



## JUUL and Youth: Rising E-Cigarette Popularity

### What is JUUL?

The term “electronic cigarettes” covers a wide variety of products now on the market, from those that look like cigarettes or pens to somewhat larger products like “personal vaporizers” and “tank systems.” Instead of burning tobacco, e-cigarettes most often use a battery-powered coil to turn a liquid solution into an aerosol that is inhaled by the user. One e-cigarette device, called a JUUL, has become increasingly popular since its launch in 2015.

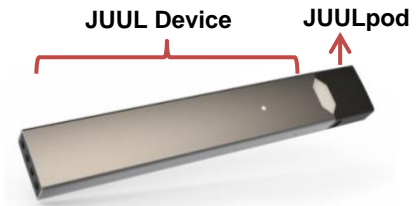


Image from JUUL website, accessed 1/24/18



JUULpods. Image from JUUL website, accessed 1/24/18



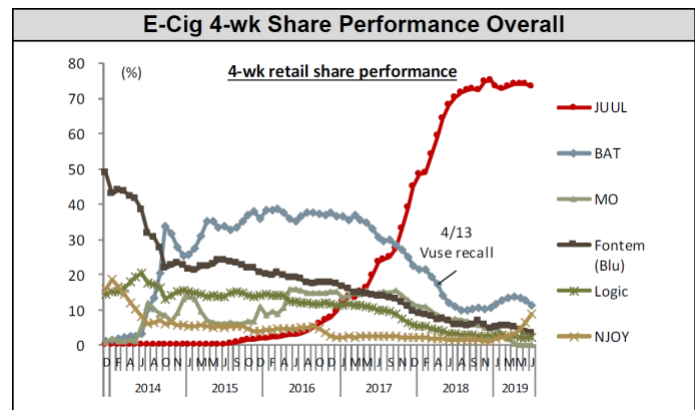
JUUL device charging in the USB port of a laptop. Image from JUUL website, accessed 1/24/18.

JUUL Labs produces the JUUL device and JUULpods, which are inserted into the JUUL device. In appearance, the JUUL device looks quite similar to a USB flash drive, and can in fact be charged in the USB port of a computer. According to JUUL Labs, all JUULpods contain flavorings and 0.7mL e-liquid with 5% or 3% nicotine by weight; JUUL Labs claims that the 5% pods contain the equivalent amount of nicotine as a pack of cigarettes. JUULpods come in eight flavors: Mango, Fruit, Cucumber, Creme, Mint, Menthol, Virginia Tobacco and Classic Tobacco.<sup>1</sup> Other companies manufacture “JUUL-compatible” pods in additional flavors; for example, the website Eonsmoke sells JUUL-compatible pods in Blueberry, Silky Strawberry, Mango, Cool Mint, Watermelon, Tobacco, and Caffé Latte flavors.<sup>2</sup> There are also companies that produce JUUL “wraps” or “skins,” decals that wrap around the JUUL device and allow JUUL users to customize their device with unique colors and patterns (and may be an appealing way for younger users to disguise their device).



JUUL skins. Images from <https://www.mightyskins.com/juul/>

According to data from Wells Fargo, JUUL’s popularity has grown dramatically in the last two years, with unit sales increasing more than 600 percent in 2017. In mid-2016, dollar sales share for JUUL products was less than 5 percent, the lowest compared to products sold by the main companies in Nielsen-tracked channels. But by the end of 2017, JUUL sales had surpassed all other companies’ products (see adjacent graph). As a result, JUUL is now more popular than the e-cigarette brands manufactured by the major tobacco companies (blu, Vuse). According to the most recent data about three-quarters of the e-cigarette market share.<sup>3</sup> In December 2018, Altria announced that it was purchasing a 35 percent share in JUUL Labs for \$12.8 billion and valued the company at \$38 billion.<sup>4</sup> As JUUL has surged in popularity, other companies have sought to mimic JUUL’s sleek design



Source: Nielsen Total US xAOC/Convenience Database & Wells Fargo Securities, LLC

\* Tracked data includes mass channel and convenience stores; does not include online sales or sales from tobacco and vape shops.

