

E-Cigarette Brand Trends in the United States: An Investigation of Data From a Youth and Young Adult Sample and the E-Cigarette Retail Market (2022)

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ABSTRACT

BACKGROUND: Electronic cigarettes (e-cigarettes) remain the most used tobacco product among young people in the United States (US). Given the need for current data on popular e-cigarette products, the current study leverages data from a rapid surveillance survey of young people and examines whether the top e-cigarette brands identified from this source align with US market data.

METHODOLOGY: Data were obtained from current e-cigarette users (N = 4145) participating in the Truth Continuous Tracker Online (CTO; a cross-sectional tracking survey of 15-24 year-olds sourced from the national Dynata panel) and NielsenIQ retail scanner data, collected in 2022 and aggregated by quarter (Q1, Q2, and Q3). The top 15 e-cigarette brands were determined from respondents' endorsement in the Truth CTO and ranked total sales in NielsenIQ in nominal dollars.

RESULTS: Overall, 58% of e-cigarette brands overlapped across the Truth CTO and NielsenIQ data (60% for Q1, 47% for Q2 and 67% for Q3). Pod-based (JUUL; VUSE) and disposable (Hyde; Breeze Smoke) brands appeared as top brands in both datasets. Top brands were fairly consistent within and across quarters; though, more variability was found in the Truth CTO, relative to NielsenIQ. Many top brands were disposable.

CONCLUSIONS: Results suggest that data from rapid surveillance and retail data can be used complementarily to characterize the popular e-cigarette brands currently on the US market. Many of these popular e-cigarette brands have yet to receive marketing granted orders under the US Food and Drug Administration, suggesting the need to continue monitoring e-cigarette brands among young people.

KEYWORDS: electronic nicotine delivery systems, tobacco Control, youth, young adults

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Introduction

The United States (US) electronic cigarette (e-cigarette) marketplace has evolved rapidly over the past decade, primarily driven by the rise of JUUL and similar pod-based e-cigarette devices that utilize nicotine salt technology to facilitate greater nicotine delivery to users.¹ From 2014 until 2017, youth and young adults in the US were more likely to report use of vape pens and mods, relative to cig-a-likes.^{2,3} In 2019, closed-system pod-based e-cigarettes became the most common e-cigarette device among youth. Specifically, three in five middle and high school students used pod-based e-cigarettes.⁴ In 2020, there was a four- and ten-fold increase in disposable e-cigarette use among middle and high school students.⁵

E-cigarettes remain the most used tobacco product among US youth. In 2023, 4.6% of middle and 10.0% of high school students (ages 11-13 and 14-18, respectively⁶) reported current

e-cigarette use.⁷ Among current e-cigarette users in middle and high school, disposable e-cigarettes are the most used e-cigarette device type, followed by prefilled or refillable pods or cartridges and tanks or mod systems.⁸ Among younger adults (aged 18-34), 12.3% report current e-cigarette use.⁹ These prevalence estimates are within the range of reported e-cigarette use from international samples.¹⁰ This is concerning, as newer e-cigarettes have higher nicotine concentrations^{11,12} and any nicotine exposure among youth can lead to long-term brain changes resulting in greater susceptibility to nicotine addictiveness and harm.¹³

There is a need to rapidly collect data on popular and emerging products, given the quickly evolving e-cigarette landscape. However, there are certain limitations to existing data. For example, established and reliable national surveillance systems – such as the National Youth Tobacco Survey



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(NYTS) – are useful in characterizing e-cigarette use behavior of young people over time, but unable to capture rapid changes (i.e., at the weekly, monthly, or quarterly level). Rapid surveillance surveys can complement national surveillance systems, but often do not offer the same depth of information. Retail sales data allows for rapid capture of existing and emerging trends in e-cigarette brands and aggregated consumer behavior, but cannot be used to specify who is purchasing or how much/often e-cigarettes are being used by consumers.¹⁴ The current study leverages the benefits of a rapid surveillance survey and retail sales data to identify the top e-cigarette brands reported by a convenience sample of US youth and young adults and examine whether these e-cigarette brands align with US e-cigarette market data.

