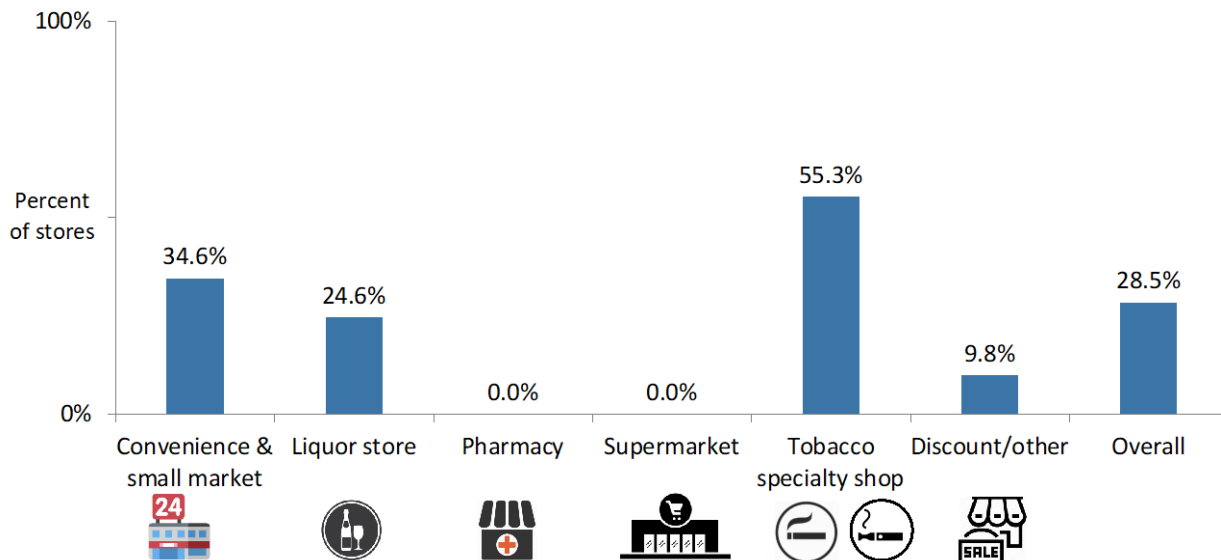
Of all stores, nearly half (49.2 percent) sold disposable nicotine vapes, 39.3 percent sold pods or cartridges, and 16.2 percent sold nicotine e-liquid (see Figure 20).

Figure 20. Nicotine vape availability, by product category (weighted percentages, $n_{\text{weighted}}= 29,681$)



Nicotine vape advertising was present in 28.5 percent of stores overall, predominately in tobacco specialty shops (55.3 percent), convenience stores/small markets (34.6 percent) and liquor stores (24.6 percent) (see Figure 21).

Figure 21. Nicotine vape advertising, by store type (weighted percentages, n weighted= 29,783)



Store neighborhood demographics associated with availability of nicotine vapes and price of JUUL

Controlling for store type, stores in rural census tracts were significantly less likely than stores in non-rural tracts to sell nicotine vape products (AOR= 0.28, 95% CI= 0.09, 0.83), and the odds of selling nicotine vape products decreased as the percent of residents non-Hispanic/Latino Asian Pacific Islander increased (AOR= 0.64, 95% CI= 0.45, 0.91) (see Table 7). Pharmacies were excluded from the model of vape product availability, owing to availability in only one observed store.

