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## A Peek Past the Vape Clouds: Vape Shop Decline in Long Beach, California during 2015-2018

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### Abstract

**Objectives:** The current study adds to the literature on vape shops by evaluating vape shop growth in an urban community over a 3-year period, assessing similarities and differences across the vape shop context, and addressing whether socialization spaces within vape shops are associated with a vape shop's ultimate success – remaining operational. As e-cigarette/vaping use enters its second decade in the US market, its regulation and status as a novel form of substance use is evolving; accordingly, it is unknown whether the presence of vape shops has changed as well.

**Methods:** In this study, we tracked and observed 19 vape shops over a 3-year period in Long Beach, California.

**Results:** Vape shop presence declined by 53% between September 2015 and September 2018. A comparison of vape shops remaining open versus those closing in the 3-year period indicated that shops with designated socialization spaces (lounges/tasting bars) were more likely to remain operational.

**Conclusions:** The substantial decline in vape shop presence in this community may reflect an entrepreneurial response to increased regulation, as well as a dynamic market for e-cigarette/vape products. Findings suggest vape users support Electronic Nicotine Delivery Systems (ENDS) retailers that promote community-building or recreational activity.

### Keywords

e-cigarettes; vape lounges; e-cigarette tasting bar; vape shop; vaping; electronic nicotine delivery systems (ENDS)

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Since their introduction into the United States (US) market in 2007, electronic nicotine delivery systems (ENDS; ie, e-cigarette/vaping) use has grown at a substantial and rapid

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Human Subjects Statement

This research did not involve human subjects.

The study was exempted from IRB review.

Conflict of Interest Statement

All authors of this article declare they have no conflicts of interest.

pace, particularly among younger populations.<sup>1,2</sup> Prevalence rates remain high and have increased: 13%–19% of adolescents and 11%–12% of young adults (as well as 5.4% of the general adult population) report past 30-day e-cigarette/vaping use.<sup>3–6</sup> Although a wealth of literature has identified multiple reasons for the surge in e-cigarette/vaping use, including smoking cessation,<sup>7,8</sup> recreation/enjoyment,<sup>9</sup> socializing with peers and friends,<sup>10,11</sup> and curiosity/experimentation with substance use,<sup>10,12</sup> it is unclear whether or how the vape shop context promotes e-cigarette/vaping use for the above reasons. A larger body of empirical work on vape shops is warranted to understand the ever-evolving ENDS market.<sup>13</sup>

When ENDS products were first introduced into the US market, they were mainly sold online or at mall kiosks; however, the rapid popularity of ENDS shifted the market to convenience and drug stores, and then to independent “vape shops” that exclusively market and sell ENDS products.<sup>14</sup> The number of vape shops in the US grew exponentially in the mid-2010s; Dai and Hao<sup>15</sup> reported the number of vape shops in the US increased from 2755 in 2013 to over 10,000 in 2016. Vape shops quickly gained popularity among e-cigarette/ vape users for several reasons. Vape users prefer the wider selection of products, particularly the ability to try and customize advanced-generation vaping products,<sup>16,17</sup> and users also appreciate access to staff persons that have a large knowledge base and can troubleshoot issues.<sup>18</sup> However, increasing regulation of ENDS products may have a marked impact on the sustainability of vape shops. In August 2016, the US Food and Drug Administration (FDA) proceeded to make ENDS a regulated tobacco product.<sup>19</sup> The FDA deeming rule is likely to result in a significant decline of previously popular vape shop services, like customization of ENDS products, manufacturing of in-house e-juices, and free sampling (these regulations are set to be in effect by August 2022).<sup>13</sup> Additionally, in states like California, added restrictions on tobacco sales (including ENDS products), such as increasing the legal age to purchase ENDS products from 18 to 21 years in June 2016, place a larger burden on vape shops to remain financially solvent.<sup>20</sup> Examining the continuity and change of the vape shop market over extended periods of time is critical for assessing the impact of increased regulation within communities.