Methods

Data Sources

Data were obtained from two sources: the Truth Continuous Tracker Online (Truth CTO) and NielsenIQ (Chicago, IL) retail scanner data.¹⁵ The Truth CTO is a cross-sectional, continuous tracking survey of participants sourced from the national Dynata online panel.¹⁶ The Truth CTO is administered to a convenience sample of approximately 300 participants (aged 15–24 years) per week. Survey responses are then weighted to US census quotas according to age, race, and gender to be nationally representative. All study procedures for the Truth CTO were reviewed and approved for human subjects' research by the Advarra Institutional Review Board. Participants or their legal guardians provided informed consent and/or assent. To be included in analyses, participants had to complete a survey in 2022, report on current use of e-cigarettes (i.e., in the past 30 days), and provide information on the brand of their e-cigarette device type (n = 4145).

NielsenIQ retail scanner data provides aggregated universal product code-level sales dollars from convenience stores (including gas stations), mass merchandisers (including food and drug stores), discount stores (including dollar stores), and military commissaries.¹⁵ Data is aggregated from the contiguous 48 US states and a proprietary vendor calculation is applied to account for non-participating retailers. All e-cigarette products that did not contain e-liquid, such as batteries, accessories, and starter kits with no refills, were excluded from the analysis. While the data comes in 4-week-period aggregates, data was further aggregated into quarterly periods by brand and product type – that is, pod-based vs disposable. Although pod-based and disposable e-cigarettes are similar in appearance, disposable e-cigarettes are not refillable, are generally cheaper, have higher concentrations of nicotine, and often feature vibrant colors and youth-appealing flavors.^{17,18} Data from the 4-week period ending on January 25, 2022, through the 4-week period ending September 3, 2022 was used in the analyses. All data were aggregated quarterly, corresponding to Quarters 1, 2, and 3

(Q1 = January to March, Q2 = April to June, Q3 = July to September) in 2022.

Measures

E-cigarette device type and brand were readily available from NielsenIQ Retail Scanner data. E-cigarette device type was not readily available in the Truth CTO. To derive e-cigarette device brand in the Truth CTO, the following question was used: "During the past 30 days, what brand of e-cigarettes/vapes did you usually use?" Possible responses included: JUUL, Puff Bar, Hyde, Vuse, Blu, Logic, NJOY, Suorin, POSH, Mr. Vapor, Mr. Fog, Pop, Bang, Flair, HQD, Bidi stick, Cali pods, Mngo Stick, Kangvape, Esco Bars, Fume, ZEO, EB Design (Formerly Elf Bar), Geek bar, HYPPE, LOON, Air Bar, Ignite, EZZY, or some other brand (please specify).

Statistical Analysis

The statistical analyses are descriptive in nature. The top 15 e-cigarette brands were determined based upon percentage of respondents endorsing use of a given e-cigarette brand in the Truth CTO and based on total sales (as reported in nominal dollars) in NielsenIQ. Rankings are presented from highest to lowest. Overlap between top brands in the Truth CTO and NielsenIQ were determined by totaling the number of brands from the Truth CTO that appeared on either disposable or pod-based brands from NielsenIQ data and then dividing that number by 15 (e.g., the total number of top brands examined per quarter). This was done to compute values indicating overlap overall in 2022, and in Quarter 1, 2, and 3 (Q1, Q2, and Q3). To account for possible product diffusion (i.e., when individuals are exposed to new e-cigarette products as a result of seeing others try them), cross-quarter overlap was computed by comparing Q1 NielsenIQ data to Q2 Truth CTO data (and, subsequently, Q2 NielsenIQ data to Q3 Truth CTO data). The percentage of disposable e-cigarette brands in the Truth CTO was determined by dividing the number of disposable brands by 15 for each quarter.

Results

Table 1 contains a full list of each dataset's top 15 brands in each of the three quarters of 2022. Within Truth CTO data, 22 unique brands identified. Disposable brands made up 60% (or, 9/15) in Q1, 53.3% (8/15) in Q2, and 66.7% (10/15) in Q3 of the top 15 brands in the Truth CTO data. Within NielsenIQ data, 20 unique brands of disposable products and 17 unique brands of pod-based products were identified. Approximately 58% of e-cigarette brands across the Truth CTO and NielsenIQ data overlapped overall. By quarter, there was 60% overlap in Q1, 47% in Q2, and 67% in Q3. Results were similar when comparing across quarters, as the top brand overlap between

Table 1. Top E-cigarette Brands in the Truth Continuous Tracking Online and NielsenIQ Retail Scanner Data, Aggregated by Quarter (2022).

