



Published in final edited form as:

Addict Res Theory. 2016 ; 24(4): 313–321. doi:10.3109/16066359.2016.1139700.

E-cigarette use in adults: a qualitative study of users' perceptions and future use intentions

Vani Nath Simmons^{a,b,c}, Gwendolyn P. Quinn^{a,c,d}, Paul T. Harrell^a, Lauren R. Meltzer^a, John B. Correa^{a,b}, Marina Unrod^{a,b}, and Thomas H. Brandon^{a,b,c}

^aDepartment of Health Outcomes and Behavior, H. Lee Moffitt Cancer Center, Tampa, FL, USA

^bDepartment of Psychology, University of South Florida, Tampa, FL, USA

^cDepartment of Oncologic Sciences, University of South Florida, Tampa, FL, USA

^dDepartment of Community and Family Health, University of South Florida, Tampa, FL, USA

Abstract

Background—There has been an exponential increase in the prevalence of e-cigarette use, particularly among youth. However, adult use is also rising, and there have been relatively few qualitative studies with adult users to understand their reasons for use and future use intentions. Such information is needed to inform both prevention and cessation approaches.

Method—Thirty-one e-cigarette users participated in one of several focus groups assessing the appeal of e-cigarettes as well as comparisons to combustible cigarettes and approved smoking cessation aids. We also obtained perspectives on future use intentions and interest in e-cigarette cessation interventions. Verbatim transcripts were analyzed using the constant comparative method.

Results—Participants reported several aspects of e-cigarette appeal as compared to approved cessation treatment options. These included similarities to combustible cigarettes, fewer side effects, and control of e-cigarettes to suit personal preferences. Participants were split on whether they preferred flavors that mimicked or contrasted with their combustible cigarettes (i.e., tobacco vs. alternative flavors, such as candy). Some participants who were unmotivated to quit smoking reported an unanticipated disinterest in continuing use of combustible cigarettes shortly after initiating e-cigarettes. Despite strong interest in reducing nicotine dosage, the majority did not intend to fully discontinue e-cigarettes.

Conclusions—Understanding e-cigarette users' perspectives can inform policy and treatment development. Regulatory and policy initiatives will need to balance the appealing characteristics of e-cigarettes with the potential for negative public health outcomes.

Keywords

electronic cigarettes; electronic nicotine delivery systems; focus groups; adults; smoking; nicotine replacement therapy

Introduction

Cigarette smoking remains the leading preventable cause of death in the United States (USDHHS, 2014). Although over two-thirds of smokers in the US report wanting to quit, the majority fail in their attempt to do so. Quit attempts are more likely to succeed if accompanied by pharmacotherapy; however, most smokers either do not use pharmacotherapy or fail to quit smoking despite their use (Curry, Ludman, & McClure, 2003; Hughes, Shiffman, Callas, & Zhang, 2003). One potential explanation for the lack of use, satisfaction, and effectiveness of current Food and Drug Administration (FDA) approved pharmacotherapies has been the inability to satisfy the behavioral and social components of smoking (Barbeau, Burda, & Siegel, 2013; Harrell et al., 2015).

Electronic nicotine delivery systems (“e-cigarettes”) have potential as a more appealing cessation aid for current smokers due to their ability to more closely mimic the sensory and behavioral aspects of smoking than nicotine replacement therapies (NRT) or other pharmacotherapy treatments (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014; Harrell, Simmons, Correa, Padhya, & Brandon, 2014). E-cigarettes vaporize a liquid solution of nicotine and other additives for inhalation, presumably without the harmful health effects of combustible tobacco use (Cahn & Siegel, 2011). Many e-cigarettes mirror the appearance of a traditional cigarette, and when the user inhales, the heating element produces a vapor that the user draws in and exhales much like cigarette smoke.

Although the long-term effects of e-cigarettes are not known and they are currently not regulated by the FDA, the prevalence of e-cigarette use has been increasing exponentially (Pepper, Emery, Ribisl, & Brewer, 2014), with smoking cessation as a primary reason for use (Dawkins, Turner, Roberts, & Soar, 2013). According to findings from survey research, former smokers who use e-cigarettes report several advantages to these devices over NRT, including perceptions of lower health risks and side effects, enhanced taste, more satisfaction, and greater perceived efficacy in reducing cravings, negative affect, and stress (Harrell et al., 2015). Recent research suggests e-cigarette users are more likely to report abstinence from traditional cigarettes compared with smokers attempting to quit via over-the-counter NRT or without a quit aid (Brown, Beard, Kotz, Michie, & West, 2014).

