JUUL & THE GUINEA PIG GENERATION

Public Health Concerns about Use by Young People

JUUL. The recent rapid rise in popularity of this flavored, potent, nicotine-based e-cigarette product, particularly among youth and young adults, as well as the apparent ease of access, use, and ability to open and custom-fill its supposedly closed-system cartridges, has alarmed the public health community.[1]

Youth use of e-cigarettes is now more common than use of conventional cigarettes, yet significant gaps remain in e-cigarette regulatory structures, federally, and among state and local governments. This fact sheet provides an overview of JUUL, examines regulatory issues related to the product, and describes regulatory measures that can help prevent harmful health impacts on this susceptible generation.

Q: What is JUUL?

A: Launched in 2015, JUUL is the fastest growing and top-selling electronic cigarette (e-cigarette) brand in the United States. JUUL's market share began skyrocketing in mid-2017 and has climbed continuously since then. For the four-week period ending March 24, 2018, JUUL's reported market (dollar) share was a remarkable 54.6 percent; its unit share was also noteworthy, at 36.2 percent for the same period.[2] JUUL has surpassed all of its competitors in the e-cigarette market, including products marketed by U.S. tobacco industry giants — RJ Reynolds' Vuse, Altria's Mark Ten, and Imperial's Blu and its new variant, myblu.[3]

A JUUL e-cigarette has two parts: the body of the device, which contains a lithium-ion polymer battery, a temperature regulator, and sensors to read the charge level and to sense inhalation; and the cartridge — called a *JUULpod* — which contains an atomizer, e-liquid, and the mouthpiece. Once the cartridge is clicked into the body, the device is ready for use. Users charge a JUUL device by connecting it to a magnetic USB charger, then plugging the charger into a USB laptop or other computer port.

JUUL Labs claims that all its cartridges contain 0.7 mL of nicotine with 5 percent nicotine by weight, about equal to the amount of nicotine in a pack of cigarettes or 200 puffs.[4] The characterization of 5 percent nicotine by weight may lead some consumers, including young users, to assume that the amount of nicotine contained in each cartridge is low when this concentration of nicotine is actually quite potent — 59 milligrams of nicotine per milliliter (59 mg/mL). In comparison, most e-liquids on the market contain 0-36 milligrams of nicotine per milliliter.

Unlike most e-liquids, which are formulated with freebase nicotine, JUUL Labs' proprietary e-liquid cartridges are formulated with cigarette-strength nicotine salts, a crystallized ver-sion of nicotine extracted from natural tobacco leaves that is blended with other substances, including propylene glycol, glycerol, benzoic acid, natural oils, extracts, and flavors.[5] According to JUUL Labs, inhaling aerosol from the proprietary heated e-liquids in JUUL devices mimics the way that nicotine is absorbed in the bloodstream from combusted cigarettes, such that use of a JUUL device, as intended, can achieve a similar rate of absorption in the bloodstream and deliver nicotine to the brain similarly to conventional cigarettes.[6]

Q: What accounts for JUUL's growing popularity among U.S. youth?

A: Although JUUL Labs promotes its brand as being for adult smokers looking to switch to a non-combustible alternative to conventional cigarettes, JUUL has developed a fervent following among youth and young adults. JUUL's popularity has been fueled by a strong presence on social media sites like YouTube, Reddit, and Twitter,[7] where young people use the term "JUULing" to describe use of the device. Closely resembling a USB flash drive, JUUL has been described as the "iPhone" of e-cigarettes. Its discreet, sleek, and techy profile is particularly attractive to youth and young adults, with an obvious part of its appeal being the ability to "JUUL" without detection in prohibited settings.

The JUUL fits in the palm of one's hand, making it very easy to conceal. Accounts of student use of JUUL in school classrooms, bathrooms, grounds, and other school settings — self-reported and described by school authorities in numerous recent news stories — indicate that users can inhale puffs of the aerosolized, flavored nicotine and exhale without producing a large cloud of vapor or a strong odor, enhancing one's ability to use the product without detection.[8] Because of its close resemblance to a USB flash drive, underage users may be able to recharge a JUUL in plain view.