and pod-based system, with new devices such as MLV's PHIX, Mylé Vapor's Mylé, Altria's MarkTen Elite†, Reynolds' Vuse Solo, and ITG Brands' myblu.<sup>5</sup> As of September 2018, researchers had identified at least 39 JUUL "knock off" devices.<sup>6</sup> JUUL has filed patent infringement complaints against many of these copycat devices.<sup>7</sup>

### **JUUL Use among Youth and Young Adults**

In December 2018, the Surgeon General issued an advisory on e-cigarette use among youth, declaring the growing problem an epidemic.<sup>8</sup> According to the 2019 National Youth Tobacco Survey, 27.5 percent of high school students and over 5 million youth were current e-cigarette users.<sup>9,10</sup> From 2017 to 2019, e-cigarette use increased by an alarming 135 percent for high schoolers.<sup>11</sup> According to the CDC, "The rise in e-cigarette use during 2017-2018 is likely because of the recent popularity of e-cigarettes shaped like a USB flash drive, such as JUUL; these products can be used discreetly, have a high nicotine content, and come in flavors that appeal to youths."<sup>12</sup> A study from Truth Initiative found that a quarter of youth and young adult JUUL users don't refer to JUUL use as "e-cigarette use" or "vaping," but rather as "JUULing."<sup>13</sup> Therefore, it is possible that existing surveys still may not be capturing the full spectrum of youth e-cigarette use.

News articles, letters from school officials, and anecdotal evidence indicate that JUUL has gained popularity among youth and young adults across the country, from middle schools to college campuses. A 2018 study found that nearly one-fifth of youth (ages 12-17) surveyed reported having seen JUUL used in their school.<sup>14</sup> News stories attribute JUUL's sleek and discreet design to its appeal among this population. For example:

*"High school and college students are rushing to retailers to buy the product because its discreet design makes it easy to hide from parents and teachers while also giving the user a big hit of nicotine. Some students have bragged on social media of using the JUUL in class, even though e-cigarettes are banned indoors at most schools."* – Pittsburgh Post-Gazette<sup>15</sup>

*"An editor for New York University's student newspaper documented JUUL's rising on-campus popularity, even in dorm rooms. A student newspaper at the University of Illinois called JUUL a "new epidemic is sweeping across campus." And in suburban D.C., a high school's principal took doors off its bathroom stalls to keep students from using drugs inside —namely JUUL."* – USA Today<sup>16</sup>

*"One reason JUUL and vape pens are so popular among teens currently might be that they can be used indoors without attracting unwanted attention or creating a stench...On Twitter, teens post about their usage in school. The most brazen of them fire up their e-cigarettes while their teachers' backs are turned."* - NPR<sup>17</sup>

The availability of flavors may also contribute to JUUL's popularity among youth. Data from the 2016-2017 wave of the FDA's Population Assessment of Tobacco and Health (PATH) study found that 96.1 percent of 12-17 year olds who had initiated e-cigarette use since the last survey wave started with a flavored product. Additionally, it found that 97 percent of current youth e-cigarette users had used a flavored e-cigarette in the past month and 70.3 percent say they use e-cigarettes "because they come in flavors I like."<sup>18</sup> More recent data also found that the vast majority of youth e-cigarette users had used flavored products.<sup>19</sup> In addition, current use of menthol or mint flavored e-cigarettes among high school e-cigarette users increased from 42.3 percent in 2017 to 51.2 percent in 2018.<sup>20</sup>

### **Health Concerns and JUUL**

The number of youth using e-cigarettes, including JUUL, is alarming and raises serious concerns that e-cigarettes could be an entryway to nicotine addiction and use of regular cigarettes for some kids. Though there is insufficient research on the long-term effects of using e-cigarettes in general, and certainly not specific to JUUL, the use of such products still raises concerns because they contain nicotine. The

† Altria pulled the MarkTen Elite device from the market shortly before announcing its plan to purchase a minority share of JUUL Labs.

