



## Youth who use e-cigarettes regularly: A qualitative study of behavior, attitudes, and familial norms

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### ABSTRACT

Limited research exists describing youth who use e-cigarettes on a regular basis, including knowledge of nicotine levels, health effects, and plans for future use. This qualitative study explored the patterns of use, social and familial norms, and perceptions of health effects among this group.

Youth (N = 43), 14–17 years old, who described themselves as regular e-cigarette users, participated in 4 focus group discussions in Miami, Florida, and Raleigh, North Carolina in February 2016.

Youth often initiated or continued e-cigarette use with a device obtained from a friend or family member, and often do not own their own device. They cite the flavors and doing tricks as the two main reasons they initially used e-cigarettes. Many reported that their family members are aware they use e-cigarettes, and that they have received implicit and explicit messages from family members that are positive toward e-cigarette use. They are aware of the negative effects of nicotine, including addiction, but not confident that they are using e-liquids without nicotine. Participants reported they will stop using e-cigarettes when they become aware of reported negative health effects.

Parents and family members are an important target audience for prevention campaigns and health messaging, given that their own use and acceptance could be encouraging initiation and continuation. Youth are using products containing nicotine and may be becoming addicted, even if they would not choose to use nicotine-containing e-juice. Increased awareness of negative health effects may encourage prevention and cessation of e-cigarette use among youth.

### 1. Introduction

Tobacco use and addiction often begin before adulthood (USDHHS, 2012) and youth nicotine exposure can cause harm in brain development, lead to addiction, and to the use of other tobacco products (USDHHS, 2012; Wills et al., 2014). Electronic cigarettes, or e-cigarettes, are the most commonly used tobacco product used by youth in middle school and high school and youth often use newer generation devices (Barrington-Trimis et al., 2018; Singh et al., 2016). The recent Surgeon General's report on e-cigarettes noted that among youth in grades 6–12, the percentage who have “ever used” e-cigarettes increased from 2.3% in 2011 to 27% in 2015 adulthood (USDHHS, 2012). Despite the known harms, research has shown that youth perceive e-cigarettes to be less harmful and less addictive than combustible cigarettes (Amrock et al., 2016). Recent studies have shown an association between e-cigarette use and subsequent cigarette smoking, adding to the importance of understanding factors that influence use (Soneji et al., 2017).

Identifying factors that influence youth e-cigarette use will require understanding the complex reasons that youth initiate and continue use, where they are most likely to obtain these devices, and the norms that may contribute to use. Previous research with youth e-cigarette users is limited because in general these studies are often conducted with youth experimenters or non-regular users (Kong et al., 2015; Gorukanti et al., 2017). However, previous research has shown that youth and young adults report that curiosity, flavors, family/peers, easy access, ability to do smoke tricks, and perceptions of “coolness” and health influence experimentation with e-cigarettes (Kong et al., 2015). This study aimed to address gaps in the literature by better understanding e-cigarette use and behavior among regular users using a qualitative approach. This approach was selected to flexibly gather detailed, rich data about social phenomenon (Ritchie and Lewis, 2014). Focus group discussions (FGDs), specifically, were chosen in order to better examine social constructs and norms through discussions between individuals with similar experiences (Ritchie and Lewis, 2014). To add to the science, the present study targeted a hard-to-reach

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population: youth who regularly use e-cigarettes, exploring and describing patterns of use, social and familial norms, and perceptions of health effects. These crucial elements expand understanding for clinicians, health educators, researchers, regulators, and others who address tobacco use and addiction among youth and are responsible for developing prevention activities and health messages.

## 2. Methods

### 2.1. Participants and focus group discussion procedures

We conducted a series of 4 focus group discussions (FGDs) with current adolescent e-cigarette users (N = 41). FGDs were held in January and February 2016 in Miami, Florida, and Raleigh, North Carolina. Participants were grouped by age: 2 FGDs of younger adolescents, aged 14 to 15, and 2 FGDs of older adolescents, aged 16 to 17. Among the participants, all reported that were regular e-cigarette users, defined as having used electronic vapor products (such as “cigalikes”—e-cigarettes designed to look like combustible cigarettes and tank devices—refillable with e-liquid and generally more expensive) every day or some days in the past 30 days. Of note, 43 participants took part in the FGD. The study team was informed after the FGD, that 2 participants, upon rescreening when they arrived to the FGDs, said they had “rarely” used in the past 30 days. This made them not eligible for the FGD and their demographic data and comments were discarded post-FGD and are not included here despite their participation in the FGD.

