Brief Report

Vapes, E-cigs, and Mods: What Do Young Adults Call E-cigarettes?

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Abstract

Introduction: A diverse class of products, “e-cigarettes” present surveillance and regulatory challenges because of nonstandard terminology used to describe subtypes, especially among young adults, where occasional e-cig use is most prevalent.

Methods: Young adults ($n = 3364$) in wave 9 (Spring 2016) of the Truth Initiative Young Adult Cohort were randomized to see two of five photos of common e-cig products (three varieties of first-generation e-cigs and one variety each of second- and third-generation e-cigs). Qualitative responses were coded into nine classifications: “e-cigarette, e-hookah, vape-related, mod, other or more than one kind of e-cig, marijuana-related, non-e-cig tobacco product, misidentified, and don’t know.” We characterized the sample and survey responses and conducted multivariable logistic regression to identify participant characteristics associated with correctly identifying the devices as e-cigs. Data were weighted to represent the young adult population in the United States in 2016.

Results: The majority of participants identified the pictured devices as some type of e-cig (57.7%–83.6%). The white first-generation e-cig, as well as the second- and third-generation e-cigs caused the greatest confusion, with a large proportion of individuals responding “don’t know” (12.2%–25.1%, depending on device) or misidentifying the e-cig as a non-nicotine product (3.4%–16.1%, depending on device) or non-e-cig tobacco product (1.4%–14.6%, depending on device).

Conclusions: Accurate surveillance and analyses of the effect of e-cigs on health behavior and outcomes depend on accurate data collection on users’ subtype of e-cig. Carefully chosen images in surveys may improve reporting of e-cig use in population studies.

Implications: Survey researchers using images to cue respondents, especially young adult respondents, should consider avoiding use of white or colorful first-generation e-cigs, which were commonly misidentified in this research, in preference for black or dark colored first-generation e-cigs, such as the blu brand e-cig. Given the sizable proportion of respondents who classified second- and third-generation e-cigs with terminology related to vaping, surveys specifically aimed at assessing use of these types of e-cigs should include the term “vape” when describing this subclass of devices.

Introduction

There are over 460 brands of e-cig products, with different designs, colors, and performance characteristics.¹ This variety has presented a challenge to surveillance surveys because of the nonstandard terminology used to describe these devices.² Most US national surveillance surveys (eg, National Adult Tobacco Survey, National Youth Tobacco Survey, Behavioral Risk Factor Surveillance System, Monitoring the Future) treat e-cigs as a single product type; however, this obscures the behavioral and health consequences of using different e-cig device types.^{3,4} The Population Assessment of Tobacco and Health (PATH) Study employs images in its assessment of e-cig use, but the effectiveness of these images correctly capturing e-cig use has not been published.

The purpose of this population-based study is to identify images that young adults can correctly identify as first-, second-, or third-generation e-cigs and to identify demographic or tobacco use history characteristics correlated with misidentifying an e-cig. In the United States, young adults have the highest prevalence of occasional e-cig use among adults and are in a stage of life when they are establishing their tobacco and nicotine use behavioral patterns.⁵ Greater precision in identification of e-cig subtypes in surveillance measurement, especially among young adults, may inform interpretation of prevalence estimates and guide product regulation as well as public health policy and practice.⁶

Methods

Study Design, Population, and Procedures

This study employs cross-sectional data from wave 9 (Spring 2016) of the Truth Initiative Young Adult Cohort Study, a nationally representative longitudinal cohort. Details on the study sample and design have been described previously.⁷ Briefly, the cohort is comprised of young adults aged 18–34 at study entry drawn from GfK's KnowledgePanel, an online panel of adults aged 18 and older. The wave 1 survey ($n = 4215$) was conducted in July 2011, with subsequent assessments occurring approximately every 6 months. The cohort was refreshed at each wave for sample size retention. African American and Hispanic communities were oversampled to ensure sufficient sample sizes. The panel recruitment rate (RECR or the percent of households consenting to join the panel from those for whom contact was attempted) for wave 9 was 13.2%. In 63.9% of the identified households, one member completed a core profile survey during which key demographic information was collected (profile rate—PROR), and 60.7% of households completed the entire survey (COMPR). The cumulative response rate (CUMRR1), which is the product of RECR, PROR, and COMPR, among all recruited individuals was 5.1%. The validity of this methodology has been reported previously,^{8,9} and KnowledgePanel samples have been used broadly in studies in the peer-reviewed medical literature.^{10,11} While wave 9 included 4100 participants, this analysis focuses on young adult participants aged 18–34 years old at wave 9 ($n = 3364$; $n = 736$ were excluded because of age >34).

