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Content Analysis of Internet Marketing Strategies Use to Promote Flavored Electronic  
Cigarettes

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## Abstract

**Introduction:** Flavored e-cigarette (ECIG) use and Internet marketing have increased in the U.S.

This study examined the content used to promote flavored ECIG liquids on retailer websites.

**Methods:** Four ECIG liquid retailers from four U.S. geographic regions (n=16) were randomly selected. Menthol, apple, and tobacco flavored liquids were purchased in April of 2016 (n=144, 48 unique flavors). Staff analyzed the text and image descriptors displayed on liquid bottles and retailer websites and coded content for presence of specific flavor, taste/smell, chemesthesis (i.e., touch), America/patriotic, and product quality/potentially modified risk content. A follow-up of retailer websites was conducted in March, 2018.

**Results:** Nearly all (97.9%) ECIG liquids included a description that promoted flavor. Most descriptions including images of something other than an ECIG liquid bottle (e.g., 62% of tobacco ECIG liquid images including dried tobacco leaves, 43% of menthol ECIG liquid images including mint leaves or ice, 62% of apple ECIG liquid images including an apple). Images often promoted product sensations (e.g., cool, ice), sweet tastes of other products (e.g., chocolate, apple pie), or other appeals (e.g., America). Menthol and apple descriptions/images were more likely than tobacco flavors to promote appeals related to chemesthesis (e.g., cool, warm, moist;  $p<.05$ ). Most flavors were still available in 2018 and included the same flavor descriptions from 2016.

**Conclusions:** Flavored ECIG liquid marketing often includes text descriptions and images that appeal to consumer sensations. Studies are needed to examine how youth access to point-of-sale Internet advertisements influences their attitudes, perceptions, and purchasing of ECIG products.

## Introduction

Electronic cigarette (ECIG) use is growing in popularity in the U.S. among adults (King, Patel, Nguyen, & Dube, 2015; McMillen, Gottlieb, Shaefer, Winickoff, & Klein, 2015; Schoenborn & Gindi, 2015) and adolescents (Arrazola et al., 2014, 2015; Singh, Arrazola, et al., 2016). ECIGs are a class of products that use a heating device to aerosolize a liquid that often contains a combination of propylene glycol, vegetable glycerin, nicotine, and chemical flavorants. Characterizing flavors, other than tobacco or menthol, were banned in cigarettes as part of the Family Smoking Prevention and Tobacco Control Act (FSPTCA) in 2009 (111th Congress, 2009) to protect young people from smoking. However, flavored ECIGs are not included in this ban and there are over 7,000 ECIG flavors on the market (Zhu et al., 2014). In a large study of Texas youth and adults, 99% of youth, 71% of young adult and 44% of older adult current ECIG users reported that their first ECIG was flavored, but not tobacco flavored (Harrell et al., 2017). Compared to non-flavored tobacco products, flavored tobacco products are viewed more favorably (Ashare et al., 2007; Manning, Kelly, & Comello, 2009) and are considered more attractive and appealing (Choi, Fabian, Mottey, Corbett, & Forster, 2012; Griffiths, Harmon, & Gilly, 2011; Liu et al., 2014; Richter, Caraballo, Pederson, & Gupta, 2008).

Online ECIG retailers more than tripled from 2013 to 2014, which exceeds that of Internet cigarette vendors, and nearly 86% of these vendors sell flavored ECIG products (Williams, Derrick, Liebman, LaFleur, & Ribisl, 2017). The Internet is the second most common source of ECIG advertisement exposure among youth (Singh, Marynak, et al., 2016) and many ECIG advertisements include youth-appealing content (Padon, Maloney, & Capella, 2017). Although it is illegal for youth under the age of 18 to purchase ECIGs, one study found that 90% of youth under the age of 18 who tried to purchase ECIGs over the Internet were successful

