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Campaigns and counter campaigns: reactions on Twitter to e-cigarette education

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Abstract

Background—Social media present opportunities for public health departments to galvanise interest in health issues. A challenge is creating content that will resonate with target audiences, and determining reactions to educational material. Twitter can be used as a real-time surveillance system to capture individuals' immediate reactions to education campaigns and such information could lead to better campaigns in the future. A case study testing Twitter's potential presented itself when the California Department of Public Health launched its 'Still Blowing Smoke' media campaign about the potential harmful effects of e-cigarettes. Pro-e-cigarette advocacy groups, in response, launched a counter campaign titled 'Not Blowing Smoke'. This study tracked the popularity of the two campaigns on Twitter, analysed the content of the messages and determined who was involved in these discussions.

Methods—The study period was from 22 March 2015 to 27 June 2015. A stratified sampling procedure supplied 2192 tweets for analysis. Content analysis identified pro, anti and neutral e-cigarette tweets, and five additional themes: Marketing Elements, Money, Regulation/propaganda, Health, and Other. Metadata were analysed to obtain additional information about Twitter accounts.

Results—'Not Blowing Smoke' was referenced more frequently than 'Still Blowing Smoke' on Twitter. Messages commonly objected to government regulation of e-cigarettes, refuted claims that e-cigarette manufactures were aligned with big tobacco, and touted the health benefits of e-cigarette use. E-cigarette companies and vape shops used campaign slogans to communicate with customers on Twitter.

Conclusions—Findings showed the time dynamics of Twitter and the possibility for real-time monitoring of education campaigns.

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INTRODUCTION

The use of electronic cigarettes (e-cigarettes) among adolescents and adults in the USA has doubled from 2013 to 2014.¹² Subsequently, state/local health departments have produced education campaigns to increase awareness about the potential health risks of e-cigarette use.³ Social media platforms, like Twitter, present opportunities for health departments to disseminate information.^{4–7} Social media, however, present challenges such as creating content that will resonate with target audiences and determining reactions to educational material.

Twitter can be used as a real-time surveillance system to capture individuals' immediate reactions to education campaigns, and such information could lead to more effective campaigns in the future. Using Twitter allows researchers to overcome well-known limitations of traditional surveillance systems such as respondents' reluctance to participate in lengthy surveys, social desirability bias, lag time between questionnaires, data collection, and data availability, and intermittent coverage of important topics due to the associated costs of surveys.⁸

A case study testing Twitter's potential as a real-time surveillance system presented itself in March of 2015 when the California Department of Public Health (CDPH) launched its 'Still Blowing Smoke' (SBS) media campaign complete with television ads, billboards, and a website, which all emphasised the potential risks of e-cigarettes, and suggested that manufactures were trying to attract youth to nicotine dependence (stillblowingsmoke.org). In response, pro-e-cigarette advocacy groups launched a counter campaign titled 'Not Blowing Smoke' (NBS) complete with a website, Twitter account, and videos on Youtube, which all denounced statements made by the CDPH (notblowingsmoke.org). NBS accused the California government of trying to maintain tobacco tax revenues by preventing smokers from switching from taxed combustible cigarettes to untaxed e-cigarettes. This study tracked the popularity of the SBS and NBS campaigns over time on Twitter, analysed the content of the messages, and determined who was involved in these discussions.

METHODS

Data were obtained from Gnip, Inc (<http://www.gnip.com>), a licensed Twitter data provider with access to 100% of public tweets and corresponding metadata, and custom software that accessed Twitter's Streaming API based on Twitter4J libraries (<http://twitter4j.org>). Tweets posted between 22 March 2015 (the CDPH campaign started 23 March 2015) and 27 June 2015 were collected. The keywords and search rules used to collect the sample of tweets were: #stillblowingsmoke OR stillblowingsmoke OR 'still blowing smoke' OR stillblngsmoke OR 'still blng smoke' OR #notblowingsmoke OR notblowingsmoke OR 'not blowing smoke' OR notblngsmoke OR 'not blng smoke' OR @CAPublicHealth.

