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Trends in Trust in the Sources of Health Information on E-Cigarettes Among US Adults, 2015–2017

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Objectives. To evaluate recent levels and trends in trust in sources of health information on e-cigarettes in the United States.

Methods. We obtained data from nationally representative samples of adults in 2015 ($n = 5389$), 2016 ($n = 5273$), and 2017 ($n = 5389$) that reported trust in 13 sources of health information on e-cigarettes in the United States. We used weighted linear regression models to examine temporal trends in trust levels.

Results. Doctors, health organizations, the Centers for Disease Control and Prevention (CDC), health experts and scientists, the National Institutes of Health (NIH), the Food and Drug Administration (FDA), and family and friends were trusted, whereas news media, e-cigarette users, social media, vape shop employees, and e-cigarette and cigarette companies were distrusted. From 2015 to 2017, trust significantly increased for CDC, FDA, health experts and scientists, and news media ($P < .01$). Trust also increased for NIH between 2016 and 2017 ($P < .01$).

Conclusions. US adults trust public health sources and distrust entities with commercial interest in e-cigarettes. This suggests that evidence-based messaging and information on health effects of e-cigarettes from public health professionals can effectively counter e-cigarette promotion and improve public understanding about e-cigarettes. (*Am J Public Health*. 2019;109:145–147. doi:10.2105/AJPH.2018.304754)

Access to evidence-based health information about novel tobacco products can facilitate informed decision-making by consumers.¹ However, the information environment surrounding the health effects of e-cigarettes in the United States is characterized by contention and uncertainty. Different sources (e.g., individuals on social media, scientists, tobacco companies, and governmental agencies) issue conflicting reports about the health effects of e-cigarettes,^{2,3} which may affect the public trust and challenge communication and policy interventions.

Trust in sources of risk communication is associated with risk perceptions about complex issues that affect public health.^{4,5} E-cigarettes are one such issue for which the public needs to trust experts and institutions for risk assessment information. E-cigarettes deliver lower levels of harmful chemicals than combusted cigarettes.⁶ Still, they contain carcinogens and can have a negative impact on the cardiovascular system.⁶ While the

scientific community debates about the long-term impact of e-cigarettes,² e-cigarette manufacturers promote them as a safer alternative to combusted cigarettes.⁷ The divisive communication about e-cigarettes necessitates scientific investigations of people's trust in these sources. We examined trust ratings and their temporal trends for 13 sources of health information on e-cigarettes in the United States to inform tobacco control efforts.

METHODS

We obtained data from the 2015 ($n = 6051$), 2016 ($n = 6014$), and 2017

($n = 5992$) Tobacco Products and Risk Perception Surveys conducted by Georgia State University Tobacco Center of Regulatory Science, with study completion rates of 74.3%, 74.0%, and 72.8%, respectively. In each year, a probability sample of adults was drawn from GfK KnowledgePanel, a national probability panel, and surveyed on tobacco use and risk perceptions. We included only participants who reported awareness of e-cigarettes, yielding samples of 5389, 5273, and 5389 in 2015, 2016, and 2017, respectively. We used an iterative proportional fitting procedure to compute a study-poststratification weight to account for sampling and nonsampling errors.

Study Measures

Trust in the sources of health information on e-cigarettes was assessed in all 3 surveys by asking, “How much do you trust what each of the following say about the health effects of electronic vapor products?” In 2015, 7 sources were assessed:

- health experts and scientists,
- the Food and Drug Administration (FDA),
- the Centers for Disease Control and Prevention (CDC),
- companies that manufacture and sell cigarettes and cigars,
- companies that only manufacture and sell electronic vapor products,
- vape shop employees, and
- the news media (newspapers, magazines, TV, Internet).

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In 2016 and 2017, 6 additional sources were included:

- your family or friends,
- your doctor or other medical provider,
- people who use electronic vapor products,
- social media sites (e.g., Facebook, YouTube, Twitter),
- National Institutes of Health (NIH), and
- health organizations or groups (e.g., the American Cancer Society, American Heart Association, or the American Lung Association).

