

# Tobacco on the web: surveillance and characterisation of online tobacco and e-cigarette advertising

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## ABSTRACT

**Background** Despite the internet's broad reach and potential to influence consumer behaviour, there has been little examination of the volume, characteristics, and target audience of online tobacco and e-cigarette advertisements.

**Methods** A full-service advertising firm was used to collect all online banner/video advertisements occurring in the USA and Canada between 1 April 2012 and 1 April 2013. The advertisement and associated meta-data on brand, date range observed, first market, and spend were downloaded and summarised. Characteristics and themes of advertisements, as well as topic area and target demographics of websites on which advertisements appeared, were also examined.

**Results** Over a 1-year period, almost \$2 million were spent by the e-cigarette and tobacco industries on the placement of their online product advertisements in the USA and Canada. Most was spent promoting two brands: NJOY e-cigarettes and Swedish Snus. There was almost no advertising of cigarettes. About 30% of all advertisements mentioned a price promotion, discount coupon or price break. e-Cigarette advertisements were most likely to feature messages of harm reduction (38%) or use for cessation (21%). Certain brands advertised on websites that contained up to 35% of youth (<18 years) as their audience.

**Conclusions** Online banner/video advertising is a tactic used mainly to advertise e-cigarettes and cigars rather than cigarettes, some with unproven claims about benefits to health. Given the reach and accessibility of online advertising to vulnerable populations such as youth and the potential for health claims to be misinterpreted, online advertisements need to be closely monitored.

## INTRODUCTION

Tobacco is the leading cause of preventable death globally, killing nearly six million people in 2012.<sup>1</sup> While cigarettes remain the most commonly used tobacco product, the introduction of new products, such as snus and electronic cigarettes (e-cigarettes), has diversified the global tobacco marketplace. The popularity of these products is growing, with annual sales of smokeless tobacco products (snuff, chew, snus and dissolvable tobacco products) now exceeding \$2.93 billion.<sup>2</sup> Global sales of e-cigarettes continue to grow at a rapid pace; sales in 2011 reached \$2 billion globally.<sup>3</sup> While use of these products is still relatively low,<sup>4–7</sup> tobacco and e-cigarette industries are investing more resources into their development and marketing.<sup>2–8</sup>

Advertising influences the initiation and continued use of tobacco products among both youth and adults.<sup>9–12</sup> Given the restrictions on tobacco advertising in the USA arising from the Master Settlement Agreement,<sup>13–14</sup> which banned tobacco advertising from broadcast media, and the restrictions set forth restricting advertising to youth in the Family Smoking Prevention and Tobacco Control Act<sup>15–16</sup> as well as the almost complete restrictions on advertising set forth in Tobacco Act of Canada and its 2009 Amendment,<sup>17–19</sup> online advertising has allowed the tobacco industry to promote their products in a space that has broad reach and is largely unregulated.<sup>20</sup> This may, in part, explain why internet advertising expenditures for smokeless tobacco have increased, at least in the USA, significantly since 2006.<sup>2</sup>

Studies have already shown illustrations of user-generated pro-tobacco content in video-sharing sites such as YouTube,<sup>21–22</sup> photo-sharing sites such as Instagram<sup>23</sup> and Facebook.<sup>24–25</sup> However, there has been little investigation of the volume or characteristics of online industry-sponsored tobacco advertisements. Particularly in those unaware of emerging tobacco products, online advertisements may be the first point of exposure, which has been shown to be particularly effective in influencing behaviour.<sup>26–27</sup> Advertisements are placed by media planners to specifically reach a target audience, which may include at-risk groups, such as youth, young adults and racial/ethnic minorities.

Using services available through advertising and media planning agencies, we conducted advertising surveillance over 1 year in order to quantify the volume and characteristics of the tobacco industry and e-cigarette online banner/video advertisements and investigated the demographics of the online audience that they reach. Data will inform strategies to limit the exposure to online tobacco and e-cigarette advertising, particularly among vulnerable populations.

