



Smokers' sources of e-cigarette awareness and risk information

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ABSTRACT

Introduction. Few studies have explored sources of e-cigarette awareness and peoples' e-cigarette information needs, interests, or behaviors. This study contributes to both domains of e-cigarette research.

Methods. Results are based on a 2014 e-cigarette focused survey of 519 current smokers from a nationally representative research panel.

Results. Smokers most frequently reported seeing e-cigarettes in stores (86.4%) and used in person (83%). Many (73%) had also heard about e-cigarettes from known users, broadcast media ads (68%), other (print, on-line) advertisements (71.5%), and/or from the news (60.9%); sources of awareness varied by e-cigarette experience. Most smokers (59.9%) believed e-cigarettes are less harmful than regular cigarettes, a belief attributed to "common sense" (76.4%), the news (39.2%), and advertisements (37.2%). However, 79.5% felt e-cigarette safety information was important. Over one-third said they would turn to a doctor first for e-cigarette safety information, although almost a quarter said they would turn to the Internet or product packaging first. Most (59.6%) ranked doctors as the most trustworthy risk source, and 6.8% had asked a health professional about e-cigarettes.

Conclusions. Future research should explore the content of e-cigarette information sources, their potential impact, and ways they might be strengthened or changed through regulatory and/or educational efforts.

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Introduction

Several studies have documented the growth in and the high public awareness of e-cigarettes, currently between 80% and 90% (King et al., 2015; Pepper et al., 2014; Emery et al., 2014). However, relatively few studies have explored sources of e-cigarette awareness (Pepper et al., 2014; Emery et al., 2014; Zhu et al., 2013; Trumbo and Harper, 2015), which may change over time in their relative influence. One recent study found that the majority of smokers had heard of e-cigarettes from another person and/or seen them in stores (47–48%), followed by TV ads (40%), the Internet (28%), other ads (~20%), and the news (~15%) (Pepper et al., 2014).

Limited research also exists about peoples' e-cigarette information needs, interests, or behaviors. One survey found that about 5% of respondents had ever searched for e-cigarette information before, although the type of information (e.g., product descriptions, health information) was not specified (Emery et al., 2014). In addition, while several studies have found that people generally believe e-cigarettes are safer than cigarettes (Choi and Forster, 2013; Pearson et al., 2012; Tan and Bigman, 2014), very little research has explored reasons for these reduced-risk perceptions and whether smokers might have any concerns about the safety of e-cigarettes. One study found that e-cigarette users complained about the lack of information on vapor composition and product risks provided with e-cigarettes, with some turning to the Internet and e-cigarette discussion

boards to learn more (Etter, 2010). Another found that some e-cigarette users expressed concerns about the devices being from China and their inadequate labeling and product information (McQueen et al., 2011).

This study aimed to provide an update on sources of e-cigarette awareness and to build on this literature by exploring the extent to which smokers value e-cigarette risk/safety information and where they might seek it.

Methods

We conducted an online survey of cigarette smokers, the primary intended audience of e-cigarettes. Eligible participants were adult current cigarette smokers (i.e., have ever smoked 100 cigarettes and now smoke "some days" or "everyday") recruited from GFK's Knowledge Networks (KN) nationally representative research panel. GFK sampled 1042 participants; 609 (58.4%) completed the smoker eligibility questions, and 519 subsequently qualified for and completed the survey in April 2014.

Among our sample of current cigarette smokers, we defined current e-cigarette users as those who had used e-cigarettes in the past 30 days and former e-cigarette users/tryers as those who had ever tried e-cigarettes but not used them in the past 30 days. Survey questions were informed by previous e-cigarette studies and our research aims. All respondents were asked yes/no questions about whether they had ever heard of e-cigarettes prior to the survey and if they had ever heard about or seen them from a variety of potential information sources (see Table 1). Comparative harm beliefs were measured with

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one question (“In your opinion, compared to smoking regular cigarettes, how harmful is using electronic cigarettes?”) using a 7-point anchored Likert scale of -3 (“a lot less harmful”) to 0 (“equally harmful”), to $+3$ (“a lot more harmful”). Responses of 0 were coded as “as harmful,” and responses of <0 and >0 were collapsed into “less harmful” and “more harmful” categories, respectively.