Young people are attracted to JUUL's availability in an assortment of flavors, including Cool Mint, Fruit Medley, Cool Cucumber, Creme Brulee, and Virginia Tobacco. Starter kits include one of each of four flavors. JUUL Labs' periodic issuance of limited-release flavors is likely an additional lure. The reportedly smooth throat-feel of the nicotine-salt based e-liquid may also entice youth and young adults, and the strength of the nicotine concentration delivers a substantial buzz, elevating the potential for rapid addiction.

Another reason for JUUL's popularity among youth is the company's heavy promotion and marketing — both online and in other media. Seven in 10 teens are exposed to e-cigarette ads.[9] E-cigarette advertisements, including those from JUUL, have a strong presence not only on the internet but also on television and radio, in film and print advertisements, and at retail points of sale. E-cigarette use among youth is rising as e-cigarette advertising grows.[10] JUUL's current outsized popularity is elevating its presence in both paid and earned media.

As with other trend-setting products like Apple's iPhone, companion products may also be helping drive the brand's popularity. For example, decorative, multi-colored and patterned "skins" that slip onto and adorn JUUL devices enable users to personalize them — similar to the way protective covers offer a popular way to personalize cell phones.

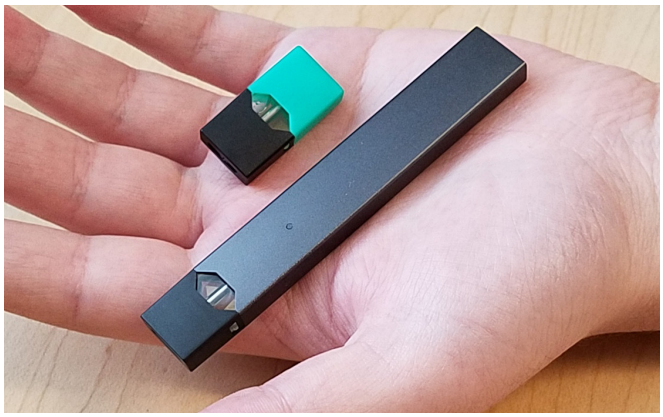


Photo: JUUL Labs, Inc.

Q: Why is the public health community concerned about youth use of JUUL?

A: JUUL's popularity among youth deeply concerns the public health community, which for decades has invested in efforts to prevent smoking of conventional cigarettes and e-cigarette use by young people. The concern is rooted in evidence that most tobacco use starts in adolescence and that exposure to nicotine during adolescence and young adulthood can cause addiction and harm the developing brain.[11] Youth use of conventional cigarettes has declined substantially, while youth use of e-cigarettes surpassed their use of conventional cigarettes in 2014. In fact, youth now use e-cigarettes more than any other tobacco product.[12]

Use of e-cigarettes by youth is strongly associated with use of other tobacco products, including conventional cigarettes and other burned tobacco products.[13] Research has found that youth who use e-cigarettes are more likely to go on to use other tobacco products, including conventional cigarettes.[14] In 2015, nearly 6 of 10 high school cigarette smokers also used e-cigarettes, and more than 3 million middle and senior high school students, including 1 in 6 high school students, reported using e-cigarettes in the past month. More than 25 percent of all middle and high school students have tried an e-cigarette.[15]

E-cigarettes containing nicotine pose serious health risks to youth, pregnant women, fetuses, and others. Products containing nicotine, including e-cigarettes, are unsafe for youth and young adults because nicotine is highly addictive. Exposure to nicotine can damage brain development by disrupting and altering the growth and structure of the circuitry that controls attention, learning, and susceptibility to addiction.[16] Brain development continues into a person's early to mid-20s. The effects of exposure to nicotine during these years may be long-lasting and include

impacts like mood disorders and lower impulse control.[17] Nicotine can also prime young brains for addiction to other drugs, including cocaine or methamphetamine. Ingesting e-liquids formulated with nicotine can cause acute toxicity and even death, depending on how they are consumed. Pregnant women (including teenagers and adults) are at risk because nicotine can cross the placenta, affecting fetal and postnatal development. Exposure to nicotine during pregnancy can have adverse consequences after birth, including sudden infant death syndrome (SIDS).[18]

