



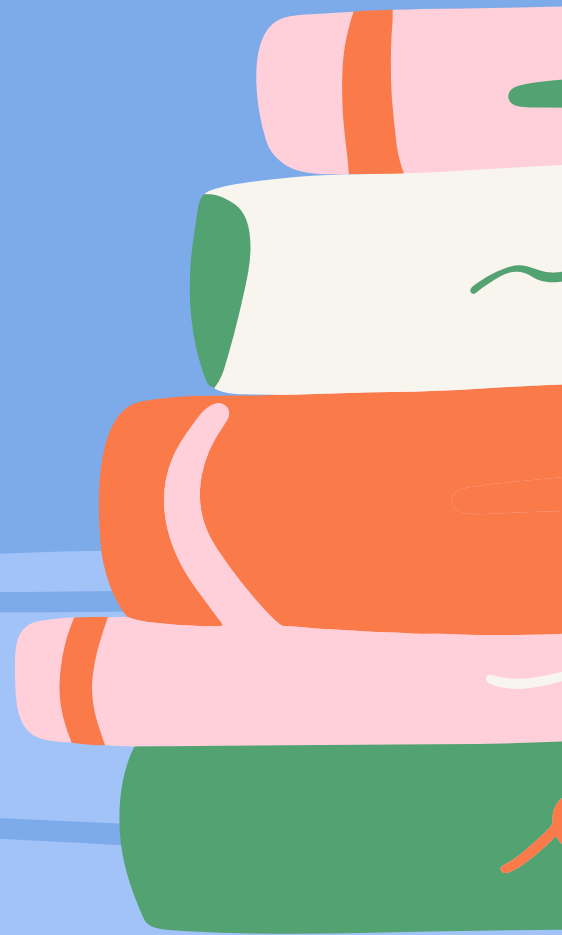
UNIVERSITY OF  
NEW ENGLAND

INNOVATION FOR A HEALTHIER PLANET

# HOW TO READ A RESEARCH ARTICLE



UNE Library Services & the  
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**I'm using reading habits that worked for other classes, but they don't seem to be working here. I can't find the main idea in these research articles.**

**I can't tell what question the writers are trying to answer, or why they or anyone would need or want to answer it.**

**I can't tell the difference between when the writer is presenting someone else's views or his or her own; I can't tell whether the writer agrees or disagrees with someone else's point.**



**I'm having a hard time seeing the structure of the writer's argument. I can't distinguish between claims and evidence, and analysis and interpretation.**

# READING SCHOLARLY LITERATURE IS DETECTIVE WORK:

## WHERE ARE THE CRITICAL POINTS AND EVIDENCE ?

- Older knowledge is located near the beginning of articles
- Newer, created knowledge comes at the end