Beliefs about the importance of having e-cigarette safety information in the context of future or continued e-cigarette use were rated on a 4-point Likert scale ranging from “not at all important” to “very important,” and a yes/no question assessed whether smokers had asked a health care professional about e-cigarettes. Respondents were also asked to rank the order in which they would most likely use a list of five potential information sources (see Fig. 1) to get more information about potential e-cigarette risks, where “1” represented the source they would likely turn to first and “5” being the source they would likely use last. Respondents were then asked to rank the same five sources with respect to trustworthiness. For both ranking questions, choices were presented in randomized order. Prior to survey implementation, cognitive interviews were conducted with a convenience sample of 10 smokers to assess respondent understanding of questions.

Weighted prevalence estimates are presented, and bivariate associations were tested using the Rao–Scott chi-square test, where p -values less than 0.05 were considered statistically significant. All statistical analyses were performed using SAS (Version 9.4) survey procedures, which account for complex sample design.

Results

Demographic and smoking characteristics (e.g., smoking frequency) are presented in Table 1. Most smokers (90.7%) were aware of e-cigarettes and most frequently reported seeing them in a store (86.4%) and used in person (83%). Many (73%) had also heard about e-cigarettes from a friend, family, or co-worker, from broadcast (television/radio) ads (68%), other (print, online) advertisements (71.5%), and/or from the news (60.9%). E-cigarette awareness from stores, observing other users, known individuals, and events were all higher among current and former e-cigarette users versus never users (Table 1). Awareness sources were also statistically associated with age, such that hearing of or seeing e-cigarettes in a store, at an event, or used in person was more prevalent among younger (18–44) than older (45+) age-groups, while seeing the product on the news was more prevalent among older age-groups (Table 1). Seeing e-cigarettes in a store or used by someone they know was significantly more prevalent among smokers who made a quit attempt in the previous year (92.8% vs. 82.4% and 79.5% vs. 68.9%, respectively) and those intending to quit smoking in the next 6 months (90.9% vs. 83.5% and 79.5% vs. 67.0%, respectively).

The majority (59.9%) of smokers believed e-cigarettes are less harmful than regular cigarettes, as compared to being as (28.8%) or more harmful (11.3%). This “less harmful” belief was significantly more prevalent among current e-cigarette users/tryers (82.8% [74.3–91.3]) than former (63.9% [55.6–72.2]) or never (48.6% [40.1–57.0]) e-cigarette users ($p < .0001$). When asked why participants thought e-cigarettes were less harmful ($n = 299$), the majority indicated that it seemed like “common sense” (87.3% [82.1–92.4]), but some also indicated that they received such ideas from tangible sources such as the news (44.2% [37.0–51.5]), e-cigarette advertisements (44.2% [36.9–51.5]), or people they knew (34.7% [27.7–41.7]). Although most perceived e-cigarettes as “less harmful,” most smokers believed that having safety information about e-cigarettes would be somewhat or very important (79.5% [74.8–84.2]) if they were to consider trying or using e-cigarettes again in the future. Valuing e-cigarette safety information did not vary statistically by demographics, regular cigarette use, or e-cigarette risk perceptions but was significantly associated with e-cigarette use ($p = 0.004$), such that current e-cigarette users were

least interested in e-cigarette risk information (69.7% [57.5–81.8]) relative to former (89.2% [84.0–94.5]) and never (76.1% [68.3–84.0]) e-cigarette users.