Nonetheless, many smokers who use e-cigarettes also continue to smoke traditional cigarettes (Biener & Hargraves, 2014). This group, often referred to as “dual users,” is concerning as these individuals maintain their exposure to smoking-related toxicants while also exposing themselves to unknown potential risks from e-cigarettes. In addition, e-cigarettes may contribute to maintaining nicotine addiction by allowing use in places where smoking is forbidden or stigmatized. Thus, additional research is needed to understand the complex relationship between traditional cigarettes and e-cigarettes, including reasons for initiating and future e-cigarette use intentions. Gathering such knowledge is critical for pending FDA regulations on e-cigarettes (DHHS:FDA, 2014) and reflects recommendations from prominent organizations such as the National Institutes of Health (Walton et al., 2015) and the American Association for Cancer Research (Brandon et al., 2015).

Qualitative research represents an informative approach into understanding patterns of, and factors influencing, e-cigarette use. Previous qualitative studies have identified positive and negative perceptions of e-cigarettes, with the majority of these studies focusing on adolescent and/or young adult perceptions (e.g., Choi, Fabian, Mottey, Corbett, & Forster, 2012; Camenga et al., 2015). The focus on youth is not surprising given the reported increase in e-cigarette use among this population (CDC, 2013). Together, these studies have found that the appeal of e-cigarettes among youth is related to aspects such as novelty, technology, social benefits (i.e., do not smell or make teeth yellow), flavors, and ease of use (i.e., e-cigarettes can be used in areas where smoking is prohibited). Among youth who did not have experience with e-cigarettes, perceptions of e-cigarettes were highly positive and intentions to use/experiment were high (Choi et al., 2012).

There are relatively few qualitative studies that have focused on the appeal of e-cigarettes from the perspective of the adult user. McQueen et al. (2011) conducted one-on-one interviews with a small number of e-cigarette users and noted a “culture of vaping” among adult users. Participants also reported a number of advantages of e-cigarettes over traditional cigarettes, such as improved breathing and the return of their senses of smell and taste. Barbeau et al. (2013) reported similar results, as adult e-cigarette users discussed the social benefits of vaping and the ability to redefine ones' identity from a “smoker” to a “vaper.” A recent qualitative study conducted by Pokhrel, Herzog, Muranaka, and Fagan (2015), sought to understand reasons for liking and disliking e-cigarettes among daily e-cigarette users aged 18-35 years old. Findings suggested multiple dimensions of appeal such as self-regulation of negative affect, the ability to use the device discreetly and in indoor spaces, and sensory satisfaction.

Negative perceptions of e-cigarettes have included feelings of uncertainty surrounding the safety of e-cigarettes and conflicting views related to the potential for continued nicotine addiction (Pokhrel et al., 2015b; Rooke, Cunningham-Burley, & Amose, 2015). A recent examination of open-ended responses on a survey conducted with e-cigarette users (Baweja et al., 2015) found that the most common negative effects of e-cigarettes mentioned were dry mouth, chapped lips, and bad breath.

Given the relatively few qualitative studies conducted with adult users, we conducted a series of focus groups with adult e-cigarette users to: (1) evaluate the appeal for initiating and using e-cigarettes; (2) explore negative aspects of use; (3) examine perceptions of e-cigarettes compared to traditional cigarettes and FDA-approved cessation aids; and (4) gauge future e-cigarette use intentions and interest in e-cigarette cessation interventions.

Method

Participants

We previously conducted a nationwide, online e-cigarette survey with 1,815 e-cigarette users (described in Harrell et al., 2015). A link to the survey was advertised via local press releases in the Tampa Bay area that were picked up by social media outlets and online e-cigarette forums. As part of the survey, participants were asked to indicate if they were willing to participate in a focus group to discuss their experiences with e-cigarettes. We

attempted to reach interested individuals who completed the survey and lived within the Tampa Bay area ($N= 108$). Eligibility criteria included: (1) 18 years old; (2) had smoked cigarettes daily for at least 1 year; and (3) had used e-cigarettes in the past 30 days. We attempted to contact all 108 individuals and ultimately 31 participated in the focus groups. Study recruitment was discontinued when we had reached saturation (i.e., no new information was emerging from the discussions). Refreshments were served, and participants received a \$25 gift card for their time. All procedures were approved by the Institutional Review Board at the University of South Florida, and all participants provided written informed consent prior to participation.

Data Collection

We conducted four focus groups using a semi-structured focus group guide. Groups were led by trained focus group moderators who were members of the research team (VNS and GPQ). Each focus group lasted 60-90 minutes, was audio-recorded, and was transcribed verbatim by research team members with experience in tobacco-related research and focus group methodology.

Online survey—The online survey noted above was completed by all participants prior to participation in the focus group. The survey assessed demographic characteristics, smoking history (years smoked, cigarettes per day), e-cigarette use, and expectancies for cigarettes, e-cigarettes, and NRT. E-cigarette use items included duration and frequency of use.

Interview guide—A semi-structured interview guide was developed to stimulate discussion regarding experiences with e-cigarettes. The interview guide covered the following domains: 1) reasons for use and appeal of e-cigarettes; 2) negative aspects of e-cigarettes; 3) attitudes toward e-cigarettes, traditional cigarettes, and FDA-approved cessation aids; 4) intentions for future continued e-cigarette use; 5) interest in receiving assistance to reduce or quit e-cigarettes.