# WHAT EVIDENCE IS NEEDED TO ACCOMPLISH YOUR PURPOSE?

**Focus your search:**

**research question/ objective**

**target population**

**methods**

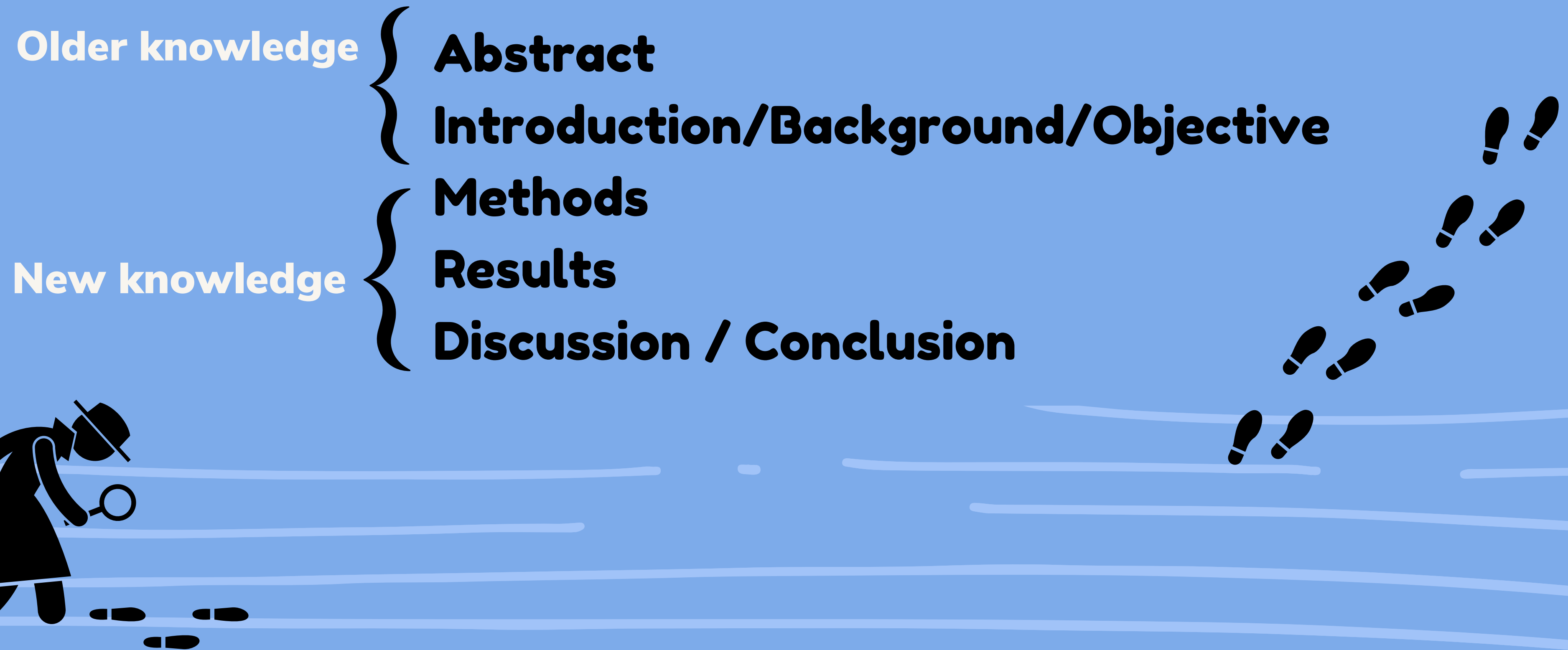
**conclusions**

**implications for future research**



Creating a literature chart or taking notes on each article can help you manage this information.

**Knowing the structure of a research article will help you search for evidence more easily.**





## THE ABSTRACT

is a summary of the research at hand—  
a recap of what the study was about,  
what it found, and what those findings  
mean.

### WARNING

Avoid **abstractitis**: a  
debilitating condition of  
not fully understanding  
the article due to lack of  
investigation past the  
abstract.

## USE THE ABSTRACT TO:

Help you decide which sections you want  
to explore more fully to  
answer your research question.

# Abstract example



OPEN ACCESS

## At the speed of Juul: measuring the Twitter conversation related to ENDS and Juul across space and time (2017–2018)

Yoonsang Kim ,<sup>1</sup> Sherry L Emery,<sup>1</sup> Lisa Vera,<sup>2</sup> Bryn David,<sup>3</sup> Jidong Huang <sup>4</sup>

### ABSTRACT

**Background** Electronic nicotine delivery systems (ENDS) are the most-used tobacco product by adolescents, and Juul has rapidly become the most popular ENDS brand. Evidence indicates that Juul has been marketed heavily on social media. In light of recent lawsuits against the FDA spurred by claims that the agency responded inadequately to this marketing push, measuring the social media conversation about ENDS like Juul has important public health implications.

**Methods** We employed search filters to collect Juul-related and other ENDS-related data from Twitter in 2017–2018 using Gnip Historic PowerTrack. Trained coders labelled random samples for Juul and ENDS relevance, and the labelled samples were used to train a supervised learning classifier to filter out irrelevant tweets. Tweets were geolocated into US counties and their *fitness for use* was assessed.

**Results** The amount of Juul-related tweets increased 67 times over the study period (from 18 849 in the first quarter of 2017 to 1 287 028 in the last quarter of 2018), spreading widely across US counties. By the last quarter 2018, 34% of US counties had more than 6 Juul-related posts per 10 000 people, up from 0% in the first quarter 2017. However, during the same period, the total of non-Juul ENDS-related tweets decreased by 25%.

to access and share information about the products.<sup>11 12</sup>

A new generation of ENDS gained traction in the US market in 2017. These products, collectively called ‘pod vapes’, resemble flash drives and are rechargeable at USB ports. The largest brand of pod vapes is Juul, first introduced in June 2015 and manufactured by Juul Labs, Inc. Only a year after its entry to the ENDS market, Juul achieved market domination. Juul’s sales growth coincided with a surge in innovative and engaging social media campaigns conducted by Juul, online ENDS vendors, social media influencers and retail stores.<sup>13–15</sup>

Because of its popularity and its dominant market position,<sup>16</sup> Juul has become eponymous for all pod-style vape devices, and their use is termed ‘Juuling’.<sup>14</sup> The Juul brand and other brands of pod vapes, along with ENDS marketers, online vendors and retail stores, aggressively employed social media to advertise and promote Juul and Juuling, and there is evidence that adolescents actively participate in Juul-related social media conversations.<sup>17–20</sup>

Although ENDS marketing and promotion on social media have been largely unregulated, the FDA has increased its scrutiny of ENDS products



The summaries in the abstract are only a starting point - keep investigating if the article relates to your topic.



► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/tobaccocontrol-2019-055427>).

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# INTRODUCTION

relays the findings of previous research on the subject,

what is known and  
what is still unknown,

so the reader understands **why this study was important** to advance understanding of the topic.



## USE THIS SECTION TO:

- Learn more about the extent of the issue/problem
- Discover what the author is studying to create new knowledge.

