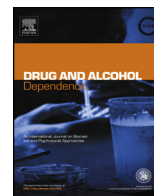




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# Exploring the e-cigarette e-commerce marketplace: Identifying Internet e-cigarette marketing characteristics and regulatory gaps<sup>☆</sup>

Tim K. Mackey<sup>a,b,c,\*</sup>, Angela Miner<sup>d,e</sup>, Raphael E. Cuomo<sup>c,f</sup>

<sup>a</sup> Department of Anesthesiology, University of California, San Diego School of Medicine, San Diego, CA, USA

<sup>b</sup> Division of Global Public Health, University of California, San Diego School of Medicine, Department of Medicine, San Diego, CA, USA

<sup>c</sup> Global Health Policy Institute, San Diego, CA, USA

<sup>d</sup> Joint Masters Degree Program in Health Policy and Law, University of California, San Diego – California Western School of Law, USA

<sup>e</sup> Department of Occupational and Environmental Medicine, University of California, San Diego – Health System, USA

<sup>f</sup> Joint Doctoral Degree Program in Global Public Health, University of California, San Diego – San Diego State University, USA

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### ABSTRACT

**Background:** The electronic cigarette (e-cigarette) market is maturing into a billion-dollar industry. Expansion includes new channels of access not sufficiently assessed, including Internet sales of e-cigarettes. This study identifies unique e-cigarette Internet vendor characteristics, including geographic location, promotional strategies, use of social networking, presence/absence of age verification, and consumer warning representation.

**Methods:** We performed structured Internet search engine queries and used inclusion/exclusion criteria to identify e-cigarette vendors. We then conducted content analysis of characteristics of interest.

**Results:** Our examination yielded 57 e-cigarette Internet vendors including 54.4% ( $n = 31$ ) that sold exclusively online. The vast majority of websites (96.5%,  $n = 55$ ) were located in the U.S. Vendors used a variety of sales promotion strategies to market e-cigarettes including 70.2% ( $n = 40$ ) that used more than one social network service (SNS) and 42.1% ( $n = 24$ ) that used more than one promotional sales strategies. Most vendors (68.4%,  $n = 39$ ) displayed one or more health warnings on their website, but often displayed them in smaller font or in their terms and conditions. Additionally, 35.1% ( $n = 20$ ) of vendors did not have any detectable age verification process.

**Conclusions:** E-cigarette Internet vendors are actively engaged in various promotional activities to increase the appeal and presence of their products online. In the absence of FDA regulations specific to the Internet, the e-cigarette e-commerce marketplace is likely to grow. This digital environment poses unique challenges requiring targeted policy-making including robust online age verification, monitoring of SNS marketing, and greater scrutiny of certain forms of marketing promotional practices.

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## 1. Introduction

Electronic cigarettes (e-cigarettes) were virtually unknown ten years ago, but are now rapidly growing in popularity in various countries (Ayers et al., 2011). This novel electronic consumer product, first introduced in the United States in 2007, converts concentrated liquid nicotine (e-liquid) into a vapor, which is then inhaled, or “vaped” by the user through different delivery systems

(e.g., look-alikes, pen-style, “Mods”, and disposables; Farsalinos and Polosa, 2014; Huang et al., 2014b; Yamin, 2010). The growing popularity of e-cigarettes can be measured by their burgeoning sales in countries such as the U.S., a primary market for e-cigarettes. In 2007, U.S. sales brought in a modest \$5 million per annum with sales now estimated at some \$2.2 billion as of May 2014 accompanied by rapid increases in promotional expenditures (Herzog et al., 2014a; Kornfield et al., 2015). The product landscape is wide and varied, with an estimated 460 brands and thousands of flavors available for sale in brick-and-mortar “vape” shops, in chain convenience stores, as well as from online vendors (Herzog et al., 2014a; Zhu et al., 2014).

Historically, the e-cigarette industry has not been subject to regulation or advertising restrictions, which has encouraged uncontrolled market expansion. As a result, advertising expenditures

<sup>☆</sup> Supplementary materials for this article can be found by accessing the online version of this paper.

\* Corresponding author at: Global Health Policy Institute, 8950 Villa La Jolla Drive, Suite #A204, La Jolla, CA 92037, USA.

E-mail address: [tmackey@ucsd.edu](mailto:tmackey@ucsd.edu) (T.K. Mackey).

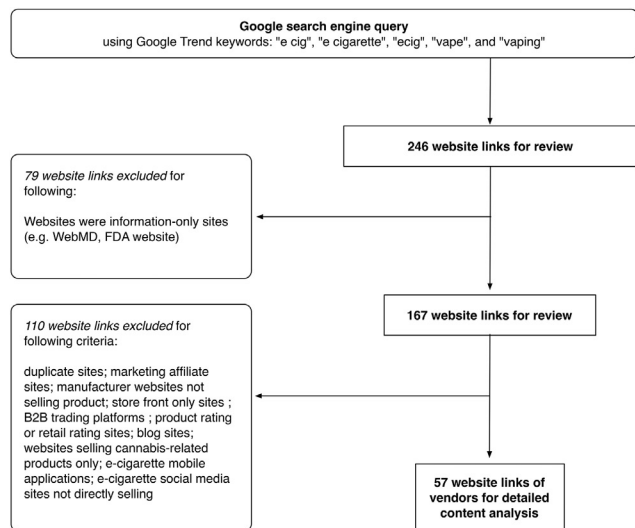
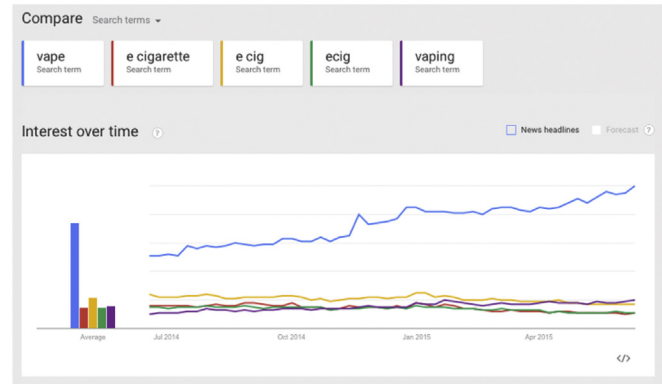


Fig. 1. Study website inclusion and exclusion protocol and Google trends electronic cigarette key search terms.

