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A Content Analysis of Electronic Cigarette Portrayal in Newspapers

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Abstract

Objective—To determine how electronic cigarettes (e-cigarettes) are portrayed in newspaper informative articles and opinion pieces.

Methods—A content analysis was conducted on 450 articles published in the United States from 1997 to mid-2014 and obtained by a Newsbank search. The articles were reliably coded for overall frame, type of article, first topic and main topics addressed.

Results—The article topics have changed over time and suggest significant differences between news articles and opinion pieces. Informative articles focused on e-cigarette regulation, while opinion pieces highlighted their increasing popularity and perceived health benefits.

Conclusions—This content analysis uncovered significant interest in e-cigarettes, particularly in their regulation. The FDA should consider public perceptions of e-cigarettes when developing regulations.

Keywords

e-cigarettes; content analysis; newspapers; regulation

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Human Subjects Statement

This study was deemed exempt from human subject review.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

Introduction

Electronic cigarettes (e-cigarettes) were introduced to United States markets in 2007 and have since been gaining exposure and popularity among the American public, both smokers and non-smokers alike.¹ E-cigarettes consist of a heating chamber, a cartridge, a battery, and a mouth piece. According to one study, the main reason for having tried an e-cigarette was “just because,” illustrating the public curiosity that surrounds this new product.² Data on e-cigarettes are somewhat limited and little is known about their long term health effects.³ What is known is that public interest in e-cigarettes is quickly rising, especially among American youth.⁴ For example, between 2011 and 2012 the use and experimentation with e-cigarettes among high school students more than doubled.⁵

The FDA proposed a rule in April, 2014 to extend its tobacco regulatory authority to include e-cigarettes and cigars.⁶ With respect to e-cigarettes, the proposed rule would prohibit their sale to minors and limit health-related marketing claims to those supported by scientific evidence. The marketing portion of the rule is often criticized for not doing enough to limit the marketing of e-cigarettes, allowing manufacturers to use techniques that are known to appeal to youth. The new rule would also require warnings on e-cigarettes about the addictiveness of nicotine, as well as the disclosure of ingredients to the FDA.

Public media including newspapers, magazines, and social media are change agents. Page and Shapiro defined the influence of public media when they determined that the public agenda is largely shaped by news, and that an analysis of what is reported can provide insight into what the public is thinking about.⁷ Cohen concisely summed up this finding when he stated that newspapers may not always be successful in telling people what to think, but they are extraordinarily good at telling readers what to think about.⁸ In other words, rather than telling the public what to think the media is successful in providing the public with the necessary information to form their own conclusions.⁹ Much of the public ranks the importance of issues and events based on of the amount of media attention they receive.¹⁰ This ability for news coverage to determine the public’s perception of their importance is termed agenda –setting.¹¹ More specific to our content analysis, studies have shown a positive correlation between news coverage on particular issues and the public’s concern about the issue.^{12,13} This correlation is not just seen with the general public, but also policy makers. Cook et al. found that news coverage affects the perception of importance that governmental policy elites placed on an issue as well as the perception of the need for policy action.¹⁴ Additionally, there has been speculation that newspapers are particularly able to influence policy makers due to their relatively complete and in-depth coverage of issues.¹⁵ Currently, there is much confusion surrounding the regulation of e-cigarettes and therefore we are interested in the information provided to policy makers as well as the general public by newspapers since it may have a significant impact on their opinions of the new devices.

Even though the circulation of newspapers has consistently been dropping for years, the reach of newspaper articles has not dwindled.¹⁶ The current circulation of printed newspapers within the United States is 48.3 million, or approximately 15% of the population.¹⁶ This number is smaller than the actual readership, because articles are now

able to be accessed from the web. In 2013, about 69% of all adults, and 59% of younger adults ages 18 to 24, reported that they had read a newspaper either in print or online within the last week.¹⁷

The reach and powerful influence of public media, and particularly of newspapers, is helpful when researching the public's perception of e-cigarettes. Through analyzing the content of articles on e-cigarettes in newspapers, one can better understand the information that is being presented to the public, which, as noted above, is likely to influence the public's awareness and framing of the issue.¹⁸ The sentiment of at least the more vocal elements of the American public can also be explored through reading letters to the editor, classifying main arguments and then comparing these to the main topics addressed in informative newspaper articles.

