



Short communication

Turning over a new leaf: Vape shop closings, openings and transitions in six U.S. Metropolitan statistical areas

Dianne C. Barker^a, Lisa Henriksen^{b,*}, David H. Voelker^b, Amna Ali^b, Ilana G. Raskind^b,
Nina C. Schleicher^b, Trent O. Johnson^b, Carla J. Berg^c

^a Barker Bi-Coastal Health Consultants, Inc., 20 Ellery Rd, Newport, RI 02840, USA

^b Stanford Prevention Research Center, Stanford University School of Medicine, 1070 Arastradero Road, Suite 100, Palo Alto, CA 94304, USA

^c Department of Prevention and Community Health, Milken Institute School of Public Health, George Washington Cancer Center, George Washington University, 800 22nd St NW, #7000C, Washington, DC 20052, USA

ARTICLE INFO

Keywords:

Vape Shops
Other tobacco products
Retail environment
Marijuana
Policy
Census tract demographics
Longitudinal
Tobacco control
Licensure

ABSTRACT

This study characterizes vape shop closings, openings, and changes in product mix in six U.S. metropolitan statistical areas with different tobacco and marijuana policies. With concern for higher rates of marijuana use among those who vape nicotine, the presence of marijuana-related terms in store names was also assessed. A census of stores that were classified online as vape shops/stores or vaporizer stores were telephoned in April-May 2018 (n = 739) and July-September 2019 (n = 919) to verify whether vape products and other tobacco products (OTP) were sold. We computed the percent of stores that closed, opened, and started/stopped selling OTP. Multilevel models tested whether these events varied by store type and by neighborhood demographics. Within 16 months, 11.5% of 739 stores had closed and 29.8% of 919 stores at follow-up had opened. Closings were more likely among vape-only than vape + OTP stores (AOR = 2.51, 95% CI = 1.47,4.29); vape-only stores were less likely to open (AOR = 0.46, 95% CI = 0.34,0.62). Regardless of store type, the odds of a store opening increased as the proportion of non-Hispanic/Latino White residents in the census tract increased (AOR = 1.47, 95% CI = 1.18,1.85). Overall, 2.0% of stores (vape-only and vape + OTP) had marijuana-related names at baseline and 3.5% at follow-up. The observed change (1.6% to 5.8%) was greatest in Oklahoma City, where the state legalized medical marijuana between baseline and follow-up. More stores were opening than closing in six U.S. metropolitan statistical areas before statewide sales restrictions on flavored tobacco and COVID-19. Uniform licensing is recommended to define vape shops and track their location and sales practices.

1. Introduction

Brick-and-mortar vape shops face an uncertain future in the U.S. Reflecting concerns about e-cigarette use among youth and e-cigarette, or vaping, product-use associated lung injury (EVALI), seven U.S. states issued temporary bans on flavored e-cigarette sales in fall 2019. (Campaign for Tobacco-Free Kids, 2021) By February 2021, five U.S. states and at least 300 localities prohibited the sale of flavored e-cigarettes or flavored tobacco altogether. (Campaign for Tobacco-Free Kids, 2021) Although tobacco retail licensing is recommended to establish and enforce such regulation, only 39 U.S. states (including

the District of Columbia) required a tobacco retail license by the end of 2020. (Centers for Disease Control and Prevention, 2021) In addition, 9 of the 39 states do not require a retail license to sell e-cigarettes. (Centers for Disease Control and Prevention, 2021)

In contrast to e-cigarettes and other tobacco products (OTP), the retail environment for marijuana is moving toward deregulation, with 11 states legalizing retail sales for non-medical use as of July 2019. (Schauer et al., 2020) In retail markets where regulation of e-cigarettes is increasing and marijuana is decreasing, anecdotal evidence suggests that some vape shops either transitioned their product mix to include conventional tobacco or abandoned tobacco to sell marijuana. (Tully, 2020)

* Corresponding author.