In addition to examining the presence of vape shops in communities over time, a closer investigation of the vape shop environment is warranted to understand the characteristics of vape shops that may facilitate e-cigarette/vaping use. Given that vape shops are evolving spaces,<sup>13</sup> continued assessment of store characteristics that may promote e-cigarette/vaping use is needed to provide a more nuanced understanding of the vape shop environment. Although research on vape shops is limited, studies published in the last 5 years have noted that vape shops foster a ‘vape culture’ that promote e-cigarette/vaping use for recreation, socialization, and experimental purposes.<sup>16,17,21,22</sup> Most of these studies have focused on interviews and interactions with customers and employees inside of vape shops,<sup>18,23–25</sup> but relatively less work has focused on store characteristics that may foster e-cigarette/vaping use. Generally vape shop retailers perceive their shops as spaces where e-cigarette/vaping users can engage in experimentation (sampling) and socialize with other users (including employees);<sup>26,27</sup> however, it is unknown whether the majority of vape shops utilize lounge areas or tasting bars, which offer e-cigarette/vaping users an opportunity to socialize and experiment with others. Furthermore, an unanswered question with relevant implications is whether differences across store characteristics are associated with a higher or lower

likelihood or remaining operational. Currently, only one study<sup>22</sup> has assessed this question. Kong et al<sup>22</sup> evaluated Yelp reviews from 72 vape shops in Los Angeles and reported that those with “bar type” atmospheres and customization abilities were more likely to remain open over the course of a year. Potentially, vape shops that are more successful in remaining open are those that foster an environment that promotes ‘vape culture’ through socialization and experimentation.

In the current study, we had 3 aims: (1) track the presence of vape shops within an urban community across a 3-year period (September 2015-September 2018) to assess whether vape shop growth has increased, decreased, or plateaued; (2) describe the vape shop context, including the similarities and differences across vape shops through naturalistic observation; and (3) assess whether specific store characteristics (lounge areas, bar setups) predicted whether a vape shop remained open or closed during the 3-year period. We anticipated a plateau in vape shop growth and a possible decline in the number of vape shops due to increased regulations in California and impending increased federal regulation. To facilitate comparison of vape shop store characteristics, a structured observation instrument was developed after an initial unstructured pilot observation. Although we expected vape shops in this urban community to have similar store characteristics, we also expected that differences in socialization spaces would predict whether a vape shop remained operational after the 3-year period. Specifically, we hypothesized that vape shops with a lounge area or bar type setup would be more likely to remain open than those without these socialization spaces.

## METHODS

Long Beach, California (CA), part of Los Angeles County, is the seventh largest city in California (population: 469,450; 50.7% female; 42.8% Hispanic/Latino, 27.6% white, 13.2% Asian, 12.9% African-American/black).<sup>28</sup>We identified businesses in Long Beach labeled as vape shops (ie, shops exclusively selling ENDS products, smoke shops, and convenience stores were excluded) in a Yelp and Google Maps search between September 2015 and September 2018. This sampling framework has been used and validated in previous studies focused on US vape shops – eg, in the Bay area,<sup>21</sup> Los Angeles,<sup>17</sup> New Hampshire,<sup>26</sup> and North Carolina.<sup>29</sup>

### Procedure

In September 2015, 19 exclusive vape shops in the city limits of Long Beach were identified through Yelp and Google Maps searches. Three female undergraduate researchers conducted unstructured observations in pairs between September 2015 and November 2015. These unstructured observations were completed to confirm the operation of identified vape shops; 3 additional listings were excluded due to being a smoke shop, a warehouse distributor, or a home-based business. Additionally, these observations provided a baseline understanding of the vape shop context in Long Beach, CA during the fall of 2015. Student researchers jointly completed a post-observation form that included the following components: (1) describe the neighborhood; (2) describe the shop from the outside and inside; (3) describe the display of products; and (4) describe the shop’s atmosphere. Considering standardized assessments

used in other vape shop observation studies yielded promising results,<sup>21,26</sup> a year later a structured, checklist-based observation instrument based off the information gathered from unstructured observations was developed to facilitate a comparison of vape shops store characteristics. We used the open-ended information from unstructured observations to create 4 domains to describe the vape shop context: exterior, interior, products, and employees/customer characteristics.