Data Analysis

Basic demographic, smoking, and e-cigarette use characteristics were summarized using descriptive statistics. Focus group data were analyzed using the constant comparative method, which seeks to compare new data with previously collected data. Within the scope of this method (Strauss & Corbin, 1990), we used three coding strategies to extrapolate themes from the focus group transcripts: 1) open coding, which is the process of examining, comparing, and categorizing data; 2) axial coding, which is the process of arranging new meaning of data after open coding; and 3) selective coding, which involves identifying systematic categories of codes. Open, axial, and selective coding processes provided structure to the content of the focus groups, allowing us to cull out concepts related to our study aims and to compare our results to other studies.

For the first round of coding, a list of codes and definitions was created based on the interview guide content. These a priori codes were applied to the focus group transcripts, and prominent themes that emerged during transcript review were also identified and added to the code list as needed. The four focus group transcripts were coded independently by two

coders, with the coders of each manuscript randomly selected from a group of three co-authors (PTH, LRM, and JBC). Coding schemas were compared between the two coders and discrepancies were discussed until agreement was reached. Each code and its definition was refined through expansion or collapse of two codes or more into one, with the goal of obtaining at least 85% agreement on all transcripts. At the conclusion of the coding process, we had achieved an inter-rater reliability of 90%, which was calculated by identifying the number of codable lines within a transcript and tracking agreement of the name of the code/codes applied to each line.

Results

Participant characteristics

Four focus groups were conducted with 5-11 participants each. Table 1 presents participant demographic, e-cigarette, and smoking characteristics ($N = 31$). Participants included both former ($n = 25$) and current smokers ($n = 6$). Most participants reported using their e-cigarettes between 10-20 times each day.

Behavioral observations

Focus group members quickly established a strong rapport as participants readily shared their knowledge of devices, flavors, batteries, and other e-cigarette characteristics with each other. Some participants even vaped during the focus group, and still others shared their “juice” or allowed a fellow participant to try a flavor. Engagement and group cohesion was strong across all four focus groups as evidenced by active participation by all focus group attendees in response to the focus group guide questions as well as spontaneous interactions between participants. Participants were enthusiastic and expressed a strong desire for e-cigarette users to be “heard” by the scientific community.

Community of e-cigarette users

About one-third of participants identified strongly as an e-cigarette user and, without prompting, spontaneously requested to be distinguished from traditional cigarette smokers. In fact, a shared sentiment across the focus groups was the desire to be referred to as “vapers.”

Could you call us personal vapers? ... We don't like to associate cigarettes with our vaporizers.

The sense of community they felt as an e-cigarette user was a source of belongingness, and this was evidenced not only by explicit verbal responses, but also by their non-verbal behaviors of sitting close to each other and sharing experiences and equipment. Further, participants were supportive and encouraging of each other in the use of the vaping devices, especially for those who were having a difficult time exploring new devices as ways to “stay off cigarettes.” The majority of participants described the “group” experience of being an e-cigarette user.

You can still be in a group and use your gear.... When I quit regular cigarettes, it was isolating – I couldn't hang out with the smokers and I missed that social aspect of smoking.

Reasons for use of e-cigarettes and appeal

Participants were asked why they started using e-cigarettes and to describe their appeal. The majority reported that they began using e-cigarettes to quit smoking traditional cigarettes, and that their health had improved since initiating use.

The ultimate benefit is that it got me away from cigarettes. Something that's never been able to happen before.

I have asthma and used my inhalers often [with traditional cigarettes]. [With e-cigarettes] I am not dependent on the inhalers and no ER visits every year.

The majority of respondents reported interest in and satisfaction from experimenting with modifiable aspects of the e-cigarette devices, including voltage, batteries, and liquids.

Once I got into the variable voltage, wattage... it gave me a much better taste and satisfaction.

Negative aspects of e-cigarettes

About half of the participants mentioned negative aspects of using e-cigarettes, including side effects and the future unknowns associated with a relatively new product.

You get vape mouth.... You have to stay hydrated.

E-cigarettes aren't regulated at all. There's no FDA. No one's regulating these cigarettes... no one's checking to make sure they're making them the same...there's no standards at all.

I definitely noticed that I'm not smoking cigarettes. At the same time there's no proof. It could be harming your liver or something. We have no idea. We don't know.

A few participants made negative comments regarding the e-cigarette use process.

...making sure the tank is full, making sure it's clean if I'm changing different liquids, make sure the battery's charged at night so that it's charged in the morning... there's a lot more to it than just opening a pack of cigarettes and lighting one up.

Comparisons of e-cigarettes and traditional cigarettes

Participants were asked how e-cigarettes were similar to or different from the taste, feel, and satisfaction of smoking traditional cigarettes. The majority of respondents indicated that multiple aspects of e-cigarettes were superior to traditional cigarettes. Many expressed a more satisfying experience from using e-cigarettes.