**The Introduction may include background or literature review sections.**



# Introduction example

10 February 2020  
Online First  
2020

related posts per 10 000 people, up from 0% in the first quarter 2017. However, during the same period, the total of non-Juul ENDS-related tweets decreased by 25%.

**Conclusions** Juul-related content grew exponentially on Twitter and spread across the entire country during the time when the brand was gaining market share. This social media buzz continued to increase even after FDA's multiple interventions to curb promotions targeting minors.

## INTRODUCTION

Electronic nicotine delivery systems (ENDS) have been the most popular tobacco product among adolescents in the USA since 2014,<sup>1</sup> sparking concerns among the public health community regarding increases in youth nicotine addiction and transition to combustible cigarette smoking. In 2016, 4 out of 5 youth in the National Youth Tobacco Survey reported exposure to ENDS advertising from at least one media source,<sup>2</sup> and advertising exposure has been associated with ENDS use among adolescents.<sup>3–5</sup> Further evidence indicates that social media are a dominant avenue for ENDS product advertising, particularly aimed at youth and young adults<sup>6–7</sup>; studies have demonstrated that ENDS are marketed heavily on social media platforms such as Instagram, Twitter and YouTube.<sup>8–10</sup> ENDS users actively engage on social networks

social media have been largely unregulated, FDA has increased its scrutiny of ENDS product and marketing since the issuance of the Deen regulation in 2016.<sup>21</sup> Partly due to concerns regarding Juul's rapid ascension to youth popularity, in March 2018 a coalition of public health groups sued the FDA for delaying rules on ENDS and cigars by granting lengthy deadline extensions to manufacturers seeking product approval.<sup>22</sup> In response, between April and June 2018 the FDA issued a series of warning letters and civil fines to retailers who illegally sold Juul and other ENDS to minors.<sup>23</sup> In October that year, facing rising concerns about advertising targeting youth, the FDA conducted a surprise inspection of Juul LLC headquarters, seizing documents related to its sales and marketing practices.<sup>24</sup> In an ostensible effort to curb Juul use by minors, and in response to public outcry and the FDA's warnings, Juul announced in June 2018 that it would "no longer use model influencers on social media platforms". Juul also removed all flavored tobacco, non-menthol flavours from its 90 000 retail outlets' shelves, and shut down its Facebook and Instagram accounts in November 2018 with the promise that it would limit its presence on Twitter to non-promotional communication and would ask social media platforms (including Twitter) to prohibit posts that promote underage use of ENDS.<sup>25–26</sup> In response to recently reported vaping-related lung illnesses and deaths, and the intensi-

This article's introduction contains a bit of literature review along with describing the method of their research approach and reasoning.

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ssions. Published

Kim Y, Emery SL,  
et al. *Tob Control*  
2021;30:137–146.



# MATERIALS AND METHODS

describes the study's design,  
how it was executed, and  
who participated in it.

## USE THIS SECTION TO:

- Learn how data was collected and analyzed
- What population was studied



# Methods example

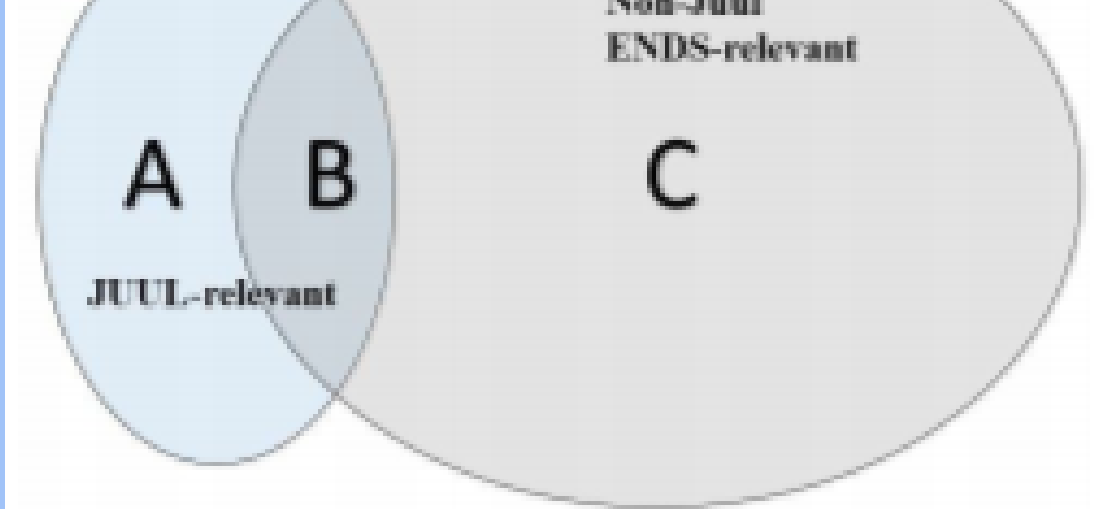
Delve in here if knowing how the research was conducted is important to your research question.