When asked to rank the order in which they would turn to certain information sources for e-cigarette risk/safety information, over one-third indicated they would turn to a doctor first, although about a quarter said they would turn to the Internet or the product packaging information first (Fig. 1). When asked to rank these same sources in terms of trustworthiness, almost 60% rated doctors as the most trustworthy (see supplemental appendix Table 1 for all rankings). However, the prevalence of having asked a healthcare professional about e-cigarettes was low overall (6.8% [4.3–9.4]), although significantly higher among current e-cigarette users (15.6% [7.2–24.0]) versus former (7.3% [3.5–11.2]) and never users (2.8% [0.0–5.9]) ($p = 0.004$). Having asked a healthcare professional about e-cigarettes was also significantly more prevalent among females relative to males (9.5% [5.0–14.0] vs. 4.3% [2.0–6.6], $p = 0.02$), those reporting a past year traditional cigarette quit attempt (12.2% [6.9–17.5] vs. 3.4% [1.1–5.7], $p = 0.0008$), and those reporting an intention to quit smoking in the next 6 months (10.7% [5.8–15.6] vs. 4.0% [1.6–6.3], $p = 0.006$), but was not significantly associated with belief about the importance of e-cigarette risk information.

Discussion

This study adds to the limited research about current and potential e-cigarette information sources. Our results were consistent with another survey conducted 1 year earlier (2013) in finding that smokers' most frequent sources of e-cigarette awareness were retail stores and other people, although the prevalence of these was qualitatively much higher (83–86%) in our study than in Pepper et al.'s (2014) (47–48%). This is significant given that both of these are major sources of product trial (Kong et al., 2015; McDonald and Ling, 2015). We also found that approximately two-thirds of smokers reported hearing about e-cigarettes from ads on television or radio, a type of advertising off-limits to other tobacco products, and that about 61% had heard about e-cigarettes in the news. These figures were both qualitatively much higher than those reported in Pepper et al. (2014), particularly that reported for the news (61 versus approximately 15%). This is important given that news is likely to present more balanced e-cigarette information regarding potential benefits and risks than advertising (Rooke and Amos, 2014).

Building on previous research, we also found that some of these same sources contributed to smokers' perceptions that e-cigarettes are less harmful than regular cigarettes. However, over three-quarters indicated that this seemed like “common sense.” During cognitive testing of the survey, participants explained that they rated e-cigarettes as less harmful because they do not have real tobacco, do not burn or produce real smoke, have less chemicals and nicotine, and because of positive health improvements (e.g., clearer skin, better breathing) they have experienced after switching to e-cigarettes. Although most believed e-cigarettes to be less harmful than regular cigarettes, this prevalence was lower than that reported in some early national results (Pearson et al., 2012), and some research suggests that the prevalence of thinking e-cigarettes is safer may be gradually falling, potentially due to increased media attention on e-cigarettes' lack of regulation and potential risks (Tan and Bigman, 2014).

Regardless of their comparative risk beliefs, we also found that smokers believe that e-cigarette safety/risk information is important, particularly for those who have not turned to e-cigarettes yet. It was interesting to find that although other people/e-cigarette users appeared to be an important source of e-cigarette awareness, they were not considered by many as a very trustworthy or likely first source of e-cigarette risk information. Instead, smokers said they were most likely to turn to physicians, the Internet, and product packaging first for e-cigarette risk information. While there may be somewhat little to be done practically about e-cigarette information online, our findings

Table 1
Sources of e-cigarette awareness by demographic, cigarette smoking, and e-cigarette use characteristics, 2014.