Measures

Participants were randomly assigned to view two of five images of different types of e-cigs and respond to the open response question, "What would you call the item in the picture below? (Not the brand name, but what you call this type of product)." The e-cig images featured (1) a white first-generation e-cig (brand: Cigirex), (2) a black first-generation e-cig (brand: blu), (3) a pink and green

Table 1. Sociodemographic Characteristics, Truth Initiative Young Adult Cohort, 2016 ($N = 3364$)

	Unweighted n	%	95% CI
Age			
18–24	1133	30.6	(28.8 to 32.4)
25–34	2231	69.4	(67.6 to 71.2)
Gender			
Male	1295	48.4	(45.9 to 50.9)
Female	2069	51.6	(49.1 to 54.1)
Race/ethnicity			
White, non-Hispanic	2154	57.1	(57.1 to 62.2)
Black, non-Hispanic	311	11.7	(11.7 to 15.6)
Other, non-Hispanic	252	8.1	(6.8 to 9.7)
Hispanic	647	18.7	(16.6 to 21.0)
Education			
Less than high school	172	9.6	(7.8 to 11.8)
High school	618	23.4	(21.2 to 25.8)
Some college	1198	31.1	(28.8 to 33.4)
Bachelor's degree	986	24.0	(22.3 to 25.9)
Graduate or professional degree	390	11.9	(10.7 to 13.3)
Current employment status			
Work full-time	1185	60.5	(58.0 to 63.0)
Work part-time	749	15.9	(14.2 to 17.8)
Do not currently work for pay	780	26.6	(21.4 to 26.0)
Financial situation			
Live comfortably	937	25.8	(23.8 to 27.9)
Meet needs with a little left	1363	40.3	(37.9 to 42.8)
Just meet basic expenses	851	26.4	(24.2 to 28.7)
Do not meet basic expenses	186	7.5	(6.1 to 9.1)
Self-defined smoking status			
Nonsmoker	2952	84.0	(82.0 to 85.9)
Occasional smoker	160	4.8	(3.9 to 6.0)
Smoker	252	11.2	(9.5 to 13.0)
Self-defined e-cigarette use status			
Nonvaper	3235	96.0	(94.9–96.9)
Occasional vaper	87	2.5	(1.9–3.4)
Vaper	42	1.5	(1.0–2.3)
Past 30-d marijuana use			
No marijuana use ^a	3024	89.8	(88.1 to 91.2)
Occasional marijuana use ^b	191	5.5	(4.4 to 6.8)
Daily marijuana use ^c	149	4.7	(3.7 to 5.9)
Past 30-d alcohol use			
No alcohol use ^a	1424	45.5	(43.0 to 48.1)
Occasional alcohol use ^b	1729	47.8	(45.3 to 50.3)
Daily alcohol use ^c	187	6.7	(5.5 to 8.1)

The following variables had missing data: current employment status (<1%), financial situation (<1%), and past 30-day alcohol use (<1%).

^aNo use in the past 30 days.

^bUse on 1–29 days in the past 30 days.

^cDaily use in the past 30 days.

first-generation e-cig (brand: EZ Cig), (4) a black second-generation e-cig (brand: e-Go T), and (5) an orange third-generation (brand: Joyetech eVic VT).

Standard data collection for each wave included participants' sociodemographic characteristics (eg, age, gender, race/ethnicity, education, employment status, financial situation), tobacco and nicotine-containing product use (eg, ever and past 30-day cigarette, cigar, hookah, e-cigarette, pipe and smokeless use), self-defined cigarette smoking and e-cig use status, and other substance use (eg, past

Table 2. Identification of ENDS Subtypes Among Young Adults, Truth Initiative Young Adult Cohort, 2016 (N = 3364)