## METHODS

### Advertising surveillance

Online advertisements were identified through Competitrack (<http://www.competitrack.com>), a full-service advertising firm that captures specific industry advertising (specified by the client) through monitoring 21 media sources, including online. Competitrack's web portal captures the advertisement as presented to the consumer (eg, in display or video format) as well as associated meta-data including: (1) date range observed (which does not necessarily mean that the advertisement



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occurred on every single day of that range); (2) first market aired (eg, National); (3) target market (eg, consumer vs business); (4) websites on which the advertisement occurred; and (5) estimated dollar amount spent on media placement based on an algorithm defined by Competitrack. This estimate is determined by considering unit costs, unit factor and audience factor. Further information is available in online supplementary appendix A. Competitrack's surveillance is limited to advertisements aired in the USA and Canada (both were allowed here) and our account is restricted to tobacco product and e-cigarette advertisements sponsored by the industries only. Furthermore, Competitrack only monitors the top 250 websites/URLs for online display advertisements and 100 websites/URLs for online video, determined by a combination of Alexa rankings (a leading provider of global web metrics, <http://www.alexa.com>), comScore page views or video advertisement impressions data (a leading internet technology company, <http://www.comscore.com>), and client feedback (methodology described through personal communication with Competitrack representative). Competitrack's surveillance does not capture affiliate marketing, a form of marketing in which a business rewards affiliates for each visitor or customer brought in by the affiliate's marketing efforts.<sup>28</sup> User-generated promotional messages, such as social media or blog entries posted by an individual not affiliated with the tobacco or e-cigarette industries, are also not captured through this service.

The following specifications were entered into Competitrack's web portal in May 2013 to identify relevant tobacco and e-cigarette advertisements: (1) the advertisements must have aired sometime between 1 April 2012 and 1 April 2013; (2) the media channel was restricted to online display, online video and viral; and (3) the target audience must be the consumer. The search had no restrictions on type of tobacco or e-cigarette product, language or primary advertiser (eg, could be either a primary or a co-op advertiser, defined as 'advertisements by retailers that include the specific mention of manufacturers, who—in turn—repay the retailers for all or part of the cost of the advertisement').<sup>29</sup>

### Identification of website characteristics and target audience

Online advertising expenditures were obtained for all relevant advertisements in addition to detailed information on the websites on which the advertisements were aired. A complete list of these websites was sent to partners at PHD Worldwide (<http://www.phdww.com/home.aspx>), a media and communications agency that specialises in target audience refinement, channel selection and media allocation. Target demographics (age, gender, race/ethnicity) of the website audience was gathered by a representative at PHD through data compiled by GfK Mediamark Research & Intelligence (GfK MRI, <http://www.gfkmri.com>). This proprietary audience demographic data are typically used by advertisers to target advertisement placement to achieve maximum exposure to their intended audience. However, demographic information was not complete; it was available for the following number of websites on which advertisements were placed: (1) 30 of the 45 websites on which e-cigarette advertisements were placed; (2) 19 out of 25 on which cigar advertisements were placed; (3) one of two websites on which cigarette advertisements were placed; and (4) 86 out of 115 websites on which snus advertisements were placed. For those websites with demographic information, the average per cent composition and range of unique users fitting into each demographic subgroup were calculated in total and by product type.

### Characteristics and thematic coding of online advertisements

The characteristics and themes of online advertisements were coded based on a methodology adapted from a previous study.<sup>30</sup> Two trained coders were instructed to independently view each advertisement and fill out a corresponding coding sheet addressing the following topics: (1) the use of themes (eg, use for harm reduction, use for quitting); (2) whether the advertisement contained flavoured products (including menthol); (3) use of price discounts or sweepstakes; and (4) whether the advertisement—if clicked—went to a landing page and, if so, the nature of the landing page and whether it featured information on smoking cessation. Agreement between coders was 93.4%; all disagreements were settled by an additional coder. Anderson *et al*<sup>31</sup> recommend that inter-coder reliability exceed 85%.