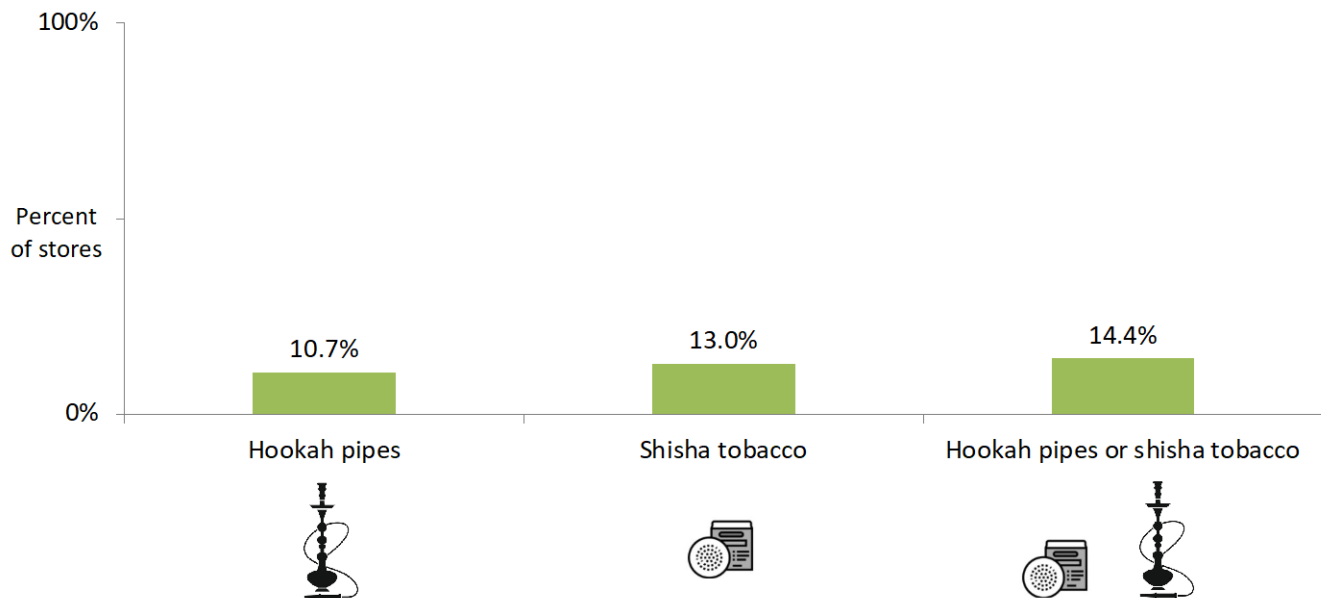
On average, the price of a tobacco-flavored JUUL four-pod pack was \$27.73, SD= \$3.69 (Minimum= \$10.00, Maximum= \$41.99). Overall, the average price for a single JUUL pod was \$6.93 (calculated from a four-pod pack price divided by four), cost considerably less than the average single-pack price of all four cigarette varieties observed in 2022, even though a JUUL pod contains approximately the same amount of nicotine as a pack of cigarettes.¹¹ Controlling for store type, the estimated price of JUUL four-pod packs cost was \$2.09 (95% CI= -3.67, -0.51) less at stores in rural census tracts than at stores in non-rural tracts (see Table 8).

Section 5: Availability of hookah pipes and shisha tobacco

The presence of hookah pipes was recorded for the first time in CTRSS 2022, available in 10.7 percent of stores (see Figure 22). Shisha tobacco was available in 13.0 percent of stores, which was a slight increase in observed availability since 2018 (11.6 percent), and 14.4 percent of stores sold either hookah pipes or shisha tobacco (see Figure 22).⁹ Availability of hookah pipes or shisha tobacco was modeled including only tobacco specialty shops (n_{weighted}= 373), owing to the lack of product type

availability in all other stores types. Because of limiting model inclusion to just tobacco specialty shops, the weighting variable and control for strata were not included in model specification. No significant relationships between neighborhood characteristics and availability of hookah pipes and shisha tobacco were identified (model not shown).

Figure 22. Hookah pipe or shisha tobacco availability, by product category (weighted percentages, $n_{\text{weighted}} = 29,634$)



CONCLUSION AND RECOMMENDATIONS

Most tobacco retailers still sold menthol cigarettes in 2022 (79.0 percent), although the observed percent was lower than in 2018 (98.3 percent). Menthol cigarettes were advertised in less than half of stores (43.9 percent) in 2022. Unlike previous research in California, the predicted odds of a store selling menthol cigarettes did not increase as the proportion of residents in the census tract who identify as non-Hispanic/Latino Black increased, and decreased as the proportion of residents identifying as non-Hispanic/Latino Asian Pacific Islanders increased. These patterns depart from long-standing disparities in California’s tobacco retail environment. It is possible that the adoption of local sales restrictions on flavored tobacco, which covered one in four California residents by June 2022, contributed to this change. However, CTRSS 2022 was not designed to test this hypothesis.