(Williams, Derrick, & Ribisl, 2015). During this time when online retail shops have increased for ECIGs, similarly, the marketing of flavored ECIGs has increased (Cantrell et al., 2017; Cantrell, Emelle, Ganz, Hair, & Vallone, 2016; Kim et al., 2015; Kim, Arnold, & Makarenko, 2014; Marynak, Gentzke, Wang, Neff, & King, 2018). Historically, flavor marketing has been shown to play a powerful role in tobacco use (Nation Cancer Institute, 2008), including the uptake of flavored tobacco among more traditional tobacco products such as cigarettes. Similarly, advertisements for flavored ECIGs increase the appeal of and interest in buying ECIGs whereas advertisements for non-flavored ECIGs do not (Czoli, Goniewicz, Islam, Kotnowski, & Hammond, 2016; Vasiljevic, Petrescu, & Marteau, 2016). ECIG advertisements can increase ECIG use susceptibility among youth non-tobacco users (Mantey, Cooper, Clendennen, Pasch, & Perry, 2016) and can increase ECIG use among young people (Agaku & Ayo-Yusuf, 2014; Singh, Agaku, et al., 2016). The increased risk of ECIG use likely results from the direct effects of ECIG advertising on positive attitudes towards ECIGs (Pokhrel et al., 2016; Pokhrel, Herzog, Fagan, Unger, & Stacy, 2018), and decreased harm perceptions of ECIGs (Pokhrel et al., 2016; Pokhrel, Fagan, Kehl, & Herzog, 2015). Additionally, ECIG advertising has also been shown to increase the risk of combustible cigarette smoking among those already using flavored ECIGs (Dai & Hao, 2016; Soneji et al., 2017).

Promotional tactics to market ECIGs have been used on the Internet and may explain the relationship between exposure to marketing and the uptake of flavored ECIGs. McGuire's theory of persuasion includes multiple stages and posits consumers must be exposed to messages to increase their awareness of the messages and gain their attention resulting in future action (McGuire, 1989), such as purchasing flavored ECIGs after marketing exposure. Persuasive-based promotion of tobacco products often includes desirable images, brand identities, and

messages that focus on increasing exposure and obtaining the audience's attention. However, persuasion-based communication models focus on awareness and conscious processing of messages in order for individuals exposed to those messages to change their attitudes toward a product or behavior. The Elaboration Likelihood Model (ELM) continues this process to include a peripheral route where a person associates certain positive or negative cues in the presentation of the message to generate the likelihood of the person changing their attitude and engaging in the behavior (Petty and Cacioppo, 1980). There may be specific tactics and content that is used to promote flavored ECIG products. Previous research has demonstrated that marketing related to desirable flavors was associated with greater interest in buying and trying ECIGs (Vasiljevic, Petrescu, & Marteau, 2016). Indeed, adolescents are especially vulnerable to trying ECIGs if they are flavored as menthol, candy, or fruit (Pepper, Ribisl, & Brewer, 2016), perhaps because some adolescents associate fruit flavors with less harm (Pepper et al., 2016). Sensory expectations, such as taste/smell and pleasure may relate to ECIG frequency in use adding to product appeal (Morean et al., 2018). Images, particularly those of the American cowboy and patriotism, often appeal to masculinity in a way that was demonstrated with combustible cigarettes (White, Oliffe, & Bottorff, 2013) and may play a similar role in ECIG appeal. Flavors, sensations, and imagery content in advertising may be working through that peripheral route to subconsciously associate those cues with positive associations and likelihood of ECIG use.

Persuasive Internet-based promotion of flavored ECIG products allows retailers to reach a large audience who can purchase products on the Internet (Williams, Derrick, & Phillips, 2017) and increases the demand for ECIGs. The increasing presence of ECIG online retailers increases exposure to flavored ECIG products and provide an avenue for individuals to purchase ECIG products. Several studies have examined the content of online ECIG advertisements (Grana &

Ling, 2014; Richardson, Ganz, & Vallone, 2015), but none to date have examined the content of flavor-related promotional messages and persuasive tactics used by tobacco industry to promote its products sold via the Internet. The purpose of this study was to examine the content of messages used to promote flavored ECIG liquids available for purchase on the Internet and examine strategies used to obtain consumer attention and increase their awareness of flavored ECIGs.

### **Methods**

At the time of the study (2016), no national database of ECIG retailers (often referred to as “vape shops”) existed because companies were not required to register with any entity. Therefore, two sources were used to collect data on vape shops in the U.S.: Yelp.com and the World Vape Expo Exhibitor lists. Yelp is a popular Internet search engine that was founded in 2004 and is used to help people find businesses in their community, events, or even communicate with other Yelp users. Yelp.com is accessed highly by users with an average of 21 million unique visitors per month and more than 102 million reviews (Yelp, 2016). The search term “vape shop” was used to identify retailers in each U.S. state from Yelp.com. “Vape shop” was the term that produced the most results as compared to “electronic cigarettes” or “tobacco shop”. Three retail shops with the highest number of reviews were selected from each state. Websites were reviewed for each retailer and characteristics were recorded including retailer name, email address, company location, number of locations, contact phone and address and coded for variables including if the business had retail stores (yes/no), wholesale distributions (yes/no), franchise capacity (yes/no), Internet sales (yes/no), and whether the business sold its own brand of ECIG liquids (yes/no) or other ECIG components (yes/no). To complement Yelp, all vape shops that were listed on the World Vape Expo Exhibitor lists from 2014 and 2015 were