E-mail address: lhenriksen@stanford.edu (L. Henriksen).

<https://doi.org/10.1016/j.pmedr.2021.101428>

Received 25 November 2020; Received in revised form 13 May 2021; Accepted 25 May 2021

Available online 30 May 2021

2211-3355/© 2021 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Understanding the rates of openings, closings and product shifts could aid in evaluating potential impacts of regulatory policies, as well as the COVID-19 pandemic, on the tobacco retail environment. Previous studies that tracked vape shops going out of business were conducted in California. In Long Beach, 53% of vape shops (9 of 19) closed between 2015 and 2018, and no new stores opened. (Lanza and Pittman, 2019) In the greater Los Angeles area, 44% (34 of 77) of vape shops closed during roughly the same time period. (Galimov et al., 2020) Expanding on this literature, the current study characterizes openings, closings, and transitions in product mix for vape shops/vaporizer stores, and did not exclude stores that sold OTP. Given the growing proportion of youth and young adults who vape marijuana (Schulenberg et al., 2020) and a higher incidence of marijuana use among those who vape nicotine, (Chadi et al., 2019) this study also investigated the proportion of store names that referenced marijuana to understand how tobacco retailers might appeal to dual users.

2. Methods

This study describes a census of stores that were identified online as vape shops or vaporizer stores, and were verified to sell vape products at two time periods in six metropolitan statistical areas: Atlanta-Sandy Springs-Roswell, Georgia; Boston-Cambridge-Newton, Massachusetts; Minneapolis-St. Paul-Bloomington, Minnesota; Oklahoma City, Oklahoma; San Diego-Carlsbad, California and Seattle-Tacoma-Bellevue, Washington. These six areas were selected to represent different regions and policies related to tobacco (e.g., excise tax, smoke-free, vape-free air restrictions). (Berg et al., 2020a) In addition, Oklahoma City and Atlanta-Sandy Springs-Roswell areas are located in states that did not require a retail license to sell e-cigarettes. (Centers for Disease Control and Prevention, 2021) At baseline, retail sales of non-medical marijuana were legal in the San Diego-Carlsbad and Seattle-Tacoma-Bellevue areas; medical marijuana sales were legal in the Minneapolis-St. Paul-Bloomington area. Three metropolitan statistical areas did not allow marijuana sales (Atlanta-Sandy Springs-Roswell, Boston-Cambridge-Newton, and Oklahoma City). Between baseline and follow-up, sales of non-medical marijuana began in Massachusetts and medical marijuana sales began in Oklahoma.

Vape shops were identified from Yelp and Google because the combination performed better than either source alone to enumerate vape shops in a ground-truthing study. (Lee et al., 2016) Yelp has one predefined store type category called “vape shops.” Google Maps does not have equivalent categories for application program interface (API) queries. Since the store type “vaporizer store” exists in scraped Google Maps records, that term was used in our API queries. The method for identifying vape shops in the six metropolitan statistical areas in November-December 2017 was to query REST APIs (“API query”) provided by Yelp Graph QL for stores classified as “vape shops,” and to query Google Maps API for stores classified as “vaporizer store.” (Berg et al., 2020a) In April 2019, the Google Maps API query was updated to incorporate the terms “vape shop” and “vape store.” Previous research confirms that vape shop owners commonly register their businesses on websites to increase store visibility. (Cheney et al., 2015) According to Yelp, it takes two days to post a new business on their website once a request has been made. New businesses can also appear based on information from users, public records, or third-party vendors (Yelp Support Center, 2021).