## METHODS

### Data collection for Juul-related tweets

Tweets posted between January 2017 and December 2018 were collected using a Juul search filter, which searched for tweets containing the substring “juul” or those posted by user accounts whose names match the substring “juul”. The search was restricted to English-language tweets, as identified by Twitter in the metadata (filtered by the operator *lang: En*). A total of 4.7 million tweets were retrieved via Gnip Historic PowerTrack, which provides access to 100% of public tweets and allows retrospective queries. Containing the string “juul” in tweets and user names does not guarantee content relevance because #JUUL, for example, was often used as a way to attract attention although tweet content (and linked images or URLs) was not relevant, and person name may contain “juul” as a substring regardless of posting about Juul; therefore, an effort was made to exclude irrelevant tweets.

A team of coders was trained to identify Juul-relevant content and reviewed a random sample of 2600 tweets to determine whether a tweet was Juul related. Images and URLs embedded in tweets were used to aid the hand-coding for relevance. Using the labelled sample, we trained a supervised machine learning model to automatically classify Juul-relevant content from irrelevant content. Standard text pre-processing was performed: standard English stop words and punctuation were removed, and word unigrams and character four-grams (sequence of four characters) from tweet content and linked URLs were extracted and transformed into term frequency-inverse document frequency (TF-IDF) representation. The best-performing classifier found via grid search was a Stochastic Gradient Descent (SGD) classifier



**Figure 1** Twitter data for Juul-relevant and non-Juul ENDS posts. A+B represents Juul-relevant tweets ( $n=3\,715\,539$ ) identified by Juul-relevance classifier; B+C represents ENDS-relevant tweets ( $n=10\,620\,249$ ) determined by ENDS-relevance classifier; B represents the set of tweets ( $n=198\,497$ ) identified by both Juul-relevance classifier and ENDS-relevance classifier.

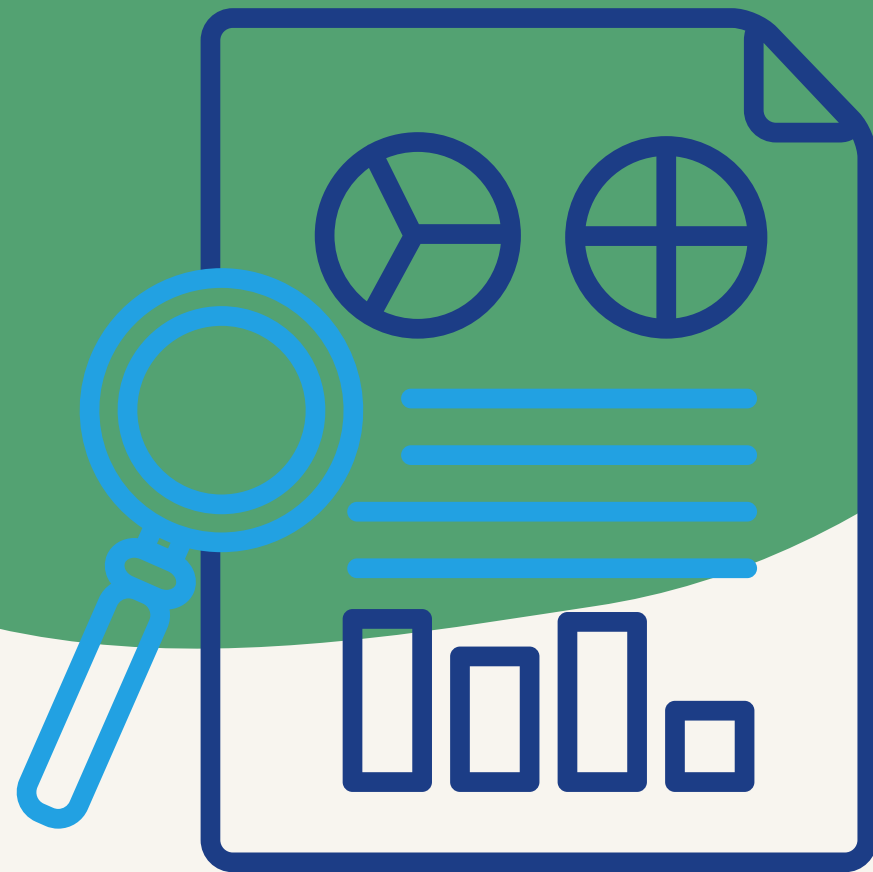
10-fold cross-validation. We excluded tweets that were classified as not relevant to Juul, and the final analytic dataset contained 3 715 539 tweets.