documented, expecting that vape shops that were popular or had large retail sales would likely participate in these expos. Vape shops were included in the sampling frame if they sold ECIG liquid through the Internet, sold their own ECIG liquid brand, had at least one retail store, and had a contact phone and address visible on the website. Our sampling frame yielded a total of 285 unique shops. In April of 2016, from the qualifying list of stores, four retailers per U.S. census tract region (West/Pacific, Northeast, Midwest, and South) were randomly selected. A tobacco, menthol, and a “sweet/fruity” flavor was selected from each retailer. Apple flavor was selected as the “sweet/fruity” flavor across all shops for consistency and because it is ranked the top fruit choice in the U.S. that is consumed in five possible forms: fresh, frozen, canned, dried, or as a juice (U.S. Department of Agriculture, 2017). Each flavor was purchased in a 0, 12, and 24 mg/ml nicotine concentration (or closest available concentration) resulting in a final sample for analysis (n=144, 48 unique flavors). Characteristics of the 16 retailers where the liquids were purchased from have been published previously (Fagan et al., 2017).

Samples were ordered in April of 2016 via U.S. mail and were received within 3-7 days. No age verification was required to receive the packages. Research staff documented retailer name, brand, flavor, description of the flavor, nicotine content, bottle volume, and ingredients lists displayed on the bottles and captured a picture of each flavor image on the retailer’s website (n=144). Descriptive data on persuasive-promotion variables were examined including brand identity, flavor images, flavor aroma (if staff noted that aroma was detectable when smelling unopened bottles), color of liquid, and type of messages on ECIG liquid bottles and retailer Internet website. Additionally, flavor descriptions, images, and ingredients lists were coded for content related to promotions of specific flavors (fruit, desserts/sweets, mint/menthol, tobacco, no flavor), taste/smell, chemesthesis (i.e. related to touch, temperature, and texture),



American/patriotic appeal, and product quality/potentially modified risk content. Multiple reviewers discussed the development of these codes and discussed coding of content to reach consensus on identified themes. In March of 2018, a follow-up study was conducted to determine the availability of liquids purchased in 2016 and the marketing content displayed at retailer websites. Chi-squared tests of association were used to examine differences in flavor description content using SPSS 24 with an alpha of 0.05.

## Results

### Electronic Cigarette Liquid Sample Description

ECIG liquid bottle volumes ranged from 10 to 30 ml with prices ranging from \$3.99 to \$9.99 (average cost per ml = \$0.62). All samples listed the flavor on the ECIG liquid bottle and retailer website and all but one retailer listed a description of the flavor on the bottle and/or Internet website the bottles were purchased. All flavor descriptions were visible at the point-of-sale of the product (i.e., at the retailer website). Table 1 shows marketing descriptive statistics by flavor type. All ECIG liquids had the flavor name displayed on the bottle and all but three apple flavors listed the brand name or logo on the bottle. Following the purchase of the ECIG liquids, staff documented whether or not they could smell the flavor through the sealed unopened bottles. Research staff could smell the flavor from over half of all liquids. Specifically, a scent could be detected in 56.3% of tobacco flavored, 56.3% of menthol flavored, 64.6% of apple flavored liquids. With regard to the color of the liquids when viewed inside the bottle, 47.2% appeared clear, 46.5% had visible color (ranging from pale yellow to dark brown), and 6.3% of liquid colors were not visible by looking at the bottles.

Table 1. Type of electronic cigarette liquid marketing content displayed on bottles and retailer websites by flavor (n=144)

Characteristic	Tobacco (n=48) % (n)	Menthol (n=48) % (n)	Apple (n=48) % (n)
Brand name/logo listed on the bottle	100.0 (48)	100.0 (48)	93.8 (45)
Flavor listed on e-liquid bottle	100.0 (48)	100.0 (48)	100.0 (48)
Flavor description on manufacturer/distributor website	93.8 (45)	93.8 (45)	93.8 (45)
Image of flavor on manufacturer/distributor website	81.3 (39)	87.5 (42)	87.5 (42)
Aroma detectable in unopened container	56.3 (27)	56.3 (27)	64.6 (31)
Color of liquid			
Clear	33.3 (16)	54.2 (26)	54.2 (26)
Visible color	60.4 (29)	39.5(19)	39.5 (19)
Not visible through bottle	6.3 (3)	6.3 (3)	6.3 (3)