Store addresses were geocoded to latitude/longitude, census tract, and metropolitan statistical area using ArcGIS v10.4.1. Of the 1,148 unique stores, 99.1% could be mapped to latitude/longitude. Research staff used the same telephone protocol to verify whether stores were in business and sold vape products at baseline (April-May 2018) and follow-up (July-September 2019), roughly 16 months later. Staff asked store employees whether other tobacco products were sold (vape + OTP) or not (vape-only). Stores that could not be reached by telephone were confirmed as permanently closed using an online search of Google,

Yelp, and/or Facebook. Stores that were new to the sampling frame at follow-up (did not appear on the list at baseline) and verified by telephone to sell vape products were categorized as openings. Stores that changed their product mix by starting or stopping the sale of OTP, or by discontinuing the sale of vape products, were categorized as transitions. Contact rates were 97.6% for stores identified at baseline and 75.8% for stores newly identified using API queries at follow-up.

3. Analyses

Descriptive statistics summarized 1) the proportion of stores at baseline that were classified at follow-up as: a) closed, b) open and still selling vape products, and c) open but stopped selling vape products, and 2) the proportion of stores at follow-up that were new. Descriptive statistics also compared the proportion of baseline stores that transitioned their product mix, by adding or removing OTP or by stopping the sale of vape products.

Multilevel logistic regression models (stores nested within 6 metropolitan statistical areas) were used to predict store status at follow-up. The primary analyses examined whether vape shop closings (stores closed for business at follow-up) and openings (stores new to follow-up) varied by store type (referent category = vape + OTP) and census tract demographics. For closings, store type was assessed at baseline; for openings, store type was assessed at follow-up. A third model assessed transitions in product mix from baseline to follow-up as a function of store type and census tract demographics. These data (median household income, population density, percent of population non-Hispanic/Latino White, and percent of population ages 5–17 and ages 18–24) were obtained from the American Community Survey census tract-level estimates (2013–2017) and standardized within metropolitan statistical areas before merging with store data. Models included a random intercept. There was insufficient clustering within tracts to warrant a 3-level model. Analyses used IBM SPSS Statistics for Windows, Version 26.0.

4. Store names

To assess the presence and change over time of marijuana-related terms in the names of vape-only and vape + OTP stores, we compiled a list of search terms from the Glossary of Cannabis Terms on leafly.com, used in prior research about tobacco and marijuana co-marketing. (Delnevo et al., 2020) Based on our inspection of tobacco retailer licensing lists in other states, we added three terms: “glass,” “haze,” and “toke.” We used R version 3.6.1 (R Core Team, 2019), and the stringr (version 1.4.0; Wickham, 2019) and dplyr (version 1.0.0; Wickham et al., 2020) packages, to query and code marijuana-related store names if one or more of the search terms appeared, and to calculate descriptive statistics at baseline and follow-up.

5. Results

Table 1 characterizes the status of stores at both time points, including closings from baseline to follow-up, new openings, and transitions in product mix (vape-only, vape + OTP or stopped selling vape products). Overall, 11.5% of stores had closed for business by follow-up (15.0% of vape-only and 6.2% of vape + OTP). The proportion of closings ranged from 9.5% of stores in the Boston metropolitan statistical area to 14.4% of stores in the San Diego area (see supplemental table). As shown in Table 2, compared to vape + OTP stores, vape-only stores were more than twice as likely to close at follow-up (AOR = 2.51, 95% CI = 1.47,4.29). Store closings did not significantly vary by neighborhood demographics.

Across the six metropolitan statistical areas, 919 stores were operating at follow-up, which represents a 24.4% increase over 16 months. Overall, 274 follow-up stores (29.8% of total) were new stores that did not appear on the list at baseline. The proportion of store openings ranged from 25.8% in both the San Diego and the Seattle metropolitan statistical areas to 38.0% in the Minneapolis area (see supplemental

Table 1
Descriptive statistics of store openings, closings and transitions by store type in six metropolitan statistical areas after 16 months.