company claims that the nicotine in JUUL is from “nicotine salts found in leaf tobacco, rather than free-base nicotine,” which they claim “accommodate cigarette-like strength nicotine levels.”<sup>21</sup> According to a 2018 Surgeon General advisory on e-cigarette use among youth, nicotine salts allow users to inhale high levels of nicotine more easily and with less irritation than e-cigarettes that use free-base nicotine. As a result, it could be easier for young people to initiate the use of nicotine with these products.<sup>22</sup>

While it is still an open scientific question whether e-cigarettes might be able to help adult smokers give up cigarettes, kids should not be using any tobacco product, including e-cigarettes. Nicotine is a highly addictive drug that can have lasting damaging effects on adolescent brain development.<sup>23</sup> Nicotine also impacts the cardiovascular system.<sup>24</sup> The Surgeon General concluded that, “The use of products containing nicotine poses dangers to youth, pregnant women, and fetuses. The use of products containing nicotine in any form among youth, including in e-cigarettes, is unsafe.”<sup>25</sup> Educating youth about the dangers of JUUL and nicotine use is critical because a study from Truth Initiative found that 63 percent of 15-24 year old JUUL users did not know the product always contains nicotine (all pods sold from JUUL do contain nicotine).<sup>26</sup>

The Surgeon General found that while more research is needed, evidence from several longitudinal studies suggests that e-cigarette use is “strongly associated” with the use of other tobacco products among youth and young adults, including conventional cigarettes.<sup>27</sup> The National Academy of Sciences, Engineering and Medicine (formerly the Institute of Medicine) also concluded in its 2018 report that, “There is substantial evidence that e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults.”<sup>28</sup>

### **JUUL’s Youth-Friendly Marketing Launch**

When JUUL first launched in 2015, the company used colorful, eye-catching designs and youth-oriented imagery and themes, such as young people dancing and using JUUL. JUUL’s original marketing campaign included billboards in New York City’s Times Square, YouTube videos, advertising in *Vice Magazine*, launch parties and a sampling tour. According to the *New York Times*, “Cult Collective, the marketing company that created the 2015 campaign, “Vaporized,” claimed that the work “created ridiculous enthusiasm” for the campaign hashtag, part of a larger advertising effort that included music event sponsorships and retail marketing.”<sup>29</sup>



JUUL billboard in Times Square, New York City, 2015. <https://www.spencer-pederson.com/work-1/2017/2/23/juul-go-to-market>

Social media continued to fuel JUUL’s popularity, with lasting effects. JUUL was one of the first major e-cigarette brands to rely heavily on social media to market and promote its products. JUUL’s initial marketing expenditures in traditional channels were modest compared to competing brands, and these expenditures decreased as the brand increased content and received more promotion on social media channels like Instagram and Twitter.<sup>30</sup> A study in *JAMA Pediatrics* found that 8 out of 10 of JUUL’s Twitter followers in April 2018 were between the ages of 13 to 20.<sup>31</sup> Additionally, user-generated posts that tag (e.g., #JUULvapor, #doit4JUUL) and feature JUUL do not have any restrictions. These kinds of social media posts can increase exposure to pro-e-cigarette imagery and messaging, by making JUUL use look cool and rebellious.



JUUL officials claim that its popularity among youth is purely accidental and that the product's viral social media presence following its launch was beyond the company's control. Ashley Gould, Chief Administrative Officer of JUUL Labs, said that the explosion of youth users *"was not anticipated and completely unexpected to us."*<sup>32</sup> Gould has noted that, *"All of the things you see on social media, we have absolutely nothing to do with."*<sup>33</sup> Contrary to these claims, a *New York Times* investigation interviewed a former senior manager at JUUL who *"said that he and others in the company were well aware the campaign launch might appeal to youth. After Juuls went on sale in June 2015, he said, the company quickly realized that teenagers were, in fact, using them because they posted images of themselves vaping Juuls on social media."*<sup>34</sup>