This study used a stratified sampling frame based on week with 14 weeks in the study period, and randomly sampled from each stratum proportionate to the number of tweets. Tweets from the first week were oversampled,⁹ and the study period extended through June to allow people to become aware of the keywords.¹⁰¹¹ There were 46 010 tweets containing

the keywords during the study period; all tweets collected were unique, with no duplicates; tweets with multiple keywords were only collected once; however, if a tweet was retweeted multiple times, each retweet by a new user was counted as a new post; 8% of tweets from week 1 and 4% of tweets from all other weeks were randomly sampled, yielding 2248 tweets to analyse. Among these 2248 tweets, 56 were removed from analyses because the content of the message was irrelevant (n=2192). The data collected were of good quality where precision was equal to 97.5% (true n/total collected or 2192/2248). The University of Southern California Institutional Review Board approved all procedures.

Coding tweets

Two investigators used an inductive process and decided on rules for determining whether tweets were anti, pro or neutral toward e-cigarette use or ‘vaping’ and for determining additional themes. The five themes identified were: (1) Marketing Elements: specific products, coupons, vape shops; (2) Money: taxes, small businesses, tobacco sales; (3) Regulation/propaganda: perceived government overreach, perceived lies being spread by the government; (4) Health: cessation, scientific studies, the effects of vaping on health; (5) Other: messages that did not clearly fall into one of the above categories. After rules were established, one investigator coded all tweets and another investigator coded a subsample of tweets (n=300) to determine reliability. Agreement for coding tweets as anti, pro, or neutral toward vaping was substantial (91%). Agreement for coding themes was acceptable (72%). Discrepancies were resolved by discussions between the two investigators.

Metadata in each Twitter profile were also analysed. Each Twitter account was classified as either an individual user, an entity (eg, company, store, advocacy group), or indeterminable. This study then coded whether the Twitter account contained a reference to e-cigarettes or vaping in the profile description (eg, ‘A happy vaper and custard lover’). The self-reported location of the user was classified (California=1, outside California=2, not listed or unclear=3 eg, ‘way up in the clouds’).

Statistical analysis

The terms SBS and NBS were monitored over the study period for the entire universe of tweets to determine popularity. The percentages of themes were described, and how themes varied by metadata were analysed by χ^2 tests.

RESULTS

NBS was referenced more than SBS (figure 1), with tweets sharply decreasing after the first week of the campaign, followed by a steady level of traffic, which remained higher for NBS than SBS. About 92% of tweets were coded as pro vaping, with 2% coded as anti vaping, and 6% neutral. About 8% of tweets were coded as Marketing Elements, for example,

We’re giving away 20 bottles of #ejuice in case folks want to be #notblowingsmoke any longer. #CDCTips <http://t.co/fpiHyx0nu2>

About 10% of tweets were coded as Money, for example,

Why .@CAPublicHealth MUST keep cigarette sales strong. The ugly story of toxic tobacco debt. <http://t.co/DKq4mOX50D#stillblowingsmoke>

CA is betting YOUR tax dollars that people will keep smoking. #ecigs threaten that revenue stream. #notblowingsmoke As you know, none of the 2000 dedicated vape shops in CA sell Big Tob products. #stillblowingsmoke?

Tobacco companies own <1% of e-cigarette brands now on the market.
#stillblowingsmoke #notblowingsmoke

About 35% of tweets were coded as Regulation/propaganda, for example,

Wow, CA DPH thinks it acceptable to deceive the ppl it is supposed to serve:
#stillblowingsmoke ? no #notblowingsmoke Don't let the FDA go without making your voice heard...#vape-community #vape #ecig #notblowingsmoke
#ecigssavelive

About 30% of tweets were coded as Health, for example,

A new study verifies that e-cigarettes are orders of magnitude safer than tobacco cigarettes #notblowingsmoke <http://t.co/fo9Iia8C3N>

A new way to inhale toxic chemicals. There's a lot the E-Cig industry isn't telling us about vaping.#StillBlowingSmoke #?? I am SO proud of all the folks posting their personal stories of how they quit smoking by #vaping Keep 'em comin'!
#notblowingsmoke

About 18% of tweets were coded as Other, for example,

What's your favourite #vaping trick? #VapeTricks #Vapelife #VapeOn
#NotBlowingSmoke"

About 48% of tweets were from individual users; 14% were from entities, and 38% were unknown. Most tweets (74%) came from Twitter accounts with explicit reference to e-cigarettes/vaping in the profile description. Only 7% of Twitter accounts listed a location within California, 44% were outside California and 49% were unclear. Themes significantly

$(\chi^2_{(8)}=58.5603, p<0.001)$ varied by location with the theme of regulation most commonly coming from a Twitter account outside California. Themes significantly

$(\chi^2_{(8)}=150.0265, p<0.001)$ varied by Twitter account type with the theme of regulation most commonly coming from individual users. The theme of regulation most commonly came from Twitter accounts that mentioned e-cigarettes in the profile description

$(\chi^2_{(8)}=48.9244 p<0.001)$.