QUARTER	BRAND	TRUTH CTO WEIGHTED %	POD-BASED BRAND (NIELSENIQ)	POD-BASED BRAND TOTAL SALES (\$, NIELSENIQ)	POD-BASED BRAND RANK BASED ON TOTAL SALES (NIELSENIQ)	DISPOSABLE BRAND (NIELSENIQ)	DISPOSABLE BRAND TOTAL SALES (\$, NIELSENIQ)	DISPOSABLE BRAND RANK BASED ON TOTAL SALES
1 (Jan – Mar 2022)	JUUL	33.4	JUUL	\$455,517,100	1	BREEZE PRO	\$41,173,500	1
	Puff bar ^a	25.9	VUSE ALTO	\$414,352,500	2	KANGVAPE ONEE STICK	\$33,344,700	2
	Hyde ^a	20.0	NJOY ACE	\$30,556,300	3	HQD	\$19,971,300	3
	Vuse	14.0	MY BLU	\$16,026,000	4	BIDI STICK	\$18,762,400	4
	SMOK	13.1	GLAS	\$1,597,800	5	HYDE	\$17,819,100	5
	Mr. Fog ^a	7.8	LEAP	\$1,478,900	6	ESCO BARS	\$14,110,200	6
	Breeze Smoke ^b	5.9	BLU ECIGS	\$332,300	7	FUME	\$13,564,300	7
	NJOY	5.2	EPIC	\$102,300	8	MR FOG MAX PRO	\$10,693,200	8
	Blu	4.6	SALT NIC	\$34,500	9	HYPPE MAX FLOW	\$9,644,900	9
	Mr. Vapor ^a	4.0	LAVA STIK	\$26,600	10	FUME INFINITY	\$9,303,700	10
	Pop ^b	3.3	NJOY DAILY	\$24,200	11	MNGO STICK	\$9,189,800	11
	POSH ^a	3.2	VUSE SOLO	\$22,300	12	BREEZE PLUS	\$8,908,000	12
	Bidi stick ^a	3.0	Z	\$3,000	13	POSH	\$8,806,600	13
	Suorin	2.9	E S	\$1,900	14	MR FOG MAX	\$7,697,600	14
	Flair ^a	2.0	Z PODS	\$700	15	KANGVAPE ONEE MAX	\$5,750,700	15
2 (Apr – Jun 2022)	JUUL	34.3	JUUL	\$480,199,000	1	BREEZE PRO	\$52,262,200	1
	Puff bar ^a	26.8	VUSE ALTO	\$428,563,700	2	KANGVAPE ONEE STICK	\$44,110,600	2
	Hyde ^a	18.6	NJOY ACE	\$30,738,200	3	HQD	\$24,173,500	3
	Vuse	18.1	MY BLU	\$11,003,800	4	ESCO BARS	\$23,037,900	4
	SMOK	12.1	GLAS	\$1,337,800	5	FUME	\$19,352,100	5
	NJOY	6.5	LEAP	\$1,182,300	6	FUME INFINITY	\$17,384,100	6
	Mr. Vapor ^a	5.3	BLU ECIGS	\$312,400	7	HYDE	\$15,271,400	7
	Blu	4.8	LAVA 2	\$124,000	8	BIDI STICK	\$14,030,100	8
	POSH ^a	4.5	EPIC	\$90,300	9	MR FOG MAX PRO	\$12,760,200	9
	Bang ^a	3.8	NJOY DAILY	\$21,100	10	HYPPE MAX FLOW	\$10,790,200	10
	Pop ^a	2.7	LAVA STIK	\$6,500	11	LOON MAXX	\$9,023,900	11
	Flair ^a	2.6	VUSE SOLO	\$4,100	12	MR FOG MAX AIR	\$8,474,800	12
	Suorin	2.3	Z	\$3,100	13	MNGO STICK	\$8,299,900	13
	Lava ^a	2.4	E S	\$2,800	14	AIR BAR BOX	\$6,671,500	14
	HQD ^a	2.3	RIP TIDE RIPSTICK	\$1,600	15	MR FOG MAX	\$6,504,800	15

(Continued)

Table 1. Continued.