	Overall		Saw in a store		Saw someone using in person		Friend/family/co-worker		TV/radio ads		Other ads		News		Saw at an event	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall	–	–	86.4	(82.7–90.2)	83.0	(79.1–86.9)	73.0	(68.0–78.0)	68.0	(62.5–73.5)	71.5	(66.4–76.6)	60.9	(55.3–66.6)	17.7	(13.1–22.3)
Age-group																
18–29	21.6	(16.3–26.8)	89.6	(80.5–98.8)*	90.6	(83.4–97.8)**	74.1	(60.8–87.3)	48.5	(33.5–63.5)**	79.8	(68.3–91.4)	48.6	(33.5–63.6)*	26.4	(13.6–39.1)**
30–44	28.8	(23.9–33.8)	94.0	(88.8–99.2)	91.2	(85.8–96.6)	72.6	(62.7–82.5)	76.7	(67.3–86.1)	69.8	(59.3–80.3)	62.0	(51.0–73.0)	24.0	(14.3–33.8)
45–59	31.6	(26.9–36.3)	83.7	(77.4–89.9)	78.5	(71.3–85.7)	77.4	(70.4–84.5)	76.2	(69.0–83.4)	73.2	(65.7–80.7)	61.6	(53.1–70.0)	11.4	(5.3–17.4)
60+	18.0	(14.5–21.6)	75.2	(65.1–85.3)	68.6	(57.9–79.3)	64.1	(53.7–74.5)	63.7	(53.4–74.0)	60.8	(49.8–71.8)	73.5	(64.3–82.7)	8.1	(2.6–13.5)
Gender																
Male	51.0	(45.6–56.4)	83.8	(78.3–89.3)	81.9	(76.4–87.4)	69.5	(62.4–76.6)	69.4	(62.1–76.8)	72.2	(65.3–79.0)	63.4	(56.0–70.8)	16.1	(10.5–21.7)
Female	49.0	(43.6–54.4)	89.2	(84.2–94.3)	84.2	(78.7–89.7)	76.7	(69.7–83.7)	66.5	(58.2–74.8)	70.8	(63.2–78.3)	58.3	(49.8–66.8)	19.4	(12.1–26.7)
Race/ethnicity																
White NH	66.1	(60.7–71.6)	88.1	(84.3–91.9)	83.9	(79.5–88.3)	74.2	(68.4–79.9)	69.0	(62.8–75.2)	71.2	(65.5–76.9)	60.6	(54.2–67.1)	15.8	(10.6–21.0)
Black NH	14.7	(10.7–18.8)	81.3	(69.5–93.1)	76.4	(64.2–88.6)	64.6	(49.7–79.5)	74.4	(58.8–89.9)	80.0	(67.3–92.7)	73.4	(59.8–86.9)	14.9	(3.7–26.0)
Hispanic	12.7	(8.3–17.2)	82.8	(65.8–99.8)	82.0	(66.9–97.2)	65.4	(44.6–86.2)	59.1	(37.0–81.2)	56.5	(34.7–78.3)	46.7	(25.1–68.3)	18.9	(2.4–35.4)
Other NH	6.4	(4.1–8.7)	86.4	(73.3–99.6)	90.2	(81.2–99.2)	91.8	(82.9–100.0)	57.9	(38.3–77.5)	80.1	(66.1–94.2)	58.6	(38.4–78.8)	41.6	(21.0–62.1)
Education																
High school or less	59.9	(54.7–65.1)	85.2	(79.9–90.4)	79.6	(73.9–85.2)*	70.8	(64.1–77.5)	68.5	(61.1–76.0)	70.7	(63.9–77.5)	58.1	(50.6–65.7)	15.5	(9.8–21.1)
Some college or more	40.1	(34.9–45.3)	88.2	(83.1–93.3)	88.0	(83.2–92.9)	76.2	(68.5–83.8)	67.3	(59.1–75.4)	72.7	(65.0–80.3)	65.1	(56.7–73.4)	20.9	(13.3–28.5)
Cigarette smoking status																