### Analysis of advertisement meta-data, themes and website characteristics

The meta-data (described in Advertising surveillance section above) and advertising expenditure data from all advertisements were downloaded and entered into an Excel database. Unique identifiers linked these data to a PDF or video of the online advertisement. The number of unique advertisements as well as the number of unique websites on which advertisements occurred were summarised in total, by product (eg, e-cigarettes, cigars) and by brand (eg, blu e-cigarettes). Websites were also categorised by two separate trained coders into subject-matter categories, including news, reference/search engine, sports, health and beauty, real estate/design, cars/motorcycles, sales, politics, music/entertainment, lifestyle, racial/ethnic, video games, job search, men's magazines, cooking, and other. Website topics, advertisement themes and advertisement meta-data (eg, spend) were analysed in whole as well as by product (eg, e-cigarettes, cigars) and by brand (eg, blu).

### RESULTS

During the course of 1 year, advertising surveillance services identified 43 online advertisements sponsored by the tobacco and e-cigarette industries: 37 promoting tobacco products and e-cigarettes and an additional six promoting the corporation, Altria. Of the 37 product advertisements, 24 unique advertisements promoted various brands of e-cigarettes, five promoted cigars, seven promoted snus and one promoted cigarettes (table 1). All but two were online display; the remaining two were online videos promoting NJOY e-cigarettes. Most of the videos ran on the ESPN website, while a few additional spots were run on TMZ.com. Online advertisements were evident only for certain tobacco and e-cigarette brands—most notably Swedish Snus (seven advertisements), NJOY e-cigarettes (seven advertisements), Green Smoke (eight advertisements) and blu (four advertisements). The range of days in which advertisements were observed varied; the single Newport cigarette advertisement was detected on only 1 day, while White Cloud e-cigarettes, Thompson cigars and Swedish Snus advertisements were, on average, observed for up to a third of the year. The amounts of money spent on advertisement placement also varied considerably, with the total spend ranging from \$84 for all eight GreenSmoke advertisements to \$933 748 for seven Swedish Snus advertisements.

Tobacco and e-cigarette advertising were found on a total of 180 out of the 250 websites that Competitrack monitors. Swedish Snus advertisements appeared on a majority of these

**Table 1** Summary of online advertising occurring between 1 April 2012 and 1 April 2013 by tobacco and electronic cigarette industries

Product	Advertiser	Unique advertisements*	Brand name (number per brand)	Average range of days observed†	Total number of websites advertisements featured on‡	Total spend (range)\$
e-Cigarettes						
	Blu	4	Blu Cigs (2), blu Smart Pack (2)	5	5	\$368 (\$79–\$177)
	NJOY	7	NJOY King (4), NJOY Electronic Cig	56	4	\$937 404 (\$124–\$798 761)
	Green Smoke	8	E-Cigarettes	9	11	\$84 (\$1–\$34)
	Vapor 4 Life	3	Vapor 4 Life (2) and Titan E-Cigarettes (1)	21	14	\$500 (\$120–\$200)
	White Cloud	2	Cirrus 3X E-Cig Kit	113	12	\$624 (\$232–\$392)
Cigars						
	Cao Cigars	1	Cao Cigars	49	3	\$465
	Macanudo	1	Macanudo	26	2	\$29 311
	Thompson	2	Thompson and Cigar & Accessory Deals	105	19	\$2515 (\$29–\$2486)
	Zino Platinum	1	Zino Platinum Z-Class Series	46	1	n/a
Cigarettes						
	Newport	1	Newport	1	2	\$126
Snus						
	Swedish Snus	7	General Swedish Snus	151	115	\$933 748 (\$39–\$746 311)
	Total	37				\$1 905 145

\*Advertisements are considered unique if there are any differences in the creative, text or warning labels presented on the advertisement.