The objective of this study was to evaluate the portrayal of e-cigarettes in newspapers across the United States. In order to better understand the public's opinion of e-cigarettes, we examined the topics addressed and the frame of articles about e-cigarettes in newspapers across the United States. A second aim was to determine the differences between informative articles and opinion pieces. The observed differences permit us to contrast the information given to the public with how the public is responding. Finally, we characterized changes in the content of articles over time. These changes offer insight into how the public's awareness and understanding of e-cigarettes may have evolved through the past several years.

METHODS

Sample

The online database Newsbank was searched for "electronic cigarettes" in the headline of articles from 5,541 newspapers across the United States. Since we were only interested in conducting a content analysis of articles published in newspapers, other forms of media, including blogs, journals, magazines, and newswires, were excluded. All types of newspaper articles were included, including informative, opinion, and question and answer pieces. The original search generated a result consisting of 501 articles. To further narrow the search, articles were excluded if they only mentioned e-cigarettes in passing or if they had fewer than 50 words. A total of 450 articles were analyzed and coded. Of these articles over three fourths of them were original with the last fourth being duplicated articles. Duplicated articles typically arose due to the use of wire services, such as the Associated Press. Since the aim was to determine the reach of articles focused on e-cigarettes, those that were repeated in several newspapers were counted every time they appeared in print.

Content Coding

The articles were coded using a coding sheet created by the authors, which was developed using similar content analysis projects as guides.^{19,20} A copy of the coding sheet and key will be provided upon request. The coding sheet consisted of several sections; the first of which coded for the descriptive characteristics of the article and newspaper, including author, name of paper, date and location published, and article type and length. In this

section, we coded whether the article was informative, opinion, or other. Informative articles were defined as articles that were written with the intention to enlighten the public about e-cigarettes and the activity surrounding them. Opinion articles included both editorials written by journalists and letters to the editors written by the general public. The other category contained questions and answer pieces, such as *Ask Dr. K*.

The second section coded for the overall tone and frame of e-cigarettes in the headline and the article as a whole. Both the frame and the tone could be coded as positive, negative, or a combined category of mixed and neutral. Frame was defined as the author's perspective of e-cigarettes. In other words, whether they were supportive or unsupportive of e-cigarette marketing, sales, or use. Tone was defined as the overall apparent attitude of the author. For instance, an article in which the author supported the use of e-cigarettes as smoking cessation devices, but was upset about recent regulation banning their use indoors would be coded to have a positive frame, but a negative tone. For simplicity, tone was coded only for opinion pieces because most informative pieces were written in a mixed or neutral tone.

The third and final section of the coding sheet consisted of a table with 20 topics which were commonly addressed. The topics included a description of e-cigarettes, the need for more research, unknown health effects, concern for youth, increasing popularity of e-cigarettes, smoking cessation, perceived social benefits, perceived health benefits, cheaper cost of e-cigarettes, e-cigarettes connection with drugs, e-cigarettes and the environment, taxation of e-cigarettes, regulation, regulation by the FDA, tobacco control funding, marketing of e-cigarettes, dangers of e-cigarettes, testimonials, addictiveness of nicotine, none, and other. The coders noted if a topic appeared in the headline, as the first topic mentioned, or anywhere within the article. The distinction as to where a topic was mentioned was made in order to assess the first impression made upon a reader. For the headline and within the article, more than one topic could be selected. For the first topic addressed, only one topic was chosen. Some articles mentioned several topics simultaneously, and in such cases the most dominant theme was coded. The primary theme was determined by analyzing the main point of the lead paragraph of the articles.

A coding key was developed by the two coders. The first 145 articles were analyzed by two coders and reliability was assessed. Incongruent coding was discussed and a solution was agreed upon before moving forward. The remaining articles were divided between the two coders, with 20% of the articles selected at random to be double-coded in order to re-assess reliability.

Data Analysis

All analyses were performed using Stata 13 (College Station, TX) and SAS version 13 (Cary, NC). Krippendorff's alpha reliability estimates were used to assess the reliability between coders for frame, topics within headline, first topic addressed, and topics within the article.²¹ An alpha value of 0.7 or above was considered reliable.