Even as the prevalence of cigarette smoking among California youth and adults has declined to historic lows, cigarettes remain omnipresent in the tobacco retail environment, available in 95.8 percent of state-licensed tobacco retailers.^{13,14} In 2022, the average price of the cheapest pack of cigarettes regardless of brand was \$8.63. That price is substantially less than the average price of a movie ticket (\$15.22) in California, but more than the average price of a gallon of gas (\$6.29) in the state, and more than the average price in western states for a pound of ground beef (\$5.53) and ground coffee beans (\$6.14).^{15–17} However, the average price for a single JUUL pod was \$6.93 (average four-pod pack price divided by four), considerably less than the average single-pack price of all four cigarette varieties

observed in 2022. A comparatively low price point for JUUL would appeal to youth, who are particularly price-sensitive.¹⁸

For the first time, CTRSS 2022 assessed availability and advertising for nicotine pouches. More than half of California tobacco retailers (55.0 percent) sold nicotine pouches and 36.2 percent advertised them. With the first oversample of tobacco retailers in rural counties, CTRSS 2022 was designed to test whether there was greater availability and advertising for nicotine pouches and other smokeless tobacco in rural stores than others. This pattern was evident for other smokeless products, however no relationship between rural location and nicotine pouch availability was detected in models adjusting for store type and neighborhood demographics. Between 2019 and 2022, US sales of 8mg nicotine pouches increased more rapidly than products with lower levels (2mg – 7mg), raising concerns about abuse liability.⁵ Future research should assess the price of the product leader (8mg ZYN, Philip Morris USA), and evaluate comparisons with the price of other smokeless tobacco and cigarettes from the same manufacturer.

For the first time, CTRSS 2022 assessed the availability of hookah pipes in addition to shisha tobacco. Overall, 10.7 percent of stores sold hookah pipes and 14.4 percent sold hookah pipes and/or shisha tobacco. Owing the absence or extremely rare availability of hookah pipes and shisha tobacco in store types other than specialty vape shops (which includes hookah lounges), models including only tobacco specialty shops did not identify significant relationships between neighborhood demographics and hookah pipe or shisha tobacco availability.

As in 2018, results from CTRSS 2022 paint a grim picture of tobacco-selling pharmacies, which remain a dominant source for cheaper tobacco products. In 2022, pharmacies offered significantly lower prices for all three premium brands of cigarettes (Marlboro red, Newport menthol, Camel Crush) than convenience stores.^{19,20} Although San Francisco was first to mandate tobacco-free pharmacies in 2008, only 42 other California localities have adopted a similar ordinance.²¹ The Family Smoking Prevention and Tobacco Control Act prohibits the US Food and Drug Administration from banning tobacco sales in pharmacies (or any other store type), states and localities can mandate tobacco-free pharmacies.²² However, tobacco-free pharmacies are mandated in Massachusetts and New York and in many countries other than the US. Based on the current evidence, a state law would eliminate a significant retail source of cheap combustible tobacco products and reduce tobacco sales to minors.²³

Price discrimination refers to charging different prices for the same product to different consumers to maximize profit.²⁴ For example, all four cigarette prices (Marlboro red, Newport menthol, Camel Crush, and cheapest pack) were significantly lower in neighborhoods (census tracts) with a higher percent of underage residents, which raises concern about encouraging initiation among price-sensitive youth. In addition, Newport menthol cost significantly less at stores in neighborhoods with a higher percent of residents with household income below 185% of the federal poverty level, which may exacerbate socioeconomic disparities in cigarette smoking. The current findings contribute to a growing body of evidence of place-based disparities in cigarette prices in California^{10,25,26} and elsewhere.^{27,28} Such evidence represents a threat to health equity in California. Future research should consider whether such patterns exist for Newport regular as well as the “menthol replacement” cigarettes marketed in California stores to circumvent the state sales restriction on flavored tobacco.^{29,30} With concern for health equity, documenting place-based in product prices remains important and could inform state and local policies.