	Vape-only	Vape + OTP	Total
Status of baseline stores at follow-up^a	n = 448	n = 291	n = 739
Closings	67 (15.0%)	18 (6.2%)	85 (11.5%)
Open, stopped selling vape products	3 (0.7%)	6 (2.1%)	9 (1.2%)
Open, still selling vape products ^b	378 (84.4%)	267 (91.8%)	645 (87.3%)
Transitions			
Started selling OTP	29 (7.7%)		
Stopped selling OTP		30 (11.2%)	
Started or stopped selling OTP			59 (9.1%)
None (same product mix)	349 (92.3%)	237 (88.8%)	586 (90.9%)
All stores open at follow-up	n = 492	n = 427	n = 919
Baseline stores still open ^c	379 (77.0%)	266 (62.3%)	645 (70.2%)
New openings	113 (23.0%)	161 (37.7%)	274 (29.8%)

OTP = Other Tobacco Products.

^a Baseline = April-May 2018, Follow-up = July-September 2019.

^b Store type measured at baseline.

^c Store type measured at follow-up.

Table 2
Store closings and openings as a function of store type and census tract demographics in six metropolitan statistical areas after 16 months.

	Closings ^a (N _{stores} = 727, N _{MSAs} = 6)	Openings ^b (N _{stores} = 916, N _{MSAs} = 6)
	AOR (95% CI)	AOR (95% CI)
Intercept	0.07 (0.04, 0.11)	0.60 (0.48, 0.76)
Store Type		
Vape-only (ref: Vape + OTP) ^c	2.51 (1.47, 4.29)	0.46 (0.34, 0.62)
Demographics^d		
Population Density	1.15 (0.91, 1.45)	1.00 (0.84, 1.20)
Median Household Income	0.78 (0.54, 1.14)	0.80 (0.64, 1.01)
Percent White, non-Hispanic/Latino residents	1.10 (0.78, 1.55)	1.47 (1.18, 1.85)
Percent of residents ages 5–17	0.90 (0.69, 1.19)	1.09 (0.91, 1.31)
Percent of residents ages 18–24	0.81 (0.63, 1.05)	0.87 (0.75, 1.00)

Note: Cell entries are adjusted odds ratios and 95% confidence intervals from a multilevel model. Models excluded three stores in census tracts that were missing data for median household income. OTP = Other Tobacco Products.

^a Includes stores that were open at follow-up and still selling vape products (n = 645) and closed for business (n = 85) between baseline and follow-up, with the exception of 3 stores in tracts with missing data for median household income. Stores (n = 9) that were open at follow-up but stopped selling vape products were not included in this analysis.

^b Includes new stores since baseline and baseline stores open at follow-up, except 3 stores with missing data.

^c Closings = store type measured at baseline; Openings = store type measured at follow-up.

^d Standardized within the metropolitan statistical area (MSA).

table). As with store closings, estimated openings also varied by store type. Compared to vape + OTP stores, vape-only stores were half as likely to open (AOR = 0.46, 95% CI = 0.34, 0.62) (see Table 2). The odds of a store being new at follow-up increased as the proportion of non-

Hispanic/Latino White residents increased in the census tract (AOR = 1.47, 95% CI = 1.18, 1.85). Openings were not correlated with any other neighborhood demographics.

Within 16 months, 87.3% of the 739 baseline stores were still open and selling vape products (either vape-only or vape + OTP) at follow-up in July-September 2019. However, the proportion of stores that were vape-only declined from 60.6% (448 of 739) at baseline to 53.5% (492 of 919) at follow-up (p < 0.05), such that more stores overall sold OTP at follow-up.

6. Product mix transitions and store names

Within 16 months, 1.2% of stores stopped selling vape products. Of the baseline stores that were open at follow-up and still selling vape products, 9.1% (n = 59) had transitioned their product mix within 16 months. Specifically, 7.7% of vape-only stores at baseline (29 of 378) had started selling OTP by follow-up, and 11.2% of vape + OTP stores at baseline (30 of 267) stopped selling OTP. In a multilevel model (not shown), vape-only stores were significantly less likely to transition their product mix (to include OTP) than vape + OTP stores (to exclude OTP) (AOR = 0.58, 95% CI = 0.35, 0.99). Whether stores transitioned their product mix from baseline to follow-up was not correlated with any neighborhood demographics.