In April 2018, the FDA sent an official request for information to JUUL Labs to obtain more information about the youth appeal of the product, including the company's marketing practices.<sup>35</sup> JUUL subsequently updated its marketing code<sup>36</sup> with the purported goal of limiting youth exposure to its advertising. In June 2018, JUUL announced a new social media policy that would no longer use models on those platforms, but instead would feature former smokers who switched to JUUL.<sup>37</sup> FDA later called on JUUL and other major e-cigarette makers to develop "robust plans on how they'll convincingly address the widespread use of their products by minors."<sup>38</sup> As part of its response to FDA, in November 2018 JUUL announced the suspension of its official social media accounts on Instagram and Facebook, and limits on its Twitter posts to "non-promotional communications only," as well as age-restricting its Twitter account. In this same announcement, JUUL noted its coordination with the major social media platforms to attempt to "police" content and "remove youth-oriented social media content from third-parties or users."<sup>39</sup>

### **Availability and Accessibility of JUUL**

JUUL devices and JUULpods are available for sale on JUUL's website and other online retailers as well as in convenience stores, vape shops, and tobacco retailers. To access JUUL's website, users must indicate that they are 21 or older by simply clicking on a button, but JUUL asserts that it uses stricter age verification processes (21+) for online purchases. FDA law prohibits sales of e-cigarettes to those under age 18 and some state and local laws have higher minimum age-of-sale laws.

Youth obtain JUUL products from social sources who may be over age 18, online or in-person from retailers that are incompliant with state or federal law, or from online resellers like ebay<sup>‡</sup> and Craigslist that have no age verification. According to the 2018 Monitoring the Future Survey, more than 60% of 10<sup>th</sup> grade students say it is easy to get vaping devices and e-liquids.<sup>40</sup> The 2018 NYTS found that 14.8 percent of middle and high school e-cigarette users under 18 report obtaining e-cigarettes from a vape shop in the past month, 8.4 percent from a gas station or convenience store, and 6.5 percent from the Internet.<sup>41</sup> A 2018 study found that among surveyed youth JUUL users (ages 12-17), half had gotten JUUL from a social source.<sup>42</sup> In April 2018, the FDA sent warning letters to 40 retailers across the country for illegally selling JUUL products to minors.<sup>43</sup>



Photo courtesy of CounterTobacco.org:

October 20, 2018, North Port, FL.

[https://countertobacco.org/wp-content/gallery/main-galleru/2018\\_LowJuul\\_NorthPortFL.jpg](https://countertobacco.org/wp-content/gallery/main-galleru/2018_LowJuul_NorthPortFL.jpg)

<sup>‡</sup> ebay policy prohibits sale of tobacco products; however, JUUL products have been found for sale on the website under other categories such as electronics, with product listings that neglect to use the terms "tobacco" and/or "nicotine." In April 2018, FDA contacted ebay regarding these violations and ebay has worked to remove JUUL listings and implement measures to prevent new JUUL listings (although some JUUL products are still available on ebay).



JUUL touted that the December 2018 investment by Altria will improve the products' distribution to and presence in retail stores, as well as "expand its reach."<sup>44</sup>

Though the up-front cost of the device is high (a JUUL starter kit, which includes the device, charger and 4 JUULpods of various flavors, is \$49.99 on the JUUL website), advocates have shared stories of kids pooling together money to share a device and sell "hits" from the device to recoup the cost. In addition, JUUL products are sometimes offered for a lower price with promotions at retail locations.

JUUL has also expanded its reach internationally, with sales in Canada, the European Union, Indonesia, South Korea and the Philippines. JUUL launched in Canada in September 2018, and just that same month, a survey found that 7.0% of Canadian teens had already tried JUUL and it had become the third most popular brand among past-month users, with 10.3% reporting it as their usual brand.<sup>45</sup>