DISCUSSION

It is important to understand why NBS gained more attention than SBS. NBS had a link to a Twitter account on their homepage. CDPH, conversely, did not create a specific Twitter account for SBS. Having campaign-specific accounts across social media platforms may help increase the popularity of informational messages.¹⁰

Messages against government regulation of e-cigarettes were most common. Since research on e-cigarettes is still evolving,¹² it is unsurprising that select Twitter accounts questioned the importance of regulating this product. The second most common theme pertained to health, which often reflected a Twitter account's sentiments toward using e-cigarettes for cessation. Public education campaigns could communicate the differences between products that have been demonstrated effective for cessation and those that have not. There is virtually no limit to what Twitter accounts can claim regarding e-cigarettes. Education campaigns may attempt to identify misinformation and circulate evidence-based information on social media as information becomes available.

Many Twitter accounts expressed concern over CDPH's motivations for wanting e-cigarettes to be regulated. They suggested CDPH was only concerned about e-cigarettes because its funds from cigarette taxes would decrease if people switched to e-cigarettes. Twitter accounts expressed fears that government regulations would impede the growth of the vape shop retail industry.¹³

NBS (or #notblowingsmoke) became a mechanism for businesses to communicate with their target audiences, and became a flag for Twitter accounts to express an indiscriminate reference to vaping. The popularity of this hashtag suggests successful branding of the idea it encompassed for example, use e-cigarettes.¹⁴ Twitter accounts listed pairs of hashtags in their tweets that supported their previously held position on e-cigarettes, and provided a counterpoint to the side they opposed. This suggests discussions of e-cigarettes may occur in an echo chamber on Twitter where previously held positions are sought after and reinforced.¹⁵ Future research should explore how to engage those on social media who are seeking information that contradicts campaign messages.

This study's findings extend prior research. A study of the Chicago Department of Public Health's anti-e-cigarette Twitter campaign found a high volume of tweets against the campaign.³ Most of those tweets originated from e-cigarette companies and advocacy groups outside of Chicago or Illinois.³ Similarly, 14% of tweets captured in the present study were from entities, and 7% of tweets were from Twitter accounts located in California. Pro e-cigarette interests across the USA appear to be able to gain traction on Twitter. Those heavily opposed to the CDPH campaign quickly created and perpetuated their own hashtag (#notblowingsmoke). In Chicago, nearly 90% of the tweets used the Chicago Department of Public Health's own hashtag in opposition to e-cigarette legislation (eg, 'hashtag hijacking'),¹⁶ and this tactic was also used in opposition to the CDPH campaign.

Limitations

Twitter has become subject to third party manipulation where automated accounts ('bots' or 'cyborgs') influence the discussions (eg, astroturfing) that take place on Twitter.^{17,18} The present study did not distinguish between human accounts and bots because the mechanisms for doing so are still in development.¹⁹ Findings described herein could reflect, in part, sentiments of automated accounts. The data set did not include tweets from private Twitter accounts. Website links (URLs) within tweets were not analysed.

CONCLUSION

This study described the reactions on Twitter to the California e-cigarette campaign and its opposing counterpart in real-time. The findings add to the growing literature on how novel data streams can inform education campaigns,²⁰²¹ public health^{22–26} and regulatory science.²⁷ Findings demonstrated the possibility for real-time monitoring of education campaigns in the future.

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What this paper adds

- ▶ Health departments have produced education campaigns to increase public awareness about the potential health risks associated with e-cigarette use.
- ▶ Twitter provides the opportunity for a real-time surveillance system that can be used to capture individuals' immediate reactions to education campaigns.
- ▶ This case study demonstrated how individuals took to Twitter to object to government regulation of e-cigarettes, refuted claims that e-cigarette manufactures were aligned with big tobacco, and touted the health benefits of e-cigarette use.
- ▶ E-cigarette companies and vape shops used education campaign slogans to identify potential customers on Twitter.
- ▶ Findings showed the time dynamics of Twitter and the possibility for real-time monitoring of education campaigns.

Figure 1. Tweets over time shows word frequency for ‘Still Blowing Smoke’ and ‘Not Blowing Smoke’ over the course of the study period. The spike around 15 May was due to a celebrity mention of the California campaign.