The proportion of all stores with marijuana-related names was 2.0% at baseline (n = 15/762, including 23 stores whose status at follow-up was not determined) and 3.5% (n = 32/919) at follow-up. “Glass” (n = 12) and “CBD” (cannabidiol, n = 8) were the most common marijuana-related terms in store names at follow-up. Of the 32 follow-up stores with marijuana-related names, 19 were new to follow-up, and one store added a marijuana-related term to its name since baseline. The greatest observed change (from 1.6% to 5.8%) occurred in the Oklahoma City area, where the state implemented medical marijuana sales between baseline and follow-up (see Supplement).

7. Discussion

This study provides the first estimate of vape shop closings and openings in a geographically diverse sample of six metropolitan statistical areas with differing policy contexts for tobacco and marijuana. There was a smaller rate of store closings (11.5%) than openings (29.8%) over 16 months, April-May 2018 to July-September 2019. Vape-only stores went out of business at twice the rate of vape + OTP stores, and vape-only stores were half as likely to open over the 16-month period. Similar to previous research about where vape shops are located, (Giovenco et al., 2016) new stores at follow-up were more likely to be located in tracts with a higher proportion of non-Hispanic/Latino White residents. Among stores that were still open at follow-up, 9.1% had transitioned their product mix (i.e., started or stopped selling OTP).

Although rare, this study also documents an uptick of marijuana-related store names from 2.0% to 3.5% across the six metropolitan statistical areas. The finding suggests an effort to appeal to a growing market of dual users, (Schulenberg et al., 2020; Chadi et al., 2019) and aligns with evidence that vape vendors and manufacturers promote cannabis-related vape products. (Majmundar et al., 2020) Future research should consider how vape shops adapt to the evolving retail markets for marijuana with expanded product lines, including products that contain cannabidiol. (Gammon et al., 2020)

This study provides a base rate for store closings/openings to compare after temporary or permanent statewide sales restrictions on flavored tobacco and non-essential business closures during COVID-19 stay-at-home periods. (Berg et al., 2020b) Other study strengths are: (1) an online search to identify vape shops or vaporizer stores from two sources, and (2) a telephone protocol to determine what products were sold, (Kim et al., 2016) because conclusions about neighborhood correlates of vape shop locations differ depending on whether the definition includes hybrid stores that sell OTP. (Giovenco, 2017)

This study did not conduct field work or more extensive telephone interviews to validate store openings and closings. Without observational data from stores, we could not validate what products were sold or characterize which store features were associated with closings or openings, as in previous research. (Lanza and Pittman, 2019; Galimov et al., 2020) Another limitation is that the study could not verify whether Google-only stores that were new at follow-up had recently opened or were missed by the baseline query. In addition, it was not practicable to gather information about continuity of ownership and how that may have affected the product mix or store names.

The lack of a uniform license requirement is an obstacle to studying tobacco retailer closings, openings and transitions in the U.S. Uniform licensing is recommended to track the location and sales practices of all tobacco retailers. (Tobacco Control Legal Consortium, 2016) This is particularly true for vape shops and other tobacco specialty retailers, where price discounts that appeal to price-sensitive youth and young adults are more prevalent, (D'Angelo et al., 2020) and where higher rates of illegal sales have been observed. (Roeseler et al., 2019) Implementing uniform standards for the definition and licensing of vape shops would facilitate retail monitoring and enforcement efforts.