Although JUUL is marketed as a *closed system* device, meaning that its proprietary e-liquid cartridges are intended to be replaced — not refilled — when empty, the cartridges can be opened with relative ease and refilled with other flavors and substances, including illicit ones. Indeed, step-by-step guidance on opening and refilling JUULpods is readily available on YouTube and other social media sites. The ease of opening JUUL cartridges raises concerns about youth and young adult susceptibility to addiction, substance abuse, toxicity, and other short- and long-term health risks.

Research has shown that flavored tobacco products appeal to youth[19] and that the majority of youth who use tobacco started with a flavored product.[20] This knowledge, coupled with the tobacco industry's track record of marketing flavored products as a way to draw young people to their products,[21] led Congress to prohibit cigarettes with all flavors except tobacco and menthol when it passed the Family Smoking Prevention and Tobacco Control Act in 2009, granting the U.S. Food and Drug Administration (FDA) the authority to regulate tobacco products.[22]

While it has full authority to do so, the FDA has not yet extended the prohibition to all flavors or prohibited flavoring in any additional tobacco products. E-cigarettes — the most-used product by youth — are not covered by the current flavor prohibition. Research findings on youth attraction to electronic cigarettes suggests the need for FDA action. A 2015 study examining youth use of e-cigarettes found that flavored e-cigarette use was associated with initiation of cigarette use among never smokers, lower odds of intention to quit tobacco use among current youth smokers (dual use); and lower prevalence of the perception of the dangers of tobacco among users of flavored e-cigarettes.[23] Public health leaders are very concerned about youth's attraction to JUUL and similar e-cigarette and e-liquid products based on industry marketing of flavors. Emerging survey research suggests, for example, that young people may be drawn to the fruit and candy-like flavors offered by JUUL without being aware that JUUL is a potent nicotine-based product to which they can become easily addicted.[24]

The inadequacy of quality control and other standards in the manufacture of e-cigarettes raises additional, serious public health concerns regarding youth access and use. For instance, actual nicotine concentrations in JUUL and other e-liquids can vary from advertised amounts, some-

times significantly exceeding the advertised concentration of nicotine. Because the concentration of nicotine in JUUL pods is already staggeringly high and potent, concentrations over the advertised amounts can increase the risk that users could become addicted or experience nicotine poisoning,[25] which can result in serious illness or death. A related concern is the lack of full disclosure of all ingredients in e-liquids, some of which can also cause harm when inhaled.[26]

These manufacturing concerns speak to the time-sensitive need for strong regulatory action at the federal level. Since extending its regulatory jurisdiction to e-cigarettes and e-liquids in 2016, the FDA has not taken any actions that could allay concerns regarding product constituents. Manufacturers are required to disclose ingredients by May 8, 2018, and harmful and potentially harmful constituents by November 8, 2019. This information is merely retained by the agency; no specific actions follow the collection of information. Although FDA premarket review of tobacco products has the potential to address unique and harmful characteristics of JUUL, the FDA has extended the deadline for manufacturers of non-combustible tobacco products to file a marketing application to August 8, 2022 — roughly five years from now. The FDA has allowed products that were on the market on August 8, 2016 to continue to be sold so long as the manufacturer files an application by August 8, 2022. The FDA is also allowing products with a pending application to remain on the market until the FDA reviews and takes action on the application, such as issuing an order that the product must be removed. Thus, unless the FDA changes course by taking an affirmative action soon, JUUL and its progeny will likely remain on the market for years to come.