My e-cig gave me a better hit than my cigarette did.

[The e-cigarette] gives me a little bit more of a cool sensation.

The majority of respondents also described what they regarded as positive physical changes associated with the use of e-cigarettes.

I don't cough as much as I used to when I smoked a pack a day.

About half of the respondents commented on the content and the perceived health benefit of the e-cigarette liquid compared to traditional cigarettes.

I don't really care what's in it right now – I'm just glad I'm not buying cigarettes, and we are measuring three or four chemicals against 4,000.

Participants were asked how often they used their e-cigarettes and to compare their use with traditional cigarettes. About half of the participants reported using them more often than they smoked a traditional cigarette, primarily because they could use e-cigarettes in environments where they were not allowed to smoke.

I use it constantly... when I smoked, I couldn't smoke in the house or around the kids, but now I'm free to smoke this thing almost anywhere, so I'm constantly puffing on this thing.

The other half said they used their e-cigarette device the same amount or less often than they smoked cigarettes and that their craving was reduced.

I used to wake up and smoke, but I don't wake up to vape.

With regard to taste and flavor, some participants reported selecting e-cigarette juice in a flavor similar to their cigarettes (e.g., menthol), whereas others reported intentionally selecting flavors that were distinct from their traditional cigarettes.

I wanted it [my e-cigarette] as close to the habit [of smoking]. Like I said it had to taste like a Newport, and I hoped like it looked like a Newport.

I didn't want to be reminded of tobacco. I got bakery flavors, sweet flavors, to stay away from the tobacco taste.

Experiences and comparisons with FDA-approved cessation methods

Participants were asked if they had previously attempted to quit smoking traditional cigarettes and which methods they had used. About three-fourths of the focus group participants had attempted to quit through various methods, including NRT.

I have tried the lozenges and the gum. They did OK, but I still craved that hand to mouth.

About a quarter of the respondents had tried prescription medications.

Chantix®.... Did help me quit. I quit for 5 months.... But it had side effects. Bad dreams.

One quarter of the respondents described prior unsuccessful experiences with smoking cessation counseling:

The counseling went well for a couple of weeks... I picked up cigarettes again and went back to smoking.

Several participants mentioned benefits of e-cigarettes in comparison to other quitting methods.

With the e-cig I can still go out there with them [friends] and have the act and talk of smoking without actually having to smoke. But when you have the patch, you feel like well, they're all having fun without me.

A few participants described themselves as unintentional quitters, based on their current exclusive use of e-cigarettes.

I had no desire to quit smoking. I enjoyed smoking. I enjoyed everything about it and wasn't really looking for a less harmful thing for it...it just kind of happened. I just started preferring the vaping over the smoking.

I'm what you'd call an accidental quitter. I had no intention of quitting cigarettes.

Changing patterns of use and future intentions

The majority of focus group participants noted they were intentionally trying to reduce the amount of nicotine in the e-cigarette juice they purchased or self-made. They also reported success in gradually cutting down the level of nicotine.

I've gone from 18mg to 6 now – that's the lowest this brand makes.

It worked for me in terms of the titration down of the nicotine. I've gone down to 2 mg now and that's not too bad.

However, a minority reported that they were not successful at maintaining e-cigarette use with zero nicotine:

I went to zero one time and I felt like it was a crack pipe, I sucked so hard. So I realized I can't do zero.

Respondents were asked about their future plans for using e-cigarettes. The majority planned to continue vaping. However, they also reported plans to reduce their nicotine dosage.

I don't have any plans on quitting [e-cigarettes].

As long as the government doesn't come out and say these are bad for you, I do not see a reason to stop using it.

I may go down to zero (nicotine) but I'm sticking with it.

However, at least 1/3 of respondents did want to stop using e-cigarettes and others were uncertain of their future plans.

I would like to get rid of it but I don't know about the near future.

At this point I'm going for the zero nicotine and I'll see what happens.

Perspectives on e-cigarette cessation interventions

Participants were asked to identify the type of intervention they would prefer if they needed assistance with quitting e-cigarettes. Without prompting, about half indicated they did not

need assistance. A minority said they were uncertain that any type of intervention would be useful.

I think I'm doing OK with it so I don't think I would need any kind of intervention.

When prompted with a list of potential interventions, there was limited consensus. Some suggested on-line assistance would be most useful, whereas others said e-mailing people with information such as tips for quitting would be beneficial. The intervention format that received most agreement was group counseling or peer support.

I would rather do a group thing... I don't like being driven into it but it would steer me in the right direction.