Daily	80.3	(75.7–84.9)	85.4	(81.2–89.7)	82.0	(77.6–86.4)	72.5	(67.1–77.9)	67.7	(61.7–73.6)	70.9	(65.4–76.4)	60.0	(53.9–66.1)	16.6	(11.9–21.4)
Some days	19.7	(15.1–24.3)	90.8	(83.4–98.1)	87.2	(79.1–95.3)	75.3	(62.4–88.2)	69.4	(55.2–83.7)	74.0	(61.2–86.8)	64.8	(50.4–79.2)	22.3	(9.5–35.1)
Cigarettes per day																
≤10	57.6	(52.3–62.8)	85.0	(79.5–90.4)	83.5	(78.3–88.7)	75.1	(68.2–82.0)	65.8	(58.0–73.6)	71.7	(64.6–78.8)	61.1	(53.3–69.0)	18.4	(11.8–25.0)
>10	42.4	(37.2–47.7)	88.7	(83.9–93.5)	82.7	(76.8–88.6)	70.2	(63.0–77.5)	71.2	(63.6–78.8)	71.3	(64.1–78.4)	61.2	(53.2–69.1)	17.0	(11.0–23.0)
Past-year cigarette quit attempt																
Yes	39.0	(33.6–44.3)	92.8	(88.3–97.4)**	87.1	(81.5–92.7)	79.5	(71.9–87.1)*	69.2	(60.1–78.4)	73.7	(64.7–82.7)	64.6	(55.2–74.1)	22.6	(14.2–31.0)
No	61.0	(55.7–66.4)	82.4	(77.1–87.7)	80.4	(75.2–85.7)	68.9	(62.3–75.5)	67.1	(60.1–74.1)	70.4	(64.3–76.5)	58.8	(51.8–65.9)	14.7	(9.5–20.0)
Intention to quit cigarettes																
Yes	44.3	(38.8–49.7)	90.9	(86.3–95.5)*	87.3	(82.2–92.4)	79.5	(72.4–86.5)*	74.1	(66.5–81.8)*	74.7	(67.2–82.2)	64.7	(56.3–73.2)	24.2	(16.3–32.0)**
No	55.7	(50.3–61.2)	83.5	(78.1–88.9)	80.1	(74.6–85.6)	67.0	(59.9–74.1)	61.6	(53.9–69.4)	69.3	(62.4–76.1)	56.5	(48.9–64.2)	11.1	(6.5–15.7)
Harm perception (vs. cigarettes)																
E-cigarettes less harmful	59.9	(54.6–65.2)	88.7	(84.3–93.1)	87.4	(83.2–91.5)*	74.7	(68.3–81.1)	68.4	(61.2–75.5)	71.0	(64.5–77.5)	58.5	(51.1–66.0)	18.9	(12.8–25.1)
E-cigarettes just as harmful	28.8	(24.0–33.6)	78.7	(69.9–87.6)	74.7	(65.5–83.8)	66.4	(56.4–76.4)	68.7	(58.6–78.7)	70.4	(60.7–80.0)	64.9	(55.1–74.6)	11.4	(5.1–17.8)
E-cigarettes more harmful	11.3	(7.8–14.7)	89.9	(80.2–99.7)	81.4	(68.2–94.6)	79.7	(65.3–94.2)	61.0	(42.2–79.9)	75.9	(58.2–93.6)	61.5	(42.9–80.2)	19.0	(6.3–31.8)
E-cigarette experience																
Current user	18.9	(14.6–23.2)	92.3	(86.9–97.7)*	93.4	(88.1–98.6)***	84.8	(76.0–93.7)***	69.6	(57.7–81.6)	79.3	(70.1–88.5)	61.6	(48.9–74.3)	28.1	(15.8–40.4)**
Former user	37.8	(32.5–43.0)	88.8	(82.9–94.7)	92.6	(88.5–96.6)	85.9	(80.1–91.8)	66.2	(57.6–74.8)	72.4	(64.1–80.7)	60.5	(51.7–69.4)	21.0	(13.5–28.5)
Never user	43.3	(37.9–48.7)	79.8	(72.8–86.9)	66.6	(58.2–75.0)	53.1	(43.9–62.4)	68.7	(59.4–78.0)	66.6	(58.1–75.1)	60.0	(50.8–69.1)	7.7	(3.0–12.4)