### Google Trends E-Cigarette Key Search Terms (past 12 months)

We first identified 13 keywords utilized in prior research on e-cigarette Internet marketing (Zhu S-H, et al, 2014 and Grana & Ling, 2014). We then identified a subset of these keywords that were the top five search terms based on "interest over time" results from Google Trends. Analysis of keywords using Google Trends was conducted prior to start of structured Internet search engine queries in beginning of June 2015. See below comparison in search interest over time for top five keywords identified used in this study



tripled from 2011 to 2012, when the industry spent \$18.3 million on magazine, television, newspaper and Internet ads (Kim et al., 2014). Although e-cigarette Internet advertising expenditures are lower than expenditures in traditional media formats (i.e., print, TV), the Internet's growth potential as a cheap and accessible marketing tool to promote e-cigarette uptake needs to be examined. In fact, industry analysts now estimate that online sales make up approximately 25–30% of the \$2.2B e-cigarette market, though exact figures are difficult to track (Herzog et al., 2014a,b). Another study examining tobacco and e-cigarette online banner/video advertisements in the USA and Canada found that an estimated \$2 million was spent by the industry between 2012 and 2013 on the web (Richardson et al., 2015).

As e-cigarette sales have increased, so have calls for Federal regulation of this new nicotine delivery technology. In April, 2014, the U.S. Food and Drug Administration (FDA) proposed regulations that for the first time would govern the use, sale, marketing, and manufacturing of e-cigarettes, and will likely establish a minimum purchasing age, require product package warnings, and set product standards once promulgated (Cobb et al., 2015; "Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act," 2014). Importantly, the proposed regulations do not specifically regulate or prohibit online e-cigarette sales, though their general requirements could be interpreted as applicable to online vendors ("Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act," 2014). Hence, given the growth of the e-cigarette market and ubiquitous access online, a more detailed assessment of the e-cigarette e-commerce marketplace is critical to inform interpretation of FDA regulations as well as in guiding future regulatory science.

To date, a handful of studies have attempted to describe e-cigarette Internet vendors and their online marketing by focusing on: the number of product brands; presence of flavors, nicotine strengths and ingredients; product claims; representation of health claims; volume and topic areas/themes of online marketing; assessing characteristics of online banner/video advertisement; and examining the relationships between affiliate networks and Internet vendors (Cobb et al., 2015; Grana and Ling, 2014; Richardson et al., 2015; Zhu et al., 2014). Expanding on this research, this study describes additional e-cigarette Internet vendor characteristics not previously explored, including vendor geographic locations, use of online sales promotion strategies, use of social networking platforms for marketing, and reexamining age

verification processes in order to further inform future policy making on this issue.

## 2. Methods

### 2.1. Structured web searches and vendor identification

The first phase of this study involved conducting structured Internet search engine queries using the five most popular e-cigarette-related key search terms "e cig", "e cigarette", "ecig", "vape" and "vaping" based on results from Google Trends on search term interest over the past 12 months. We then used Google search engine to query these popular e-cigarette-related search terms based upon Google's overwhelming popularity among English-speaking Internet users and its large volume of global users/traffic (Sullivan, 2013). Google Chrome browser (with all Google user accounts deactivated) was used to conduct searches in the "incognito" browser mode in order to minimize the influence of browser history, user cookies, and search history when performing searches. We then collected the website addresses for the first five pages of organic search results (i.e., not including sponsored links) which is a sampling methodology consistent with prior studies indicating Internet users rarely access websites beyond these search results (Liang et al., 2011, 2012; Lorigo et al., 2008). Using results from our search engine queries, we then constructed a list of websites to be analyzed in the study.

### 2.2. Website content analysis

In the second phase we reviewed the content of each website and applied an inclusion and exclusion criteria (see Fig. 1) to identify e-cigarette Internet vendors (defined as websites actively engaged in the sale of e-cigarettes or liquid nicotine direct-to-consumer) similar to a methodology utilized by Zhu et al. (2014). Following identification of sites we categorized as e-cigarette Internet vendors, we then conducted content analysis, whereby we coded characteristics of interest. Characteristics reviewed included information on the location of e-cigarette Internet vendors (specifically primary business address and IP address location geocoded and visualized using ArcGIS, Redlands, CA: ESRI); use of different sales promotion strategies (i.e., social media marketing and promotional incentives); use of age verification procedures; and representation of product safety and health warnings.

The first author and second author independently reviewed website content and coded website characteristics. Inter-coder reliability between reviewers was high for both the inclusion criteria for websites (0.98) and for coding of all categories measured (with all Cohen's kappas greater than 0.85 and with a mean score of  $k = 0.93$ .) All three authors received identical training for applying website inclusion/exclusion criteria and for coding website characteristics. When there was a discrepancy between the first and second authors, all three trained authors revisited the sites and agreed upon the best decision. A detailed description of the review and coding procedures is provided in the Supplementary Table.<sup>1</sup> SPSS v.20 (IBM: Armonk, NY) was used for all data analyses.

<sup>1</sup> Supplementary material can be found by accessing the online version of this paper.

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