	Device 1			Device 2			Device 3			Device 4			Device 5		
	n	Weighted % (95% CI)		n	Weighted % (95% CI)		n	Weighted % (95% CI)		n	Weighted % (95% CI)		n	Weighted % (95% CI)	
	White cigalike, n = 1243			Black cigalike, n = 1121			Pink & Green cigalike, n = 1190			e-Go, n = 1146			Mod, n = 1189		
ENDS-related	935	73.7 (69.7 to 77.4)		972	83.6 (79.5 to 87.0)		742	63.1 (59.0 to 67.0)		966	82.3 (78.7 to 85.4)		693	57.5 (53.2 to 61.6)	
E-cigarette	845	66.1 (61.8 to 70.1)		840	72.2 (67.7 to 76.2)		613	52.8 (48.7 to 56.9)		530	47.0 (42.9 to 51.2)		211	18.3 (15.3 to 21.6)	
E-hookah	0	0.0		1	0		9	1.0 (0.2 to 1.4)		9	1.2 (0.1 to 3.1)		3	0.1 (0.0 to 0.7)	
Vape-related	48	3.2 (2.0 to 4.9)		80	6.3 (4.5 to 8.7)		70	5.3 (3.7 to 7.4)		340	26.9 (23.4 to 30.7)		403	32.5 (28.8 to 36.4)	
Mod	0	0		0	0		0	0		0	0		16	1.2 (1.0 to 2.7)	
Other ENDS	42	4.5 (2.7 to 7.4)		48	4.6 (2.9 to 7.3)		42	3.9 (2.4 to 6.4)		74	5.6 (3.9 to 8.0)		45	4.6 (3.1 to 6.9)	
Marijuana-related	0	0.0		3	0.5 (0.1 to 1.6)		8	0.5 (0.2 to 0.1)		13	1.5 (1.0 to 3.4)		15	1.0 (0.4 to 2.4)	
Non-ENDS tobacco product	176	14.0 (11.1 to 17.1)		33	3.9 (2.2 to 6.8)		193	14.6 (11.9 to 17.6)		17	2.2 (1.1 to 4.0)		17	1.4 (0.6 to 2.9)	
Don't know	83	6.5 (4.8 to 8.9)		72	9.0 (6.4 to 12.3)		180	16.4 (13.5 to 19.8)		120	12.2 (9.6 to 15.4)		294	25.0 (21.4 to 29.0)	
Everything else	49	5.8 (3.7 to 9.0)		44	3.6 (2.3 to 5.5)		75	6.0 (4.3 to 8.3)		43	3.4 (2.1 to 5.4)		185	16.1 (13.3 to 19.5)	

Answers included in "everything else" included responses such as "fake cigarette," misidentified items (eg, a flashlight), or uninterpretable responses. CI = confidence interval.

30-day marijuana and alcohol use, defined as nonuser, occasional user, and daily user in the past 30 days).

Analyses

We coded qualitative response to the open e-cig identification item into one of nine categories: (1) e-cigarette (any derivation of “e-cigarette” or “e-cig”), (2) e-hookah (any derivation of “e-hookah”), (3) vape-related (any reference to “vape,” “vapor,” or “vape pen”), (4) mod (any reference to “mod” or “box mod”), (5) other or more than one kind of e-cig (some other clear reference to e-cig or using more than one reference to e-cigs, such as “vape mod”), (6) marijuana-related (any reference to cannabis consumption), (7) non-e-cig tobacco product (any reference to a tobacco product, such as a cigarette or cigar), (8) misidentified (any reference to a non-e-cig and/or nontobacco product, uninterpretable responses, and non-marijuana product, such as references to cosmetics), and (9) “don’t know.” The second author coded the responses and resolved unclear participant responses with the first author. We used descriptive statistics to characterize the study sample and responses to the e-cig identification items. Furthermore, we used chi-square analyses to identify significant sociodemographic correlates of correctly identifying each photo as some type of e-cig and used these significant sociodemographic variables as covariates in regression models to identify individual characteristics associated with correctly identifying e-cig subtypes. Individuals with missing data were listwise deleted only for analyses where this missing observation was needed. Employment status, financial situation, and past 30-day alcohol use all had missing data at less than 1%. Analyses were conducted using SAS 9.4 and Stata IC 14.0, and post-stratification weights were used to offset any nonresponse or noncoverage bias and produce nationally representative estimates specific to each wave of data collection.

Results

Sample Characteristics

Wave 9 of the Truth Initiative Young Adult cohort includes 4100 participants; however, 736 (17.9%) participants were excluded from this analysis as they were no longer aged 18–34 in 2016, leaving a final sample of 3364 young adults. The majority of participants were aged 25 to 34 years (69.4%), female (51.6%), and non-Hispanic white (57.1%). Most had completed high school (23.4%), some college (31.1%), or finished a Bachelor’s degree (24.0%); 40.3% reported meeting their financial needs “with a little resources left.” Few identified as smokers (11.2%) or vapers (1.5%). Nearly 90% reported no past 30-day marijuana use, and 45.5% did not consume alcohol in the past 30 days.

Responses by Device Photo

Table 2 presents responses by device photo. Overall, most people identified items in these pictures as some sort of e-cig from 57.7% of people who saw the third-generation (Joyetech eVic VT) picture to 83.6% who saw the black (blu) first-generation picture. However, within the category of e-cig terms, participants used “e-cigarette” to describe some pictures with greater frequency than others. The black (blu) and white (Cigirex) first-generation e-cigs were most commonly described as an “e-cigarette” (72.2% and 66.1%, respectively), followed by the pink and green first-generation e-cigs (EZ Cig; 52.8%), the black second-generation e-cig (e-Go T; 47.0%), and orange third-generation e-cig (Joyetech eVic; 18.3%). “Vape” was most frequently associated with the black second-generation e-cig

(e-Go T; 26.9%) and the orange third-generation e-cig (Joyetech eVic; 32.5%).