Studies specifically related to youth use of JUUL are just beginning to emerge.[27] National online survey research conducted by the Schroeder Institute for Tobacco Studies in November of 2017 among young persons, ages 15 to 24, studied perceptions and use of JUUL products. Overall, one-quarter of respondents (n-1013) reported recognition of JUUL devices, 10 percent reported both recognition and use, and 8 percent reported using a JUUL device within the past 30 days. Those 15 to 17 years of age were less likely to recognize JUUL products than 18 to 24 year-olds (21% vs. 29%), less likely to have ever used the product (7% vs. 12%), and less likely to have used a JUUL device within the past 30 days (6% vs. 10%). Of particular note, only 25 percent of all who recognized the product and 37 percent of those who had used a JUUL device during the past 30 days knew that JUUL devices always contain nicotine. In other words, 63 percent of JUUL users did not know that JUUL always contains nicotine. Twenty-five percent of those who recognized JUUL products reported that others their age referred to use as "JUULing." Strikingly, nearly 80 percent of survey respondents who reported ever using JUUL were also users within the past 30 days. The study authors note that this finding differs from earlier research showing smaller proportions of current users among ever users, suggesting that a sizeable majority of ever users of JUUL may be using the device regularly, rather than simply experimenting.[28]

Q: Is JUUL one-of-a-kind?

A: While several copy-cat or other similar products are available on the market,[29] JUUL is far-and-away the front-runner in sales volume among all marketed brands of e-cigarettes. The proliferation of similar products is concerning, especially given the FDA's failure to prevent products from entering the market without premarket review after August 8, 2016.

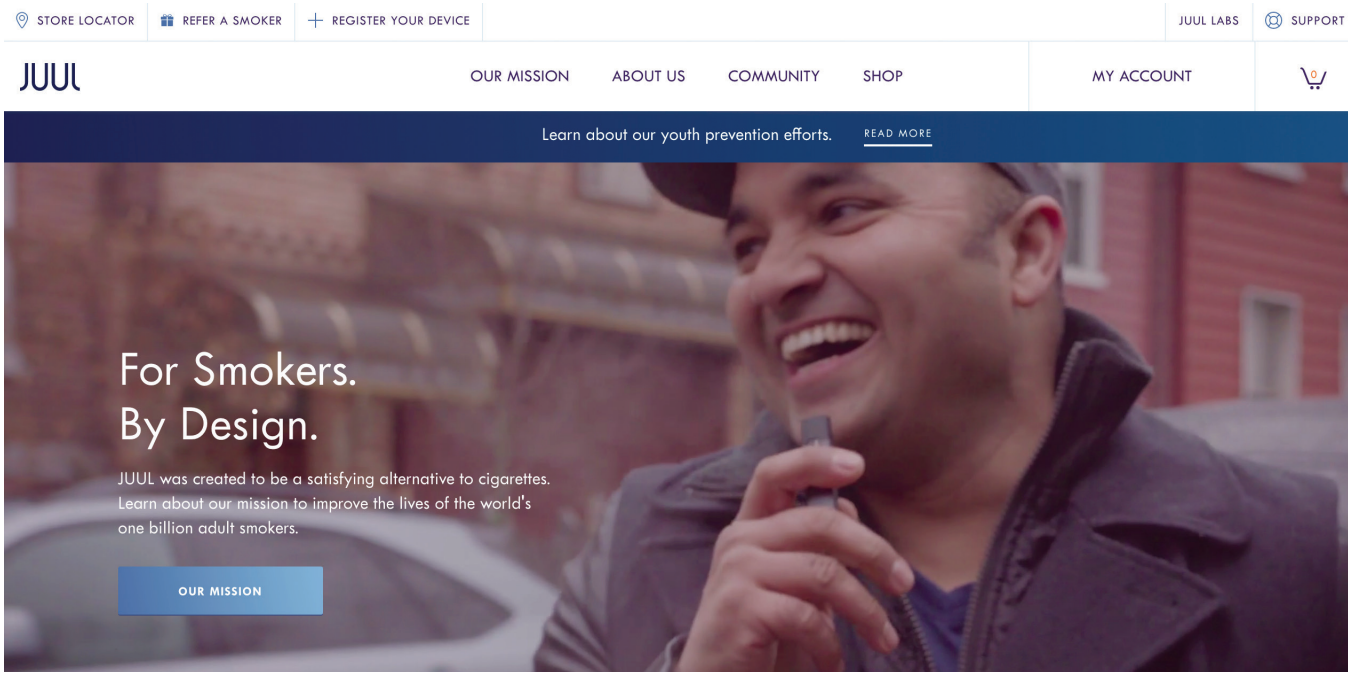
Q: How much do JUUL products cost?