QUARTER	BRAND	TRUTH CTO WEIGHTED %	POD-BASED BRAND (NIELSEN/Q)	POD-BASED BRAND TOTAL SALES (\$, NIELSEN/Q)	POD-BASED BRAND RANK BASED ON TOTAL SALES (NIELSEN/Q)	DISPOSABLE BRAND (NIELSEN/Q)	DISPOSABLE BRAND TOTAL SALES (\$, NIELSEN/Q)	DISPOSABLE BRAND RANK BASED ON TOTAL SALES
3 (Jul – Sep 2022)	JUUL	35.9	VUSE ALTO	\$477,933,500	1	BREEZE PRO	\$80,201,300	1
	Puff bar ^a	24.4	JUUL	\$382,226,500	2	KANGVAPE ONEE STICK	\$40,497,600	2
	Vuse	17.3	NJOY ACE	\$29,822,300	3	ESCO BARS	\$25,180,100	3
	Hyde ^a	16.2	MY BLU	\$2,521,800	4	HQD	\$22,801,300	4
	EB DESIGN (formerly known as ELF BAR) ^a	16.5	LEAP	\$1,216,000	5	FUME	\$18,565,700	5
	Blu	8.5	GLAS	\$934,100	6	FUME INFINITY	\$16,428,400	6
	Bang ^a	7.9	BLU ECIGS	\$281,400	7	EB DESIGN (formerly known as ELF BAR)	\$15,226,800	7
	Breeze Smoke ^a	7.5	LAVA 2	\$103,000	8	HYDE	\$12,479,600	8
	Mr. Fog ^a	7.5	EPIC	\$47,100	9	BIDI STICK	\$11,669,900	9
	Esco bars ^a	6.7	NJOY DAILY	\$19,100	10	HYPPE MAX FLOW	\$11,054,100	10
	+pods ^a	6.3	VUSE SOLO	\$7400	11	LOON MAXX	\$10,694,300	11
	Fume ^a	5.6	LAVA STIK	\$3100	12	MR FOG MAX PRO	\$10,186,500	12
	NJOY	5.6	Z	\$3,000	13	ESCO BARS RIPE COLLECTION	\$6,434,300	13
	Mr. Vapor ^a	5.3	E S	\$1,100	14	MR FOG MAX AIR	\$5,993,100	14
	SMOK	4.8	RIP TIDE RIPSTICK	\$500	15	MINGO STICK	\$5,185,800	15

Note. CTO = Truth Continuous Tracking Online.

^aIndicates disposable e-cigarette product for listed brands in Truth CTO dataset. Weighted percentages are given for the Truth CTO data, while rank and total sales dollars (rounded up to the nearest \$100) are presented for NielsenIQ data.

NielsenIQ Q1 and Truth CTO Q2 was 53%, and between NielsenIQ Q2 and Truth CTO Q3 was 60%.

JUUL and Puff Bar were the top two self-reported brands used by Truth CTO respondents at Q1, Q2, and Q3 of 2022, followed by Hyde, Vuse, and SMOK in Q1 and Q2. In Q2, three brands debuted in the top 15: Pop, Lava, and HQD. However, these brands did not appear again in Q3. The most significant changes were found in Q3, with EB Design (formerly known as Elf Bar) debuting in the top five and the appearance of Esco Bars, +pods, and Fume in the top 15 brands.

Different patterns emerged when looking at NielsenIQ data, showing a steadier list of top 15 brands overall for disposable and pod-based devices. Among disposable devices, Breeze Pro, Kangvape Onee Stick, and HQD were in the top five in Q1, with Esco Bars and Fume reaching the top five in Q2 and Q3. The top five among pod-based devices include JUUL, Vuse, NJOY Ace, My Blu, and Glas. In Q3 the most significant change amongst pod-based devices is at the top, with Vuse becoming market leader and JUUL moving to number two.

Discussion

The current study demonstrates that retail and rapid surveillance data can be used complementarily in characterizing the most popular e-cigarette brands currently on the market. NielsenIQ data provides information on emerging trends in popular e-cigarette brands available in the US retail market. Rapid surveillance data from the Truth CTO allows for the tracking of popular e-cigarette brand trends among youth and young adults, available online and in the retail market, at a quicker pace than national surveillance data. Together, these data sources allow for a more current characterization of the e-cigarette brands popular among youth and young adults – including those under, at, and over the minimum legal sale age for nicotine products.