We were also interested in the degree to which young adults might misidentify these e-cig devices. The pink and green EZ Cig first-generation e-cig caused the most confusion, with a number of “don’t know” or misidentified free responses. The pink and green EZ Cig first-generation e-cig was misidentified as a tobacco product like a “foo foo cigarette” or “a flavored cigarette” or a “pink cigarette” 14.6% of the time. The Cigirex white e-cigarette was also misidentified as a cigarette by 14.0% of participants. Sixteen percent of the participants identified the orange Joyetech eVic third-generation as something that was not tobacco related, such as a “muffler,” “breathalyzer,” and “lighter.”

Individual Characteristics Associated With E-cig Identification

There were no sociodemographic characteristics associated with identifying the Cigirex white first-generation e-cig. Occasional past 30-day alcohol use (compared with nondrinkers) was marginally associated with correctly identifying the pink and green EZ Cig first-generation e-cig ($p = .048$). Compared with non-Hispanic whites, Hispanic young adults had a reduced odds of correctly identifying the black blu first-generation e-cig (aOR: 0.40, 95% CI: 0.21 to 0.78). Additionally, individuals with some college education, a Bachelor’s degree, and a graduate or professional degree had 3.7 (95% CI: 1.32 to 10.3), 4.0 (95% CI: 1.5 to 10.7), and 7.2 (95% CI: 2.3 to 22.3) times higher odds of correctly identifying the black blu first-generation as an e-cig. Compared with non-Hispanic whites, Black (aOR: 0.32, 95% CI: 0.16 to 0.63) and Hispanic (aOR: 0.39, 95% CI: 0.22 to 0.70) young adults had a lower odds of correctly identifying the e-Go T second-generation e-cig, as did individuals not working for pay (compared with those with full-time jobs; aOR: 0.43, 95% CI: 0.25 to 0.74). There were several characteristics associated with misidentifying the Joyetech eVic third-generation e-cig. Young adult women (aOR: 0.68, 95% CI: 0.48 to 0.98), non-Hispanic Blacks (aOR: 0.29, 95% CI: 0.15 to 0.53), and Hispanics (aOR: 0.56, 95% CI: 0.34 to 0.91) had a lower odds of identifying the Joyetech eVic third-generation as an e-cig compared with men and non-Hispanic white young adults, respectively. Compared with nondrinkers, occasional alcohol use was also associated with correctly identifying the Joyetech eVic third-generation (aOR: 1.74, 95% CI: 1.19 to 2.54).

Discussion

For each of the five products pictured, the majority of the participants were able to correctly identify the devices as some type of e-cig. However, the e-cig-related terms used for each device varied significantly, and between 10%–35% of individuals misidentified devices or did not know what to call them. On a practical level, researchers using images to cue respondents, especially young adult respondents, should consider avoiding use of white or colorful first-generation e-cigs, which were commonly misidentified in this research, in preference for black or dark colored first-generation e-cig, such as the blu brand e-cig. Given the sizable proportion of respondents who classified second- and third-generation e-cig with terminology related to vaping, surveys specifically aimed at assessing use of these types of e-cigs should include the term “vape” when describing this subclass of devices. When researching e-cig use more

generally, investigators should also consider presenting e-cigs like the blu, e-Go, and Joyetech eVic in one image to communicate to respondents that these products should be considered as one class when answering survey items. Researchers using images of e-cigs like the e-Go or Joyetech should also consider clarifying whether they are interested in use of these devices with cannabis.

Several sociodemographic characteristics were associated with misidentification of e-cig devices. In line with research documenting disparities in the distribution of vape shops, Black and Hispanic young adults were less likely to correctly identify second- and third-generation devices as e-cigs compared with their white counterparts.^{12,13} Higher education was also associated with correctly identifying the blu e-cigarette as an e-cig. These results echo sociodemographic trends associated with e-cig use in the US population and may reflect general familiarity with e-cig devices by sociodemographic characteristics.^{14,15}

While we used images of five e-cig devices intentionally chosen to represent the most common types of devices on the market at the time of the study, there are hundreds of e-cig devices available in the United States. Of note, we did not include images of JUUL products in our study, as they were not prevalent at the time of data collection. Use of other images in our study may have yielded different conclusions. Additionally, the low prevalence of e-cig or tobacco product use in this sample did not allow us to examine identification of terms by experience with e-cig and/or tobacco products. Future research with a larger sample of tobacco and nicotine product users is needed to explore the correlation between tobacco and/or nicotine product use and correct identification of e-cig subtypes.

Conclusion

A considerable proportion of young adults is able to identify common subtypes of e-cig products; however, terminology varies by product within young adults and differs across key demographics. Researchers should be cautioned against using images of e-cig products that resemble conventional tobacco products and should present a variety of e-cig subtypes in one image to communicate interest in this class of products.

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Declaration of Interests

None declared.

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