Descriptive statistics were used to characterize the articles reviewed, to determine the types of articles, and the region and year in which they were published. The analysis focused on comparing the topics addressed in informative and opinion articles and examining the

changes in content over time. In order to obtain a more concise understanding of the topics addressed 20 coding categories were condensed into seven main topics, including general description, policies, benefits, drawbacks, increasing popularity, the need for more knowledge, and other. Within the policies category there were references to taxation, regulation, regulation by the FDA, tobacco control funding and the marketing of e-cigarettes. Smoking cessation, perceived social benefits, perceived health benefits, and cheaper cost of e-cigarettes were combined into the benefits of e-cigarettes. The drawbacks of e-cigarettes included concern for youth, the connection to drugs, possible dangers, and the addictiveness of nicotine. The need for more research and the unknown health effects were condensed into the need for more knowledge. The other category was expanded to include other, none, testimonials, and references to e-cigarettes and the environment.

Chi-square tests were used to compare informative and opinion pieces with respect to topics addressed in the headline, within the article, and the first topic addressed. A separate test was run for each topic addressed. For all tests, the level of significance was set at $\alpha < .05$. Chi-square tests were also used to determine significant changes in article characteristics over time. Identifying time trends consisted of comparing the relative amount a particular topic was addressed through the years 2009 to 2014.

To further examine the public's perception of e-cigarettes, opinion pieces were separated by frame and examined for differences in topics addressed within the headline, first topic, and within the article. Once again, chi-square tests were used to compare the two groups with a significance level of $\alpha < .05$.

RESULTS

From a total of 501 articles obtained from a Newsbank search, 450 articles met the inclusion criteria and were analyzed and coded. Results from the reliability testing suggested high reliability (greater than 0.7) for frame, topics addressed within the headline, and first topic mentioned. The reliability coefficients for topics addressed within the articles were more variable, all categories had alpha values greater than 0.65, except for the increasing popularity code which had an alpha value of 0.39. Therefore, that code was dropped from our analyses and reporting of topics within the body of the informative article or opinion piece.

The descriptive statistics of the coded articles are presented in Table 1. A majority of the articles were informative ($n=354$, 76.7%) as compared to opinion ($n=62$, 13.8%) or other ($n=43$, 9.6%). With respect to regions across the United States, most articles were published in the South ($n=162$, 36%) followed by the Midwest ($n=116$, 25.8%), West ($n=88$, 19.6%) and finally the Northeast ($n=84$, 18.7%). The number of articles published in the United States regarding e-cigarettes has been steadily growing since their introduction into US markets. It should be noted, however, that the search in 2014 ended in August, so the entire year is not represented.

A majority of the articles had a mixed or neutral frame in both the headline ($n=401$, 89%) and in the article overall ($n=383$, 85%) (data not shown). Most of the articles coded,

however, were informative pieces, which are typically written objectively. Among the opinion pieces, there was a higher percentage of negatively framed headlines (n=17, 27%) than positive headlines (n=9, 15%). Within these opinion articles presided a tendency towards a negative (n=26, 42%) rather than positive (n=16, 26%) overall frame of e-cigarettes.

The topics addressed in the headline, first topic, and within articles for both informative and opinion pieces are presented by percentage in Table 2. While regulation of e-cigarettes was the most common topic addressed within the headline of both informative and opinion articles, it was significantly more likely to be addressed by informative pieces. Most of the time when the regulation of e-cigarettes was discussed, it was in broad, general terms, typically addressing the concerns of e-cigarette use in nonsmoking areas as well as the sale and marketing of e-cigarettes. Less often, the articles contained direct mentions of or appeals to the FDA (data not shown in the table). Informative articles were also more likely to discuss regulation as a first topic, whereas opinion articles began with a discussion of the increasing popularity of e-cigarettes. The discussion of the increasing popularity of e-cigarettes mainly focused two main issues: their use as a smoking cessation device and the concern for youth becoming addicted to nicotine. Informative pieces were significantly more likely to address the topic of e-cigarette regulation, with almost 95% of the articles mentioning it at some point. Informative articles, fulfilling their role of educating the public, also provided a description of e-cigarettes more often than opinion pieces. Additionally, opinion pieces placed more emphasis on the benefits of e-cigarettes, having mentioned at least one potential benefit in 87% of the articles. The main benefit mentioned in opinion pieces was their potential to be used as a smoking cessation aid, with more than 50% of the articles making this claim (data not shown in the table).