The order of the sources was randomized. Responses were on a 5-point scale (−2 = strongly distrust to 2 = strongly trust) or “don’t know.” We excluded participants who answered “don’t know” to each source of information from the final analyses. The weighted proportions of “don’t know” responses ranged from 8.9% to 12.9%.

Current smokers smoked at least 100 cigarettes in their lives and were currently smoking “every day” or “some days.” Participants who smoked at least 100 cigarettes in their lives but were currently not smoking cigarettes were classified as former smokers. Those who reported having smoked fewer than 100 cigarettes were considered never smokers.

E-cigarette use status was assessed by asking, “Have you ever used electronic vapor products, even one or two times?” Participants who answered “no” were classified as never users. Those who answered “yes” were then asked, “Do you now use electronic vapor products every day, some days, rarely, or not at all?” Because there was a considerable overlap in the reported number of days of e-cigarette use in the past 30 days between “rarely” and “some days” users (Figure A, available as a supplement to the online version of this article at <http://www.ajph.org>), we classified “every day,” “some days,” or “rarely” as current users of e-cigarettes, and those who answered “not at all” as former users.

Statistical Analysis

We used SAS version 9.4 (SAS Institute, Cary, NC) to obtain a weighted mean trust score for each source. For each source, we also estimated the proportion of trust by dichotomizing trust ratings into 1 = trusted (1 and 2 scores) and 0 = distrusted or neutral (0, −1, and −2 scores). Some participants of the

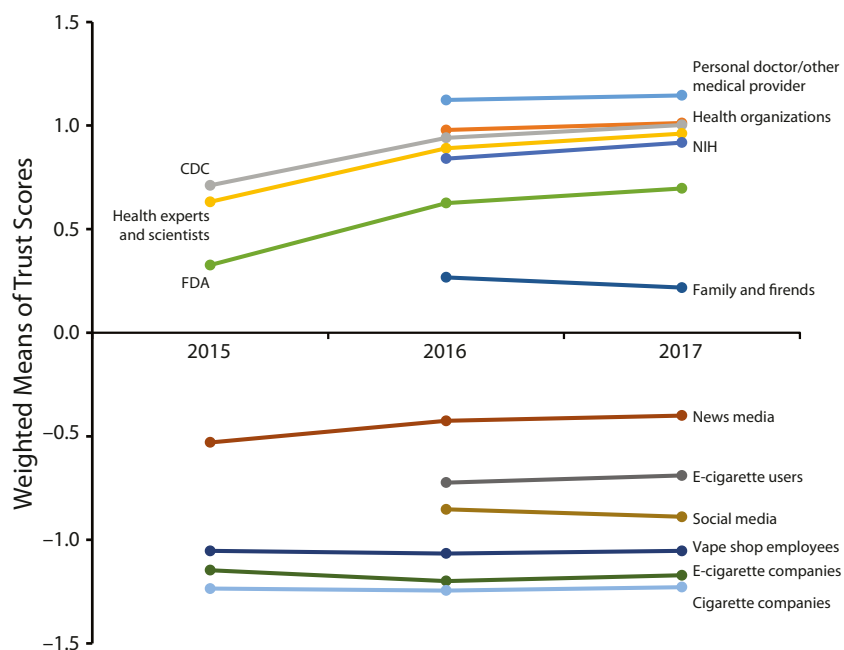
2015 survey ($n = 973$) were resampled in 2017. Therefore, we obtained robust standard errors that allowed correlated residuals between observations from resampled participants by using the Taylor series linearization method.^{8,9} We employed weighted linear regression models to assess changes (linear and quadratic change for sources assessed in all 3 years) in trust levels for each source, for the entire sample, and stratified by cigarette smoking and e-cigarette use status.

RESULTS

Participants’ characteristics are shown in Table A (available as a supplement to the online version of this article at <http://www.ajph.org>). In 2017, trusted sources, in descending order of trust level, were personal doctors or other medical providers, health organizations, CDC, health experts and scientists, NIH, FDA, and family and friends.