In each city, local market research facilities recruited participants using convenience sampling of their databases to identify participants that met the requirements for inclusion based on a screener developed by the study team. Market research facility databases are proprietary and include demographic information from individuals who have indicated their willingness to participate in market research. For this study, parents of children in the desired age range were selected from the database, then contacted by phone and asked if they would consent to allow their child to be screened for eligibility. Eligible participants had to be aged 14–17 and have used electronic vapor products regularly, defined as “every day” or “some days” in the past 30 days. Those who answered that they used these products “rarely” or “not at all” in the past 30 days were not eligible. Potential participants were also asked to identify the device they used “most of the time” as either a cigalike or tank. Study procedures were approved by the Institutional Review Board at RTI International. Additionally, participants signed an assent form and were required to bring a signed parental permission form to the FGD.

A 46-year-old female moderator experienced with both the subject matter and FGDs with youth conducted all FGDs using a semistructured moderator guide addressing such topics as e-cigarette initiation, reasons for use, current use, setting of use, terminology, dual use of e-cigarettes and at least one other tobacco product, perceptions of benefits and relative negative health outcomes, and peer and family perceptions of e-cigarette use and health outcomes. Each FGD lasted approximately 90 min and was audio recorded and then transcribed.

### 2.2. Analysis

During each FGD, a notetaker entered notes directly into a standardized matrix. This matrix, the moderator guide, and the verbatim transcripts from each FGD were used by the lead researcher to develop a codebook with codes and subcodes reflecting variables of interest. All codes were given operational definitions to increase reliability and validity and to aid the coding process. A second researcher reviewed the codes and subcodes, and the team made modifications to ensure that themes and variables of interest were captured. Next, the lead researcher coded transcripts using NVivo Version 10 (QSR International, 2012). The second researcher reviewed coding of a random sample of

**Table 1**  
Participant characteristics: overall and by age group (2016).

Characteristic	Age group (years)			
	Overall	14 to 15	16 to 17	
n =	41	19	22	
Race	Black	3 (7.3%)	1 (5.3%)	2 (9.1%)
	White	38 (92.7%)	18 (94.7%)	20 (90.9%)
Gender	Female	19 (46.3%)	10 (52.6%)	9 (40.9%)
	Male	22 (53.7%)	9 (47.4%)	13 (59.1%)
Ethnicity	Hispanic	12 (29.3%)	6 (31.6%)	6 (27.3%)
	Non-Hispanic	29 (70.7%)	13 (68.4%)	16 (72.7%)
Age (mean (SD))		15.8 (1.1)	14.7 (0.5)	16.7 (0.5)
School grade	8	2 (4.9%)	2 (10.5%)	0 (0.0%)
	9	8 (19.5%)	8 (42.1%)	0 (0.0%)
	10	13 (31.7%)	9 (47.4%)	4 (18.2%)
	11	10 (24.4%)	0 (0.0%)	10 (45.5%)
	12	7 (17.1%)	0 (0.0%)	7 (31.8%)
	Not in school	1 (2.4%)	0 (0.0%)	1 (4.5%)
City	Miami, FL	20 (48.8%)	10 (52.6%)	10 (45.5%)
	Raleigh, NC	21 (51.2%)	9 (47.4%)	12 (54.5%)
Electronic vapor product use in past 30 days	Some days	36 (87.8%)	19 (100.0%)	17 (77.3%)
	Every day	5 (12.2%)	0 (0.0%)	5 (22.7%)
Cigalike device user	No	28 (68.3%)	9 (47.4%)	19 (86.4%)
	Yes	13 (31.7%)	10 (52.6%)	3 (13.6%)
Tank device user	No	7 (17.1%)	5 (26.3%)	2 (9.1%)
	Yes	34 (82.9%)	14 (73.7%)	20 (90.9%)
Ever tried a cigarette	No	22 (53.7%)	12 (63.2%)	10 (45.5%)
	Yes	19 (46.3%)	7 (36.8%)	12 (54.5%)
If ever tried a cigarette, smoking frequency in past 30 days (n = 19)	Not at all	10 (52.6%)	2 (28.6%)	8 (66.7%)
	Rarely	5 (26.3%)	4 (57.1%)	1 (8.3%)
	Some days	2 (10.5%)	0 (0.0%)	2 (16.7%)
	Every day	2 (10.5%)	1 (14.3%)	1 (8.3%)

transcripts to ensure they were coded according to the previously agreed on definitions. Disagreements and challenges were discussed until reaching consensus. Basic descriptive statistics to describe the sample were conducted using R for the overall participant sample and stratified by age group (R. Development Core Team, 2016).