†This applies only when there are multiple advertisements per advertiser. For single advertisements, this refers to the range of days that the single advertisement was observed.

‡This applies only when there are multiple advertisements per advertiser. For single advertisements, this refers to the total number of websites on which the advertisement was observed.

\$Spend refers to the estimated money spent (US currency) on media placement only according to an algorithm developed by Competitrack. For multiple advertisements, total spend per advertiser is calculated as well as the range. For single advertisements, this refers to the total spend for that advertisement.

websites (n=115 websites), followed by advertisements for e-cigarettes (n=46), cigars (n=25) and cigarettes (n=2). Snus advertisements appeared on websites covering numerous topical areas, from news and music/entertainment to real estate/design, health and beauty, to cars and job search sites. Conversely,

e-cigarette advertisements tended to be placed on websites focused on music/entertainment (39.1% of the websites on which e-cigarettes advertisements were placed were on sites of this topical area) or news (17.4%). Certain brands of e-cigarettes focused on one of these subject areas specifically; for example,

**Table 2** Demographic characteristics of users accessing websites featuring tobacco and electronic cigarette advertisements between 1 April 2012 and 1 April 2013\*

	Product advertised			
	e-Cigarettes† Average% (range)**	Cigars‡ Average% (range)**	Cigarettes§ Average% (range)**	Snus   Average% (range)**
Age				
<18	10.5 (1.4–35.0)	4.0 (1.2–9.9)	8.5	7.6 (0.6–29.0)
18–24	16.5 (4.4–33.9)	12.1 (4.7–25.3)	18.2	16.4 (3.2–36.9)
25–34	22.4 (5.6–60.1)	18.3 (7.2–36.9)	21.1	22.6 (7.1–48.5)
>35	49.2 (19.8–85.6)	65.4 (37.2–81.4)	49.5	52.7 (24.6–83.3)
Gender				
Male	53.2 (28.7–85.7)	53.7 (31.1–85.0)	50.5	60.6 (23.9–97.0)
Female	46.8 (14.3–71.3)	46.3 (15.0–68.9)	49.5	39.4 (3.0–76.1)
Racial/ethnic minorities				
Black	8.6 (0.3–38.6)	4.4 (0.4–11.4)	15.1	6.9 (0.5–43.3)
Hispanic	9.9 (0.5–22.6)	7.1 (0.4–22.0)	19.1	8.0 (0.3–18.7)

\*All information on website demographics is according to estimates supplied by GfK MediaMark Services.

†Demographics are unavailable for 15 out of the 45 websites on which advertisements were placed.

‡Demographics are unavailable for four out of the 25 websites on which advertisements were placed.

§Demographics are unavailable for one of the 2 websites on which cigarette advertisements were placed.

||Demographics are unavailable for 29 out of the 115 websites on which advertisements were placed.

\*\*This refers to average % composition of unique users and applies only when there are multiple websites per product. For single websites, this refers to the demographics of the one website.

**Table 3** Themes and characteristics of online advertisements\*

	Product type advertised*		
	e-Cigarettes (n=24 advertisements) % (N)	Cigars (n=4 advertisements) % (N)	Snus (n=7 advertisements) % (N)
<b>Themes†</b>			
The product is less harmful than cigarettes	37.5% (9)	0% (0)	0% (0)
The product is an alternative to cigarettes when someone cannot smoke	33.3% (8)	25% (1)	14.3% (1)
The product is more 'green' or environmentally friendly than cigarettes	54.2% (13)	0% (0)	0% (0)
The product is less expensive than cigarettes	0% (0)	0% (0)	0% (0)
The product can help people to quit smoking	20.8% (5)	0% (0)	0% (0)
<b>Flavour</b>			
A flavoured product is being advertised in the advertisement	8.3% (2)	0% (0)	100% (7)
<b>Price/Sweepstakes</b>			
The advertisements feature a price promotion, discount coupon or price break	8.3% (2)	50% (2)	85.7% (6)
The advertisements mention or feature a sweepstakes	0% (0)	50% (2)	0% (0)
<b>Landing page</b>			
When advertisement is clicked, the advertisement links to a landing page	58.3% (14)	50% (2)	58.3% (4)
The landing page features information on how to quit smoking	0% (0)	0% (0)	0% (0)n