Policy solutions exist to address price discrimination. Both tax and non-tax mechanisms to increase cigarette prices are recommended,^{31–34} such as establishing a minimum price (as in New York City) and eliminating coupon redemption and discounts, as in Providence (Rhode Island), New York City, and in more than 20 jurisdictions in California.³⁵ According to a modeling study that simulated the effects of a floor price for cigarettes, increasing a hypothetical floor price in California from \$7.00 (the floor price in Sonoma County) to \$9.00 per pack would decrease smoking prevalence between 0.05 and 0.43 percentage points.³⁶ The impact of minimum prices is even more effective in combination with other policy interventions. For example, eliminating coupon redemption would disrupt industry efforts at target marketing and could reduce disparities in tobacco use.²⁴ The widespread availability of low-priced little filtered cigars, which are a substitute for more expensive cigarettes, is also problematic.³⁷ With concern for health equity, future research should investigate place-based differences in the relative price of the cheapest cigarette pack and the top-selling brand of little filtered cigars measured within stores.

One limitation of CTRSS 2022 is the sampling frame for state licensed tobacco retailers, as some Local Lead Agencies report discrepancies between local licensing lists and the CDTFA list (i.e., not all retailers with a local license appear on the state licensing list and vice versa). In addition, we telephoned retailers to verify they were still in business and sold tobacco, which could introduce non-response bias. The tobacco retail environment is also increasingly complex, with more varieties of tobacco products to monitor than ever before. This may contribute to measurement error, with some outcomes excluded due to very low reliability as well as some reported outcomes at the low end of acceptable reliability. The presence of non-nicotine vape products and CBD cigarettes, which can be confused with nicotine tobacco products, also increase the potential for measurement error.

Strengths of CTRSS 2022 include the new sampling strategy, separate measures for availability of hookah pipes and shisha tobacco (new to CTRSS 2022), availability of nicotine pouches (also new to CTRSS 2022), and the effort to record prices of multiple cigarette brands and two brands of nicotine vape products. With concern for health equity and policy implications, multi-level modeling was used to investigate place-based differences in availability, advertising, and price of tobacco products. Future CTRSS surveillance could investigate the availability of FDA-approved nicotine replacement therapies and very low nicotine cigarettes,³⁸ as well as examine their price relative to nicotine vape products.

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TABLES

Table 1. Inter-rater reliability (maximum n=132)

	Kappa
Store type (single question with all responses available)	0.81
Product availability	
Cigarettes sold	0.81
Menthol cigarettes sold	0.78
Cigarillos sold	0.79
Little cigars, cigarillos and cigar and/or blunt wraps (LCCs) sold	0.90
Hookah pipes and/or shisha tobacco sold	0.78
Hookah pipes sold	0.78
Shisha tobacco sold	0.75
Nicotine pouches sold	0.88
Other smokeless (Chew, dip and/or snus sold)	0.78
Nicotine vapes	0.82
Disposable nicotine vapes sold	0.47
Nicotine vape pods and/or cartridges sold	0.66
Nicotine e-liquids sold	0.84
Advertisements	
Any cigarettes advertised inside and/or outside	0.76
Any menthol cigarettes advertising inside and/or outside	0.62
Any nicotine pouch advertising inside and/or outside	0.80
Any nicotine vape advertising inside and/or outside	0.49
Discounts	
Any cigarette discounts inside and/or outside	0.43
Any menthol cigarette discount inside and/or outside	0.47
Price	
Marlboro red hardpack	0.72
Newport menthol hardpack	0.56
Camel Crush	0.67
Cheapest cigarette	0.67
JUUL pods, 4-pack	0.74

Note. ICCs were computed for price before sales tax. Descriptive statistics computed for measures with IRR statistic ≥ 0.40 ; models estimated for measures with IRR statistic ≥ 0.50 .