### Data collection for ENDS-related tweets

Twitter data for ENDS were collected separately. The authors and their research team have developed and maintained a database of ENDS-related Twitter data collected since 2014 via the Gnip Historic PowerTrack. The data pulled from this database have been used elsewhere.<sup>14 42</sup> Tweets were collected using an ENDS search filter, which comprised a comprehensive list of more than 300 relevant keywords and search rules to retrieve content related to ENDS. The ENDS search filter was developed based on expert knowledge and examining relevant posts on Twitter and other social media platforms, and updated at regular intervals over the years and whenever we learnt popular new products emerged in the market. Moreover, it is our typical practice to retrospectively collect data again in case we learn that important keywords were missed after data collection. Since ENDS encompasses a wide variety of products and devices, to capture all ENDS-related content, our keyword rules included specific ENDS brands, device types and components, and colloquial vocabulary associated with ENDS use (eg, njoy, juul, vuse, blu, eonsmoke, ecig, ejuice, ehookah, cartomizer, vape, vaping). Our general approach to developing search filters to collect

## RESULTS

reveals the cold, hard data — often accompanied by visuals to bedazzle you. It's a good idea to read the Results section before looking at the author's interpretation of what he or she found.



## USE THIS SECTION TO:

- Examine relevant tables, figures, charts
- Evaluate how the data matches the conclusions.



# Results example

This is a good section to be an attentive evidence detective: what did the study actually find?

## RESULTS

### Geolocated tweets versus all tweets

Approximately 29% of Juul-relevant tweets (1.5% from tagging and 27.5% from Gnip prediction) and 18% of n ENDS-relevant tweets (1% from user tagging and 17% Gnip prediction) were geolocated to US counties. For Juul tweets, the cosine similarity of the content between geo tweets and all tweets (geolocated and non-geolocated combined) increased over time, from an average of 0.62 (SD 0.05) in January 2017 to an average of 0.93 (SD 0.05) in December 2018 (figure 2). Interestingly, variability (SD) in the content similarity decreased over time. For non-Juul ENDS tweets, on the other hand, cosine similarity between all tweets and geolocated tweets

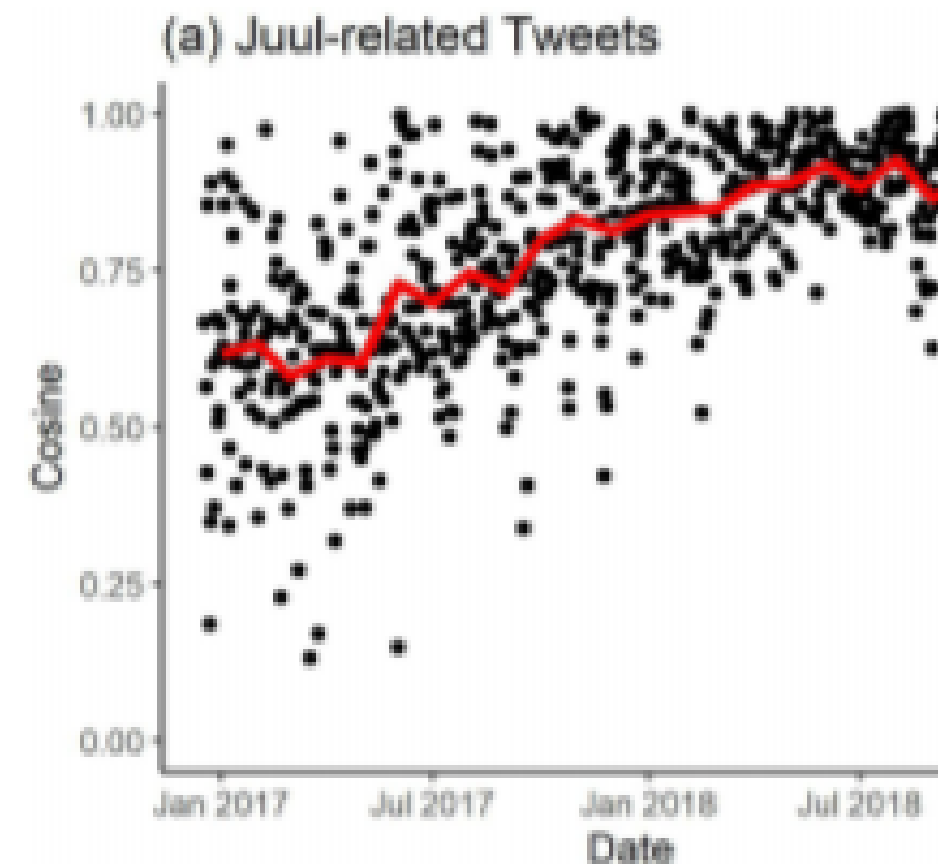


Figure 2 Cosine similarity between geolocated tweets and all tweets per month.