### Flavors Names and Flavor Descriptions

Table 2 shows the description used to identify the flavor type (i.e., tobacco, menthol, or apple) on the bottle and the website. The ECIG liquid product name displayed on the bottles differed by flavor type. Tobacco and menthol flavored liquids were significantly less likely to include the word “tobacco” or “menthol” in the product name displayed on the bottle compared to the word “apple” on apple flavored ECIG liquid bottles [ $\chi^2(2) = 12.56, p = 0.002$ ]. Specifically, 62.5% of tobacco flavors did not include the word “tobacco” in the flavor name and 43.8% of menthol flavors did not include the word “menthol.” Conversely, all apple flavors included the word “apple” in the flavor name. For example, some of the tobacco flavored liquid names included “Roadhouse,” “American Mix,” “Mellow Blend,” “Dry Blend” and “Black Bear.” Menthol flavored liquid names included “Artic Mint-issippi,” “Frostbite,” and “Traffic Jam.” Other common words used in menthol flavored liquids product names and descriptions included “mint” (25% of menthol flavors) or words related to ice, cold, or the cooling sensation of menthol such as “Menthol Breeze,” “Extreme Ice” or “Kiwi Menthol Ice.” Apple flavored liquid names included “Apple,” “Green Apple,” “Apple Pie,” “Caramel Apple,” and “Apple Crumbake.” Some apple flavors names included words related to desserts and spices (e.g., pie or cinnamon; 25% of apple flavors).

Nearly all (93.8%) of all flavors had a flavor description on retailer websites (Table 1).

Compared to ECIG liquid flavor names displayed on bottles, the text on retailers’ websites included greater detail regarding descriptions of the tastes, sensation, and overall experience associated with each ECIG liquid flavor (See Table 2). For example, whereas 25% of the menthol flavor names included words related to the cooling sensation of menthol (e.g., Arctic, ice, frostbite), nearly two-thirds (62.5%) of menthol ECIG liquid flavor descriptions on retailer

Table 2. Examples of flavor related messages, channels, and content of persuasive messages in menthol, apple, and tobacco flavored electronic cigarette liquids.

Brand	Flavor list on E-liquid bottle in 2016	Description on website in 2016	Description of the image on the website in 2016	Flavor offered in 2018 (Yes/No)	Descriptor on website in 2018
<b>Menthol Flavored Liquids</b>					
The Vaping Tiger	Arctic Mint-issippi	“For those vapers that just can’t get enough mint, this juice is a minty mint mentholated blast with a little extra mint for that chill of the Arctic.”	A cross-sectional view of an arctic iceberg (mostly submerged) with a slightly overcast blue sky behind	Yes	“A powerful spearmint, peppermint and menthol”
Apollo	Menthol Breeze	“Menthol and mint aren’t quite the same thing – one’s minty, and the other’s a cool, pure sensation. This E-Liquid is made with the latter in mind: pure menthol that delivers an icy-fresh blast you can really feel. Feeling adventurous? This E-Liquid is easy to blend with other flavours (Green Apple and Berry Blend are our favourites). Please feel encouraged to explore! And if you find a winning combo, we’d love to hear about it.”	Cubes of ice in blue water. Actively being spilled in image.	Yes	“Menthol and mint aren’t quite the same thing – one’s minty, and the other’s a cool, pure sensation. This E-Liquid is made with the latter in mind: pure menthol that delivers an icy-fresh blast you can really feel. Feeling adventurous? This E-Liquid is easy to blend with other flavours (Green Apple and Berry Blend are our favourites). Please feel encouraged to explore! And if you find a winning combo, we’d love to hear about it.”
Volt Vapes	Menthol Madness Classic Tobacco	“A direct punch of wintery mint and cooling menthol Bold, yet smooth, no apologies”	A mint plant sitting on a background of blue ice.	Yes	“A direct punch of wintery mint and cooling menthol Bold, yet smooth, no apologies”
			A horizontal close-up of stacks of tobacco stuffed-cigarettes	Yes	
Koil Kandy	Extreme Ice	“Extreme ice vapor juice; On one of our mintiest flavors! An intense, bold Wintergreen recipe”	A frozen cracked layer of ice on a frozen lake with snow in the background.	Yes	“Extreme ice vapor juice; On one of our mintiest flavors! An intense, bold Wintergreen recipe”
Ecig Crib	Fresh Mint	“A true cooling extravaganza, purse mint flavor without tobacco tones, just clean cool mint.”	A pile of mint with a mint leaf positioned in the middle on a white background. Logo on bottom right.	Yes	“A true cooling extravaganza, purse mint flavor without tobacco tones, just clean cool mint.”