Table 3 presents information about time trends in the first topic addressed in the article. Over half of the most recently published articles started with a focus on the policies and regulations surrounding e-cigarette use. Articles published in 2011 and 2012 were more likely to begin by mentioning the potential benefits of e-cigarettes, but more recent articles drew attention to the drawbacks. Only within the past two years have articles begun to quickly draw the reader's attention to the need for more knowledge about the long term health effects of e-cigarettes. Overall, there is not a clear trend in the first topic mentioned over the years.

Figure 1 shows the changes through the past six years in topics addressed within the headlines of the coded articles. One can clearly tell that the most popular topic addressed within the headlines is the regulation of e-cigarettes. There has also been a steep increase in the past three years about the regulation of this new product. It can be speculated that the spike in the discussion of regulation of e-cigarettes seen in 2010 is due to the attention given to the new product as a result of the deeming clause that was included in the Family Prevention and Tobacco Control act that was passed in mid-2009. It is interesting to note that in every year except for 2012 more newspaper articles addressed the potential drawbacks of e-cigarettes rather than their potential benefits.

The frame of opinion pieces influenced what topics were addressed within the article (Table 4). As would be expected, opinion articles with a positive outlook on e-cigarettes were more likely to mention their benefits and less likely to address their drawbacks or the need for more knowledge. The opposite is true with negatively framed articles. A greater percentage of negatively framed articles mentioned the potential benefits of e-cigarette (65.4%) than the percentage of positively framed pieces that addressed the potential drawbacks (25.0%). Every opinion article with a mixed or neutral frame referred to policies or regulations surrounding e-cigarettes.

DISCUSSION

To our knowledge, this is the first content analysis focused on e-cigarette newspaper articles in the United States. The results revealed significant differences between informative and opinion newspaper articles about e-cigarettes. Informative pieces focused on explaining the new technology of e-cigarettes and discussing the debate surrounding their use and regulation. A higher percentage of opinion pieces addressed the potential benefits of e-cigarettes and often noted their increasing popularity. These differences are important to note, because they highlight the difference between the information about e-cigarettes that is presented to the public and the thoughts the public has about the relatively new products. Informative articles discuss the advantages and disadvantages of regulation, while the public appears to be more concerned about the actual use of e-cigarettes.

Stories with a negative or neutral frame were significantly more likely to mention the drawbacks of e-cigarettes and the need for additional research into the long term health effects of the new product. When put into context, these findings seem logical. Articles with a negative frame were most likely written by individuals who are against the use of e-cigarettes and therefore would be more likely to discuss their drawbacks and potentially negative long term health effects. The neutral framed opinion pieces seemed to be written by individuals who are trying to make up their minds regarding the use of e-cigarettes, and are therefore more likely to consider the entire picture, including the potential drawbacks and currently unknown health effects. These findings are noteworthy because there has been little research into the messages the public has been receiving about e-cigarettes. Previous studies have mainly focused on motivations behind initiating e-cigarette use, as well as the public's increasing awareness of e-cigarettes.^{2, 4} Our findings, which examined the information available to the public, allow for a more detailed understanding about the public's awareness and perceptions of e-cigarettes.

The use of e-cigarettes among high school students more than doubled between 2011 and 2012.⁵ This drastic increase was mirrored by a rise between 2011 and 2012 in the proportion of newspaper articles discussing the popularity of e-cigarettes. About half of the 450 articles reviewed in this study referenced the increasing popularity of e-cigarettes, often in conjunction with a concern for youth becoming addicted to nicotine. Many opponents are concerned the increase in e-cigarette use will allow smoking to become renormalized.⁶

Critics claim that e-cigarette companies are using the same marketing techniques as the cigarettes companies used in the past to appeal to youth.²⁰ As a result of advertising for

electronic cigarettes in the United States not yet being regulated; e-cigarette companies are allowed to advertise on television, sponsor sporting events and use celebrity endorsements. Regulation, which includes policies regarding the advertising of e-cigarettes, was mentioned in greater than 90% of the analyzed articles. In addition to policies on marketing, many believe that policies restricting access to e-cigarettes should be initiated to prevent widespread use of e-cigarettes before long term health effects are known.²²

More research is needed to determine the safety of e-cigarettes. The confusion surrounding the health effects of e-cigarettes is illustrated by the fact that over 50% of the articles coded referred to the need for more knowledge surrounding the effects of e-cigarettes. More recent pieces have placed an emphasis on this need by bringing it to the reader's attention early on in the article. Both informative and opinion articles often included testimonials praising e-cigarettes as a smoking cessation device. These claims, however, have not been adequately researched or scientifically demonstrated.^{23,24} Supporters of e-cigarettes claim the health benefits and the use of e-cigarettes as smoking cessation aids justifies their availability before regulation has been established.