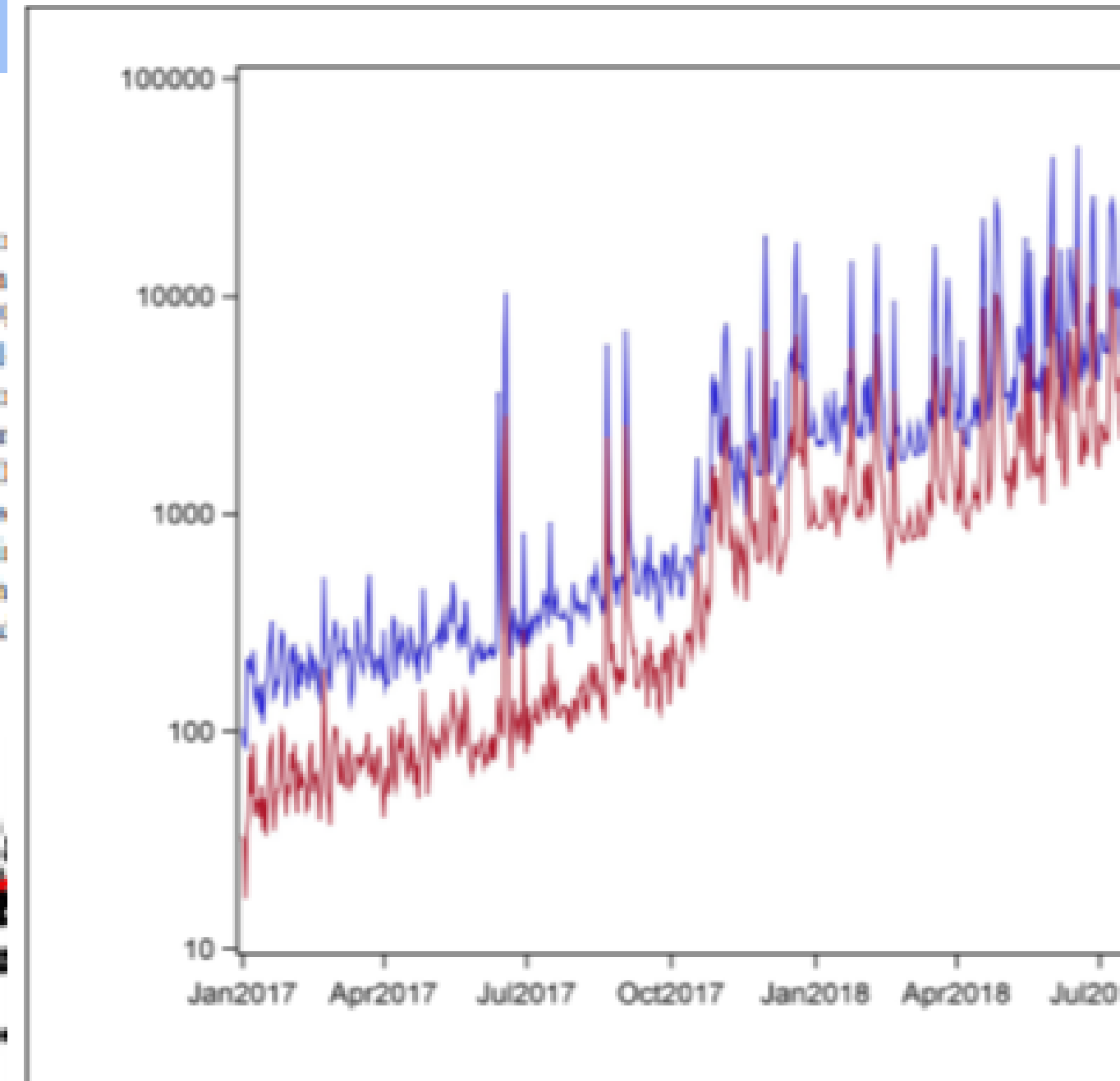


Figure 3 Daily amount of Juul-related tweets, 2017–2018. Daily count of tweets is log-transformed (base 10) on the y-axis. The blue line represents the number of all Juul-related tweets per day and the red line represents the number of geolocated Juul-related tweets per day. A dashed vertical line at Jan 13, 2018 when Juul Labs closed its Facebook and Instagram accounts is indicated with a dashed vertical line.

this post contributed to 87% of Juul-related tweets that single day.

The number of tweets posted by Juul Labs (@JUULvapor) also increased over time: from 7 in January 2017 to 259 in December 2018 (online supplementary figure A, appendix). Juul Labs' tweets were also shared (ie, retweets of tweets by @JUULvapor) at increasing rates, with a rapid upward trend from late 2017 to early 2018, and then a decline was observed (online supplementary figure A, appendix). However, the amount of tweets by Juul Labs and their retweets accounted for less than 1% of all Juul-related tweets, and its relative frequency decreased over time, suggesting Juul's marketing was very effective in keeping up the

was largely due to Juul-related ENDS-related tweets about Juul Labs. In Q4, Juul Labs accounted for 53.8% in Q4.