\*Cigarettes were omitted since there was only one advertisement. e-Cigarette advertisements encompassed all advertisements from blu, NJOY, GreenSmoke, Vapor4Life and White Cloud. Cigar advertisements encompassed advertisements from Cao Cigars, Macanudo, Thompson and Zino. Snus advertisements encompassed only Swedish Snus advertisements.

†Codors were asked whether the advertisement *suggested* any of the following. Claims did not have to be overtly stated.

NJOY placed half of their online advertisements on either music/entertainment sites (eg, TMZ.com) and the remainder on sports websites (eg, FightHype.com). Vapor4Life also focused heavily on music/entertainment (eg, LyricsMania.com), placing 64.2% of their advertisements on such sites. The majority of cigar advertisements (60%) were placed on news sites, with the remainder placed mainly on music/entertainment or sports sites. Similar to e-cigarettes, however, placement differed by brand. For example, Macanudo cigars placed all of their advertisements on sports sites (eg, ESPN.com) and Thompson cigars placed 78.9% of their advertisements on news sites (eg, USA Today.com).

The demographic characteristics of individuals potentially exposed to tobacco and e-cigarette advertising online are displayed in table 2. Among the websites for which information was available (30/45 for websites displaying e-cigarette advertisements, 21/25 displaying cigar advertisements, 1/2 displaying cigarette advertisements, 89/115 displaying snus advertisements), media data estimates that 8.0% of the audience exposed to the advertisements were under 18 years of age. e-Cigarette advertisements were placed on websites with the highest average percentage of a youth audience (10.5%), but some advertisements (eg, White Cloud e-cigarettes) were placed on websites (123mycodes.com) where up to 35.0% of their audience consists of youth. The average percentage of young adults, 18–24 years of age, potentially exposed to advertisements is even higher, with rates as high as 33.9% for White Cloud e-cigarettes and 36.9% for Swedish Snus. The average proportion of the website audience exposed to all online advertisements who were black and Hispanic was 8.8% and 11.0%, respectively. However, the range extended up to 38.6% black and 22.6% Hispanic for websites on which e-cigarette advertisements were placed, up to 22.0% Hispanic for websites on which cigar advertisements were placed, and up to 43.3% black and 18.7% Hispanic for websites on which snus advertisements were placed.

The themes and characteristics of the online advertisements are displayed in table 3. e-Cigarette advertisements were most likely to feature themes of harm reduction (featured in 37.5%

of e-cigarette advertisements), use as a cessation aid (20.8% of e-cigarette advertisements), being more 'green' or environmentally friendly than cigarettes (54.2% of e-cigarette advertisements) or being an alternative to cigarettes when someone cannot smoke (33.3% of e-cigarette advertisements). This varied by product; all Green Smoke advertisements, for example, featured the theme of e-cigarettes as more environmentally friendly than cigarettes, while NJOY, blu and White Cloud advertisements were more likely to suggest harm reduction or use as an alternative to cigarettes. An example of this theme from a White Cloud is featured in figure 1. The theme of use as an alternative to cigarettes was the only theme assessed in this study that was featured in any of the cigar advertisements (featured in 25.0% of cigar advertisements) or snus advertisements (featured in 14.3% of snus advertisements). Otherwise, cigar advertisements did not feature any of the themes specifically assessed here.