### **Regulatory Action Needed to Curb JUUL Use among Youth**

As part of its November 2018 response to FDA, JUUL announced that it planned to take several voluntary actions, including limiting sales of its flavored refill pods (except for mint, menthol, and tobacco) exclusively to its website instead of retail stores; limiting purchases from its website to prevent bulk purchases; enhancing its online age-verification system for purchases; and enforcement against unauthorized online sales, including third-party sales.<sup>46</sup> FDA has since proposed to restrict sales of all flavored e-cigarettes (except for tobacco, mint, and menthol flavors) to age-restricted retail stores and require more effective age-verification processes for online sales.<sup>47</sup>

Insisting that more needs to be done to reverse the epidemic of youth e-cigarette use, public health groups have called on FDA to go further, including implementing marketing restrictions and stopping the sales of all flavored e-cigarette products that have not been subject to public health review by the FDA as the law requires.<sup>48</sup>

### ***Campaign for Tobacco-Free Kids, September 12, 2019 / Laura Bach***

<sup>1</sup> JUUL Website, accessed November 12, 2018, <https://www.juul.com/shop/pods>.

<sup>2</sup> Eonsmoke website, accessed January 24, 2018, <https://www.eonsmoke.com/12-buy-juul-compatible-pods-capsules>.

<sup>3</sup> Nielsen Total US xAOC/Convenience Database & Wells Fargo Securities, LLC, in Wells Fargo Securities, Nielsen Tobacco All Channel Data Through 5/18, May 28, 2019

<sup>4</sup> Altria, "Altria Makes \$12.8 Billion Minority Investment in JUUL to Accelerate Harm Reduction and Drive Growth," December 20, 2018, <http://www.altria.com/Media/Press-Releases/Pages/PressReleaseDetails.aspx?reqID=2381292>. JUUL Labs, "JUUL Statement about Altria Minority Investment and Service Agreements," December 20, 2018, <https://newsroom.juul.com/2018/12/20/juul-statement-about-altria-minority-investment-and-service-agreements/>.

<sup>5</sup> See letter to FDA Commissioner Scott Gottlieb from the American Academy of Pediatrics, American Cancer Society Cancer Action Network, American Heart Association, American Lung Association, Campaign for Tobacco-Free Kids, and Truth Initiative. August 7, 2018, [https://www.tobaccofreekids.org/assets/content/press\\_office/2018/2018\\_08\\_07\\_new\\_ecig\\_products.pdf](https://www.tobaccofreekids.org/assets/content/press_office/2018/2018_08_07_new_ecig_products.pdf). See also [https://www.tobaccofreekids.org/assets/content/what\\_we\\_do/federal\\_issues/fda/2018\\_07\\_18\\_New\\_Ecigs\\_Post\\_Juul.pdf](https://www.tobaccofreekids.org/assets/content/what_we_do/federal_issues/fda/2018_07_18_New_Ecigs_Post_Juul.pdf).

<sup>6</sup> Jackler, RK and Ramamurthi, D, "Nicotine arms race: JUUL and the high-nicotine product market," *Tobacco Control*, published online February 6, 2019.

<sup>7</sup> Geller, M, "E-cigarette maker Juul files complaints against 'copycat products,'" *Reuters*, October 4, 2018, <https://www.reuters.com/article/us-juul-e-cigarettes-patents/e-cigarette-maker-juul-files-complaints-against-copycat-products-idUSKCN1ME127>.

<sup>8</sup> Office of the Surgeon General, "Surgeon General's Advisory on E-Cigarette Use Among Youth," December 18, 2018, <https://e-cigarettes.surgeongeneral.gov/documents/surgeon-generals-advisory-on-e-cigarette-use-among-youth-2018.pdf>.

<sup>9</sup> Centers for Disease Control and Prevention (CDC), 2019 National Youth Tobacco Survey. Accessed at: [https://www.fda.gov/news-events/press-announcements/trump-administration-combating-epidemic-youth-e-cigarette-use-plan-clear-market-unauthorized-non?utm\\_source=CTPEblast&utm\\_medium=email&utm\\_term=stratout&utm\\_content=pressrelease&utm\\_campaign=ctp-vaping](https://www.fda.gov/news-events/press-announcements/trump-administration-combating-epidemic-youth-e-cigarette-use-plan-clear-market-unauthorized-non?utm_source=CTPEblast&utm_medium=email&utm_term=stratout&utm_content=pressrelease&utm_campaign=ctp-vaping) on September 12, 2019. Current use defined as any use in the past month.