## 3. Results

### 3.1. Participant characteristics

During screening, we collected demographic characteristics and product use of the 41 participants. Table 1 shows this data both overall and by age group.

### 3.2. Initiation

Across both age groups (younger and older), participants reported that they first heard about e-cigarettes from friends, older siblings, or other family members. Most younger participants (including all in one of the FGDs) and many older participants said their first use of an e-cigarette was their first use of any nicotine product. First use was overwhelmingly positive. Asked to describe their initiation of these devices, most said that they first used them with friends or siblings. This usually occurred in one of three settings: at school, at a public place such as a park, or at home or the home of a peer.

*“When I first tried it, I coughed a lot but it was fun.”*

[Younger]

*“My parents were out for the night and I got it from my older brother; he was with his friends...he told me I should try it.”*

[Younger]

*“I was in the bathroom [at school] and I remember my friends had something and they're like, ‘Oh, we have this vapor.’ It was mango. I'm like, ‘Oh, what is it?’”*

[Older]

Flavors were the most popular reason for trying, with most or all participants citing this reason and reporting that the first e-cigarette they used was flavored. The ability to do tricks was mentioned by many participants as a reason for trying e-cigarettes, particularly among older participants.

*“I thought it was cool. You get like big clouds out of these little pens that taste like cotton candy and stuff.”*

[Older]

*“You want to try every single flavor.”*

[Older]

*“Yeah, it's a cool thing. It's like you can have like one flavor in and then the next tank is a totally different flavor...The names are attractive, like Tiger Blood or Kryptonite or Space Jam Galactica.”*

[Older]

*“Lots of people do smoke tricks and I wanted to try them.”*

[Older]

Participants in both age groups mentioned the influence and involvement of peers on their first experience. Having friends who already used and being with friends where an e-cigarette was available were cited as reasons for first use.

*“To be honest...it was just one of my friends kind of telling me, ‘Oh, yeah, you should try this.’”*

[Older]

*“It was after school. We were just in a group and then we were just passing it around...at the park.”*

[Younger]

*“I only do it because my friends do it.”*

[Younger]

### 3.3. Current and future use

Participants reported that they used tank devices far more often than cigalike devices, in part because of the availability of flavored e-liquid and the ability to perform smoke tricks. According to data collected during screening, 83% of participants most often use a tank device. Younger participants were more likely to use a cigalike device than older participants; 53% versus 14%, respectively. In some cases, younger participants said that they use cigalikes as a “last resort” when they cannot access tanks, with one saying, “[A cigalike] wouldn't give out a lot of smoke. Yeah, so it's kind of pointless.”

Older participants were more likely to use e-cigarettes while alone, whereas younger participants were more likely to use them with others, usually peers. Additionally, younger participants were less likely to own their own device, using a friend or family member's device.

Younger participants who own their own devices purchase them from several sources. Most often, they buy them from peers; from older friends or siblings who are willing to purchase devices for them; at mall kiosks or vape shops that do not ask for proof of age; or, less often, online. Older participants used the same sources, but they were more likely to buy devices themselves at a vape shop because they did not get asked for proof of age or knew someone who works at the store.

When asked what would cause them to stop using e-cigarettes, participants cited three main reasons: finding out that e-cigarettes are harmful to their health, not being around friends who use them, and e-cigarettes not being as popular or being replaced by a new product. Several participants mentioned that e-cigarettes were not as popular as they once were, and they expected them to fall out of favor as a “fad” in

the coming years.

*“I'm only doing it now because apparently it's perfectly safe.”*

[Younger]

*“There's no study saying that it's bad for you...I enjoy it, so why stop if I know that there's nothing that's going to kill me? Now like if they're like, ‘People who use the vaporizers for 5 years are going to die when they are 23,’ then I'll probably be like, ‘Oh, nope,’ and throw it out a window or something; but like for now...why stop?”*

[Older]

*“I feel like they're going to find some study on them that's going to find them unhealthy and like cigarettes, and then something else is going to come in and take their place.”*

[Younger]

*“[I will stop] if they find out it's not healthy and I might die for doing it. I don't want to die.”*

[Younger]

*“Well, yeah, it does seem like everybody does and so if they don't do it [where I will go to college], I probably won't do it and blow it in their face because it comes with a stigma...I don't want people thinking I'm a tool.”*

[Older]

### 3.4. Nicotine

Participants were knowledgeable about nicotine. Participants described having learned about nicotine in school health classes, school anti-drug programs, and from anti-tobacco public service announcements. They were aware that nicotine is an addictive substance, that cigarettes contain nicotine, and that e-cigarettes could contain nicotine. When asked if there were differences between the nicotine in e-cigarettes and the nicotine in cigarettes, however, participants were unsure. Participants said that cigarettes contain more nicotine than e-liquid, and they knew that e-liquid was available with different levels of nicotine. Some participants also said that the nicotine in cigarettes came from tobacco leaves and is therefore “natural”; whereas the nicotine in e-liquid is “chemically engineered” or “chemically made.”