A: JUUL Labs sells its devices and pods directly online and at retail stores throughout the country, including convenience store chains. A JUUL device, sold with a rechargeable battery, currently retails for $34.99. A starter kit, which contains a device, a charger, and four proprietary JUULpod cartridges, one in each of four flavors, retails for $49.99.[30] JUUL Labs has introduced additional flavors (cool cucumber, classic menthol, and classic tobacco) and markets some flavors in limited releases. JUUL markets the cartridges, four to a pack, for $15.99.[31] With one cartridge containing a nicotine concentration equal to a pack of cigarettes, this amounts to a per pack equivalent of about $4.00, plus tax. On its website, JUUL offers online shoppers a variety of deals that further reduce costs, including first-time purchase discounts, discounts for referring "a smoker," free shipping, and subscription services (e.g., subscribers are offered a 15 percent discount), and some similar discounts are being offered at retail locations.

The approximate, weighted average price for a pack of cigarettes in the United States is currently about $6.32 per pack.[32] While some states tax e-cigarettes and e-liquids containing nicotine at the same rate as other tobacco products, many states do not.[33]

Q: Where are youth learning about and acquiring JUUL?

A: Youth appear to be learning about JUUL through multiple communication channels, including networks of friends, family, schoolmates, and coworkers, as well as social media sites on the internet,[34] advertisements, and news sources. JUUL Labs sells its devices and cartridges to consumers directly online. Although JUUL Labs states on two company-run websites (www.juullabs.com and www.juulvapor.com) that it sells only to persons 21 and over, researchers have found that the company's online age verification processes fail to prevent youth access.[35] This is a problem affecting online e-cigarette vendors, generally, and underscores the need to strengthen regulation of internet sales.[36] An additional concern is that in conducting an internet search, one can easily find multiple sites other than JUUL Labs where JUUL or copy-cat



www.juul.com.

products are offered for sale. On its own site, JUUL Labs provides a store indicator tab, which anyone can use to locate brick-and-mortar vendors nationwide, including convenience store chains such as Kwik-Stop, Cumberland Farms, 7-Eleven, and Circle K.

Q: Is JUUL subject to federal, state, or local regulation?

A: A combination of federal, state, and local policy options can be pursued to strengthen regulation of JUUL and other e-cigarettes. The Public Health Law Center's website has multiple resources on e-cigarette regulation. Prominent policy options that can help prevent initiation and use of JUUL and other electronic cigarettes and e-liquids include:

Sales

- Prohibiting sales of e-cigarettes and e-liquids to persons under 21;
- Restricting locations of sales to adult-only licensed retailers that are off-limits to persons under 21;
- Prohibiting sales of flavored e-cigarettes and e-liquids or restricting sales of such products to licensed retailers that do not allow persons under 21 to purchase or enter at any time;

- Prohibiting the sale of e-cigarettes and e-liquids with a nicotine concentration over a certain amount (e.g., over 40 mg/ml);
- Prohibiting direct shipping of online orders of e-cigarettes and e-liquids to consumers (e.g., allowing online orders to be shipped only to licensed distributors or retailers); and
- Restricting and monitoring shipments by strengthening age of verification, shipment, and enforcement policies.

Use

- Amending school policies and state and local smoke-free or tobacco-free workplace laws by adding or updating definitions and policy language, as needed, to prohibit e-cigarette use in settings where smoking is prohibited;

Marketing

- Addressing false or misleading claims through use of state consumer protection and/or unfair trade practice laws; and
- Placing limits on advertising, to the extent permitted by law.