### Geographical variation over time

To examine geographical variation in Juul-related tweets over time, a series of county maps were created showing ENDS-related tweet rates from January 2017 to the last quarter of 2018 (Q4 2018). For each quarter, the county-specific tweet rates were categorised to six levels: 0, 0.1

# THE DISCUSSION (AND/OR CONCLUSION) SECTION

highlights the authors' interpretation of their findings, explaining any strengths or shortcomings of the study.

Sometimes authors will compare their findings with other studies on the topic.



## USE THIS SECTION TO:

Read for the authors' descriptions of their research, including

- Patterns
- Themes
- Limitations



# Discussion & Conclusion example



had non-zero tweet rates, although only 2.2% had active posting (larger than 6 tweets per 10 000). By the last quarter Q8, 84.1% counties had non-zero tweet rates, and 1081 (34.4%) counties had tweet rates greater than 6; Los Angeles County, CA had the top number of tweets (=16513), and Cape May County, NJ had the top tweet rate (=163 per 10 000).

Table 1 also presents descriptive statistics for the rate of non-Juul ENDS-related tweets over counties by quarter. Both median and IQR values of non-Juul ENDS tweet rates increased gradually in 2017 and then decreased in 2018. Mean and SD values fluctuated more widely than median and IQR, indicating that some counties had extreme tweet rates. During the peak in the last quarter of 2017 (“Q4”), 2333 (74.3%) counties had non-zero rates of non-Juul ENDS tweets and 378 (12.0%) counties had a tweet rate of higher than 6. One of the top counties was Fulton County, GA, with a tweet rate of 100 during Q4. Since then, non-Juul ENDS tweet rates decreased, and by the second quarter of 2018 (“Q6”), the rate of Juul-related tweets exceeded the rate of non-Juul ENDS tweets by an average of 0.7 more Juul tweets per 10000.

### SUMMARY AND DISCUSSION

The results of our study reveal four important findings. First, our study shows that Juul-related content on Twitter increased

rapidly in 2017–2018. In early 2017, Juul-related content on Twitter was scarce. However, between the first quarter of 2017 and the last quarter of 2018, the amount of Juul-related tweets increased by 67 times, from an average 1450/week to over 99 000/week. The amount of tweets by Juul Labs and their retweets also increased during this time, but it was a small fraction of all Juul-related tweets, suggesting that Juul’s marketing was very effective in making Juul-related content widespread. The exponential increase in Juul content over the study period likely reflects consumer/user-generated content about Juul products and use, and messages from and about a growing number of Juul-like competitors and compatible products, which were presumably inspired by Juul’s social media marketing.<sup>15</sup> Similarly, Malik *et al*<sup>20</sup> reported that 72% of randomly sampled tweets was posted by regular people (non-commercial), mainly expressing personal opinions about Juul as well as personal use, intentions to use, and advocacy for Juul use and discussing tips, tricks and flavours; 13% was generated by the tobacco industry.

The proliferation of Juul-related posts on Twitter coincided with the rapid growth of sales and ENDS use—vaping nicotine in the past month among grades 8, 10 and 12 nearly doubled from 7.5% to 14.2% between 2017 and 2018.<sup>14 35 36</sup> Studies report that 36% of Instagram posts that promoted Juul featured

Third, our results revealed that despite the intense scrutiny of Juul’s marketing practice from the FDA and Congress, and the Juul Labs’ own voluntary action of taking down its social media

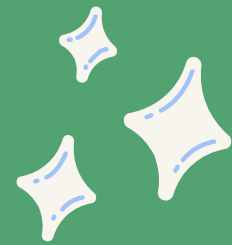
quarter

mean  
(SD)  
Q8 (21.47)

### What this paper adds

- We analysed the amount of Juul-related and electronic nicotine delivery systems (ENDS)-related Twitter posts across time and space, showing a rapid increase in and widespread reach of Juul-related content on Twitter during the time when the brand was seizing market share.
- This study is the first to demonstrate the methodology for constructing county-specific exogenous measure of ENDS-related communication on Twitter and assessing its statistical fitness for use.

What did this study contribute? What future research is recommended?



## THE REFERENCES LIST

corresponds to citations in the article where the authors are using another study to backup a claim they've made.

**Use this list to find additional sources related to your research questions.**



# References example

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Research articles may describe an original study or may review many studies to identify trends.