**Apple Flavored Liquids**

Generation V	Apple Crumble	“Apple Crumbake E-Liquid is a savory combination of sharp green apples, cinnamon and sugar generously topped with a sweet graham cracker crumble. Simply dive-in-divine!”	A partially eaten apple pie with a spoon sticking out of it next to cut green apples and another spoon with ice cream. Wooden table as a background.	Yes	“Apple Crumbake E-Liquid is a savory combination of sharp green apples, cinnamon and sugar generously topped with a sweet graham cracker crumble. Simply dive-in-divine!”
Boondock Vapes	Apple Pie	“Warm Apple Pie”	One apple pie slice with a crispy golden crust topping covering multiple apple pieces oozing out from the sides of the slice onto a white plate.	Yes	“Warm Apple Pie”
Beyond Vapes	Apple Pie	“BV Apple Pie: Slice of sweet, delicious Apple Pie (with video)”	Container of e-liquid. Black label with red dots on packaging.	Yes	n/a
Vapor Villa	Caramel Apple	“Vapor Villa's Caramel Apple is a premium juice providing delicious flavor and a quality vapor.”	Two caramel green apples – one whole, one with a slice removed – on a white background.	No	n/a
Apollo	Green Apple	“A juicy and crisp flavor that is ripe with deliciousness. Green apple is a sweet and fresh concoction that has just a hint of tartness without being bitter. The perfect ratio of sour and sweet makes for a delightful taste and a refreshing vapor. Apollo is proud to offer our very own, 100% American-made e-liquid that is carefully crafted in our lab in Northern California.”	Two and half green apples spread over a glass-green leaf with small green bubbles scattered around on a white background.	Yes	“A juicy and crisp flavor that is ripe with deliciousness. Green apple is a sweet and fresh concoction that has just a hint of tartness without being bitter. The perfect ratio of sour and sweet makes for a delightful taste and a refreshing vapor. Apollo is proud to offer our very own, 100% American-made e-liquid that is carefully crafted in our lab in Northern California.”

**Tobacco Flavored Liquids**

Generation V	Mellow Brand	“Mellow Blend E-Liquid is subtly sweet blend of tobaccos.”	A faded image of unpacked tobacco.	Yes	“Mellow Blend E-Liquid is subtly sweet blend of tobaccos.”
The Vaping Tiger	Black Bear	“Chocolate is a great compliment to just about anything. That holds true for this tobacco and chocolate blend with some creamy accents Chocolate is a great compliment to just about anything. That holds true for this tobacco and chocolate blend accented with light delicious creams creating a wonderful velvety vape. Eating a velvety flavor.”	A cigar on a white table with a cigar cutter and flakes of chocolate sitting on top of it.	Yes	“A creamy chocolate RY4 tobacco.”
OKC Vape	American Mix	“A smooth, all American tobacco flavor remarkably similar to an analog cigarette.”	A dark American flag with a shadow of the statue of liberty on the bottom right. American Mix written in the center.	Yes	“A smooth, all American tobacco flavor remarkably similar to an analog cigarette.”
Koils Kandy	7 Leaves	“A nice dry, radiant flavor complimented by earthier, drier undertones and wrapped together with a woody, almost spicy nuance. A great daily vaper for tobacco lovers.”	n/a	Yes	“A nice, dry, radiant flavor complimented by earthier, drier undertones and wrapped together with a woody, almost spicy nuance. A great daily vaper for tobacco lovers.”
NicDrops	Coumarin Pipe	“A robust pipe tobacco flavor with a hint of sweet grasses.”	A circular container of tobacco with an old fashioned pipe image superimposed over the middle	Yes	“A robust pipe tobacco flavor with a hint of sweet grasses.”

websites included these words. Many of the retailers' website descriptions of the flavors included text that described feelings and sensations that were associated with using the ECIG liquid. For example, the website description of a menthol flavored liquid called "Menthol Breeze" described the cooling sensation that the flavor would provide:

Menthol and mint aren't quite the same thing – one's minty, and the other's a cool, pure sensation. This E-Liquid is made with the latter in mind: pure menthol that delivers an icy-fresh blast you can really feel. Feeling adventurous? This E-Liquid is easy to blend with other flavours (Green Apple and Berry Blend are our favourites). Please feel encouraged to explore! And if you find a winning combo, we'd love to hear about it.

