Editorial

Vape shops: The e-cigarette marketplace

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ABSTRACT

As the vape shop industry begins to be regulated by Local, State, and Federal agencies, it becomes more imperative to engage in research on this new sales modality of e-cigarette products, and to understand its functions and reactions to regulations. There are rather few currently published peer-reviewed papers in this arena. This introductory paper provides the background and introduction to the papers in this Special Issue. This is the first issue of its kind on vape shops that will increase the pool of research papers in this arena by a third, and provides marketing, vaping behavior, and policy-related information.

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KEYWORDS
vape shop, electronic cigarette

Received: 16 August 2017
Accepted: 18 August 2017

Tob. Prev. Cessation 2016;2(Supplement):11 http://doi.org/10.18332/tpc/76484

INTRODUCTION

Electronic or e-cigarettes are battery-powered devices that are used to vaporize a propylene glycol [PG] and/or vegetable glycerin [VG] solution, generally with some type of flavoring, and which may also contain liquid nicotine in various concentrations. There are also e-cigarettes that do not contain nicotine. E-cigarettes may be disposable (e.g. blu and NJOY disposable brands often sold at convenience stores) or reusable (with battery chargers, heating coils, and the option to customize the liquid solution). E-cigarette users (often called "vapers") inhale a vapor that does not contain many of the toxic compounds that are found in cigarette smoke generated by combustion and which contribute to the extremely high risk of disease and premature death in smokers[1]. In the last few years, "vape shops" have proliferated in various countries, including the USA where vape shops have nearly tripled from an estimate of 3,500 in 2013[2] to 9,945 in 2015[3]. These shops are so-named because they specialize in sales of electronic cigarette products.

Unlike other retailers, most vape shops allow users to sample several types of e-liquids, using rechargeable tank-style devices. Vape shops sell a variety of types of refillable (and, rarely, disposable) e-cigarettes, several types of solution strengths and flavors, more complex and powerful tank systems that offer customized vaping experiences for experienced users, and sometimes other accessories (e.g. t-shirts). The vape shop business visibility is rapidly increasing. For example, a Google search for "vape shops" with "Los Angeles" revealed over 5,000 pages (accessed 12-20-2015), which increased to over 88,300 pages in 16 months (accessed 4-15-2015), to 134,000 pages one-year later (accessed 5-2-2016), and up to 168,000 pages assessed over a year after that (accessed 8-11-2017). The mark-up on e-cigarettes can be 200-400% (compared to 10-20% for combustible cigarettes), which may account in part for the unprecedented growth in the prevalence of such shops[2,4], with total e-cigarette sales worldwide being approximately $2.5 billion USD in 2014, estimated to be over $3.5 billion in 2015[5] and over $50 billion dollars by 2025[6]. Sales of e-cigarette products in vape shops likely are quite high, perhaps an average of $300,000 per shop[7], although traditional measures (e.g. the Nielsen Company) have not included vape shops yet as retailers[8]. Also, it is not yet possible to accurately calculate

price elasticity of vape shop-related vaping in the USA[9], though one European Union pooled time-series study indicated that every 10% increase in e-cigarette prices is associated with a drop in sales by approximately 8.2%[10], and the future growth of vape shops is uncertain[11]. In fact, among the 77 vape shops studied in California by Sussman and colleagues[12], 16 of them had shut down one year later (unpublished data; also see the work of Kong and colleagues)[13].

The current vape shop literature is guided, at least in part, by acknowledgement that least three factors may be driving the evolution of the vape shop industry: 1) the tobacco industry; 2) consumer demand; and 3) the public health sector and its diverse stakeholders. These influences and the responses of the vape shop sector have resulted in a rapidly changing landscape[14] .

The relationship between the vape shop industry and tobacco industry is adversarial in general, besides the presence of some "vape and smoke" shops that, anecdotally, are rejected by a majority of the vape shop industry. The vape shop industry is pretty open regarding its adversarial relationship with the tobacco industry[14, 15], generally viewing its shops as being more egalitarian and with a harm-reduction focus[16].

Regarding consumers, generations of box-type modular devices ("third generation box mod e-cigarette"), which permits regulating ohms (resistance), watts, and volts through use of a memory chip and is increasingly affordable, has been taking the place of tubular, more inefficient devices[17]. These tank-style devices appear more popular among adolescents and young adults than disposable e-cigarettes[18]. However, a higher percentage of older adult smokers who vape use disposables (51%) than later generation models (41%)[19]. Certainly, store owners perceive e-cigarettes as much more safe than combustible cigarettes[12], offer sophisticated marketing approaches, including loyalty point incentives for customers, and make vape shops an environment in which customers can socialize[1, 12, 20, 21].