Pricing

- Prohibiting all free and nominal price sampling of e-cigarettes and e-liquids, regardless of whether they purport to contain no nicotine;
- Prohibiting discounting of products;
- Imposing state excise taxes of e-cigarettes and e-juices to achieve parity (be on par) with taxation of other tobacco products and to keep taxes at a high enough level to discourage youth initiation and continuation of use.

Ingredient disclosure and/or lab testing

- Requiring manufacturers to report lab tests to verify all active ingredients and their concentration levels.

For a more detailed discussion of policy options, please see the Public Health Law Center's publication, *Regulating Electronic Cigarettes & Similar Devices* (2017). The Center's *U.S. E-Cigarette Regulations — 50 State Review* (2018) provides a good starting point for review of the currently applicable state laws affecting youth access, legal age of purchase, licensed retailers and distributors, and retail and online sales. Also, the Center's publication, *The Deeming Regulation: FDA Authority Over E-Cigarettes, Cigars, and Other Tobacco Products* (2016) provides an overview

of the FDA regulatory framework and opportunities for strengthening federal laws to achieve public health aims, including e-cigarette regulation.

Recent Activity: On April 18, 2018, five national public health groups wrote to the FDA, urging immediate action to protect young people, and the public health, from the use of JUUL e-cigarettes. Among the actions they requested was the removal of any JUUL flavors introduced after August 8, 2016 without first receiving the required FDA authorization, and the suspension of internet sales of JUUL until adequate rules are established to prevent sales to underage persons. [37]

While the FDA has full authority to take all these requested actions, or a more comprehensive action, stringently enforcing premarket review by ordering every JUUL product off the market entirely until the agency has reviewed the products and authorized their marketing, it has yet to do so. However, on April 24, 2018, citing growing concern about the popularity of JUUL among youth and its common use in middle and high schools, the FDA took initial steps toward addressing public health concerns. The agency sent a letter to JUUL Labs, asking it to submit documents relating to its marketing practices and research on marketing, effects of product design, public health impact, and adverse experience and complaints regarding JUUL products. The FDA also issued a statement, chronicling other steps it is taking to address concerns.[38]

This publication was prepared by the Public Health Law Center at Mitchell Hamline School of Law, St. Paul, Minnesota, made possible with funding from American Cancer Society Cancer Action Network.

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Endnotes

1 In this publication, the term "youth" is used to refer to young people through their early twenties.

2 Richard Craver, *Reynolds Brands Gain Ground on Top-selling Marlboro; Juul Reaches 54% Market Share*, Winston-Salem Journal, Apr. 3, 2018, http://www.journalnow.com/business/reynolds-brands-gain-ground-on-top-selling-marlboro-juul-reaches/article_5c040731-0c29-590e-85b3-c7cfc79b3f58.html; *see* Bonnie Herzog, *Nielsen Tobacco 'All Channel' Data 3/24*, Wells Fargo Securities Equity Research, Apr. 3, 2018.

3 *Id.* Just one year ago, RJ Reynolds' Vuse had a 35.4 percent market, with JUUL at 25 percent, whereas the report for the period ending March 24, 2018 shows Vuse falling in market share over the last three months, dropping from 21.4 percent to 19.3 percent.

4 JUUL Labs, Inc., *FAQS, JUULpods & Juice*, https://support.juul.com/home/learn/faqs (last visited April 20, 2018).

5 JUUL Labs, Inc., *FAQS, Manufacturing Quality, What Makes JUULU Unique?*, https://support.juulvapor.com/home/learn/faqs/manufacturing-quality (last visited April 14, 2018).

6 *Id.*

7 *See* Ramakanth Kavuluru et al., *On the Popularity of the USB Flash Drive-shaped Electronic Cigarette Juul, Research Letter*, 0 TOB. CONTROL 0 (2018), http://tobaccocontrol.bmj.com/content/early/2018/04/13/tobaccocontrol-2018-054259.