The distrusted sources, from the least distrusted to most distrusted, were news media, e-cigarette users, social media, vape shop employees, e-cigarette companies, and cigarette companies. The trust valence (trusted vs distrusted) for each source in 2017 was identical to their trust valence in 2015 and 2016.

Among the trusted sources, the CDC, health experts and scientists, and FDA all showed significant increases in trust between 2015 and 2017 ($P < .01$). Trust in NIH (assessed in 2016 and 2017 only) also increased ($P < .01$). Trust ratings of distrusted sources remained relatively constant from 2015 to 2017, with only news media improving between 2015 and 2017 (Figure 1). In 2017, the proportion of participants who trusted different sources ranged from 77.3% for personal doctors or other medical providers to 5.6% for cigarette companies (Table B, available as a supplement to the online version of this article at <http://www.ajph.org>). The stratified



Note. CDC = Centers for Disease Control and Prevention; FDA = US Food and Drug Administration; NIH = National Institutes of Health. We used weighted linear regression models to examine the temporal trends. Data were from nationally representative surveys of noninstitutionalized adults in the United States from 2015 to 2017. Negative means indicate distrusted sources, and positive means indicate trusted sources. Both linear and quadratic trends were significant for CDC, FDA, and health experts and scientists ($P < .01$). News media showed significant linear trend only ($P < .01$). Trust scores for the NIH also increased significantly between 2016 and 2017 ($P < .01$).

FIGURE 1—Trends in the Trust in the Sources of Information on E-Cigarettes in the Total Samples: United States, 2015–2017

analyses showed that, for current smokers and e-cigarette users, although trusted, trust for CDC, health experts and scientists, FDA, NIH, and health organizations was low and remained stable over the study period for all sources (P s < .05; Tables C and D, available as supplements to the online version of this article at <http://www.ajph.org>).

DISCUSSION

Amid the debate surrounding e-cigarettes, public trust in individuals and organizations responsible for public education and health protection is paramount to ensuring that the public has evidence-based information to make informed judgment about the risk and benefits of e-cigarette use. Our study showed that health authorities, organizations, and health experts and scientists are the most trusted sources of information on the health effects of e-cigarettes and are trending up. Although participants consistently distrusted the news media, which is in line with the overall low public trust in news media in recent years,^{10,11} participants' trust in news media also showed a positive linear trend.

Limitations

Although we used nationally representative data collected over 3 years, we cannot tell how trust affected e-cigarette use because of the cross-sectional nature of the data. Neither can the study tell how the use of other tobacco products influenced trust. Although we included many sources of health information on e-cigarettes, some sources were broad, and delving into more nuanced sources in each category (e.g., specific institutes within NIH, nurses within health professionals) might produce different results. Although designed to be representative of the US population, the Web-based surveys may have limited generalizability attributable to potential panel conditioning.

Public Health Implications

Evidence-based messaging about e-cigarettes' risks could help foster correct risk perception about the product.¹² Because of the relatively high level of trust in health authorities, organizations, and health experts and scientists, they have a particular

responsibility to communicate evidence-based information about e-cigarettes, and media can support this effort. Doctors and medical providers also have an important role in public education about e-cigarettes. Meanwhile, there is still some room for improvement in public trust in health agencies, especially among current smokers and e-cigarette users. It is important to further increase public recognition of health agencies as sources of accurate e-cigarette information. The finding that the public distrusts individuals and companies with commercial interest in e-cigarettes and trusts public health sources is encouraging and provides an opportunity for public health professionals to counter e-cigarette promotion with evidence-based counter-messaging. **AJPH**

CONTRIBUTORS

D. Owusu conducted the data analysis and prepared the first draft. S. R. Weaver led the data acquisition and provided technical assistance with data analysis. B. Yang conducted the literature review and contributed to the preparation of the discussion. D. L. Ashley provided technical support for the regulatory relevance of the article. L. Popova and D. Owusu conceptualized the study. L. Popova supervised the study. All authors contributed to interpretation of data, writing, editing, and approval of the final article.

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Note. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

HUMAN PARTICIPANT PROTECTION

This study was approved by the Georgia State University institutional review board.

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