Conversely, with the assumption that e-cigarettes may be dangerous to users and persons exposed to vapor[22], restrictions on the number, location, and density of vape shops, types and content of e-liquids, and ability to vape within shops have been considered at Local, State and Federal levels. While there is some debate, in general, the public-health sector is hesitant to recommend e-cigarettes as a method to quit combustible cigarettes[23], and calls for increased regulation of e-cigarettes continue to be made that explicitly mention vape shops as a distribution channel[24, 25]. The recent culmination of public-health policy actions at the Federal level has led to the FDA now having regulatory authority over e-cigarettes in the USA (as well as hookah, cigar, pipe tobacco, and combustible cigarettes)[26]. As of 8 August 2016, e-cigarettes were no longer to be sold to persons under the age of 18 (both in person or online), age verification is needed via photo ID, and free samples may no longer be distributed. This latter regulation (which may be even more stringent given some State and Local regulations) rules out free trial of e-liquids in vape shops. On 8 August 2016, the FDA issued its final deeming rule, which also included the removal of modified-risk claims (e.g. "light", "low", "mild") by 8 December 2017, and the classification of vape shops that create or modify electronic nicotine delivery systems including e-liquids as manufacturers requiring compliance with FDA manufacturing requirements, now extended to 8 August 2022[27] . These regulations post-date some of the findings in the papers in this Special Issue (modifying devices, in house; free e-juice samples). However, the work presented still has clear and timely implications for marketing and safety considerations.

Table 1. Topics of peer-reviewed articles located on a Google Scholar search

Topic	*Number of commentaries*	*Number of data-based papers*
Proliferation of vape shops and health dangers	3	0
Vape shop-derived e-cigarette toxicity	0	2
Vape shop products	0	4
Locating vape shops or customers from vape shops	2	5
Vape shop employees/ owner attitudes, beliefs, and behavior	0	4
Vape shop customers quitting smoking	0	3
Vape shop customer attitudes and beliefs	0	2
Vape shops antagonism toward the tobacco industry	1	0
Vape shop-related policy or activism	0	1
Vape shop reviews (multiple topics)	1	0

Note: The journals in which the articles appear were: *Addiction, American Journal of Health Behavior, American Journal of Public Health, British Medical Journal, Canadian Journal of Public Health, Evaluation & the Health Professions, Health & Place, International Journal of Environmental Research and Public Health, Journal of Analytical Toxicology, Nicotine & Tobacco Research, Preventing Chronic Disease, The Lancet Respiratory Medicine, Tobacco Control, Tobacco Induced Diseases, and Tobacco Regulatory Science.*

While there is a lot of popular literature accumulating on vape shops, there is a relative paucity of research literature. Examining Google Scholar over time, back in previous searches (10-8-2015 and 5-1-2016) only 48 and 99 webpages, respectively, were found when the keywords "vape shops," "vape shop," "vape lounges", and "vape lounge" were searched for individually. This number increased to 227 in a more recent search (8-11-2017). However, there are few peer-reviewed articles that address vape shops directly. A literature search on multiple search engines (Google Scholar, OvidMedline from 1946 to August Week 1, 2017, PsycINFO, and PubMed, 8-11-2017), considering only peer reviewed publications, and excluding articles that only mention "in passing" that vape shops are venues that sell e-cigarettes (or any of the papers from this Special Issue), only 28 articles currently are published (this list is available upon request). They appear in 15 journals; seven are commentaries and 21 are data-based. The topics addressed and journal names are shown in Table 1.

THIS SPECIAL ISSUE

There are several domains that are examined in this Special Issue, which includes 10 original data-based articles, which will increase the research literature in this arena by a third. These content areas substantively are divided up into three domains: marketing practices (five articles), vaping behavior of consumers and employees (three articles), and policy or activism efforts (two articles). We introduce these topics as follows.

Marketing practices

Vape shops intend to make potential customers aware of their existence and curious about visiting a shop and engaging in vaping. They also intend to make the shop accessible to encourage sales of e-cigarette-related products (vaping equipment, e-liquids, and hobby-related items such as t-shirts and magazines). Barker and colleagues[28] interviewed vape shop owners/managers in 37 vape shops and observed availability, price, promotion and placement of vaping products and e-liquids across nine USA cities: Atlanta, Chicago, Henderson, Phoenix, Oklahoma City, San Jose, Seattle, Thousand Oaks, and Ventura. A majority of vape shops primarily use social media outlets (e.g. 100% Facebook, 86% Instagram and Yelp, 65% Twitter, 38% YouTube) and special events open to the community (57%) for marketing. Few stores reported using print or broadcast media, with radio being the most popular venue (19%). About half (51%) of stores had external advertisements, and almost one-third had no signage related to sales to minors. Inside stores, few posted prices on ENDS products, although available e-liquid flavors (ranging from 15 to 404) and prices often were posted on chalkboards.