<sup>10</sup> Edney, A., et al., "Vaping Furor Intensifies as Trump Vows Tough U.S. Scrutiny", *Bloomberg*, September 11, 2019, <https://www.bloomberg.com/news/articles/2019-09-11/trump-to-hold-meeting-on-vaping-after-reports-of-u-s-illness>.

<sup>11</sup> Centers for Disease Control and Prevention (CDC), 2019 National Youth Tobacco Survey. Accessed at: [https://www.fda.gov/news-events/press-announcements/trump-administration-combating-epidemic-youth-e-cigarette-use-plan-clear-market-unauthorized-non?utm\\_source=CTPEblast&utm\\_medium=email&utm\\_term=stratout&utm\\_content=pressrelease&utm\\_campaign=ctp-vaping](https://www.fda.gov/news-events/press-announcements/trump-administration-combating-epidemic-youth-e-cigarette-use-plan-clear-market-unauthorized-non?utm_source=CTPEblast&utm_medium=email&utm_term=stratout&utm_content=pressrelease&utm_campaign=ctp-vaping) on September 12, 2019. Current use defined as any use in the past month.

- 12 Centers for Disease Control and Prevention (CDC), "Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students—United States, 2011-2018," *Morbidity and Mortality Weekly Report (MMWR)*, 67(45):1276-1277. [https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s\\_cid=mm6745a5\\_w](https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s_cid=mm6745a5_w). Current use defined as any use in the past month.
- 13 Truth Initiative, "Monitoring the Future reveals good and bad news underscoring need for education and regulation," December 14, 2017, <https://truthinitiative.org/news/monitoring-future-reveals-good-and-bad-news-underscoring-need-education-and-regulation>.
- 14 Truth Initiative, "Nearly 1 in 5 youth say they have seen Juul used in school," May 23, 2018, <https://truthinitiative.org/news/nearly-1-5-youth-say-they-have-seen-juul-used-school>.
- 15 Routh, J. "A mango-scented flash-drive-looking device lets kids smoke in class," *Pittsburg Post-Gazette*, December 12, 2017, <http://www.post-gazette.com/local/region/2017/12/12/JUUL-vaporizer-nicotine-flash-drive-small-concealable-e-cigarette/stories/201712120151>.
- 16 Hafner, J. "Juul e-cigs: The controversial vaping device popular on school campuses," *USA Today*, October 31, 2017, <https://www.usatoday.com/story/money/nation-now/2017/10/31/juul-e-cigs-controversial-vaping-device-popular-school-campuses/818325001/>.
- 17 Chen, A. "Teenagers Embrace JUUL, Saying It's Discreet Enough to Vape in Class," *NPR*, December 4, 2017, <https://www.npr.org/sections/health-shots/2017/12/04/568273801/teenagers-embrace-juul-saying-its-discreet-enough-to-vape-in-class>.
- 18 FDA, "Modifications to Compliance Policy for Certain Deemed Products: Guidance for Industry, Draft Guidance," March 13, 2019, <https://www.fda.gov/media/121384/download>.
- 19 CDC, "Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students—United States, 2011-2018," *MMWR*, 67(45): 1276-1277. [https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s\\_cid=mm6745a5\\_w](https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s_cid=mm6745a5_w). Current use defined as any use in the past month.
- 20 CDC, "Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students—United States, 2011-2018," *MMWR*, 67(45): 1276-1277. [https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s\\_cid=mm6745a5\\_w](https://www.cdc.gov/mmwr/volumes/67/wr/mm6745a5.htm?s_cid=mm6745a5_w). Current use defined as any use in the past month.
- 21 Pax Labs, Inc. (former name of JUUL Labs), *Pax Labs, Inc. Granted U.S. Patent for Nicotine Salt E-Cigarette*, December 22, 2015, [https://www.juulvapor.com/media/wysiwyg/JUUL/JUUL\\_USPTO\\_Patent\\_Press\\_Release\\_15-1216.pdf](https://www.juulvapor.com/media/wysiwyg/JUUL/JUUL_USPTO_Patent_Press_Release_15-1216.pdf).
- 22 Office of the Surgeon General, "Surgeon General's Advisory on E-Cigarette Use Among Youth," December 18, 2018, <https://e-cigarettes.surgeongeneral.gov/documents/surgeon-generals-advisory-on-e-cigarette-use-among-youth-2018.pdf>.