This content analysis took a distinctive approach to investigating the public's perception on e-cigarettes by analyzing both the information with which they were presented in newspapers, and the response of more engaged readers through expressions of opinion such as letters to the editor. Strengths to this approach include choosing to analyze the content within newspapers, which are still widely read and have been shown to greatly influence public opinion^{13,17}, and assessment of similarities and differences between news coverage and opinion expression.

Limitations of the analysis include the relatively small number of opinion pieces, which were significantly outnumbered by the informative articles, the narrow search on Newsbank, and the fact that only newspapers were analyzed. The search conducted on Newsbank only retrieved articles with "electronic cigarettes" in the headline. E-cigarettes are known by a wide range of other names, such as vapes or personal vaporizer. Articles using these alternative names would have been excluded. With the advancement of technology, people are now getting their information from a growing number of places including magazines, news sources other than newspapers on the internet, and countless social media outlets. A future direction for this content analysis could be looking into the portrayal of e-cigarettes on social media sites like Facebook and Twitter to determine what information is being communicated in this more personal and informal form of public media.

Due to their quickly increasing popularity, it is critical to understand the information readily available to the public about e-cigarettes. This content analysis indicated that there remains much public confusion surrounding the new technology along with controversy regarding its regulation. More research needs to be conducted to lead to informed use and regulation of e-cigarettes and steps should be taken to make the public aware of the most current scientific knowledge about e-cigarettes.

IMPLICATIONS FOR TOBACCO REGULATORY SCIENCE

The analyzed informative and opinion articles both demonstrated a considerable amount of interest surrounding the regulation of e-cigarettes. This interest has increased in recent years as the FDA has started the process of extending its tobacco regulatory jurisdiction to include e-cigarettes. With regard to regulation, this content analysis of newspaper articles suggests two areas of particular interest.

First, as indicated by the leads of the articles, there is a significant amount of discussion about the increasing popularity of e-cigarette often in conjunction with a concern for youth becoming addicted to nicotine. This concern is even shared by those who view the emergence of e-cigarettes as a generally positive development. The proposed FDA “deeming” rule, which would provide the FDA’s Center for Tobacco Products with regulatory authority over e-cigarettes, did not include any restrictions on e-cigarette advertising beyond limiting the health-related marketing claims to those that have been scientifically proven.⁷ The FDA should be aware of public concern about this issue and should act promptly, by either adding an edit to the final draft of the “deeming” rule or subsequently by adopting reasonable restrictions on e-cigarette promotion.

Second, much of the newspaper coverage relating to e-cigarettes includes discussion of their potential benefits, the most stated of which was the use of these products as smoking cessation aids. Under current law, e-cigarette manufacturers cannot make claims relating to the use of their products for smoking cessation unless they go through the FDA’s drug approval process and substantiate those claims, which no e-cigarette manufacturers have done to date.²⁵ Nonetheless, this study suggests that there is robust public discussion about the use of e-cigarettes for smoking cessation. As the FDA considers the appropriate regulatory framework for e-cigarettes, it should be aware that the uptake and use of these products, and particularly their use for smoking cessation purposes, is likely to be influenced by news coverage, social media commentary, and other factors that are outside of the manufacturers’ direct control. Thus, for example, the FDA’s analysis of whether it would be “appropriate for the production of public health” to permit the sale of a new e-cigarette product should consider not only the product’s physical characteristics and health effects, but also how the social, cultural, and informational context might impact the use of the product by various populations.

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References

1. Franck C, Budlovsky T, Windle SB, et al. Electronic cigarettes in North America: history, use, and implications for smoking cessation. *Circulation*. 2014; 129(19):1945–1952. [PubMed: 24821825]
2. Zhu SH, Gamst A, Lee M, et al. The use and perception of electronic cigarettes and snus among the U.S. population. *PLoS ONE*. 2013; 8(10):e79332. [PubMed: 24250756]