Author contributions

Henriksen and Berg conceptualized the study and Berg acquired the funding. Schleicher, Raskind, and Berg led the data curation. Voelker and Raskind conducted the formal analysis with guidance from Schleicher. Barker, Henriksen, and Ali collaborated on the original draft. All authors were involved in review and editing and approved the final manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

The authors wish to thank Dennis L. Sun (Cal Poly San Luis Obispo) for Python programming to obtain data for vape stores; Monika Vishwakarma and Lindsey Winn (Stanford Prevention Research Center) for data preparation and geocoding; Betelihem Getachew, Brooke Patterson, Heather Posner, DeEnna Wedding and Carly West (Emory University and George Washington University) for telephoning the retailers at one or both time points; Hudson Kingston and Craig Moscetti (Public Health Law Center) for advice on preferred terminology for sales of marijuana for non-medical use.

Funding: This research was supported by the National Cancer Institute at the National Institutes of Health, 1R01-CA215155 (PI: Berg) and 1R01-CA217165 (PI: Henriksen). IGR was supported by the National Heart, Lung, and Blood Institute at the National Institutes of Health, T32-HL007034 (PI: Gardner).

References

- Berg, C.J., Callanan, R., Johnson, T.O., Schleicher, N.C., Sussman, S., Wagener, T.L., Meaney, M., Henriksen, L., 2020. Vape shop and consumer activity during COVID-19 non-essential business closures in the USA. *Tob Control*. Published online October 19, doi:10.1136/tobaccocontrol-2020-056171.
- Berg, C.J., Schleicher, N.C., Johnson, T.O., Barker, D.C., Getachew, B., Weber, A., Park, A.J., Patterson, A., Dorvil, S., Fairman, R.T., Meyers, C., Henriksen, L., 2020a. Vape shop identification, density and place characteristics in six metropolitan areas across the US. *Prev. Med. Rep.* 19, 101137. <https://doi.org/10.1016/j.pmedr.2020.101137>.
- Campaign for Tobacco-Free Kids, 2021. States & Localities That Have Restricted the Sale of Flavored Tobacco Products. Accessed March 16, 2021. <https://www.tobaccofreekids.org/assets/factsheets/0398.pdf>.
- Centers for Disease Control and Prevention, 2021. State Tobacco Activities Tracking and Evaluation (STATE) system. Accessed March 16, 2021. https://nccd.cdc.gov/STATESystem/rdPage.aspx?rdReport=OSH_State.CustomReports.
- Chadi, N., Schroeder, R., Jensen, J.W., Levy, S., 2019. Association between electronic cigarette use and marijuana use among adolescents and young adults: A systematic review and meta-analysis. *JAMA Pediatr.* Published online August 12, e192574. doi: 10.1001/jamapediatrics.2019.2574.
- Cheney, M., Gowin, M., Wann, T.F., 2015. Marketing practices of vapor store owners. *Am. J. Public Health.* 105 (6), e16–e21. <https://doi.org/10.2105/AJPH.2015.302610>.
- D'Angelo, H., Rose, S.W., Golden, S.D., Queen, T., Ribisl, K.M., 2020. E-cigarette availability, price promotions and marketing at the point-of sale in the contiguous United States (2014–2015): National estimates and multilevel correlates. *Prev. Med. Rep.* 19, 101152. <https://doi.org/10.1016/j.pmedr.2020.101152>.
- Delnevo, C., Giovenco, D.P., Kurti, M.K., Al-Shujairi, A., 2020. Co-marketing of marijuana and cigars in US convenience stores. *Tob Control.* 29 (2), 224–225. <https://doi.org/10.1136/tobaccocontrol-2018-054651>.
- Gammon, D.G., Gaber, J., Lee, Y.O., 2020. CBD products that resemble tobacco products enter traditional retail outlets. *Tob Control.* Published online April 8, doi:10.1136/tobaccocontrol-2019-055452.