In September 2016, vape shops were again identified through Yelp and Google Maps searches. The PI of the study visited each location in September 2016 to verify operational or non-operational status; 6 vape shops identified as operational in September 2015 had become non-operational by the time of the structured observation period. Additionally, no vape shops opened after September 2015 based on Yelp and Google Maps searches. The structured, checklist-based observation instrument was implemented for vape shop observations occurring between October 2016 and March 2017. Three female undergraduate researchers observed 13 operational vape shops. In pairs student researchers spent about 20 minutes observing each store, including its exterior. Observations were conducted on weekday early evenings (approximately 5pm-7pm). To avoid pressure of trying samples or buying products during the visit, one of the student researchers stated she was thinking about buying a vape for her boyfriend if store employees approached the researchers. Researchers completed the observation form out of view of the vape shop. Any discrepancy between raters on the store exterior, interior, or product (eg, lighting in store, types of businesses nearby) was cross-checked by the PI of the study within a week of the observation. Discrepancies involving employee or customer characteristics (eg, number and gender) could not be cross-referenced and were marked as missing for analyses. Of the 51 data points taken for each vape shop, inter-rater reliability was 96.5%. Most of the discrepancies were related to the types of business located nearby, type of floor, store interior lighting (dim vs dark), and whether the store displayed print media like stickers or flyers.

In September 2017 and September 2018, Vape shops were again identified as operational or non-operational through Yelp and Google Maps searches. The PI of the study then went to each location to verify operational or non-operational status of each vape shop. No new vape shops were identified through Yelp and Google Maps from the beginning of the study in September 2015 and conclusion in September 2018.

## Measures

The structured, checklist-based observation instrument consists of 4 domains that were used to assess each vape shop's store characteristics: exterior, interior, products, and employees/customer characteristics.

**Exterior.**—This domain included information on neighborhood and storefront characteristics. Observers provided information on whether residences were within view of the shop, whether the shop was located on a major street and near a bus stop, type of business setting (eg, strip mall), type of businesses nearby, visibility of shop interior, and whether the shop exterior had prominent advertising (ie, clear store signage).

**Interior.**—Observations on the shop interior were focused on the physical layout and design of the shop, including whether the shop had a lounge space (eg, couch, furniture), a tasting bar setup (eg, long table/bar with high chairs/stools), glass displays, shelving, a menu of available e-juices, as well as the color/hue of floor/walls and lighting.

**Products.**—This domain addressed both ENDS products being advertised and sold. Questions asked whether vape shops displayed ENDS-related print (posters, stickers, or flyers) or digital advertisements. In terms of available products, observers reported whether ENDS products were displayed in glass cases or shelves, and whether customers had access to handle products without employee assistance.

**Employee/customer characteristics.**—Employees and customers were not approached for this study; thus, there were no data on interactions or interviews with employees or customers. However, student researchers reported on how many employees and customers were present, the presumed gender of employees and customers, whether customers vaped inside the shop, and whether customers appeared to be novice e-cigarette/vape users.