Discussion

Findings from our study provide insight into the appeal of e-cigarettes and the characteristics that influence users to view these devices as superior to current FDA-approved cessation treatments. As compared to other methods of quitting, participants reported fewer side-effects from e-cigarette use, described a sense of community among e-cigarette users, and preferred the behavioral aspects of the vaping experience. Evidence is converging that e-cigarettes provide an opportunity for smokers to redefine themselves from “smokers” to “vapers” (Barbeau et al., 2013). Given the loss of identity and social engagement reported by individuals who quit smoking, the social characteristics may be a particularly appealing aspect of transitioning from smoking to vaping (Pokhrel et al., 2015b). Additionally, our study participants felt they were able to escape the stigma of being a “smoker” by referring to themselves as a “vaper.” A few participants referred to the e-cigarette as a “vaporizer” to avoid using the word “cigarette,” thereby further distinguishing use from traditional cigarettes. If e-cigarettes are found to be efficacious as a cessation tool, these may be important social benefits to highlight in future interventions.

Another frequently-cited factor contributing to the appeal of e-cigarettes was the ability to control the e-cigarette to suit individual needs and preferences (e.g., voltage, flavors, nicotine dosage). As the policy landscape surrounding e-cigarettes evolves, various device parameters of e-cigarettes may be subject to regulation. For instance, given recent research suggesting potential harms from exposure to toxic compounds in vapors from e-cigarettes operating at high voltages (Jensen, Luo, Pankow, Strongin, & Peyton, 2015; Kosmider et al., 2014), it is possible that future regulation of e-cigarettes may impact the availability of products allowing this degree of control.

In an internet survey of e-cigarettes users conducted by Etter (2010), the taste and variety of flavors were the most frequently cited positive feature of e-cigarettes. An interesting finding in the current study was the preference for some users to select e-cigarette flavors matching their combustible cigarettes (e.g., tobacco or menthol) versus those who preferred to use flavors distinct from their cigarettes (e.g., candy flavored). Future research is needed to determine if flavor can be an aid or hindrance to smoking cessation. On one hand, use of a similar flavor to their cigarettes may make the transition from traditional cigarettes to e-cigarettes easier. Alternatively, use of flavors that mimic their combustible cigarettes may serve as a trigger or cue to resume combustible cigarettes. The occurrence and potential

impact of flavor transitions (e.g., from tobacco to candy flavors, or vice-versa) is also worthy of future research. For instance, it is plausible that e-cigarette users may use similar flavors to ease the transition to e-cigarettes and later switch to a contrasting flavor to prevent the flavor from serving as a cue to resume combustible cigarettes.

The appeal of e-cigarette flavors is an important factor to consider given the possibility that pending FDA policies may restrict particular flavors to dissuade e-cigarette initiation among youths. In fact, recent research suggests that appealing flavors are a primary reason for experimentation among adolescents and young adults (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2014). As regulatory changes occur, it will be necessary to study the consequent effects on e-cigarette appeal for adult users. Regulations that reduce the appeal of e-cigarettes to non-smoking adolescents may also reduce their appeal to adult smokers seeking cessation or harm reduction.

Some participants noted that aspects of the e-cigarette use process, such as charging batteries and ensuring “their tank is full,” can be cumbersome in comparison to the ease of using traditional cigarettes. These findings are consistent with prior studies in which participants reported several negative technical issues with e-cigarettes (e.g., liquid/e-juice leaking, batteries lose charge too frequently, lack of reliability) (Etter, 2010; Pokhrel et al., 2015b). The majority of participants in our study, however, viewed the options for modifying their e-cigarette as an appealing feature. Previous qualitative research conducted with young adult smokers also found that the technological aspects of e-cigarettes were appealing and that e-cigarettes were perceived as another “toy” among existing technologies such as one's mobile phone and flash drive, or as a form of “entertainment” and “hobby” (McDonald & Ling, 2015; Pokhrel et al., 2015b).

Other negative aspects of e-cigarette use reported by our focus group participants included side effects such as “vape mouth” and the unknown safety and health issues related to long-term e-cigarette use. Recent research suggests e-cigarette risk perception is related to e-cigarette use and smoking behavior (Sherratt et al., 2015). Participants who reported uncertainty regarding whether e-cigarettes were less harmful than tobacco cigarettes smoked a greater number of cigarettes per day, compared to those who were certain they were safer than tobacco cigarettes. Overall, the negative aspects may limit use of e-cigarettes as a smoking cessation device, but they may also offer an avenue for promoting eventual cessation of e-cigarettes themselves.

Survey research has identified several perceived advantages of e-cigarettes as compared to traditional cigarettes and to FDA-approved treatments (Farsalinos, Romagna, Tsiapras, Kyzopoulos, & Voudris, 2014; Harrell et al., 2015). Our focus group results were consistent with these findings, as the majority of participants reported that they had previously tried multiple approaches to quitting smoking and reported dissatisfaction with the existing FDA-approved cessation methods. In addition to fewer side-effects experienced with e-cigarettes, the most frequently and strongly endorsed benefit of e-cigarettes compared to other quitting aids was the ability to maintain the social aspects and community they enjoyed with smoking. In contrast to experiences with traditional cigarettes, many participants also reported less need to wake up to use an e-cigarette. Indeed, other research indicates that e-

cigarette users do not experience the same level of overnight withdrawal, as indicated by a longer “time to first vape” than their former time to first cigarette (Dawkins et al., 2013).