- 23 HHS, *The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General*, CDC, Office of Smoking and Health (OSH), 2014, <http://www.surgeongeneral.gov/library/reports/50-years-of-progress/index.html>. See also: CDC, "Electronic Cigarettes: What's the Bottom Line?," accessed November 16, 2018, [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/pdfs/Electronic-Cigarettes-Infographic-508.pdf](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/pdfs/Electronic-Cigarettes-Infographic-508.pdf).
- 24 HHS, *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*, Centers for Disease Control and Prevention, Office on Smoking and Health, 2010 <http://www.ncbi.nlm.nih.gov/books/NBK53017/>.
- 25 HHS, *E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General*. Atlanta, GA: U.S. 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, 2016.
- 26 Willett, J, et al., "Recognition, use and perceptions of JUUL among youth and young adults," *Tobacco Control*, published online April 18, 2018. See also: <https://truthinitiative.org/news/juul-e-cigarettes-gain-popularity-among-youth>.
- 27 HHS, *E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General*. Atlanta, GA: U.S. 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, 2016. See also, Leventhal, AM, et al., "Association of Electronic Cigarette Use With Initiation of Combustible Tobacco Product Smoking in Early Adolescence," *Journal of the American Medicine Association*, 314(7):700-707, 2015. Wills, Thomas A, et al., "Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii," *Tobacco Control*, published online first January 25, 2016. Wills, TA, et al., "E-cigarette use is differentially related to smoking onset among lower risk adolescents," *Tobacco Control*, published online August 19, 2016. Barrington-Trimis, JL, et al., "E-Cigarettes and Future Cigarette Use," *Pediatrics*, 138(1), published online July 2016. Barrington-Trimis, JL, et al., "E-Cigarettes and Future Cigarette Use," *Pediatrics*, 138(1), published online July 2016. Wills, TA, et al., "E-cigarette use is differentially related to smoking onset among lower risk adolescents," *Tobacco Control*, published online August 19, 2016.
- 28 National Academies of Sciences, Engineering, and Medicine. 2018. *Public health consequences of e-cigarettes*. Washington, DC: The National Academies Press. <http://nationalacademies.org/hmd/Reports/2018/public-health-consequences-of-e-cigarettes.aspx>.
- 29 Richtel, M & Kaplan, S, "Did Juul Lure Teenagers and Get 'Customers for Life'?", *The New York Times*, August 27, 2018, <https://www.nytimes.com/2018/08/27/science/juul-vaping-teen-marketing.html>.
- 30 Huang, J, et al., "Vaping versus JUULing: how the extraordinary growth and marketing of JUUL transformed the US retail e-cigarette market," *Tobacco Control*, published online May 31, 2018.
- 31 Kim, A, et al., "Estimated Ages of JUUL Twitter Followers," *JAMA Pediatrics*, published online May 20, 2019.
- 32 Ramanathan, L, "We killed the cigarette. What we got in return is mango-flavored nicotine in 'party mode,'" *The Washington Post*, August 8, 2018, [https://www.washingtonpost.com/lifestyle/style/we-killed-the-cigarette-what-we-got-in-return-is-mango-flavored-nicotine-in-party-mode/2018/08/08/bf4db3a8-8b8a-11e8-8aea-86e88ae760d8\\_story.html](https://www.washingtonpost.com/lifestyle/style/we-killed-the-cigarette-what-we-got-in-return-is-mango-flavored-nicotine-in-party-mode/2018/08/08/bf4db3a8-8b8a-11e8-8aea-86e88ae760d8_story.html).
- 33 Barshad, A, "The Juul Is Too Cool," *The New York Times*, April 7, 2018, <https://www.nytimes.com/2018/04/07/style/the-juul-is-too-cool.html>.
- 34 Richtel, M & Kaplan, S, "Did Juul Lure Teenagers and Get 'Customers for Life'?", *The New York Times*, August 27, 2018, <https://www.nytimes.com/2018/08/27/science/juul-vaping-teen-marketing.html>.
- 35 FDA Center for Tobacco Products, "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," April 24, 2018, <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm605432.htm>.
- 36 JUUL Marketing Code, <https://www.juulvapor.com/marketing-code/>, accessed 1/31/18.