3. Carr ER. E-cigarettes: facts, perceptions, and marketing messages. *Clin J Oncol Nurs*. 2014; 18(1): 112–116. [PubMed: 24476733]
4. Choi K, Forster J. Awareness, perceptions and use of snus among young adults from the upper Midwest region of the USA. *Tob Control*. 2013; 22(6):412–417. [PubMed: 22821750]
5. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report: Notes from the field: Electronic cigarette use among middle and high school students - United States, 2011-2012. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6235a6.htm?utm_source=rss&utm_medium=rss&utm_campaign=notes-from-the-field-electronic-cigarette-use-among-middle-and-high-school-students-united-states-20112012. Accessed July, 2014
6. United States Food and Drug Administration. Deeming- Extending Authorities to Additional Tobacco Products. <http://www.fda.gov/TobaccoProducts/Labeling/ucm388395.htm>. Accessed August, 2014
7. Page, BI.; Shapiro, RY. *The Rational Public: Fifty Years of Trends in American's Policy Preferences*. University of Chicago Press; Chicago, IL: 1992.
8. Cohen BC. The press and foreign policy. *JSTOR*. 1964; 69(3)
9. Lasorsa, DL. *Encyclopedia of Political Communication*. SAGE Publications; Thousand Oaks, CA: 2008. p. 13-20.
10. National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use*. Tobacco Control Monograph No. 19. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; Jun. 2008 NIH Pub. No. 07-6242
11. Iyengar S, Simon A. News coverage of the Gulf crisis and public opinion. *Communication Research*. 1993; 20(3):365–381.
12. McCombs ME, Shaw DL. The agenda-setting function of mass media. *JSTOR*. 1972; 32(2):176–187.
13. Smith KA. Effects of Newspaper Coverage on Community Issue Concerns and Local Government Evaluations. *Communication Research*. 1987; 14(4):379–395.
14. Cook FL, Tyler TR, Goetz EG, et al. Media and agenda setting: Effects on the public, interest group leaders, policy makers, and policy. *Public Opin Q*. 1983; 47(1):16–35. [PubMed: 10261275]
15. Walgrave S, Van Aelst P. The contingency of the mass media's political agenda setting power: Toward a preliminary theory. *J Commun*. 2006; 56:88–109.
16. The Pew Research Center's Project for Excellence in Journalism. *Annual Report on American Journalism: Newspapers: Stabilizing, but still threatened – The State of the News Media 2013*. <http://www.stateofthemedial.org/2013/newspapers-stabilizing-but-still-threatened/>. Accessed July, 2014
17. Newspaper Association of America. *Across platforms, 7 in 10 adults access content from newspaper media each week – SenseMaker Report*. <http://www.naa.org/News-and-Media/Press-Center/Archives/2013/7-in-10-Adults-Access-Content-From-Newspaper-Media-Each-Week.aspx>. Accessed July, 2014
18. Scheufele DA. Framing as a theory of media effects. *J Commun*. 1999; 49(1):103–122.
19. Durrant R, Wakefield M, McLeod K, et al. Tobacco in the news: an analysis of newspaper coverage of tobacco issues in Australia. *Tob Control*. 2003; 21(Suppl II):ii75–ii81. [PubMed: 12878777]
20. Grana RA, Ling PM. "Smoking revolution": a content analysis of electronic cigarette retail websites. *Am J Prev Med*. 2014; 46(4):395–403. [PubMed: 24650842]
21. Krippendorff, Klaus. *Computing Krippendorff's Alpha-Reliability*. University of Pennsylvania; 2011. p. 1-10.
22. Chapman S. Should electronic cigarettes be as freely available as tobacco cigarettes? No. *BMJ*. 2013; 346:f3840. [PubMed: 23771038]
23. World Health Organization and the Tobacco Free Initiative. *Electronic cigarettes (e-cigarettes) or electronic nicotine delivery systems*. http://www.who.int/tobacco/communications/statements/electronic_cigarettes/en/. Accessed July, 2014
24. Harrell PT, Simmons VN, Correa JB, Padhya TA, Brandon TH. Electronic nicotine delivery systems ("e-cigarettes"): review of safety and smoking cessation efficacy. *Otolaryngol Head Neck Surg*. 2014; 151(3):381–393. [PubMed: 24898072]

25. Cobb NK, Abrams DB. E-cigarette or drug-delivery device? Regulating novel nicotine products. *N Engl J Med.* 2011; 365(3):193–195. [PubMed: 21774706]

