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Commentary: The Emergence of Pod Mods at Vape Shops

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Abstract

The vape shop industry is a rapidly growing market sector with a constantly changing product landscape. The rapid evolution of nicotine delivery systems, most notably the emergence of salt nicotine e-juice and pod mod devices, have resulted in a sudden shift in the product market, suggesting new implications for the health professions in addressing electronic cigarette use.

Keywords

vape shops; electronic cigarettes; pod mods; health

Electronic cigarettes entered the U.S. market in the mid-2000s, although the concept of the e-cigarette was introduced back in the 1960s. In the last few years, “vape shops” have flourished in various countries including the United States, as brick and mortar e-cigarette retail outlets, as well as a highly e-commerce-driven industry. In a 2016 article, the business rating site “Yelp” provided the locations of 10,591 stores that were identified as vape shops in their database (Groskopf, 2016). The author notes that there is rapid growth in physical locations, in contrast to only a third of all vapor products being found to be bought online. Brick and mortar vape shops sell a variety of products, ranging from e-cigarettes (pod mods, box mods, pens, cig-a-likes), e-juices (varying from 0 mg of nicotine to levels as high as 50 mg), to accessories such as T-shirts and hats, and play a major role in sales of e-cigarettes currently. The sudden spread of vape shops and ever-changing electronic nicotine delivery systems, the vaping of which may emit heavy metal particulates, formaldehyde, diacetyl, and nicotine-containing e-juices that may be poisonous if imbibed by young children, ultimately may have a negative impact on health behaviors and health outcomes in the future (USDHHS, 2016). Alternatively, these vape shops may serve to assist chronic combustible cigarette smokers to quit a likely more hazardous habit (USDHHS, 2016).

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A rather dynamic marketplace exists, which began with first-generation cig-a-like, or “like a cigarette,” products, such as Blu by Imperial Brands, many of which were disposable after use. The second generation of e-cigarettes then became tubular shaped, larger, tank style (generally refillable), and rechargeable. A few years later, third-generation products were developed. These were “box mods” (relatively sleek in appearance and shaped like a box) that could be programmed on voltage and wattage, to vary the amount of vapor exuded. Second- and third-generation products involve periodic changing of certain parts of the devices (cotton and coils), along with dripping more e-juice into the device.

Standard packaged freebase e-juice nicotine levels may vary, ranging from non nicotine (0 mg) e-juice, to 3 mg, which has been reported as the most popular level of nicotine at a majority of surveyed shops in Southern California (Garcia et al., 2016), as well as 6, 9, 12, 18, and 24 mg of juice. Liquid nicotine is dissolved in a mixture of propylene glycol (PG) and vegetable glycerin (VG). VG tends to lead to relatively large vapor “clouds” and a relatively mild throat hit (sensation in throat). A higher PG/VG ratio leads to less clouds and a harsher throat hit. With second- and third-generation devices, manufacturers appeared to try to create the ability for customers to produce bigger vapor clouds, with some vape shops even holding “cloud chasing” contests, where vapers could win prizes for blowing the biggest cloud of vapor.

Although more appealing to use for some, many older, longtime combustible cigarette smokers were not looking to engage in the cloudchasing outlet of vaping but desired a “throat hit” and nicotine metabolism pattern more comparable to smoking a combustible cigarette (e.g., see USDHHS, 2016; Sussman et al., 2016). On June 1, 2015, Pax Labs, formerly Ploom, introduced the first of the marketed “pod mods.” This is a low-powered, high-nicotine device called the JUUL, which looks like a USB flash drive. This small device features a simple design, no buttons and an atomizer that are contained inside disposable JUUL pods. Shortly, thereafter, many brands of pod mods were manufactured, which are concealable and economical. These devices offer a “mouth to lung” experience, a popular smoking (or vaping) method used by combustible cigarette smokers where the smoke, or vapor, is inhaled into the mouth, then pulled into the lungs. Since it is similar to smoking a cigarette, many new e-cigarette users who were combustible tobacco users appear to prefer these types of devices (MistHub, 2018). One may consider pod mods the fourth generation of vaporizers.