**Figure 1** Example of an online e-cigarette advertisement with harm reduction claims.





**Figure 2** Example of an online cigar advertisement with mention of a price discount.

Cigar advertisements mainly mentioned price promotions, breaks or discounts (50.0%), or sweepstakes offerings (50.0%). An example of this in a Thompson cigar advertisement is featured in figure 2. Snus advertisements also featured price promotion, break or discount (50.0%) and all seven advertisements featured a flavoured product (notably mint/menthol). Cigarettes were omitted from table 3 since there was only one advertisement (Newport), but this particular advertisement suggested that the product is less expensive than other cigarettes and featured a price promotion. More than half of all advertisements (57.0%), when clicked, linked to another website or landing page (links may have been broken by the time of the study); most consisted of the company's home page (87.0%). Not one of the landing pages featured any information on how to quit smoking.

## DISCUSSION

This study examined the volume, characteristics and target audience of online banner/video tobacco and e-cigarette advertisements. Relatively few advertisements were observed over the course of a year, only 43, and those that were observed were mainly for e-cigarettes, snus and cigars. Even within these categories, only a few specific brands were noted, notably Swedish Snus and blu, GreenSmoke and NJOY e-cigarettes. The financial investment for most advertisements was minimal (under \$3000), with the exception of Swedish Snus and NJOY which together accounted for roughly 98% of the almost \$2 million total spend. Given that the tobacco industry spends roughly \$8.8 billion per year marketing cigarettes and smokeless products in the USA alone,<sup>2 32</sup> online banner/video advertising does not represent a large portion of their financial investment. Since this type of advertising generally costs significantly less than traditional broadcast or print advertisements however, it does offer a low-risk investment that likely complements other forms of advertising and may be particularly effective for reaching very specific subpopulations that may be of particular interest to some brands.

While there is little room for messaging on online display advertisements, analysis of the themes and characteristics of the advertisements showed that e-cigarette advertisements, in particular, still managed to convey themes of harm reduction, use as an alternative to cigarettes, the product being 'green' or environmentally friendly, or use as a cessation aid. This is disconcerting given that e-cigarette advertisements were most likely to be placed on websites, such as music/entertainment sites, where a sizable per cent of the audience are youth under 18 (up to 35%) and young adults, 18–24 years of age (up to 34%). These audiences are vulnerable to both initiation and establishment of life-long tobacco use<sup>9 10 12</sup> and may be more influenced than older adults by certain advertisement messages.<sup>33</sup> Unfounded health claims or messages of harm reduction may also support misperceptions of their safety, promote uptake in those who would not otherwise use tobacco, encourage dual-use of tobacco products and/or delay smoking cessation efforts.<sup>34 35</sup> Any of these scenarios could cause a net increase in population-level harm.<sup>36</sup>

Another prominent theme identified was price promotions, discounts and price breaks. This was particularly evident for cigars, snus and the one cigarette advertisement identified. It is well known that price influences uptake and use of tobacco;<sup>9 37 38</sup> this message, therefore, may be more likely to attract the attention of individuals with less financial resources available to them. This includes youth and young adults and smokers of lower socioeconomic status more generally, who are also an at-risk group for tobacco-related morbidity and mortality.<sup>39 40</sup> Additionally, some e-cigarette, cigar and snus advertisements were placed on websites that have a high proportion of blacks and Hispanics as their audience, greater than the proportion of these demographic subgroups in the US population<sup>41</sup> and much greater than that in the Canadian population.<sup>42</sup> These are not only populations at-risk for tobacco-related disease,<sup>43</sup> but ones that the industry has specifically targeted in the past.<sup>44–46</sup> For these reasons, it is critical to continue to examine the degree to which the tobacco and e-cigarette industries messages are specifically tailoring and/or placing advertisements to appeal to minority and vulnerable audiences. Further research will also be necessary to consider how the themes, messaging and channels used to advertise are influenced by the current regulatory context and emergence of new tobacco products.