- 37 JUUL Labs, *JUUL Labs Implements New Social Media Policy for Instagram, Facebook and Twitter in Ongoing Effort to Combat Underage Use and Drive Awareness of Mission to Help Adult Smokers*, June 14, 2018, <https://support.juul.com/learn/read/juul-labs-implements-new-social-media-policy>.
- 38 FDA Center for Tobacco Products, "Statement from FDA Commissioner Scott Gottlieb, M.D., on new steps to address epidemic of youth e-cigarette use," September 12, 2018, <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm620185.htm>.
- 39 JUUL Labs, "JUUL Labs Action Plan, Message From Kevin Burns, CEO, JUUL Labs," November 13, 2018, <https://newsroom.juul.com/juul-labs-action-plan/>.
- 40 University of Michigan, 2018 Monitoring the Future Study, *Trends in Availability – Tables 15-17*. See <http://monitoringthefuture.org/data/18data/18drtbl15.pdf> and <http://monitoringthefuture.org/data/18data/18drtbl16.pdf>.
- 41 FDA, "Modifications to Compliance Policy for Certain Deemed Products: Guidance for Industry, Draft Guidance," March 13, 2019, <https://www.fda.gov/media/121384/download>.
- 42 Truth Initiative, "Where are kids getting JUUL?" May 29, 2018, <https://truthinitiative.org/news/where-are-kids-getting-juul>.
- 43 FDA Center for Tobacco Products, "Warning Letters Issued to Retailers for Selling JUUL to Minors," April 24, 2018, <https://www.fda.gov/TobaccoProducts/NewsEvents/ucm605278.htm>.
- 44 JUUL Labs, "JUUL Statement about Altria Minority Investment and Service Agreements," December 20, 2018, <https://newsroom.juul.com/2018/12/20/juul-statement-about-altria-minority-investment-and-service-agreements/>.
- 45 Hammond, D, et al., "Prevalence of vaping and smoking among adolescents in Canada, England, and the United States: repeat national cross sectional surveys," *BMJ* 2019; 365:l2219.
- 46 JUUL Labs, "JUUL Labs Action Plan, Message From Kevin Burns, CEO, JUUL Labs," November 13, 2018, <https://newsroom.juul.com/juul-labs-action-plan/>.
- 47 FDA Center for Tobacco Products, "Statement from FDA Commissioner Scott Gottlieb, M.D., on proposed new steps to protect youth by preventing access to flavored tobacco products and banning menthol in cigarettes," November 15, 2018, <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm625884.htm>.
- 48 Campaign for Tobacco-Free Kids, American Academy of Pediatrics, American Cancer Society Cancer Action Network, American Heart Association, American Lung Association and Truth Initiative, "To Address Youth E-Cigarette Epidemic, FDA Must Stop Sales of All Flavored Products and Restrict Marketing and Sales to Protect Kids," November 9, 2018, [https://www.tobaccofreekids.org/press-releases/2018\\_11\\_09\\_fda\\_flavors](https://www.tobaccofreekids.org/press-releases/2018_11_09_fda_flavors). See also: [https://www.tobaccofreekids.org/press-releases/2018\\_11\\_15\\_fda](https://www.tobaccofreekids.org/press-releases/2018_11_15_fda).