Results from these data sources align with reports from the 2022 National Youth Tobacco Survey (NYTS), which show that Vuse and JUUL were the most popular e-cigarette brands among youth⁸ and the 2023 NYTS, which lists EB Designs (formerly Elf Bar), Esco Bars, Vuse, JUUL, and Mr Fog as the most popular e-cigarette brands among youth.⁷ According to the Truth CTO, JUUL, Puff Bar, Hyde, Vuse, and SMOK were identified as the most popular e-cigarette brands among youth and young adults. SMOK and JUUL have also been identified as leading e-cigarette brands in Canada and England.¹⁹

Overall, there was a 58% overlap between the top 15 e-cigarette brands identified by the Truth CTO and those identified by NielsenIQ in 2022. These results could suggest a greater variability in the e-cigarette brands used by youth and young adults, relative to what is available in retail stores, or be reflective of the availability and cost of e-cigarette products. Young people are generally more sensitive to changes in

e-cigarette prices²⁰ and although a considerable proportion of youth and young adults are (still) obtaining e-cigarette devices from retail sources, the majority report obtaining e-cigarette devices from social sources, such as friends and family members.²¹ These social sources may be obtaining e-cigarettes from a variety of sources, including retail stores and sources not captured by NielsenIQ sales data (i.e., vape shops and online sources, which are estimated to account for between 20 and 30% of e-cigarette sales¹⁴). Further, on average, the price of e-cigarette products sold online are estimated to be lower, relative to the price estimates obtained retail sales data.²²

Of the e-cigarette brands identified, JUUL and most disposable e-cigarette brands (i.e., Puff Bar) have been found to include youth-appealing content, such as flavors, fruit imagery, and positive sensations.²³ This is supported by the finding that youth who use e-cigarettes are likely to choose their specific brand of e-cigarettes, based on the brand being “more popular among friends”, “easier to use”, and “better flavor/taste”.¹⁹ E-cigarette companies, like JUUL and Puff Bar, have relied on social media to market their products to youth and young adults,²⁴⁻²⁶ primarily through social media influencers who often promote specific brand-related content on platforms popular among youth, such as Instagram.²⁷ Exposure to social media posts featuring e-cigarette products – including promotional content – has been found to lower risk perceptions and increase the likelihood of initiation.²⁸

A large proportion of the brands identified in the Truth CTO (53.3% to 66.7%) and NielsenIQ data were disposable e-cigarette products. The growing popularity of disposable e-cigarette products are supported by the literature^{18,29,30} and is concerning as disposable e-cigarette products are larger in volume capacity, have greater nicotine strength, and are cheaper.³⁰ Given that higher e-cigarette prices have been found to decrease use amongst youth,²⁰ cheaper e-cigarette products might increase accessibility of these products to youth and adults and may explain why disposable brands were popular among this demographic. Lastly, it is important to remember that many of these e-cigarette products have yet to receive marketing granted orders under the US Food and Drug Administration’s Premarket Tobacco Product Applications pathway to be legally sold in the US.³¹

As with other studies, there are a few limitations to consider. Data from youth and young adults were obtained via self-report, which could be affected by recall and social desirability bias. Further, e-cigarette brands described in this study might not be comprehensive, as respondents were asked to select which e-cigarette brands they used most often, from a list of e-cigarette brands. To mitigate this limitation, Truth CTO respondents are given an opportunity to enter their preferred brand if it is not within the options. This minimizes the chances of not capturing a popular brand. With regards to retail sales data, analysis did not include information on purchases from independent vape shops or the internet. According to one industry report, it is estimated that NielsenIQ sales capture approximately 61% of

the market in 2021.³² Finally, this study is unable to provide information on associations between exposure to e-cigarette advertising and marketing on social media, cost, and nicotine strength on reported use of the most popular e-cigarette brands and future studies examining these associations are warranted.

Conclusions

Results demonstrate that rapid surveillance and retail data can be used complementarily in characterizing the most popular e-cigarette brands currently on the US retail market. An estimated 58% of e-cigarette brands used most by a convenience sample of youth and young adults overlap with US retail sales data in 2022. Many of these top e-cigarette brands are disposable and have yet to receive marketing granting orders under the US Food and Drug Administration's Premarket Tobacco Product Applications pathway to be legally sold in the US. Continued monitoring of e-cigarette brands is needed to identify emergent trends and inform strategies to reduce e-cigarette use among this population.

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Author Contributions

This study was conceptualized by EKD, AB, MCD, and ECH. ML and AB analyzed the data. All authors contributed to the writing and editing of the manuscript.

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