Similarly, retailer website descriptions of 62.5% of the apple flavors included words related to desserts, sweets, or spices compared to 25% of flavor names displayed on bottles. Many of these descriptions were detailed and vivid. For example:

Green Apple: A juicy and crisp flavor that is ripe with deliciousness. Green apple is a sweet and fresh concoction that has just a hint of tartness without being bitter. The perfect ratio of sour and sweet makes for a delightful taste and a refreshing vapor. Apollo is proud to offer our very own, 100% American-made e-liquid that is carefully crafted in our lab in Northern California.

In addition, 31.3% of tobacco flavor descriptions included words related to sweet tastes including chocolate and caramel such as the description for "Black Bear" ECIG liquid:

"Chocolate is a great compliment to just about anything. That holds true for this tobacco and chocolate blend with some creamy accents creating a velvety flavor."

Flavor names and descriptions also used words that appeared to market the quality of the ECIG liquids including “premium,” “quality,” “American/American-made,” “fresh,” “crisp,” and “pure.” The “Classic Tobacco” ECIG liquid flavor description focused on the appeal of the American made product:

Classic tobacco: The perfect tobacco flavor for those who favor the classic American tobacco blend (cowboy). This is a full bodied and robust tobacco flavor with a slight hint of sweetness on the finish. Our Classic Tobacco was carefully crafted to provide a bright and tasty vapor with a powerful but smooth throat hit. It will satisfy your craving for the classic American tobacco brands. 100% American-Made E-liquid.

### **Thematic Analysis**

Results of the coding analysis are displayed in Table 3. Overall, almost all (97.9%) of the ECIG liquids included in the sample described some type of flavor in the description of the ECIG liquid. There were differences by flavor type (i.e. menthol, apple, or tobacco flavors). Specifically, all menthol flavors included mint or menthol in their descriptions or images, whereas only 6.3% of apple and none of the tobacco flavors did ( $p < .05$ ). Apple flavors were also more likely than menthol or tobacco flavors to include fruit in the flavor descriptions than menthol or tobacco ECIG liquids ( $p < .05$ ). None of the menthol flavors described dessert/sweet flavors whereas significantly more apple (62.5%) and tobacco (31.3%) liquid descriptions included dessert/sweet flavors ( $p < .05$ ). With regard to sensory appeals, approximately 90% of all flavors included descriptions that appealed to tastes and smells, and there were no significant difference by flavor type. However, menthol (62.5%) and apple (43.8%) flavored liquids were significantly more likely to include descriptions that related to chemesthesis (e.g., cool, cold, warm, wet) compared to tobacco flavored liquids ( $p < .05$ ). There were no significant differences



in use of patriotic/America appeal descriptions between flavor types with approximately 10% of all flavors including this content. Approximately half of the liquids included descriptors that related to product quality or potentially modified risk content, which did not differ by flavor type.

### **Pictures, Images, and Videos on Retailer Websites**

On retailer websites, 85.4% of the flavors were promoted with a picture or image in advertisements for the ECIG liquid products. While 14.5% of these images were pictures of the bottle of ECIG liquid, the remaining 85.4% depicted an image other than the product advertised for purchase. Table 1 includes descriptions of the images displayed on websites. Of all the menthol flavors, 43.8% included pictures of mint leaves and 43.8% included pictures of ice. Website advertisements of apple flavors included pictures of fruit (62.5% of apple flavors) and desserts such as apple pie (18.8% of apple flavors). Tobacco flavor advertisements included a wide variety of images. The most common was other tobacco products (e.g., cigarettes, cigars, or pipes) or dried tobacco leaves (62.5% of tobacco flavors). Images related to America (e.g., American flag and the Statue of Liberty) and cowboys (e.g., cowboy hat, boots, and whip) were displayed on three retailers' tobacco flavor website advertisement. One tobacco flavor advertisement included a picture of chocolate. In addition to images, two flavors from one retailer included embedded videos on the retailer's website. In these videos, an ECIG user engaged in ECIG use with several flavors that had been supplied free of charge by the retailer to provide a review of each flavor for consumers. These reviews included descriptions of the overall tastes and feelings associated with each flavor used in the videos.

Table 3. Frequency of coded themes on 48 unique ECIG liquid flavors stratified by ECIG liquid flavor type.