## RESULTS

### Decline of Vape Shops, 2015–2018

Figure 1 shows the decline of vape shop presence in Long Beach from September 2015 to September 2018. Figure 2 presents a Google map of the city of Long Beach with designated markings for vape shops that remain open versus closed during the observation period (September 2015–September 2018). In August 2015, we identified 19 vape shops as operational through Yelp and Google Maps searches, and operational status was confirmed by student researchers conducting unstructured observations during September–November 2015. One year later (September 2016), 13 vape shops remained operational. The PI confirmed that 6 of the vape shops identified as operational in September 2015 were no longer operational one year later; additionally, no new vape shops were identified through Yelp or Google Maps searches. In September 2017, the PI of the study went to the 13 vape shops identified as operational in September 2016 and observed that 3 vape shops had closed in the past year; again, no new vape shops were identified through Yelp and Google Maps searches. Finally, in September 2018, the PI went to the 10 vape shops identified as operational in September 2017 and reported that one vape shop had closed since September 2017; again, no new vape shops were identified through an online search. Thus, during the 3-year period between September 2015 and September 2018, the number of operational vape shops in Long Beach decreased from 19 to 9 (a 53% decline). Furthermore, no new vape shops were identified as operational within the city limits since the initial observation period in September 2015.

### Structured Observations of Vape Shops in September 2016

The following section presents a descriptive analysis of the data collected through the structured, checklist-based observation form of 13 vape shops from October 2016–March 2017.

**Store exterior.**—The majority of vape shops (76.9%) were within view of residences (either houses or apartments). Almost all vape shops (92.3%) were located on a major street, and close to two-thirds (61.5%) were easily accessible by public transportation. Almost all (92.3%) were part of a strip mall. Most shops had prominent advertising outside of the shop exterior (84.6%). The most common businesses located nearby were restaurants (fast-food and casual dining; 92.3%), hair/nail salons (69.2%), and convenience/liquor stores (53.8%). For many vape shops (69.2%), the interior of the store was visible from the exterior.

**Store interior.**—Most of the vape shop interiors were under dim or dark lighting (69.2%) and floors also tended to be in darker colors (61.5%); however, walls were usually a light or neutral color (69.2%). Although stores varied in their layout, all shops contained glass display cases and 84.6% had wall shelving. Eleven of the 13 vape shops (84.6%) had a lounge area comprised of couches and/or soft chairs, with small tables or a coffee table nearby. Most stores (76.9%) also had a tasting bar setup. These vape shops had a bar-type area comprised of a long bar or table alongside stools or high chairs that customers could utilize to vape and try e-juices. Ten of the shops (76.9%) had both a lounge space and a tasting bar. In terms of a menu for e-juices, about half of the shops (46.2%) had a menu available. Five of the 13 shops (38.5%) had a lounge, tasting bar, and a menu of flavors. Most shops (84.6%) were playing music or had a TV on inside the store.

**Products.**—In terms of product advertisement, most vape shops did display vaping-related posters, stickers, flyers, or digital advertisements (69.2%). All vape shops displayed vaporizers along with other ENDS products inside glass cases that were usually counter-height; almost all shops (85.6%) displayed e-juices on wall shelves presented at eye-level. As such, ENDS products were not easily accessible to customers without employee assistance. Only 3 vape shops (23.1%) had any ENDS product accessible to customers without employee assistance.

**Employees/customer characteristics.**—Most vape shops had either one (38.5%) or 2 (53.8%) employees working (one shop had 3 employees present). Not all vape shops had customers present during the observation, but of those that did have customers (61.5%), 1–3 customers were noted inside the shops. At most vape shops (69.2%), employees were reported to be men-only; a few vape shops had a mix of male and female employees (23.1%), and one vape shop had women-only (7.7%). Similarly, across vape shops with customers present, 50% were reported to have only male customers, 37.5% had a mix of men and women, and one shop (12.5%) had only women customers. Of the vape shops with customers, 50% had customers that were vaping inside the shop; furthermore, 75% of shops with customers appeared to have non-novice customers (eg, came into the shop with an already owned vape product, asked for a specific type of e-juice).