Many types of pod mods now exist, as of 2018. Pod mods may be categorized into three different types: open system (drip; e.g., Kandypens, Suorin Drop/Air), closed system (packets or pods; e.g., JUUL, Aspire, Cue Vapor), or both (e.g., Envii FITT). These devices utilize nicotine salt e-juice (benzoic acid added to lower the pH level) along with a somewhat higher level of VG relative to PG. Nicotine salts may contain up to 50 mg of nicotine inhaled at a relatively low wattage. Typically, nicotine salt products contain a PG:VG ratio of 30-to-40:60 (JUUL-Our Technology, 2018; Mr. Salt-E Nicotine Salt, 2018).

It is estimated that JUUL and other pod mod products currently account for 40–70% of the e-cigarette retail market share (Huang et al., 2018), rendering some information about e-cigarette devices published 2 years ago obsolete (e.g., see USDHHS, 2016, p. 149). This

rapid increase in prevalence of pod mods has also been noted in the popular media (e.g., Barshad, 2018). Devices such as the JUUL are widely marketed online and through social media. In 2017, a Schroeder Institute survey of 15-to-24-year-old youth indicated that 25% of the sample recognized the JUUL device and 8% used it in the last 30 days (Willett et al., 2018). Teen use of pod mods on school grounds, including the use during class time, is reportedly widespread (Barrington-Trimis & Leventhal, 2018).

The first longitudinal project of vape shops is ongoing, conducted by Sussman and colleagues in Southern California (e.g., see Kong, Unger, Baezconde-Garbanati, & Sussman, 2017; Yu et al., 2018). Seventy-seven shops were assessed at baseline in 2014. At Wave 2, 61 of these baseline shops were still open (assessed 1 year later in 2015), while 43 were still open 2.5 years after baseline (2018—Wave 3). None of the baseline shops sold pod mod devices. At 1-year follow-up, two of the open shops carried a pod mod (4.7%), and at a 2.5-year follow-up, 35 (83.3%) of the remaining 42 shops that were observed and surveyed (only one shop refused, of 43 shops still open) carried pod mods or at least the pods (found in two shops).

The project goal will be to collect data from 120 shops by 2019, including the longitudinal sample and many new vape shops. Among an interim sample of 92 total shops (as of August 29, 2018), 72 (78.3%) shops sold pod mod devices. Nineteen (20.7%) of these shops sold one brand of pod mod device, 27 (29.3%) sold two brands, while 26 (28.3%) sold three or more brands. The most popular pod mod brand sold was Suorin (Suorin Drop or Suorin Air), an open-system pod mod device compatible with salt-nicotine e-juice containing 25-to-50 mg of nicotine. Sixty-one (66.3%) of these 92 shops sold Suorin. The second most popular brand, JUUL, was found in 40 (43.5%) of these shops. The third most prevalent brand was PHIX, another closed system pod mod, which was sold at 27 (37.50%) shops. Other various brands of pod mod devices entered the market a few months later. These include Aspire Breeze, which was sold at 11 shops; SMOK, sold at nine shops; BO, Mi-Pod, and Zoor pods sold at six shops; and Kilo sold at three shops. χ^2 analysis showed that shops surveyed after January 1, 2018, were more likely to sell pod mod devices, compared to those surveyed before the New Year (85.9% vs. 14.1%, $p < .01$).

Future Directions

The nicotine delivery system landscape has proved to evolve faster than it is possible to develop, implement, and disseminate novel evidence-based programs for tobacco use cessation, or adolescent tobacco use prevention, as well as initiate public health campaigns against those who currently do not smoke or are unaware that certain vaping devices like JUUL contain nicotine. More research is needed on the long-term effects of vaping nicotine e-juice as well as the adverse effects of vaping these pod devices and whether they, or any substitute device, might truly assist with combustible tobacco smoking cessation. At least one review suggests that e-cigarettes, prior to the advent of pod mods, are ineffective as a means of smoking cessation (Kalkhoran & Glantz, 2016). However, pod mods were not examined, and most of the studies involved nonoptimal research designs. Learning more about the health-related risks and cessation efficacy and effectiveness of e-cigarette devices are sorely needed to provide practitioners in the health professions evidence-based findings

that will help them determine whether their patients should consider using these devices and whether it may be an effective tool to assist in quitting smoking. The health professions involved in nicotine prevention, cessation, and regulation will need to keep pace with this very dynamic marketplace.