Also related to usage patterns, many participants reported using e-cigarettes more often than their traditional cigarette. Baweja et al. (2015) similarly found that, compared to cigarette smoking, e-cigarette users reported using their e-cigarettes more frequently, yet with fewer puffs. Participants in our study and others (e.g., McDonald & Ling, 2015; Pokhrel et al., 2015a; Pokhrel et al., 2015b), reported that the ability to use e-cigarettes in places in which smoking is prohibited, was both an appealing factor and reason for increased use. Given the trend to incorporate e-cigarette use into existing restrictions on smoking in public places (Kadowaki et al., 2015), it will be important to examine whether e-cigarettes lose appeal as policies evolve and greater restrictions are placed on use. The reported increased frequency of use may also be due to the fact that self-imposed smoking bans, such as in the car or home, are often not maintained for e-cigarette use due to the reported “lack of bad smell” (Pokhrel et al., 2015a).

A finding of particular interest was that some participants who were initially unmotivated to quit smoking reported a disinterest in continuing to smoke combustible cigarettes shortly after initiating e-cigarettes. These participants self-described themselves as “accidental quitters.”

Research is needed to explore the occurrence of unplanned transitions from dual use to exclusive e-cigarette use. If e-cigarettes are found to be efficacious for smoking cessation, it will be important to examine whether they may be used as a cessation strategy among unmotivated smokers.

The majority of focus group participants reported engaging in an intentional process to reduce the nicotine levels in their e-cigarettes over time, as had previously been reported with younger users (Camenga et al., 2015). Some also reported use of unique flavors to avoid associations with tobacco. Longitudinal or experimental research is needed to increase understanding of whether these strategies are effective for smoking cessation. This perspective coincides with our larger survey study ($N=1815$) in which the majority of respondents indicated no plans to stop or reduce use of e-cigarettes (Harrell et al., 2015). Thus, not surprisingly, when participants were asked to identify what kind of intervention they would prefer for e-cigarettes cessation, about half of participants reported that they did not want or need any intervention. When prompted with a list of possible interventions, participants expressed greatest support for a group or peer program offered either in-person or online. These findings identify both challenges and opportunities for the development of e-cigarette cessation interventions.

There are limitations to our research that must be considered. First, our sample comprised self-selected individuals who had completed an online survey related to their current e-cigarette use and indicated willingness to participate in a focus group. Thus, they were clearly vested in, and enthusiastic about, e-cigarettes. Second, it is important to note that different results might have been obtained with a larger sample size, particularly with greater representation by dual users. As with all qualitative research, results are not generalizable to

other populations; however, these data provide a snapshot of the current landscape of motivated e-cigarette users.

Conclusions

Overall, results from our study extend prior quantitative and qualitative research in understanding the experience and perspectives of e-cigarettes users and also spark novel areas worthy of future research. Our findings confirm the need to consider the multiple dimensions of appeal (e.g., perceived reduced harm, ability to modify the product to user preference, social benefits) for e-cigarette users. Although the majority of our participants reported success with using e-cigarettes for quitting smoking, large clinical trial research is urgently needed to determine whether e-cigarettes are indeed an efficacious smoking cessation tool. As noted above, these trials will also need to consider the potential efficacy of e-cigarettes among unmotivated smokers. If found to be efficacious, various aspects reported as appealing will have to be weighed with larger public health implications. Regulatory and policy initiatives will need to balance minimizing potential negative public health outcomes (e.g., youth initiation, renormalization of smoking) while considering the potential for e-cigarettes to reduce harm among current smokers.