### Comparison of Vape Shops that Remained Open versus Closed

To compare vape shops that remained open as of September 2018 ( $N = 9$ ) versus those that had closed between September 2015 and September 2018 ( $N = 10$ ), we utilized data from both structured, checklist-based observations (for 13 vape shops identified as operational in September 2016) and unstructured observations (for 6 vape shops identified as operational in

September 2015 but became non-operational prior to the structured observation period). Reviewing available data across structured and unstructured observations, information on the physical layout was largely complete across vape shops. Thus, comparisons between operational and non-operational stores as of September 2018 focused on the presence of a glass display case, tasting bar setup, lounge area, and both a tasting bar and lounge area. All vape shops had at least one glass display case that contained vaporizers, accessories, and sometimes e-juices. Of the 9 vape shops that remained operational, 100% contained a lounge area and all but one (88.9%) contained a tasting bar setup. In comparison, of the 10 vape shops that closed during the tracking period, 50% had a lounge area and 40% had a tasting bar setup. A chi-square test showed that vape shops that remained open in September 2018 were significantly more likely to have a lounge area ( $\chi^2 = 6.11, p < .05$ ), tasting bar setup ( $\chi^2 = 4.87, p < .05$ ), and both tasting bars and lounges ( $\chi^2 = 4.87, p < .05$ ) compared to those vape shops that closed sometime between September 2015 and September 2018.

## DISCUSSION

We spent 3 years identifying and tracking vape shops in Long Beach, CA to gain a more nuanced understanding of vape shop trends within this urban community. Considering that vape shops grew at an exponential pace in the mid-2010s,<sup>15</sup> we did not expect to see vape shop growth in Long Beach that would surpass previous growth trends; however, the lack of new shops opening and the substantial decline (53%) in shops from September 2015 to September 2018 was somewhat unexpected. Although speculation at this point, the lack of growth and decline of vape shops may be attributed to multiple factors, including actual and impending increased regulatory practices. As mentioned previously, the FDA's deeming rule passed in 2016 will impose tighter regulations on vape shops that limit sampling in stores, customization of products, and manufacturing of in-house e-juices.<sup>13,19</sup> These regulatory practices are likely to reduce e-cigarette/vape users' preference for vape shops versus online purchasing as many of the services and products vape shops offer will diminish.<sup>16-18</sup> Although the deeming rule was initially set to be implemented in 2016, it has been delayed several times;<sup>30</sup> what is not known is whether vape shop owners decided to close their shops when they believed the policy was imminent. Additionally, state regulations increasing the legal tobacco age from 18 to 21 years have been in effect since June 2016 (about a year into this study), which may have resulted in the vape shop market correcting for over-saturation. Furthermore, with the introduction and surge in popularity of podstyle vapes (JUUL) into the market in 2015,<sup>31</sup> consumers may be driving sales to online retailers.<sup>32</sup>

Besides the focus on understanding vape shop growth trends in Long Beach, our results also demonstrate the utility of a standardized, checklist-based instrument to observe vape shop store characteristics. A standardized assessment of vape shops allowed for a more accurate description of the vape shop context in one urban community, even without the benefits of interviewing or interacting with employees or customers. Overall, the structured observations reveal that most vape shops present themselves as prominent businesses within the community that are open to walk-in or novice customers. Almost all shops were located on major streets alongside typical strip mall business (eg, casual restaurants, hair/nail salons, convenience/ liquor stores), and most had visible advertising. From our observations it

appears that vape shop retailers in Long Beach seek high exposure to city residents. Inside, mostly dimly or darkly lit interiors add to vape shops 'bar-like' atmosphere. Products like vaporizers are usually displayed inside glass cases and e-juices are typically displayed on shelves; employee interaction was almost always necessary to handle or try ENDS products.