Many longtime combustible cigarette smokers still turn to vape shops and e-cigarettes as a means of cessation (Allem, Unger, Garcia, Baezconde-Garbanati, & Sussman, 2015). It is not uncommon that vape shop employees are put in the role of counselors and readily offer advice to customers who seek information on quitting smoking and buying e-cigarette products. While maybe helpful for cessation from combustible cigarettes, combustible cigarette smokers looking to quit through the use of pod mods should be wary of the high levels of nicotine in salt-based juices used by these devices until the long-term effects are studied more extensively in lab-based research studies. Future public health campaigns should be aimed at deterring minors from using any nicotine-containing product, since nicotine may interfere with the development of executive cognitive function among youth (USDHHS, 2014).

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References

- Allem J, Unger JB, Garcia R, Baezconde-Garbanati L, & Sussman S (2015). Tobacco attitudes and behaviors of vape shop retailers in Los Angeles. *American Journal of Health Behavior*, 39, 794–798. doi:10.5993/ajhb.39.6.7 [PubMed: 26450547]
- Barrington-Trimis JL, & Leventhal AM (2018). Adolescents' use of "Pod Mod" E-cigarettes-Urgent Concerns. *New England Journal of Medicine*, 379, 1099–1102. [PubMed: 30134127]
- Barshad A (2018, 4 7). The Juul is too cool. Retrieved from <https://www.nytimes.com/2018/04/07/style/the-juul-is-too-cool.html>
- García R, Sidhu A, Allem JP, Baezconde-Garbanati L, Unger JB, & Sussman S (2016). Marketing activities of vape shop as a function of community racial/ethnic communities. *Tobacco Prevention & Cessation*, 2, 6. [PubMed: 28393129]
- Groskopf C (2016, 2 10). What Yelp data reveal about the sudden rise of vape shops in America. Retrieved from <https://qz.com/608469/what-yelp-data-tells-us-about-vaping/>
- Huang J, Duan Z, Kwok J, Binns S, Vera LE, Kim Y, & Emery SL (2018). Vaping versus JUULing: How the extraordinary growth and marketing of JUUL transformed the US retail e-cigarette market. *Tobacco Control*. doi:10.1136/tobaccocontrol-2018-054382
- JUUL-Our Technology. (2018). Retrieved from <https://www.juul.com/our-technology>
- Kalkhoran S, & Glantz SA (2016). E-cigarettes and smoking cessation in real-world and clinical settings: A systematic review and meta-analysis. *Lancet Respiratory Medicine* 4, 116–128. doi: 10.1016/S2213-2600(15)00521-4 [PubMed: 26776875]
- Kong G, Unger J, Baezconde-Garbanati L, & Sussman S (2017). The associations between yelp online reviews and vape shops closing or remaining open one year later. *Tobacco Prevention & Cessation*, 2. doi:10.18332/tpc/67967

- MistHub. (2018, 3 11). Mouth to lung vs direct to lung vape guide. Retrieved from <https://www.misthub.com/blogs/vape-tutorials/mouth-to-lung-vs-direct-to-lung-vape-guide>
- Mr. Salt-E Nicotine Salt and Premium E-liquid. (2018). Retrieved from <https://www.misthub.com/products/tobacco-e-juice-by-mr-salt-e>
- Sussman S, Baezconde-Garbanati L, Garcia R, Barker DC, Samet JM, Leventhal A, & Unger JB (2016). Commentary: Forces that drive the vape shop industry and implications for the health professions. *Evaluation of the Health Professions*, 393, 379–388.
- U.S. Department of Health and Human Services. (2014). *The health consequences of smoking-50 years of progress: A report of the surgeon general*. Atlanta, GA: U.S. DHHS, CDC, NCCDPHP, OSH.
- U.S. Department of Health and Human Services. (2016). *E-cigarette use among youth and young adults. A report of the surgeon general*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- Willett JG, Bennett M, Hair EC, Xiao H, Greenberg MS, Harvey E, & Vallone D (2018). Recognition, use and perceptions of JUUL among youth and young adults. *Tobacco Control*. doi:10.1136/tobaccocontrol-2018-054273
- Yu S, Escobedo P, Garcia R, Cruz T, Unger J, Baezconde-Garbanati L, & Sussman S (2018). A descriptive longitudinal study of changes in vape shop characteristics and store policies in anticipation of the 2016 FDA regulations of tobacco products, including E-Cigarettes. *International Journal of Environmental Research and Public Health*, 15, 313. doi:10.3390/ijerph15020313