Theme	All Flavors (n=48) % (n)	Menthol (n=16) % (n)	Apple (n=16) % (n)	Tobacco (n=16) % (n)
Flavor				
<b>Fruit</b>	<b>39.6 (19)</b>	<b>18.8 (3)<sup>a</sup></b>	<b>93.8 (15)<sup>b</sup></b>	<b>6.3 (1)<sup>a</sup></b>
<b>Dessert/Sweet</b>	<b>31.3(15)</b>	<b>0.0 (0)<sup>a</sup></b>	<b>62.5 (10)<sup>b</sup></b>	<b>31.3 (5)<sup>b</sup></b>
Drinks	4.2 (2)	0.0 (0)	12.5 (2)	0.0 (0)
<b>Menthol/Mint</b>	<b>35.4 (17)</b>	<b>100.0 (16)<sup>a</sup></b>	<b>6.3 (1)<sup>b</sup></b>	<b>0.0 (0)<sup>b</sup></b>
<b>Tobacco</b>	<b>37.5 (18)</b>	<b>18.8 (3)<sup>a</sup></b>	<b>6.3 (1)<sup>a</sup></b>	<b>87.5 (14)<sup>b</sup></b>
No Flavor	2.1 (1)	0.0 (0)	0.0 (0)	6.3 (1)
Taste/Smell	89.6 (43)	87.5 (14)	87.5 (14)	93.8 (15)
<b>Chemesthesis</b>	<b>35.4 (17)</b>	<b>62.5 (10)<sup>a</sup></b>	<b>43.8 (7)<sup>a</sup></b>	<b>0.0 (0)<sup>b</sup></b>
Patriotic/America	10.4 (5)	6.3 (1)	6.3 (1)	18.8 (3)
Product Quality/Potentially Modified Risk	47.9 (23)	43.8 (7)	43.8 (7)	56.3 (9)

Note. Bold text indicates significant difference in percentage of flavors that included content related to a coded theme by flavor type. Different superscript letters in the same row indicate significant subgroup differences.

### Follow-up Study

Of the 48 total unique flavors purchased in 2016, 13 flavor descriptions (27.1%) were not displayed on websites in 2018: seven flavors (14.5%) were no longer sold but other flavors were still sold on the website, three flavors (6.3%) from one retailer had unknown unavailability because the website no longer listed the ECIG liquids that were sold, and three flavors (6.3%) from one retailer were not available because the website no longer was active. Of the 35 flavors that had descriptions in 2018, five flavor descriptions changed on retailer websites and one new description was added to “7 Leaf Tobacco” from Juicity Vapor (See Table 2).

### Discussion

This study, which used a national sample of tobacco, menthol, and apple flavored ECIG liquids, showed that ECIG retailers who sell their products on the Internet use detailed descriptions and images to market and promote flavored ECIG liquids. ECIG liquid flavor descriptions focused on the sensory experiences related to tastes, smell, and feel resulting from ECIG use. At retailer websites, images of fruit, sweets/desserts, candy, mint, ice, or patriotic themes were often displayed to promote ECIG liquids rather than images of the actual ECIG liquid products. ECIG liquid names often provided limited information about the flavors of the ECIG liquid. As a result, consumers may rely on the flavor descriptions and images on retailer websites and ECIG liquid bottles when purchasing when deciding to purchase or use these ECIG liquids. Furthermore, ECIG retailers use these advertisements and marketing techniques at the point-of-sale (i.e., Internet websites) which may influence consumers to purchase ECIG products, just as exposure to point-of-sale advertising in brick-and-mortar retail outlets is associated with youth tobacco use (Robertson, Cameron, McGee, Marsh, & Hoek, 2016). Retailers may use these marketing strategies to increase product appeal, however, these messages

may be perceived by consumers as modified risk claims and should be examined further.

Because advertisements for ECIGs and flavors are quite popular on the Internet (Chu, Sidhu, & Valente, 2015; Huang, Kornfield, & Emery, 2016; Kim et al., 2015; Wang, Zheng, Freeman, & Chapman, 2015) and are widely accessible, it is important to examine the content of ECIG liquid flavor advertisements. The attention-attracting, persuasive, and vivid images and descriptions used to promote ECIG flavors may affect the decision making of potential ECIG users. For example, exposure to vivid visceral cues can cause individuals to disproportionately value rewards rather than weighing risks. This was demonstrated in a study where individuals exposed to visceral conditions of smelling freshly baked cookies versus only seeing images of cookies were more likely to engage in high risk gambling tasks (Ditto, Pizarro, Epstein, Jacobson, & MacDonald, 2006). Similarly, participants exposed to a scenario presented as a sexually suggestive video that ended with a question of whether a couple in the scenario should have sex without a condom focused on the attractiveness of the characters for the decision to have sex without a condom. However, when the scenario was presented as a paragraph describing the scenario, participants focused on the risk of unprotected sex with regard to decision making (Ditto et al., 2006). Research should examine if the vivid descriptions and images used to promote ECIG liquids increase appeal of ECIG products or lower risk perceptions, especially if promotion of flavors using this approach entices individuals to use ECIGs who would not have used otherwise. Data from such studies would provide support for restrictions on content used at point-of-sale advertisements on the Internet.