Participants were asked if the first e-cigarette they used had nicotine in it. Overall, most participants were unsure. In most cases, they were using a device supplied by a friend or family member and did not ask. In some cases, participants described asking the person whose device they used, but not being sure that the person was telling the truth or even aware if the device contained nicotine.

*“I asked my older brother and he said there wasn't, but I don't know if he was telling the truth or not.”*

[Younger]

*“Well, I actually don't know. My friend, she said there wasn't any.”*

[Younger]

*“I don't know, my friend gave it to me.”*

[Older]

The uncertainty expressed when asked about nicotine in their first e-cigarette extended to current use. While a few older participants said they buy e-liquid with no nicotine every time, most other participants reported that they were not sure if their e-cigarette contained nicotine. Older participants, who were more likely to buy their own e-liquid than younger participants, were more likely to say that they choose their e-liquid either with or without nicotine. Younger participants, however, were often using a borrowed device or were dependent on others for the purchase of e-liquid and were not able to choose whether they used e-liquid with nicotine. Additionally, older participants were more knowledgeable about nicotine levels in e-liquid, noting that the percentages were found on the vials. In some cases, they were able to describe their preferred levels and percentages of nicotine. When asked

how they were sure that the e-liquid they were using had (or did not have) nicotine, both older and younger participants said that they could tell because of the color of the e-liquid (e.g., higher levels of nicotine made e-liquids darker) and the effects of using an e-liquid with different levels of nicotine. Higher levels of nicotine increased the likelihood of a strong taste, (e.g., “throat hit”) and made them feel lightheaded or “buzzed.”

*“I think the guy that gave it to us said there wasn’t.”*

[Younger]

*“I ask my friend. I tell him, ‘Does it have nicotine? Because I’m not going to use it if it does,’ and he’s like, ‘No,’ and so I just use it.”*

[Younger]

*“I think you would know because even if it is just like a small amount, it does burn your throat, so if there isn’t any nicotine in it, you’re just going to taste the flavor but if there is, you’ll feel it in your throat.”*

[Younger]

### 3.5. Family norms and perceptions

Most participants in all FGDs reported that they have family members in their home who use e-cigarettes; split between older siblings and parents/other adults. In many cases, these were the first devices used by participants. In some cases, parents and siblings gave or bought e-cigarettes for participants. Older participants reported that parents (or other older relatives such as aunts or uncles) bought devices for them after finding out that they were smoking cigarettes. Younger participants were more likely to use a parent/relative’s device secretly and were less likely than older participants to have their own device, but some participants also reported receiving their first device from a family member.

*“My sister [gave me my first one]. She does it or she did it a lot in the house, it smelled really good and I was like, ‘Oh, let me.’”*

[Younger]

*“My godmom, when I moved in with her a couple years ago...when I got my first one, it was actually her brother that bought it for me because he found out I was smoking cigarettes.”*

[Older]

*“My dad gave me my first one, so.”*

[Older]

Participants were asked if their parents knew that they used e-cigarettes; and, if so, what parents thought about their use. Overwhelmingly across age groups, when participants reported having family members in their home who used e-cigarettes. Additionally, participants reported the perception that their parents had positive or neutral feelings about the participant’s use of e-cigarettes. In cases where family members did not use e-cigarettes, participants were split about parents’ reactions; in many cases, when they were aware that the participants used e-cigarettes, participants perceived parents’ reactions as neutral. Some younger participants reported that their parents would be accepting of them trying or using an e-cigarette but not owning an e-cigarette. When parents were not aware, participants said that many of them would accept participant e-cigarette use, especially in comparison with combustible cigarette or other substance use. A minority of participants said that their parents would be upset if they found out that their child was using e-cigarettes.