While this study may suggest that many companies are not advertising their products online, there remains a sizable portion of pro-tobacco content online. User-generated promotional messages are being spread through YouTube,<sup>21 22</sup> Instagram<sup>23</sup> and Facebook,<sup>24 25</sup> as well as online blogs and forums, such as those dedicated to e-cigarette users.<sup>47</sup> Additionally, although not captured by Competitrack, advertisements for tobacco products and e-cigarettes are also circulated online through affiliate marketing (N Cobb, Maryland, USA, unpublished data, May 2013). Traditional online advertisements captured by Competitrack coexist with these alternate forms of pro-tobacco content. Assessment of the sum total of pro-tobacco content online is crucial for determining the overall effects of promotional material on tobacco-related attitudes, beliefs and behaviour and important when considering the challenges of regulating pro-tobacco content online. As pointed out in Freeman's article,<sup>48</sup> Article 13 of WHO Framework Convention on Tobacco Control<sup>49</sup> requires all 172 ratifying nations, barring constitutional limitations, to adopt a total ban on tobacco advertising, promotion and sponsorship. However, the guidelines recognise that banning only traditional forms of tobacco advertising could simply lead to promotion of tobacco through other means,<sup>50</sup> which may include covertly posting content on YouTube and social media. While it would be near impossible to monitor all content connected to tobacco on the internet, information on how user-generated pro-tobacco content online influences tobacco use trajectories, particularly youth initiation and continuation of use among current users, can inform policy and aid in public education efforts.

There are several limitations to this study. First, the advertising surveillance service, Competitrack, monitors online display

advertising on their top 250 websites and online video advertising for their top 100 websites. Although these encompass websites with wide reach and popularity, additional advertisements likely appeared on other websites that were not captured as part of this study. Since surveillance was limited to the USA and Canada, this has particular implications with regard to the generalisability of these findings to other countries. Second, Competitrack only supplied information on whether or not an advertisement was placed on a website and provided no further information on who actually saw the advertisement. This is an issue when considering that one's prior web activities influence the type of advertisements that one is exposed to through advertisement-serving algorithms and use of cookies. Further research will need to examine how this influences who sees online advertisements and their response to these advertisements. Third, analysis of the content of the advertisements may have missed certain attributes that are of importance. Further research should consider how best to consider online advertisements in terms of the sender (eg, the tobacco industry), the message and the receiver (ie, the potential consumer).<sup>31</sup> Fourth, as mentioned above, Competitrack does not capture affiliate marketing, which may represent a tactic used to market certain products, e-cigarettes in particular (N Cobb, Maryland, USA, unpublished data, May 2013). Fifth, individual-level exposure to online advertisements is unknown. Future research will need to further investigate actual exposure to online advertisements, the impact of advertisements on tobacco and e-cigarette-related attitudes and behaviours, and the relationship between exposure level, or 'dose,' on both attitudinal and behavioural outcomes.

Currently, there are over 2 billion people worldwide on the internet, and the online population continues to grow.<sup>51</sup> The tremendous reach of the internet offers a great opportunity for tobacco and e-cigarette companies to tailor message content and delivery to their target audience. Given the relative lack of regulatory authority over online content, and the evolving nature of the tobacco product marketplace, it is critical to monitor promotional messages sponsored by these industries. This study is the first to provide a comprehensive surveillance of all tobacco and e-cigarette online banner/video advertising occurring online over a full year, and lays the groundwork for future work to further investigate the impact of these advertisements on consumer attitudes and behaviour.

### What this paper adds

- Although it is well known that the internet is widely accessible to the global population, there has been almost no surveillance of tobacco-related advertisements online and very limited characterisation of its content and the audience to which it is advertising.
- This study fills this gap by providing much needed information on the volume and characteristics of tobacco advertisements, specifically whether these advertisements communicate scientifically accurate information and the degree to which they are accessible to youth. These two points are critically important for policymakers to consider as part of efforts to regulate tobacco and its advertising to prevent youth from initiating tobacco use and reduce the burden of tobacco-related illness in society.

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