- Galimov, A., Galstyan, E., Yu, S., Smiley, S.L., Meza, L., Baezconde-Garbanati, L., Unger, J.B., Sussman, S., 2020. Predictors of vape shops going out of business in Southern California. *Tob. Regul. Sci.* 6 (3), 187–195. <https://doi.org/10.18001/TRS.6.3.3>.
- Giovenco, D.P., 2017. Smoke shop misclassification may cloud studies on vape shop density. *Nicotine Tob. Res.* 20 (8), 1025–1026. <https://doi.org/10.1093/ntr/ntx136>.
- Giovenco, D.P., Duncan, D.T., Coups, E.J., Lewis, M.J., Delnevo, C.D., 2016. Census tract correlates of vape shop locations in New Jersey. *Health & Place.* 40, 123–128. <https://doi.org/10.1016/j.healthplace.2016.05.008>.
- Kim, A.E., Loomis, B., Rhodes, B., Eggers, M.E., Liedtke, C., Porter, L., 2016. Identifying e-cigarette vape stores: description of an online search methodology. *Tob Control.* 25 (e1), e19–23. <https://doi.org/10.1136/tobaccocontrol-2015-052270>.
- Lanza, H.I., Pittman, P.S., 2019. A peek past the vape clouds: Vape shop decline in Long Beach, California during 2015–2018. *Tob. Regul. Sci.* 5 (5), 447–455. <https://doi.org/10.18001/trs.5.5.5>.
- Lee, J.G.L., D'Angelo, H., Kuteh, J.D., Martin, R.J., 2016. Identification of vape shops in two North Carolina counties: An approach for states without retailer licensing. *Int. J. Environ. Res. Public Health.* 13 (11), 1050. <https://doi.org/10.3390/ijerph13111050>.
- Majmundar, A., Kirkpatrick, M., Cruz, T.B., Unger, J.B., Allem, J.-P., 2020. Characterising KandyPens-related posts to Instagram: implications for nicotine and cannabis use. *Tob Control.* 29 (4), 472–474. <https://doi.org/10.1136/tobaccocontrol-2019-055006>.
- R Core Team, 2019. R: A language and environment for statistical computing, version 3.6.1. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Roeseler, A., Vuong, T.D., Henriksen, L., Zhang, X., 2019. Assessment of underage sales violations in tobacco stores and vape shops. *JAMA Pediatr.* 173 (8), 795–797. <https://doi.org/10.1001/jamapediatrics.2019.1571>.
- Schauer, G.L., Tynan, M.A., Marynak, K., 2020. Self-reported exposure to, perceptions about, and attitudes about public marijuana smoking among US adults, 2018. *Addiction.* 115 (7), 1320–1329. <https://doi.org/10.1111/add.v115.710.1111/add.14955>.
- Schulenberg, J.E., Johnston, L.D., O'Malley, P.M., Bachman, J.G., Miech, R.A., Patrick, M.E., 2020. Monitoring the Future National Survey Results on Drug Use, 1975–2019: Volume II, College Students and Adults Ages 19–60. Institute for Social Research, The University of Michigan. <http://monitoringthefuture.org/pubs.htm#monographs>.
- Tobacco Control Legal Consortium, 2016. Using Licensing and Zoning to Regulate Tobacco Retailers. Accessed May 10, 2021. <https://www.publichealthlawcenter.org/sites/default/files/resources/tclc-guide-licensing-and-zoning-2016.pdf>.
- Tully T. 2020. Vape shops face a choice: Close or rebrand? The New York Times. <https://www.nytimes.com/2020/02/19/nyregion/new-jersey-vape-stores.html>. Published February 19, 2020. Accessed October 29, 2020.
- Wickham, H., 2019. stringr: Simple, Consistent Wrappers for Common String Operations. R package version 1.4.0.
- Wickham, H., Francois, R., Henry, L., Müller, K. 2020. dplyr: A Grammar of Data Manipulation. R package version 1.0.0.
- Yelp Support Center, 2021. How did my business information end up on Yelp? Accessed May 10, 2021. https://www.yelp-support.com/article/How-did-my-business-information-end-up-on-Yelp?!=en_US.