Abbreviations: Other ads include print and Internet; NH, non-Hispanic.

* $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

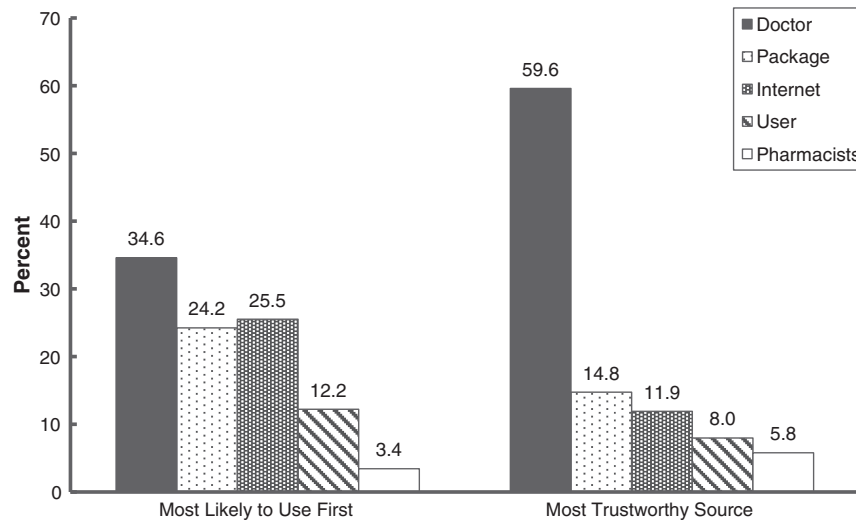


Fig. 1. Percentage of smokers' ranking different e-cigarette information sources by likelihood of use and trustworthiness, 2014.

underscore the need for e-cigarette regulation that would require standards in product labeling and packaging, an action that fits under the FDA's regulatory purview. While the Internet and product packaging might be the quickest way to access e-cigarette risk information, we found that physicians were by far perceived as the most trustworthy such source. Given this and that physicians have historically been influential in motivating smokers' to quit (Fiore et al., 2008), it is important for health professionals to be informed about e-cigarettes and feel comfortable in talking to their patients about e-cigarettes. Indeed our study is consistent with two other recent studies in finding that patients have already begun asking their health professionals about e-cigarettes (Berg et al., 2015; Steinberg et al., 2015). One found that 27% of smokers had spoken with a health-care provider about e-cigarettes and that 18% had received provider endorsement to use e-cigarettes for cessation (Berg et al., 2015). Another found that 65% of physicians surveyed in 2014 had been asked about e-cigarettes by their patients and that 30% had recommended e-cigarettes as a smoking cessation tool (Steinberg et al., 2015).

Our study was limited in having a relatively small sample size, did not ask detailed questions about or independently evaluate the content of e-cigarette information sources, and only consisted of current smokers who have different (generally higher) levels of e-cigarette awareness than former and never smokers (Pepper et al., 2014). Differences in question wording and sampling may also account for differences found between our source estimates and those reported in Pepper et al. (2014).

Nevertheless, our results are important in suggesting that smokers' exposure to e-cigarette information from certain sources may be growing, that smokers are interested in information about e-cigarettes' safety (even if they believe e-cigarettes have reduced risks), and that they may look to various sources for such information, some of which are easily accessible but unregulated and less trusted, and others, like health professionals, which are less readily available but considerably more trusted. Future research should continue to explore the content of potential e-cigarette information sources, their impact on the public's e-cigarette perceptions and use, and in ways they may or should be strengthened through regulatory and/or educational efforts. More research is also needed to learn what health professionals think about e-cigarettes, how they might advise their patients, and what types of training or resources they might need to help in their patient communication about e-cigarettes (Steinberg et al., 2015).

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.pmedr.2015.10.006>.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

Transparency document

The Transparency document associated with this article can be found, in the online version.

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