The presence of lounge areas and tasting bar setups in vape shops proved to be a defining feature of vape shops – a feature that may explain why vape shops that promote 'vape culture' may be more likely to remain operational over time. In other words, vape stores that provide space for customers to socialize, recreate, and experiment within vape stores may be more likely to remain operational in the long run. At first glance, vape shops interior layout appeared similar because all shops had standard glass display cases and most utilize shelving to present ENDS products. However, closer evaluation of both unstructured and structured observational data revealed that not all vape shops contained spaces meant to foster socialization, recreation, and experimentation with other customers or employees. A comparison of vape shops that remained operational as of September 2018 versus those that became non-operational between September 2015 and September 2018 clearly showed a marked difference in the use of socialization spaces. Only 50% of vape shops that had closed contained a lounge area and/or tasting bar setup versus 100% of vape shops that remained open (and 88.9% of operational shops had both a lounge area and tasting bar setup); the presence of either a lounge or tasting bar significantly predicted vape shops remaining open over the 3-year period. This finding, along with Kong et al's<sup>22</sup> report that vape shops in Los Angeles with a 'bar-type' atmosphere were more likely to remain open over a one-year period (2013–2014), suggests the presence of socialization spaces is a key element of vape shop operational success. Vape shops that have a lounge space and/ or tasting bar appear to be encouraging customers to stay at the shop, try new products, and vape with other customers or employees. This could be interpreted as promoting a sense of community or strengthening 'vape culture'.

Limitations of the study need to be considered before findings are utilized for prevention or intervention efforts. First, this study was restricted to a small geographic area (specific to the city limits of Long Beach, CA); thus, the generalizability of the study across the US is limited. Further research, particularly in the longitudinal tracking of vape shops across a large geographic area, is needed to ascertain whether a trending decline of vape shops is occurring across the US. Second, the small sample size limited the analyses used to compare operational versus non-operational vape shops. A sample size closer to 30 would have achieved an ideal level of statistical power ( $1-\beta = .80$ ; the current study's power was .62) for chi-square analyses; however, only 19 vape shops existed in the specified geographical area during the 3-year observation period. Thus, findings need to be considered as preliminary. Third, although our study did track vape shops over a 3-year period, structured vape shop observations did not occur until the second year of the study; consequently, information about 6 vape shops that closed within the first year of the study were limited to information garnered from unstructured observations. With the development and implementation of structured, checklist based observational tools used in this study and others,<sup>21,26</sup> it is feasible for future longitudinal studies to conduct more in-depth, sophisticated analysis of the vape shop context. Lastly, the observational methods used in the study allowed student researchers to observe the physical structure of the vape shops (exterior, interior, products)



in the role of a customer; however, this method restricted the ability to gather information on employees or customers past simple demographics. Future work should aim to combine non-participatory observational methods with interviews of employees and customers as highlighted by others;<sup>18,23–25</sup> this would be especially useful to understand why some vape shop owners promote socialization spaces and others do not.

## IMPLICATIONS FOR TOBACCO REGULATION

Although empirical studies on the vape shop context have increased in number, the dynamic, ever-evolving nature of vape shops has made it difficult to gain an accurate understanding of the current vape shop experience for e-cigarette/vape users. We spent 3 years identifying, tracking, and observing vape shops in an urban community with the aim of evaluating vape shop growth during a critical period of increasing regulation, as well as systematically observing and identifying factors that may facilitate e-cigarette/vaping use as well as store success. Within the specific urban community assessed, there was a marked decline in vape shop presence, but whether this decline reflects a transition to a different point-of-sale or a shift in perception about vape shops among e-cigarette/vape users is not yet known. Moving forward, this is a pertinent research question to address, as reasons for the decline in vape shops may inform ENDS prevention and intervention efforts. Moreover, evidence that both lounge areas and bar type setups are significantly predictive of vape shops remaining open over a 3-year period is a critical preliminary finding; although physical structures in vape shops are not being targeted by regulatory policies, understanding how the physical environment facilitates ENDS use ultimately can inform the motivations underlying e-cigarette/vaping use. Though findings are based on vape shops within a specific geographical area, this study provides a foundation and replicable method for use in other regions. With increasing regulatory practices by federal and state agencies, and ENDS entering its second decade in the US market, continual assessment of the dynamic changes occurring within vape shops is essential for informing behavioral health outcomes.