*“She’s just happy I’m not doing anything serious, you know.”*

[Older]

*“My mom smacked me. Now she’s okay with it.”*

[Older]

*“So, I was like, ‘Well, it’s the same thing as smoking like I did before but*

*it’s better for me,’ and [my mother] was kind of sad about it, you could say...And then it kind of turned into, she doesn’t care. Now, she’s like, ‘Just don’t do it in the house.’”*

[Older]

*“My mom doesn’t trust it either, but she told me that she’d rather me be doing that than other bad things.”*

[Younger]

## 4. Discussion

This study is one of the few to qualitatively examine the perceptions, attitudes, and beliefs of regular youth users of e-cigarettes, rather than youth who have ever tried or infrequently use e-cigarettes (Wagoner et al., 2016). It supports recent studies that highlight the confusion and lack of information available to youth and young adults regarding the health effects of e-cigarettes (Coleman et al., 2016; Gorukanti et al., 2017). While our study makes clear that sampled youth enjoy using e-cigarettes, in particular the flavors and the ability to perform tricks, they are aware that nicotine is harmful and addictive and aware that there is limited information available on the health effects of e-cigarettes. They expect that future studies will show negative health effects and stated their intention to stop using e-cigarettes when these studies are available. However, they did not express awareness that they may not be able to easily quit using e-cigarettes at that point because of nicotine addiction. They also expect that e-cigarette use will fall out of favor as a “fad” and will be replaced by another product. Peer influences, therefore, remain an important avenue for prevention messaging (Kong and Krishnan-Sarin, 2017).

Importantly, youth in this study often initiated e-cigarette use with a device obtained from a family member, as most participants said they had family members who use these devices. In recent survey research from (Tsai et al., 2018), the most common reason cited for ever use of e-cigarettes was use by a friend or family member. In the current study, participants reported that their family members are aware that they use e-cigarettes, and that they have received implicit and explicit messages from family members that are neutral or positive toward e-cigarette use. These messages could be encouraging initiation and continued use, as numerous studies have examined the positive associations between perceived familial acceptability and initiation of cigarette use among youth (Olds et al., 2005; Pedersen et al., 2013). It remains unclear if these positive associations carry over to e-cigarette use. It is conceivable that even neutral family attitudes and norms, also reported by participants, could affect e-cigarette initiation and use. Family member behavior and norms represent an important avenue for future research, and prevention campaigns and health messages must also be targeted to parents and family contacts.

Recent survey research by Miech et al. (2017) has shown that a majority of youth users report that they are not knowingly using e-liquid containing nicotine. This current study adds to that finding, however, as younger youth reported that they share or borrow e-cigarettes and either did not know if they were vaping nicotine or were unable to choose whether they wanted to vape nicotine. Older youth were more likely to purchase their own e-liquid, but those who did not purchase their own were also unsure if they were vaping nicotine. Our findings mirror survey data from Morean et al. (2016) that show that many youth were unaware of the amount of nicotine they use. Regardless of whether they are vaping nicotine or not, participants’ awareness of nicotine’s negative health effects was high, even while they erroneously believe that e-cigarettes produce only harmless water vapor. While studies have shown that there is limited social desirability bias in adult and youth self-report of nicotine consumption regarding cigarettes (Messeri et al., 2007; Yeager and Krosnick, 2010), more research is needed to determine whether this extends to e-cigarettes.

Study findings should be interpreted considering several limitations. This study sample was relatively small and not nationally

representative. It used non-random, convenience sampling methods for recruitment and is therefore not generalizable to any broader populations of youth who use e-cigarettes regularly. In addition, this study did not address the important issue of dual use and potential dual use of e-cigarettes and combustible cigarettes beyond the collection of demographic information during screening (Table 1). Finally, this study was designed to generate findings from one point in time and did not address the rapid and regular introduction of new device types (such as Juul).

Overall, this study demonstrates that youth study participants who regularly use e-cigarettes are knowledgeable about nicotine generally, but they are not necessarily aware of their own level of consumption. The study also highlights the relationship between regular use of e-cigarettes by youth, use by family members, and attitudes of parents and other family members. These findings have important implications for future research to confirm and expand on these study findings and for the development of e-cigarette health messaging that reaches youth and their family contacts.

#### 4.1. Conclusions

Few qualitative studies have explored attitudes, beliefs, and perceptions among youth who use e-cigarettes regularly, rather than those who ever or occasionally use. This study provided insight into these regular users' experiences and reveal positive attitudes toward flavors and ability to perform tricks and a lack of knowledge about health effects of e-cigarettes and the nicotine used. Youth in our study perceived implicit and explicit positive and neutral messages about e-cigarettes from parents and family members. These findings underscore the importance of prevention messaging aimed at both youth and parents to disseminate information about e-cigarette ingredients, health effects, and the possibility of becoming addicted to nicotine.

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