Regulating ECIG marketing and advertising content may present challenges, however, some restrictions may be warranted. For example, if descriptions and images of ECIG flavors are interpreted as unsubstantiated modified risk messages, these advertisements would be subject to

FDA's regulatory authority and the FDA may consider prohibiting these marketing tactics. Omitting the word "tobacco" from tobacco flavored ECIG liquids, describing cooling sensations or using images of ice to market menthol flavored ECIG liquids, using images of desserts to market apple flavored ECIG liquids, or using words such as "natural," "pure," or "organic" to describe flavors or ingredients are examples of marketing tactics identified in the current study that may decrease the perceived harm associated with ECIG use. Despite a lack of evidence of reduced harm, research has shown that consumers believe cigarettes that are described as "natural" and "organic" are more appealing and less harmful compared to cigarettes that are not marketed using these terms (Arnett, 1999; Byron, Baig, Moracco, & Brewer, 2016; Czoli & Hammond, 2014; Pearson et al., 2016). Future studies are needed to examine how descriptions and images used to market flavored ECIG liquids affect product appeal and harm perceptions, especially among vulnerable populations like youth.

This study had several limitations. ECIG liquids analyzed in this study were purchased from a small sample of 16 popular retailers. However, these retailers were selected randomly from a national sample of retailers from each of the U.S. census tract regions, were all U.S. based retailers who sold ECIG liquids at retail sites and online, and the ECIG bottles represent 144 unique samples and 48 unique flavors broadening the generalizability of the findings. Additionally, this study focuses on product labels and Internet retailer marketing content. Advertisements for flavored ECIG products may differ in other social media outlets, in point-of-sale displays in stores, or in television or magazines advertisements. Future research should also examine the content of ECIG product marketing in these media sources.

This study demonstrates that ECIG retailers appeal to consumers by using flavor descriptions that likely capture user attention and also help establish positive attitudes towards

their products, principals shown to be predictive of behavior (McGuire et al., 1989; Petty and Cacioppo, 1980). While this may be a common marketing tactic for other consumer products, the use of flavor descriptions that appeal to consumers' senses of tastes, smell, and touch/feel may influence individuals to use ECIGs when they may not have otherwise. Similarly, content that relates to patriotic/American pride as well as product quality/potentially modified risk content may similarly encourage individuals to use one ECIG liquid over another, or perhaps use ECIGs when they may not have otherwise used them. Additionally, many of the flavor descriptions within ECIG retailers remain constant over time suggesting attempts to establish brand recognition. Just as Marlboro appealed to the consumers with the rugged "Marlboro Man," ECIG retailers may attempt to establish flavors that consumers will come to know and recognize. This may be the case currently as flavors that remained on the market from 2016 to 2018 often used the same flavor descriptions over time. Future research is needed to determine how the specific types of appeals promoted in ECIG flavor descriptions identified in the current study as well as others may affect ECIG use initiation and maintenance.

Among ECIG users, there is widespread appeal of flavors, high prevalence of flavored ECIG product use, and many identify flavors as a primary reason for using ECIGs (Ambrose et al., 2015; Corey, Ambrose, Apelberg, & King, 2015). The potential benefit of cigarette smokers switching to ECIGs must be balanced against the possibility that marketing flavored ECIG products may attract other populations such as youth or non-tobacco users to use ECIGs. Youth have easy access to the Internet and are easily exposed to advertisements at the point-of-sale on the Internet and while illegal, Internet purchases by consumers under the age of 18 are still occurring. Future research should continue to examine how flavors and the marketing of flavored

ECIG products can modify ECIG product appeal and harm perceptions in order to inform regulatory policies.

### **Competing interests**

None.

### **Contributions**

PF, PP, and TH conceptualized the study design and supervised the data collection. SP and PF participated in data collection and management. ES conducted the main content analysis with support from KS, PF, SP, and NT. All authors contributed substantially to the final manuscript. ES led the writing of the manuscript with support from KS and PF and SP, PP, and TH provided critical review.

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### **Supplementary data**

**Supplementary material**

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**Highlights:**

- ECIG retailers use vivid images and descriptions to promote ECIG liquids
- Text and images used to promote ECIG products may affect harm perceptions appeal
- Research on how ECIG product marketing affects at-risk populations is needed

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