8 *See, e.g.*, Kate Zernike, *'I Can't Stop': Schools Struggle with Vaping Explosion*, N.Y. Times, Apr. 2, 2018, https://www.nytimes.com/2018/04/02/health/vaping-ecigarettes-addiction-teen.html; Ana B. Ibarra, California Healthline, *Juul E-cigarettes and Teens: 'Health Problem of the Decade'?*, CNN, Mar. 15, 2018, https://www.cnn.com/2018/03/15/health/juul-e-cigarette-partner/index.html; Ginia Bellafante, *Cool-Looking and Sweet, Juul is a Vice Teens Can't Resist*, N.Y. Times, Feb. 16, 2018, https://www.nytimes.com/2018/02/16/nyregion/juul-teenagers-vaping-ecigarettes-dangers.html.

9 Nat'l Insts. of Health, *Teens and E-Cigarettes*, Fig. 4 (2016), https://www.drugabuse.gov/related-topics/trends-statistics/infographics/teens-e-cigarettes.

10 Ctrs. for Disease Control & Prevention, *E-Cigarette Ads & Youth, CDC Vital Signs* (2017), https://www.cdc.gov/vitalsigns/ecigarette-ads/index.html#infographics.

11 U.S. Dep't Health & Human Services, E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General—Executive Summary (2016), https://e-cigarettes.surgeongeneral.gov/documents/2016_SGR_Exec_Summ_508.pdf.

12 *Id.* Also in 2014, use of e-cigarettes by young adults 18 to 24 years of age surpassed that of adults 25 years of age or older, with more than one-third of young adults having tried e-cigarettes as of that year. *Id.*

13 *Id.*

14 *Id. See also* Krysten W. Bold et al., *Trajectories of E-Cigarette and Conventional Cigarette Use Among Youth*, 141 Pediatrics 1 (2018), http://pediatrics.aappublications.org/content/pediatrics/early/2017/11/30/peds.2017-1832.full.pdf, finding that past-month e-cigarette use was associated with (predicted) future conventional cigarette use across three longitudinal waves, yet conventional cigarette use was not associated with (did not predict) future e-cigarette use.

15 *Id.*

16 *Id.*

17 *Id.*

18 *Id.*

19 E-Cigarette Use: Surgeon General—Executive Summary, *supra* note 11.

20 Bridget K. Ambrose et al., *Flavored Tobacco Product Use Among US Youth Aged 12-17 Years, 2013-2014* (2015), https://jamanetwork.com/journals/jama/fullarticle/2464690?utm_source=TWITTER&utm_medium=social_jn&utm_term=263756569&utm_content=content_engagement|article_engagement&utm_campaign=article_alert&linkId=18258836.

21 E-Cigarette Use: Surgeon General—Executive Summary, *supra* note 11, stating that the 2012 Surgeon General's Report on tobacco use among youth and young adults found that tobacco advertising causes young people to start using tobacco products, and further stating that much of today's advertisements for e-cigarettes uses approaches and themes similar to those used to promote conventional tobacco products.

22 Family Smoking Prevention and Tobacco Control Act, Pub. L. 111-31, tit. I, sec. 101, § 907(a)(1)(A), 123 Stat. 1776, 1799 (2009) (codified at 21 U.S.C. § 387g(a)(1)(A)).

23 Hongying Dai & Jianqiang Hao, *Flavored Electronic Cigarette Use and Smoking Among Youth*, 138 Pediatrics 6 (2016), http://pediatrics.aappublications.org/content/pediatrics/early/2016/11/03/peds.2016-2513.full.pdf.

24 Jeffrey G. Willett et al., *Recognition, Use and Perceptions of JUUL Among Youth and Young Adults*, Research Letter, 0 Tob. Control 0 (2018), http://tobaccocontrol.bmj.com/content/early/2018/04/07/tobaccocontrol-2018-054273.

25 Erika Mansur, *E-Liquid Lab Testing & School Resource Officer Outreach in Arizona*, webinar presentation, in *JUUL: What's the Hype?, JUUL Electronic Cigarette's Popularity with Youth & Young Adults*, Public Health Law Center, Apr. 26, 2018, http://www.publichealthlawcenter.org/webinar/what%E2%80%99s-hype-juul-electronic-cigarette%E2%80%99s-popularity-youth-young-adults.