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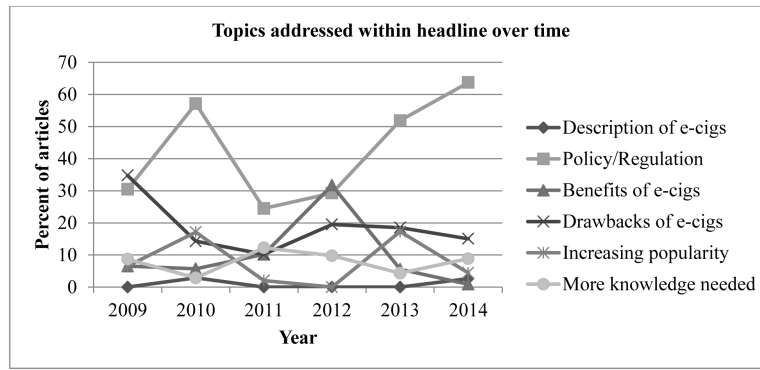


Figure 1. Distribution of topics addressed within the headline of articles over time (N = 446).

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Table 1

Descriptive statistics of the analyzed articles (N = 450).

Variable	N (%)
Type of Article	
News/Informative	345 (76.7)
Editorial/Opinion	62 (13.8)
Other	43 (9.6)
Region of the United States	
Northeast	84 (18.7)
Midwest	116 (25.8)
South	162 (36.0)
West	88 (19.6)
Year Articles were Published	
2014	113 (25.1)
2013	162 (36.0)
2012	41 (9.1)
2011	49 (10.9)
2010	35 (7.8)
2009	46 (10.2)
2008	3 (0.7)
1997	1 (0.2)

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Table 2

Distribution of topics mentioned in news and opinion articles (N = 407).

Topics Addressed	Headline		1 st Topic		Within Article	
	News (N = 345)	Opinion (N = 62)	News (N = 345)	Opinion (N = 62)	News (N = 345)	Opinion (N = 62)
Description of e-cigs (%)	0.9	1.6	4.9	1.6	74.8 ^a	48.4 ^a
Policy/Regulation (%)	54.8 ^a	40.3 ^a	49.6 ^a	33.9 ^a	94.2 ^a	87.1 ^a
Benefits of e-cigs (%)	6.7	12.9	14.5	17.7	73.3 ^a	87.1 ^a
Drawbacks of e-cigs (%)	17.4	19.4	9.6	8.1	77.1	72.6
Increasing popularity (%)	11.6	6.5	13.3 ^a	27.4 ^a	NA	NA
More knowledge needed (%)	4.6	8.1	1.2	0.0	53.6	41.9

NA: Not available due to inadequate intercoder reliability.

^a p<.05 from χ^2 test.

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Table 3Distribution of first topic mentioned within articles over time (N = 446)^a.

First Topic Addressed	2009 N = 46	2010 N = 35	2011 N = 49	2012 N = 41	2013 N = 162	2014 N = 113
Description of e-cigs (%)	13.0	5.7	8.2	0.0	1.2	4.4
Policy/Regulation (%)	23.9	54.3	24.5	26.8	47.5	53.1
Benefits of e-cigs (%)	13.0	25.7	63.3	39.0	16.7	5.3
Drawbacks of e-cigs (%)	23.9	5.7	2.0	2.4	4.3	14.2
Increasing popularity (%)	23.9	5.7	0.0	22.0	19.1	9.7
More knowledge needed (%)	0.0	0.0	0.0	0.0	0.6	5.3

^a All topics changed significantly overtime with a $p < .05$ from χ^2 tests.

Table 4

Distribution of topics addressed by frame of opinion articles (N = 62).

Topics Addressed	Positive Frame (N = 16)	Negative Frame (N = 26)	Mixed/Neutral Frame (N = 20)
Description of e-cigs (%)	56.3	42.3	45.0
Policy/Regulation (%)	56.3 ^a	76.9 ^a	100.0 ^a
Benefits of e-cigs (%)	100.0 ^a	65.4 ^a	90.0 ^a
Drawbacks of e-cigs (%)	25.0 ^a	96.2 ^a	80.0 ^a
Increasing popularity (%)	12.5 ^b	3.8 ^b	5.0 ^b
More Knowledge needed (%)	18.8 ^a	61.5 ^a	35.0 ^a

^a p<.05 from χ^2 test.^b Based on headline coding due to inadequate intercoder reliability for increasing popularity addressed within the article.