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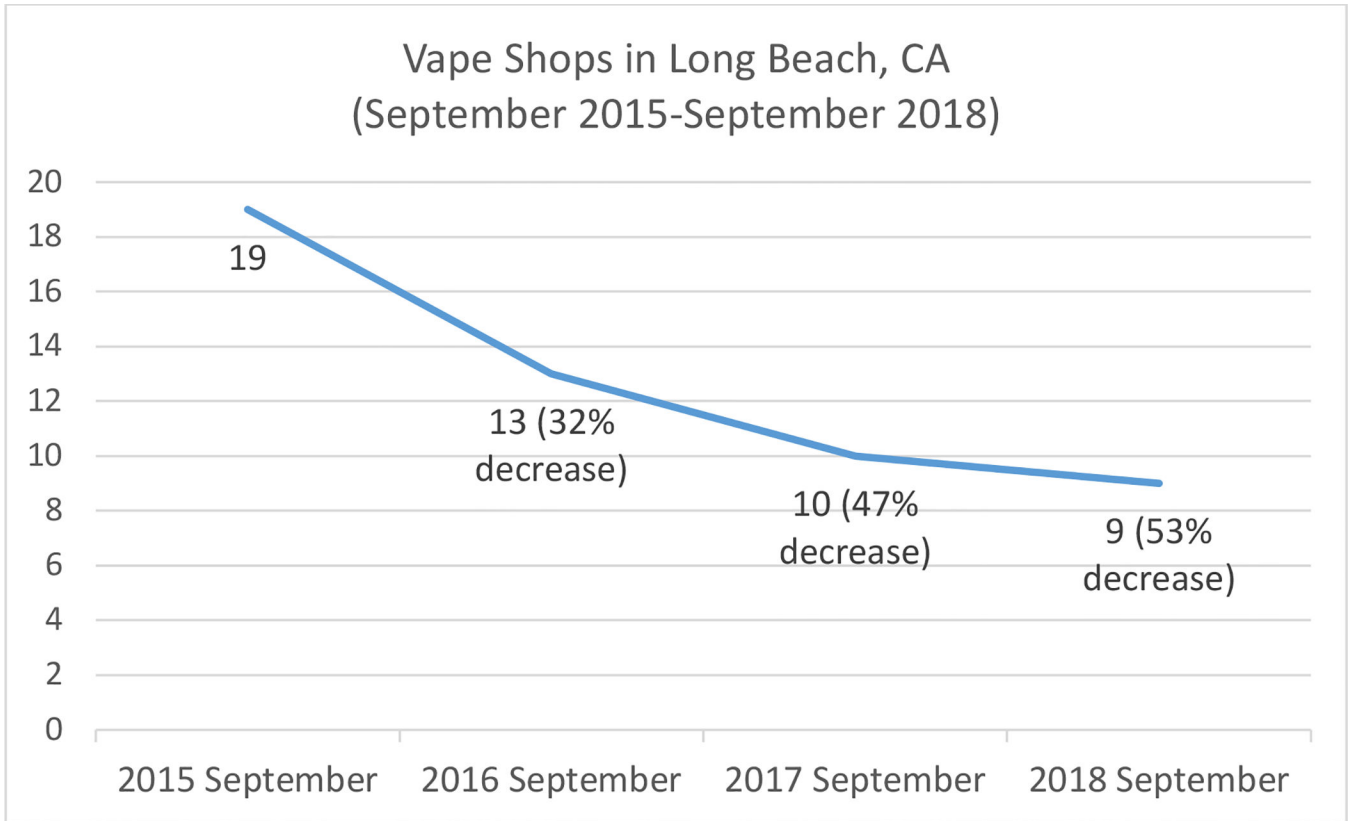
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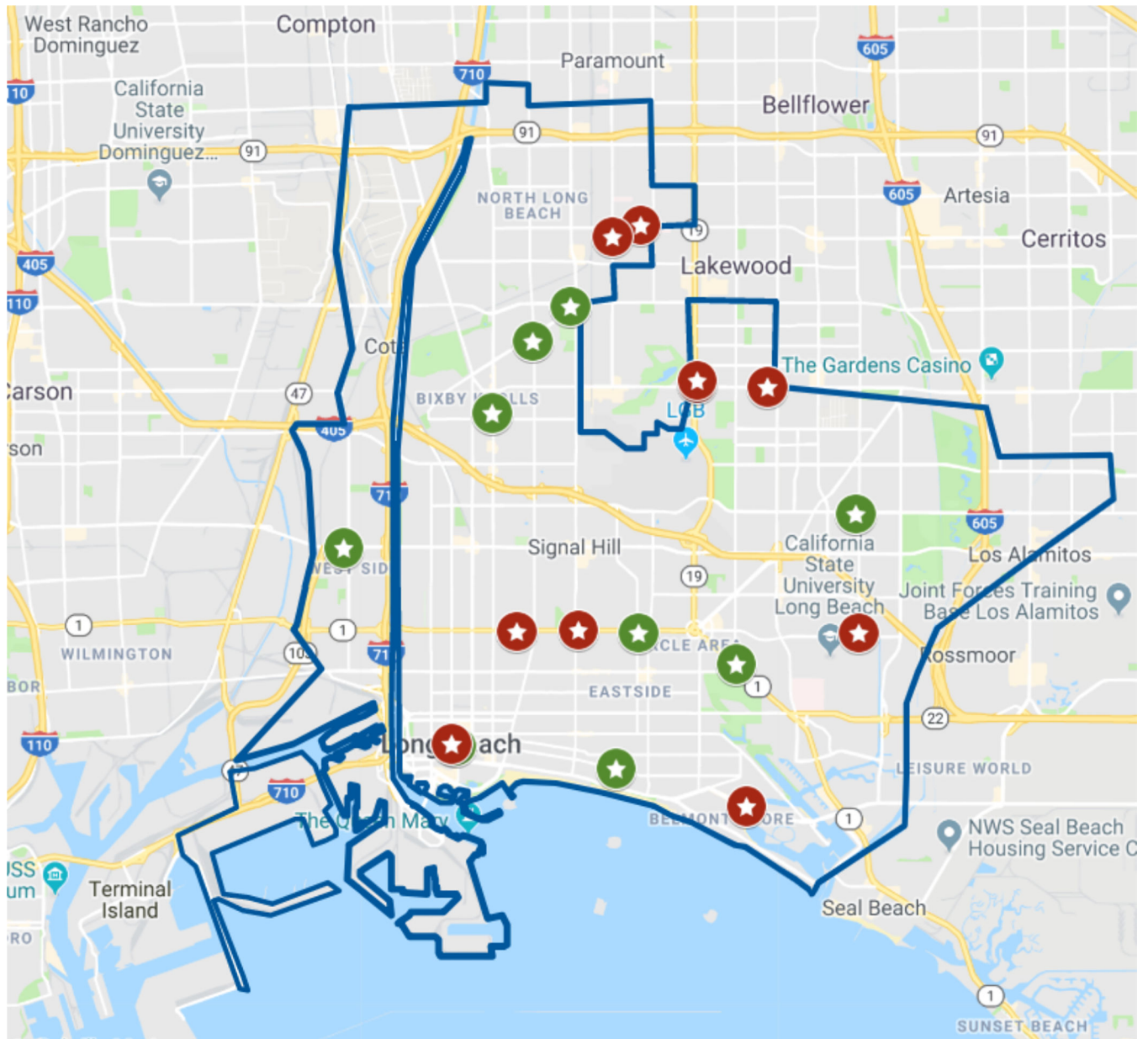
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### Vape Shops in Long Beach, CA (September 2015-September 2018)



**Figure 1.**  
Decline of Vape Shop Presence in Long Beach, California (CA): September 2015-September 2018



**Figure 2.**  
 Google Map of Exclusive Vape Shops in Long Beach, California: September 2015-  
 September 2018

Note.

Green circle = vape shop operational as of September 2018; red circle = vape shop became non-operational between September 2015 and September 2018.