Table 2. Multilevel model of menthol cigarette availability (n_{stores, weighted} = 29,743)

Model Term	AOR	95% CI
Store characteristics		
Store type		
Convenience/Small market, reference category		
Liquor	0.59	(0.11, 3.06)
Pharmacy	5.80	(1.09, 30.75)
Supermarket	0.30	(0.07, 1.20)
Tobacco specialty shop	0.10	(0.01, 1.34)
Discount/Other	0.14	(0.03, 0.68)
Located near school	0.45	(0.14, 1.40)
Neighborhood characteristics		
% NHL Black	0.77	(0.48, 1.23)
% NHL Asian/Pacific Islander	0.53	(0.36, 0.79)
% Hispanic/Latino	0.94	(0.71, 1.26)
% NHL Other race	0.58	(0.14, 2.39)
% Under 21 years	1.49	(0.79, 2.81)
% <185% federal poverty level	1.18	(0.85, 1.62)
Rural	4.26	(0.93, 19.55)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at p<0.05; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Estimates for intercept and strata not shown.

Table 3. Multilevel models of any cigarette advertising ($n_{\text{stores, weighted}} = 29,786$) and menthol cigarette advertising ($n_{\text{stores, weighted}} = 29,851$)

Model Term	Any cigarette ads		Any menthol cigarette ads	
	AOR	95% CI	AOR	95% CI
Store characteristics				
Store type				
Convenience/Small market, reference category				
Liquor	0.21	(0.06, 0.73)	0.23	(0.07, 0.77)
Pharmacy	0.15	(0.03, 0.73)	0.32	(0.07, 1.41)
Supermarket	0.03	(0.01, 0.09)	0.00	(0.00, 0.01)
Tobacco specialty shop	0.10	(0.01, 0.93)	0.41	(0.04, 3.98)
Discount/Other	0.05	(0.01, 0.17)	0.05	(0.01, 0.22)
Located near school	0.44	(0.16, 1.23)	0.44	(0.17, 1.16)
Neighborhood characteristics				
% NHL Black	0.79	(0.55, 1.13)	0.89	(0.62, 1.29)
% NHL Asian/Pacific Islander	1.12	(0.81, 1.56)	0.78	(0.57, 1.07)
% Hispanic/Latino	0.88	(0.72, 1.08)	0.81	(0.67, 0.98)
% NHL Other race	1.09	(0.37, 3.18)	0.75	(0.29, 1.91)
% Under 21 years	2.11	(1.30, 3.45)	2.33	(1.45, 3.75)
% <185% federal poverty level	1.03	(0.79, 1.33)	1.03	(0.81, 1.31)
Rural	0.54	(0.18, 1.59)	0.89	(0.33, 2.42)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at $p < 0.05$; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Estimates for intercept and strata not shown.

Table 4. Multilevel models of single-pack cigarette prices, 3-brands and cheapest pack (including sales tax; maximum n_{stores, weighted}= 27,495)