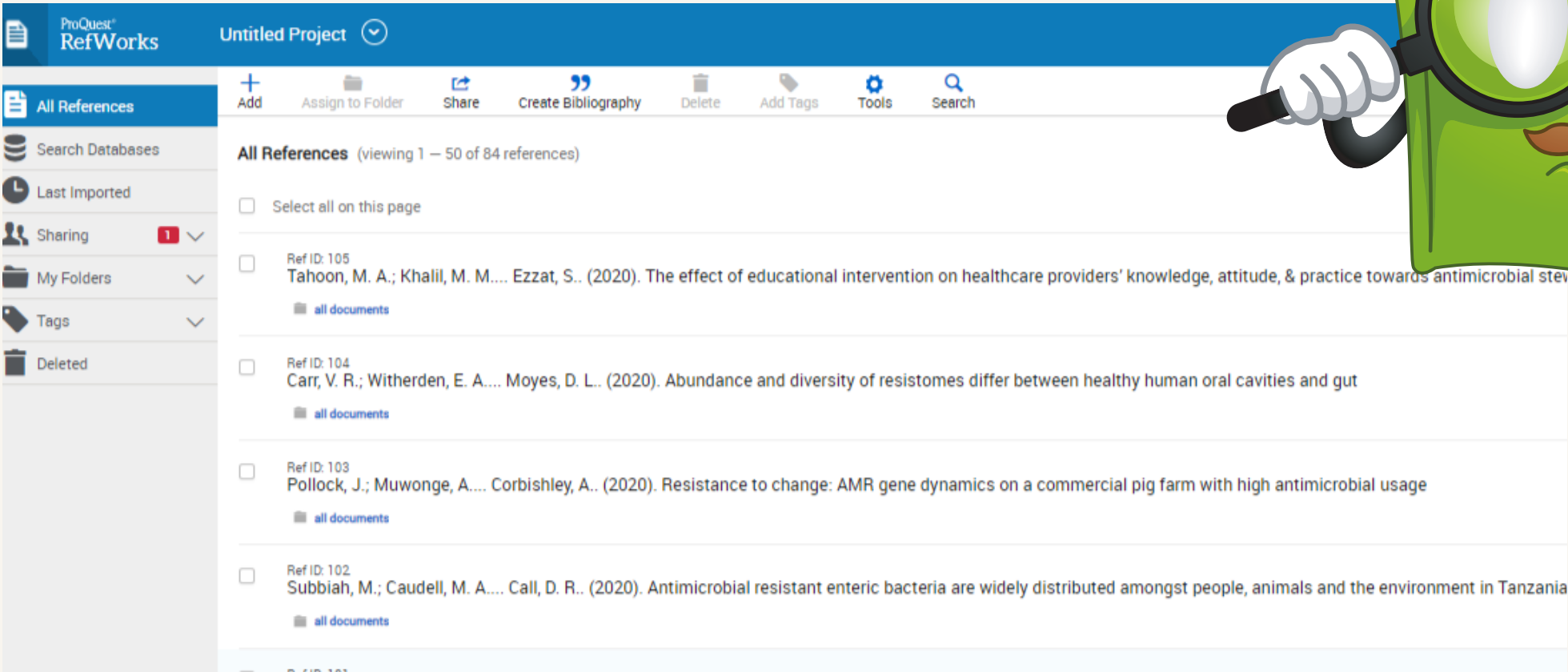
# KEEP YOUR SOURCES ORGANIZED

It's important to find a way to keep track of and manage all this information.

Use RefWorks or a literature matrix or chart to keep a personal library of articles you find useful or informative.

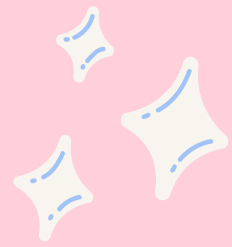


## Literature Matrix



| Author                      | Year | Title   | Type of study              | Additional description  | Key findings in nursing leadership and competencies   | Recommendations/ conclusions   |
|-----------------------------|------|---|----------------------------|---|---|--|
| Arabi, A.; Akbari, A.; Aein | 2014 | Iranian nurses' perception of essential competences in disaster response: A qualitative study                           | Qualitative: Phenomenology | 35 nurses from various provinces and working background interviewed from Iran; each had prior experience working in a disaster. | Five themes were identified with corresponding categories: disaster scene coordination, management of human and other resources, professional ethics in disaster, adherence to law in disaster, knowledge about duties and organization hierarchy, unity in command, physical ability, self-management, meta competence critical thinking ability, communication skills, specific knowledge and applying knowledge. Subcategories identified were determined by interviewees as competencies for nursing. | This study examined the competencies required for nurses to provide better care in disaster situations. According to the findings, technical, management, ethical and personal abilities are necessary for all nurses who are providing care. Considering the importance of these competencies in disastrous situations, it seems necessary to put these trainings in academic curriculums and in nurses' service trainings. |
| Blanke, & McGrady           | 2011 | From hot ashes to a cool recovery: Reducing risk by acting on business continuity and disaster recovery lessons learned | Qualitative: Case study    | Continuing operations post-fire at a Visiting Nurses Association building.  | Critical leadership and clear communication across all stakeholders is important. Ongoing and regularly scheduled leadership communication is also very important. Senior leadership was onsite to immediately initiate the business continuity and disaster response plan.   | To create a CEO and senior management succession plan in the event that they are not onsite or not available.  |
| Lukey                       | 2010 | Transformative experience for   | Qualitative: Phenomenology | 8 self-selected volunteer   | The prominent finding was that volunteering in response to these  | The author recommends that using federal guidelines and  |





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**For More Reading and Writing Strategies:**

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