References

- Barbeau AM, Burda J, Siegel M. Perceived efficacy of e-cigarettes versus nicotine replacement therapy among successful e-cigarette users: a qualitative approach. *Addiction Science & Clinical Practice*. 2013; 8(5).doi: 10.1186/1940-0640-8-5 [PubMed: 23497603]
- Baweja R, Curci KM, Yingst J, Veldheer S, Hrabovsky S, Wilson SJ, et al. Foulds J. Views of experienced electronic cigarette users. *Addiction Research & Theory*. 2015; doi: 10.3109/16066359.2015.1077947
- Biener L, Hargraves JL. A Longitudinal Study of Electronic Cigarette Use in a Population-Based Sample of Adult Smokers: Association With Smoking Cessation and Motivation to Quit. *Nicotine & Tobacco Research*. 2015; 17(2):127–133. DOI: 10.1093/ntr/ntu200 [PubMed: 25301815]
- Brandon TH, Goniewicz ML, Hanna NH, Hatsukami DK, Herbst RS, Hobin JA, et al. Warren GW. Electronic nicotine delivery systems: a policy statement from the american association for cancer research and the american society of clinical oncology. *Clin Cancer Res*. 2015; 21(3):514–525. DOI: 10.1158/1078-0432.CCR-14-2544 [PubMed: 25573384]
- Brown J, Beard E, Kotz D, Michie S, West R. Real-world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. *Addiction*. 2014; 109(9):1531–1540. DOI: 10.1111/add.12623 [PubMed: 24846453]
- Cahn Z, Siegel M. Electronic Cigarettes as a Harm Reduction Strategy for Tobacco Control: A Step Forward or a Repeat of Past Mistakes? *Journal of Public Health Policy*. 2011; 32:16–31. DOI: 10.1057/jphp.2010.4 [PubMed: 21150942]
- Camenga DR, Cavallo DA, Kong G, Morean ME, Connell CM, Simon P, et al. Krishnan-Sarin S. Adolescents' and Young Adults' Perceptions of Electronic Cigarettes for Smoking Cessation: A Focus Group Study. *Nicotine & Tobacco Research*. 2015; doi: 10.1093/ntr/ntv020
- Centers for Disease Control and Prevention (CDC). Notes from the field: electronic cigarette use among middle and high school students - United States, 2011-2012. *MMWR Morbidity and Mortality Weekly Report*. 2013; 62(35):729–730. [PubMed: 24005229]
- Choi K, Fabian L, Mottey N, Corbett A, Forster J. Young adults' favorable perceptions of snus, dissolvable tobacco products, and electronic cigarettes: findings from a focus group study. *American Journal of Public Health*. 2012; 102(11):2088–2093. DOI: 10.2105/ajph.2011.300525 [PubMed: 22813086]

- Curry SJ, Ludman EJ, McClure J. Self-administered treatment for smoking cessation. *Journal of Clinical Psychology*. 2003; 59(3):305–319. DOI: 10.1002/Jclp.10131 [PubMed: 12579547]
- Dawkins L, Turner J, Roberts A, Soar K. ‘Vaping’ profiles and preferences: an online survey of electronic cigarette users. *Addiction*. 2013; 108(6):1115–1125. DOI: 10.1111/add.12150 [PubMed: 23551515]
- DHHS:FDA. Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act, as Amended by the Family Smoking Prevention and Tobacco Control Act; Regulations on the Sale and Distribution of Tobacco Products and Required Warning Statements for Tobacco Products; Proposed Rule (21 CFR Part 1143). *Fed Reg*. 2014; 79:23142–23207.
- Etter JF. Electronic cigarettes: a survey of users. *BMC public health*. 2010; 10(1):231. [PubMed: 20441579]
- Fagerstrom K. Time to first cigarette; the best single indicator of tobacco dependence? *Monaldi Archives for Chest Disease*. 2003; 59(1):91–94. [PubMed: 14533289]
- Farsalinos KE, Romagna G, Tsiapras D, Kyrzopoulos S, Voudris V. Characteristics, Perceived Side Effects and Benefits of Electronic Cigarette Use: A Worldwide Survey of More than 19,000 Consumers. *International Journal of Environmental Research and Public Health*. 2014; 11(4): 4356–4373. DOI: 10.3390/ijerph110404356 [PubMed: 24758891]
- Giovenco DP, Lewis MJ, Delnevo CD. Factors Associated with E-cigarette Use: A National Population Survey of Current and Former Smokers. *American Journal of Preventive Medicine*. 2014; 47(4): 476–480. DOI: 10.1016/j.amepre.2014.04.009 [PubMed: 24880986]
- Hajek P, Etter JF, Benowitz N, Eissenberg T, McRobbie H. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit. *Addiction*. 2014; 109(11): 1801–1810. DOI: 10.1111/add.12659 [PubMed: 25078252]
- Harrell PT, Marquinez NS, Correa JB, Meltzer LR, Unrod M, Sutton SK, et al. Brandon TH. Expectancies for Cigarettes, E-Cigarettes, and Nicotine Replacement Therapies Among E-Cigarette Users (aka Vapers). *Nicotine & Tobacco Research*. 2015; 17(2):193–200. DOI: 10.1093/ntr/ntu149 [PubMed: 25168035]
- Harrell PT, Simmons VN, Correa JB, Padhya TA, Brandon TH. Electronic nicotine delivery systems (“e-cigarettes”): review of safety and smoking cessation efficacy. *Otolaryngology -- Head and Neck Surgery*. 2014; 151(3):381–393. DOI: 10.1177/0194599814536847 [PubMed: 24898072]
- Hughes JR, Shiffman S, Callas P, Zhang J. A meta-analysis of the efficacy of over-the-counter nicotine replacement. *Tob Control*. 2003; 12(1):21–27. [PubMed: 12612357]
- Jensen RP, Luo W, Pankow JF, Strongin RM, Peyton DH. Hidden Formaldehyde in E-Cigarette Aerosols. *N Engl J Med*. 2015; 372(4):392–394. DOI: 10.1056/NEJMc1413069 [PubMed: 25607446]
- Kadowaki J, Vuolo M, Kelly BC. A review of the current geographic distribution of and debate surrounding electronic cigarette clean air regulations in the United States. *Health & place*. 2015; 31:75–82. [PubMed: 25463920]
- Kong G, Morean ME, Cavallo DA, Camenga DR, Krishnan-Sarin S. Reasons for Electronic Cigarette Experimentation and Discontinuation Among Adolescents and Young Adults. *Nicotine & Tobacco Research*. 2015; 17(7):847–854. DOI: 10.1093/ntr/ntu257 [PubMed: 25481917]
- Kosmider L, Sobczak A, Fik M, Knysak J, Zacierka M, Kurek J, Goniewicz ML. Carbonyl Compounds in Electronic Cigarette Vapors: Effects of Nicotine Solvent and Battery Output Voltage. *Nicotine & Tobacco Research*. 2014; 16(10):1319–1326. DOI: 10.1093/Ntr/Ntu078 [PubMed: 24832759]
- McDonald EA, Ling PM. One of several ‘toys’ for smoking: young adult experiences with electronic cigarettes in New York City. *Tobacco Control*. 2015; 24:588–593. [PubMed: 25564287]
- McQueen A, Tower S, Sumner W. Interviews with “vapers”: implications for future research with electronic cigarettes. *Nicotine & Tobacco Research*. 2011; 13(9):860–867. DOI: 10.1093/ntr/ntu088 [PubMed: 21571692]
- Pepper JK, Emery SL, Ribisl KM, Brewer NT. How U.S. Adults Find Out About Electronic Cigarettes: Implications for Public Health Messages. *Nicotine & Tobacco Research*. 2014; 16(8):1140–1144. DOI: 10.1093/ntr/ntu060 [PubMed: 24755397]