Model Term	Marlboro red		Newport menthol		Camel Crush		Cheapest cigarette	
	Coef	95% CI	Coef	95% CI	Coef	95% CI	Coef	95% CI
Intercept	\$11.26	(10.86, 11.66)	\$12.03	(11.37, 12.68)	\$11.22	(10.76, 11.68)	\$9.89	(9.26, 10.52)
Store characteristics								
Store type								
Convenience/Small market, reference category								
Liquor	\$0.38	(-0.04, 0.80)	\$0.60	(0.01, 1.19)	\$0.33	(-0.07, 0.73)	\$0.19	(-0.31, 0.69)
Pharmacy	-\$0.70	(-0.94, -0.46)	-\$0.36	(-0.72, 0.00)	-\$0.90	(-1.20, -0.60)	\$0.31	(-0.04, 0.66)
Supermarket	\$0.16	(-0.17, 0.50)	\$1.26	(0.77, 1.75)	\$1.69	(1.24, 2.13)	\$0.55	(0.06, 1.04)
Tobacco specialty shop	-\$0.41	(-0.69, -0.13)	-\$0.04	(-0.45, 0.37)	-\$0.17	(-0.60, 0.25)	-\$1.00	(-1.68, -0.32)
Discount/Other	\$0.27	(-0.12, 0.65)	\$0.58	(-0.04, 1.21)	\$0.46	(0.01, 0.92)	\$0.40	(-0.34, 1.13)
Located near school	\$0.19	(-0.03, 0.40)	\$0.32	(-0.05, 0.70)	\$0.00	(-0.30, 0.29)	\$0.27	(-0.06, 0.61)
Neighborhood characteristics								
% NHL Black	-\$0.03	(-0.11, 0.05)	-\$0.02	(-0.14, 0.09)	\$0.01	(-0.10, 0.12)	-\$0.09	(-0.21, 0.04)
% NHL Asian/ Pacific Islander	\$0.13	(0.05, 0.21)	\$0.03	(-0.07, 0.13)	\$0.05	(-0.04, 0.14)	\$0.01	(-0.11, 0.13)
% Hispanic/Latino	\$0.02	(-0.03, 0.07)	\$0.04	(-0.02, 0.11)	\$0.06	(0.01, 0.12)	-\$0.02	(-0.11, 0.06)
% NHL Other race	-\$0.23	(-0.45, -0.02)	-\$0.09	(-0.42, 0.24)	\$0.02	(-0.29, 0.33)	\$0.00	(-0.40, 0.40)
% Under 21 years	-\$0.22	(-0.36, -0.09)	-\$0.20	(-0.37, -0.04)	-\$0.22	(-0.36, -0.09)	-\$0.28	(-0.49, -0.08)
% <185% federal poverty level	\$0.00	(-0.07, 0.06)	-\$0.21	(-0.15, 0.00)	-\$0.02	(-0.09, 0.05)	-\$0.14	(-0.23, -0.04)
Rural	\$0.29	(0.01, 0.57)	\$0.26	(-0.22, 0.75)	\$0.10	(-0.24, 0.43)	-\$0.09	(-0.53, 0.35)

Note. Store neighborhoods are census tracts; Coef= Coefficient; **Bolded** coefficients are significant at p<0.05; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Estimates for strata not shown.

Table 5. Multilevel models of cigarillo availability ($n_{\text{stores, weighted}} = 29,625$) and availability of little filtered cigars, cigarillos and cigar/blunt wraps (LCCs) ($n_{\text{stores, weighted}} = 29,859$)

Model Term	Cigarillos		LCCs	
	AOR	95% CI	AOR	95% CI
Store characteristics				
Store type				
Convenience/Small market, reference category				
Liquor	0.78	(0.10, 6.40)	0.96	(0.09, 10.71)
Pharmacy	1.96	(0.21, 18.35)	1.40	(0.14, 13.69)
Supermarket	0.00	(0.00, 0.01)	0.00	(0.00, 0.00)
Tobacco specialty shop	0.03	(0.00, 0.85)	0.02	(0.00, 0.68)
Discount/Other	0.01	(0.00, 0.04)	0.01	(0.00, 0.04)
Located near school	0.33	(0.10, 1.13)	0.45	(0.12, 1.73)
Neighborhood characteristics				
% NHL Black	1.74	(0.92, 3.30)	1.70	(0.86, 3.39)
% NHL Asian/Pacific Islander	0.79	(0.54, 1.15)	0.76	(0.51, 1.12)
% Hispanic/Latino	1.01	(0.75, 1.36)	0.87	(0.64, 1.19)
% NHL Other race	3.29	(0.67, 16.19)	2.03	(0.39, 10.51)
% Under 21 years	1.41	(0.67, 2.97)	2.69	(1.26, 5.73)
% <185% federal poverty level	1.17	(0.82, 1.65)	1.17	(0.81, 1.67)
Rural	4.83	(1.15, 20.35)	3.91	(0.85, 18.05)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at $p < 0.05$; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Estimates for intercept and strata not shown.