Garcia, Sidhu, and colleagues[29] present empirical data from 77 southern California vape shops, involving employee interviews and store observations. The data were collected from shops in communities that are of a relatively high percentage African-American (n=20), Hispanic (n=17), Korean (n=18), or non-Hispanic White (n=22) origin. Sixty-one percent of the stores had advertisements for e-cigarettes and 84% had promotions offering discounts. Vape shops in Hispanic communities were more likely to have ethnic-specific marketing material compared to shops in other communities. Visible self-service displays were prominent (83%), with differences also observed across communities. Korean and White location shops were relatively more likely to have self-service displays (>90%) compared to the other two communities (<77%).

Burbank and Ling[30] aimed to identify products and pricing of devices and e-liquid at 23 retail vape shops in the San Francisco Bay Area. Qualitative interviews of owners/employees were supplemented with observational data. All stores sold nicotine-free e-liquid, and 91% offered free samples of e-liquid; 57% of those offering free samples only offered nicotine-free e-liquid. All stores carried second and third-generation vape devices, and only 17% of stores carried first-generation devices. Employees estimated that 72% of their customers bought devices for smoking cessation or to substitute for combustible tobacco, and 10% for first-time recreational use. However, six stores reported a subpopulation of customers that were young adult hobbyists (e.g. engaged in "cloud chasing"), who viewed vaping as a peer-group activity.

Tsai and colleagues[31] engaged in a qualitative exploration of retailers' perceptions towards their products, customers, and services provided by the shop. Semi-structured interviews with vape shop retailers (n=77) located across Los Angeles County were conducted. Interviews were coded using a qualitative, conventional content-analysis approach. Vape shop retailers created a space that exclusively assists customers to know about vaping products but functions as a lounge, bar, or art gallery. Most retailers identified customers as young adults who wanted to quit smoking. Qualities associated with their customers included curiosity, friendliness/happiness, and being health conscious. Retailers purported that e-cigarettes have been used recreationally or as products that help curb other addictions (e.g. cigarette, sugar, drugs). While most conveyed positive experiences with

vaping, some reported negative experiences such as failure to quit smoking, dual use of e-cigarettes and cigarettes, and increased nicotine dependence.

Kong and colleagues[13] engaged in a one-year follow-up of a Yelp website content analysis of 72 vape shops in southern California. A total of 22% (n=16) of these shops closed permanently. Shops that remained open demonstrated a relatively greater number of Yelp reviews, mentions of rebuilds/fixing devices, ratings of staff as helpful/patient/respectful, and tended to report the vape shop physical environment as being a "bar type".

Vaping-related behavior of customers and employees

A second group of articles examines behavioral correlates of visiting vape shops, reasons for vaping, dual use of cigarettes and e-cigarettes among visitors to vape shops, and handling of nicotine in vape shops. Rose and colleagues[32] examined the prevalence and correlates of having ever visited a vape shop among USA young adults. Data were drawn from Wave 7 (weighted n = 3,542) of the Truth Initiative Young Adult Cohort, a nationally representative sample of men and women aged 18 to 34 years. Eleven percent of young adults had ever visited a vape shop. Significant correlates of ever visiting a vape shop in multivariable analyses were past 30-day use of cigarettes, past 30-day or ever use of an e-cigarette or hookah, past 30-day use of marijuana or other drugs, younger age (18-24 versus 25-34 years), Hispanic and other race (versus White race), and limited financial means.

Wagener and colleagues[33] surveyed a convenience sample of 100 vape shop customers (51% male; 76% White; Mean age = 37.6, SD = 15.1) from four Midwestern, metropolitan vape shops. All participants completed exhaled carbon monoxide testing to biochemically confirm self-reported smoking status (CO > 10 ppm). Participants had been vaping for a little over a year, with 63.4% of e-cigarette users biochemically-verified smoking abstinent. Most customers (91%) reported enjoying vaping more than smoking, with 80% preferring non-tobacco e-cigarette flavors. Participants reported that the most important device features were "battery life", "tastes good", and "curbs cravings"; the least important feature was "feels/looks like traditional cigarette". A majority 'agreed' or 'strongly agreed' that they preferred to buy e-cigarette supplies at vape shops because of "access to staff who can help troubleshoot device problems" (85%), "enjoy the atmosphere" (74%), and "because the e-liquid is fresher" (66%). Overall, vape shop customers demonstrated a high rate of smoking abstinence and overwhelmingly preferred vaping to smoking; however, no differences were seen between e-cigarette-only users and dual users in terms of smoking history or vaping behavior.