26 Joseph G. Allen et al., *Flavoring Chemicals in E-Cigarettes: Diacetyl, 2,3 Pentanedione, and Acetoin in a Sample of 51 Products, Including Fruit-, Candy-, and Cocktail-Flavored E-Cigarettes*, 124 Envt'l. Health Persp. 6 (2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4892929.

27 Willett et al., *supra* note 24; Kavuluru, et al., *supra* note 7.

28 *Id.*

29 Herzog, *supra* note 2. For example, PAX Labs, Inc., who first introduced and marketed JUUL before it was spun off by its originators in mid-2017, continues to market a similar e-cigarette product for use with nicotine e-liqu*id.* Other somewhat similar e-cigarette products include Phix, myblu and blu, Rubi, Cora, and Feather.

30 JUUL Labs, Inc., JUULpods, https://www.juulvapor.com/shop-pods. The webpage states that there is a limit of 15 packs (of 4 cartridges each) per customer per month.

31 JUUL Labs, Inc., *JUUL Device Kits*, https://www.juulvapor.com/devices.

32 Ann Boonn, *State Cigarette Excise Tax Rates & Rankings*, Campaign for Tobacco-Free Kids (2018), https://www.tobaccofreekids.org/assets/factsheets/0097.pdf. Boon indicates that the approximate, average weighted price per pack includes a federal tax of $1.01 and state taxes, but not local cigarette or sales taxes, other than New York City's $1.50 per pack cigarette tax.

33 Public Health Law Center, *U.S. E-Cigarette Regulation — 50 State Review* (2018), http://www.publichealthlawcenter.org/resources/us-e-cigarette-regulations-50-state-review.

34 Kavuluru et al., *supra* note 7.

35 Jeffrey G. Willett, Schroeder Inst., Truth Initiative, *JUUL: Recognition, Use and Perceptions,* webinar presentation in *JUUL: What's the Hype?, JUUL Electronic Cigarette's Popularity with Youth & Young Adults*, Public Health Law Center, Apr. 26, 2018, http://www.publichealthlawcenter.org/webinar/what%E2%80%99s-hype-juul-electronic-cigarette%E2%80%99s-popularity-youth-young-adults.

36 Rebecca S. Williams et al., *Electronic Cigarette Sales to Minors via the Internet*, 169 Pediatrics 3 (2015), https://jamanetwork.com/journals/jamapediatrics/fullarticle/2174572.

37 Campaign for Tobacco-Free Kids et al., Letter to Dr. Scott Gottlieb, Comm'r., U.S. Food & Drug Admin. (Apr. 18, 2018), https://www.tobaccofreekids.org/assets/content/press_office/2018/2018_04_18_fda_juul.pdf. The groups, which included the Campaign for Tobacco-Free Kids, American Academy of Pediatrics, American Cancer Society Cancer Action Network, American Heart Association, and American Lung Association, also asked the FDA to remove similar new products that are alleged to perform like JUUL and have been introduced without first receiving FDA approval; to reverse its unlawful 2017 decision allowing e-cigarettes on the market as of August 8, 2016, to stay on the market until at least 2022 without filing marketing applications and receiving marketing authorization from the FDA; and to apply federal rules, prohibiting cigarette brand names from being used on other products, to JUUL and other e-cigarette brand names, e.g., decorative wraps or skins, t-shirts, sweatshirts.

38 Matthew R. Holman, U.S. Food & Drug Admin., Letter to JUUL Labs, Inc. (Apr. 24, 2018), https://www.fda.gov/downloads/TobaccoProducts/Labeling/RulesRegulationsGuidance/UCM605490.pdf; Scott Gottlieb, U.S. Food & Drug Admin., Statement from FDA Commissioner Scott Gottlieb, M.D., on new enforcement actions and a Youth Tobacco Prevention Plan to stop youth use of, and access to, JUUL and other e-cigarettes (Apr. 24, 2018), https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm605432.htm.