Table 6. Multilevel models of nicotine pouch availability ($n_{\text{stores, weighted}} = 29,566$) and other smokeless tobacco availability ($n_{\text{stores, weighted}} = 29,623$)

Model Term	Nicotine pouches		Other smokeless	
	AOR	95% CI	AOR	95% CI
Store characteristics				
Store type				
Convenience/Small market, reference category				
Liquor	0.76	(0.19, 3.00)	0.45	(0.12, 1.71)
Pharmacy	0.26	(0.05, 1.21)	0.08	(0.02, 0.37)
Supermarket	0.00	(0.00, 0.02)	0.00	(0.00, 0.01)
Tobacco specialty shop	0.28	(0.02, 3.15)	0.07	(0.01, 0.90)
Discount/Other	0.01	(0.00, 0.04)	0.00	(0.00, 0.02)
Located near school	0.37	(0.14, 0.97)	0.29	(0.11, 0.74)
Neighborhood characteristics				
% NHL Black	0.73	(0.48, 1.11)	0.94	(0.64, 1.39)
% NHL Asian/Pacific Islander	0.75	(0.55, 1.01)	0.74	(0.55, 1.01)
% Hispanic/Latino	0.71	(0.58, 0.88)	0.74	(0.59, 0.92)
% NHL Other race	2.85	(0.95, 8.61)	2.22	(0.65, 7.59)
% Under 21 years	1.58	(0.98, 2.53)	2.04	(1.25, 3.33)
% <185% federal poverty level	0.99	(0.78, 1.27)	0.95	(0.74, 1.21)
Rural	0.76	(0.24, 2.37)	6.31	(1.83, 21.70)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at $p < 0.05$; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Estimates for intercept and strata not shown.

Table 7. Multilevel model of nicotine vape product availability ($n_{\text{stores, weighted}} = 29,658$)

Model Term	AOR	95% CI
Store characteristics		
Store type		
Convenience/Small market, reference category		
Liquor	1.54	(0.32, 7.42)
Supermarket	0.00	(0.00, 0.01)
Tobacco specialty shop	1.11	(0.07, 17.25)
Discount/Other	0.00	(0.00, 0.02)
Located near school	0.40	(0.15, 1.07)
Neighborhood characteristics		
% NHL Black	0.70	(0.45, 1.08)
% NHL Asian/Pacific Islander	0.64	(0.45, 0.91)
% Hispanic/Latino	0.84	(0.67, 1.05)
% NHL Other race	1.26	(0.42, 3.82)
% Under 21 years	1.45	(0.84, 2.48)
% <185% federal poverty level	0.96	(0.73, 1.28)
Rural	0.28	(0.09, 0.83)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at $p < 0.05$; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/ Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Pharmacies excluded from model. Estimates for intercept and strata not shown.

Table 8. Multilevel model of JUUL tobacco-flavored four-pod pack price ($n_{\text{stores, weighted}} = 8,999$)

Model Term	Coef	95% CI
Intercept	\$29.53	(27.64, 31.42)
Store characteristics		
Store type		
Convenience/Small market, reference category		
Liquor store	-\$1.11	(-3.03, 0.81)
Tobacco specialty shop	-\$4.43	(-8.07, -0.79)
Discount/Other	-\$0.32	(-4.15, 3.50)
Located near school	-\$0.19	(-1.62, 1.24)
Neighborhood characteristics		
% Under 21 years	-\$0.07	(-0.59, 0.44)
% Hispanic/Latino	-\$0.11	(-0.57, 0.34)
% NHL Black	-\$0.14	(-0.42, 0.14)
% NHL Asian/Pacific Islander	-\$0.60	(-1.88, 0.68)
% NHL Other	\$0.06	(-0.51, 0.62)
% <185% federal poverty level	-\$0.04	(-0.35, 0.28)
Rural	-\$2.09	(-3.67, -0.51)

Note. Store neighborhoods are census tracts; AOR= Adjusted odds ratio; **Bolded** AORs are significant at $p < 0.05$; 95% CI= 95 percent Confidence Interval; NHL= non-Hispanic/Latino; % NHL Other= percent of population who identified as non-Hispanic/Latino American Indian, Alaskan Native, multiple races, or other (combined); % <185% federal poverty level refers to percent of population with household income less than 185 percent of the federal poverty level. Located near school refers to within 1000 feet of a K-12 public school. Pharmacies and supermarkets excluded from model. Estimates for strata not shown.