Garcia, Allem, and colleagues[34] examined how customers and employees from 77 vape shops in the greater Los Angeles area handle nicotine-containing e-liquids in vape shops. Half of the vape shops allowed customers to sample e-liquids with nicotine. Most of the shops (83.1%) provided self-service sampling stations. A majority of employees (72.4%) reported that spills of e-liquids containing nicotine had occurred in the past. While 64% of the shops provided safety equipment, only 34% provided equipment for proper e-liquid handling. Furthermore, 62% of the shops reported handling e-liquid without gloves or other protective equipment.

Policy, activism and vape shops

Finally, the impact of pricing and vape shop anti-regulation activism/harm-reduction focus were considered. In a cross-sectional survey of vape shop customers (n=80), Sears and colleagues[35] aimed to characterize spending on e-cigarettes and evaluate the association with use behavior. Overall, spending amounts ranged from less than $10/month to more than $250/month, with a median around $50-75/month. Males spent more than females, but spending did not significantly differ by age. Customers who spent more than $50/month tended to use lower levels of nicotine (mg/mL) in e-liquid compared to customers who spent under that amount and used traditional tobacco less frequently in a month.

Walker and colleagues[36] examined vape shop employees' perceptions and use of e-cigarettes from 16 vape shops, in Louisville, Kentucky. They found that nearly all employees were former smokers (93.33%), who now use solely e-cigarettes, replicating the results of Allem et al. (2016)[12]. Many employees (83.33%) began using e-cigs as a replacement for traditional cigarettes, and 93.33% reported better health since starting e-cigarette use. Only 40% of employees believed e-cigarettes should be regulated. Both the qualitative and quantitative findings revealed that vape shop employees perceived e-cigarettes as viable smoking cessation tools, and relished their role in assisting others to take positive health actions.

CONCLUSIONS

Noteworthy changes in the operation of vape shops have taken place over the last several months. However, the implications of these changes may not dramatically impact on vape shops. For example, marketing has needed to change to encourage customers to come to shops and purchase e-liquids without the ability to sample flavors for free. Anecdotally, though,

many shop owners now charge a small fee (e.g. $1 USD) for samples that easily side-step this new regulation. As another example, while devices no longer will be modified in the shops, advanced generation box-mod devices permit a great deal of the sorts of adjustments that required modification in earlier-generation devices. A third example, as noted among the manuscripts in this Special Issue and elsewhere[37], minors tend not to visit brick-and-mortar vape shops, so the new FDA sales regulations are unlikely to impact on shops in terms of age of customers, unless minimum age standards are changed (e.g. they are 21 years old now in California). Research is needed to examine whether, or in what ways, the deeming rule regulations are enforced in the vape shop context.

One may speculate that the vape shop environment will remain one that encourages customers to congregate. However, if vaping is not allowed within the shops in the future, one may predict that the locations would not be a place for hobbyists to visit. To the extent that prepackaged juices are the norm at vape shops, possibly nicotine-related spills would be less likely to occur. To the extent that e-cigarette devices continue to be made increasingly affordable, possibly attempts to raise prices through taxation may not have much of an impact on prevalence of use.

Certainly, the public-health community is split on whether vaping may be a harm-reduction method, or whether other approaches are to be preferred[14]. Activism efforts among those in the vape shop industry are expected to continue, though regulation of e-cigarette products is now under FDA jurisdiction and it is expected that the reigns over vape shops will continue to be tightened in the USA.

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CONFLICT OF INTERESTS
The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

FUNDING
This work was supported by the National Cancer Institute of the National Institutes of Health (NCI-NIH), the Food and Drug Administration (FDA) Center for Tobacco Products (CTP) (Award Number 1P50CA180905) (Pentz/Samet), the Tobacco-Related Disease Research Program (TRDRP) (Award Number 53-5146-2616), and a USC gift account. The content is solely the responsibility of the authors and does not necessarily represent the official views of NCI-NIH or the FDA.

PROVENANCE AND PEER REVIEW
Commissioned; Internally peer reviewed