- Pokhrel P, Herzog TA, Muranaka N, Regmi S, Fagan P. Contexts of cigarette and e-cigarette use among dual users: A qualitative study. *Bio Med Central Public Health*. 2015a; 15:859.doi: 10.1186/s12889-015-2198-z
- Pokhrel P, Herzog TA, Muranaka N, Fagan P. Young adult e-cigarette users' reasons for liking and not liking e-cigarettes: A qualitative study. *Psychology & Health*. 2015b; doi: 10.1080/08870446.2015.1061129
- Sherratt FC, Marcus MW, Robinson J, Newson L, Field JK. Electronic cigarette use and risk perception in a Stop Smoking Service in England. *Addiction Research & Theory*. 2015; 23:336–342.
- Strauss, A.; Corbin, JM. *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications, Inc; 1990.
- USDHHS. *The Health Consequences of Smoking-50 Years of Progress: 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; 2014.
- Walton KM, Abrams DB, Bailey WC, Clark D, Connolly GN, Djordjevic MV, et al. Hatsukami DK. NIH electronic cigarette workshop: developing a research agenda. *Nicotine & Tobacco Research*. 2015; 17(2):259–269. DOI: 10.1093/ntr/ntu214 [PubMed: 25335949]

Table 1
Participant characteristics (N = 31)

	M (SD) or n (%)
Age	48.9 (15.8)
Female	15 (48.8%)
Caucasian/White Race	29 (93.5%)
Education	
High school diploma/G.E.D. or less	6 (19.4%)
Some college or technical school	17 (54.8%)
4 year college degree or beyond	8 (25.8%)
Total Household Income	
Under \$40,000	7 (22.6%)
\$40,000-\$89,999	17 (54.8%)
Over \$90,000	4 (12.9%)
Preferred not to answer	3 (9.7%)
Cigarettes per day before quitting (n=25)	
1-9	2 (8.0%)
10-20	6 (24.0%)
More than 20	17 (68.0%)
Cigarettes per day at time of survey (n=6)	
1-9	4 (66.6%)
10-20	1 (16.7%)
More than 20	1 (16.7%)
Time since started using e-cigarettes	
Less than 1 month ago	2 (6.5%)
1-6 months ago	8 (25.8%)
6-12 months ago	5 (16.1%)
12-24 months ago	8 (25.8%)
More than 2 years ago	8 (25.8%)
Frequency of use of e-cigarettes ¹	
1-9 times a day	8 (25.8%)
10-20 times a day	16 (51.6%)
More than 20 times a day	7 (22.6%)
Ever use of NRT	
Patch	20 (64.5%)
Gum	19 (61.2%)
Lozenge	10 (32.2%)
Inhaler	2 (6.4%)
Nasal spray	0 (0.0%)
None—never used NRT	7 (22.5%)
Past 30 days use of NRT	
None reported	24 (77.4%)

	M (SD) or n (%)
No response provided	7 (22.6%)
Other medication experience	
varenicline	9 (29.0%)
bupropion	7 (22.5%)

¹One time of e-cigarette use = 15 puffs, or around 10 minutes

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript