

# Portrayal of Electronic Cigarettes on YouTube

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**Abstract.** Despite the growing number of videos featuring electronic cigarettes, there has been no investigation of the portrayal of these videos. This paper presents the first surveillance data of electronic cigarette videos on YouTube. Our results suggest that viewers are primarily being exposed to content promoting the use of these emerging tobacco products and the viewership is global. This study shows that it is critical to develop appropriate health campaigns to inform potential consumers of harms associated with electronic cigarette use.

**Keywords:** Electronic Cigarettes, YouTube, Data Mining, Public Health.

## 1 Introduction

Recent years have witnessed tremendous growth in the electronic cigarette marketplace. Electronic cigarettes are marketed online with testimonials from people trying to quit, despite the fact that electronic cigarettes are not scientifically proven or FDA-approved cessation aids [1]. There is a notable lack of public education dedicated to informing consumers about the health and safety concerns associated with electronic cigarettes [2]. However, there are many publicly available videos that purposely promote tobacco use on YouTube [3], [4]. Messages embedded in YouTube have the potential to influence tobacco-related attitudes, beliefs and behaviors [5]. Social media websites like YouTube have recently become a critical platform for health surveillance [6] and social intelligence [7].

Taking YouTube as a data source, previous researchers have studied information on ‘smoking’ [8], smoking cessation [9], smoking imagery associated with cigarettes [10], smokeless tobacco [11] and little cigars [12]. Although there is a study which mined data on usage of electronic cigarettes from YouTube videos [13], they didn’t examine the portrayal of electronic cigarette contents.

Despite the growing literature on the portrayal of tobacco on YouTube, there are no published studies to date that have systematically assessed electronic cigarette content on YouTube. Given the potential that YouTube has to promote electronic cigarette use through user-generated content or covert advertising, this study aims to gain a better understanding of what electronic cigarette messages people are being exposed to on YouTube.

## 2 Methods

We first created a sample dataset from YouTube and then categorized these collected videos. The detailed information of each stage is described as follows.

### 2.1 Data Collection

We sampled electronic cigarette related videos on YouTube for study purpose in line with several previous related studies [8], [11], [12]. Using YouTube's search engine we conducted searches for electronic cigarette videos on February 3, 2013. The sample of YouTube videos for this study was selected from the top search results for the following search terms: "electronic cigarettes", "e-cigarettes", "ecigarettes", "ecigs", "smoking electronic cigarettes", "smoking e-cigarettes", "smoking ecigarettes", "smoking ecigs". These eight search terms were chosen because they are the most frequently used terms for electronic cigarettes and they can cover both "pro" and "anti" electronic cigarette videos, hopefully. In addition, through a Google Trends [14] analysis we found that there is a higher proportion of web traffic searching for these search terms than other electronic cigarette terms.

Two searches were conducted for each term (a) "by relevance" and (b) "by view count". These two kinds of search strategy were chosen to mimic the typical user behavior by using the default search strategy (searching "by relevance") as well as capture the most popular videos (searching "by view count").

Based on insight on user browsing behavior gained from previous studies [15] on a several Internet search engines indicating that the majority of people will only click on the first page of search results, we assume that few users would watch more than 20 videos since the first page of YouTube search results contains 20 videos. As a result, the sample was limited to the top 20 videos for each search. The initial sample included 320 videos in total (20 videos for each of the eight search terms and each of the two search strategies).

After obtaining the initial sample for this study from the first stage, we then eliminated videos that were not relevant to electronic cigarettes and videos that were duplicates. Videos were considered not relevant to electronic cigarettes if they didn't feature electronic cigarettes or there was only a brief mention or image of electronic cigarettes. Duplicate videos that appeared more than once by using different search terms and search strategies were also eliminated from the initial sample.

In the end, we obtained a total of 196 unique electronic cigarette related YouTube videos that were coded and analyzed in later stages to achieve the research goal of this study.

## 2.2 Video Coding

To access the overall portrayal of these electronic cigarette YouTube videos, we first rated the videos on whether they had contents that were “pro”, “anti” or “neutral” to electronic cigarettes. “Pro” was defined as promoting the use of electronic cigarettes, such as presenting the advantage of electronic cigarettes, sharing their using experience with positive attitude toward electronic cigarettes, or making them look enjoyable or socially acceptable. Videos about quitting, negative consequences of using electronic cigarettes, or those that contained obvious negative feedbacks or warnings were considered “anti” to electronic cigarettes. Any videos that were not easily classified as either “pro” or “anti”, but included mention about electronic cigarettes, were rated as “neutral” because they could make electronic cigarettes appear either positive or negative depending on the perspective of the video viewer when he/she was watching.

Within each portrayal category, videos were further classified by genre of YouTube video. The genres include advertisement, user sharing, product review, introduction, celebrity use, free trial, news clip and other TV program. These genres were chosen based on recurring themes in the 196 videos. Detailed description of each genre is shown as follows.

**Table 1.** Description of each genre

<b>Genre</b>	<b>Description</b>
Advertisement	Videos created by companies to promote a specific brand or product
User sharing	Videos uploaded by users to share experience or tips
Product review	Videos comparing multiple different products
Introduction	Videos introducing electronic cigarettes in general
Celebrity use	Videos showing several celebrities used electronic cigarettes
Free trial	Videos featuring URL links or store address to get free products
News clip	News clips reporting electronic cigarettes
Other TV program	Including TV shows, interviews which focused on electronic cigarettes

Finally, to perform the later video analysis, basic information was collected from each of the YouTube videos, including the video title, the username of person uploading the video, the number of views, favorites, likes and dislikes since YouTube users can archive videos by labeling a video as a “favorite” one and rate videos by whether they “like” or “dislike” a video. Given that YouTube has made several demographic information available, we also documented the countries in which the video was most frequently watched, age (13-17, 18-24, 25-34, 35-44, 45-54, 55-64), and gender of those most likely to watch the video.

### 3 Results

Among all the sample videos, 94% (n=185) were “pro” electronic cigarettes and 4% (n=8) were neutral, while there were only 2% (n=3) were “anti” electronic cigarettes. Obviously, the vast majority of the videos promoted the use of electronic cigarettes.

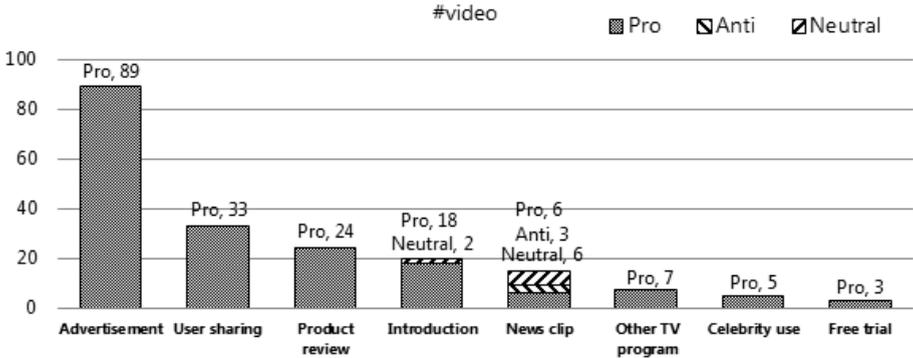


Fig. 1. Genres of YouTube videos

The distribution of video amount over the 8 genres is presented in the above Figure 1. Among all the “pro” videos, 48.1% (n=89) were advertisement. All the user sharing videos (n=33) were “pro” ones. In the news clip genre, there were 6 videos which promoted electronic cigarettes. The 3 “anti” videos were all news clips.

The following Table 2 shows the video statistics associated with the “pro”, “anti” and “neutral” videos, which reflects the degree of viewer active participation.

Table 2. Video statistics associated with YouTube videos

		“pro” (n=185)	“anti” (n=3)	“neutral” (n=8)
#view	Total	<b>14,335,197</b>	174,638	324,486
	Average	77,488	58,213	40,561
	Range	2-2,362,588	284-90,060	8-122,256
#comment	Total	14,746	1,080	257
	Average	81	<b>360</b>	37
	Range	0-2,148	0-841	0-206
#favorite	Total	8,540	24	122
	Average	<b>56</b>	12	20
	Range	0-682	0-24	0-80
#like	Total	24,092	102	234
	Average	<b>135</b>	34	33
	Range	0-4,430	0-58	0-133
#dislike	Total	3,158	886	58
	Average	18	<b>295</b>	8
	Range	0-582	0-871	0-48

The 185 “pro” videos had been watched by 14,335,197 times in total and it had 56 “favorites” and 135 “likes” averagely, which were higher than “anti” and “neutral” videos. On the other hand, it had 295 “dislikes” and 360 comments for “anti” videos averagely that were much higher than “pro” videos. Preliminary examination showed that most of the comments were explicitly against the opinion that electronic cigarettes were negative for public health. In one word, “pro” electronic cigarette views are dominated the discussion on YouTube.

According to the demographic information available on YouTube, the majority of the audience was from the “Male, 45-54 years” group. In terms of the nationality of the audience, Figure 2 has shown the number of videos for each country, in which the video was popular.

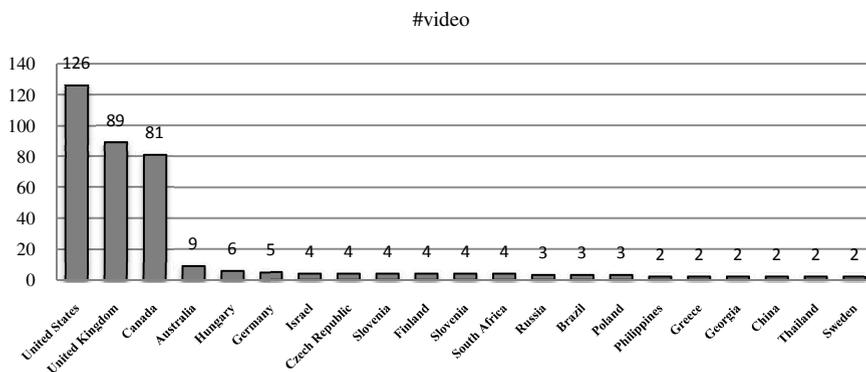


Fig. 2. Country of the majority of audience (top 3 countries for each video are available)

It is clear the viewership of these electronic cigarette videos is global. However, most videos were popular in United States, United Kingdom and Canada. This result reflects the fact that people in these countries are particularly interested in electronic cigarettes and marketers are putting many promotional efforts in these countries.

#### 4 Discussion and Conclusion

To the best of our knowledge, this is one of the first studies to document the quantity, portrayal and reach of electronic cigarette videos on YouTube. The vast majority of information on YouTube about electronic cigarettes promotes their use. In addition, “pro” electronic cigarette views are dominated the discussion on YouTube, while “anti” electronic cigarette voice are so weak.

Our results have several implications regarding policy making. First, it’s urgent to monitor electronic cigarette videos posted on YouTube and other social media websites. Second, public health organizations should appropriately inform potential consumers of harms associated with electronic cigarette use. Third, governments may consider developing health messages to counter “pro” electronic cigarette content on YouTube.

The results presented in our study highlight the extent of “pro” electronic cigarette contents on YouTube. It is critical to develop appropriate health campaigns to inform potential consumers of harms associated with electronic cigarette use. Further research is needed to evaluate the influence of electronic cigarette contents on people.

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