

At-a-glance

What can social media tell us about the opioid crisis in Canada?

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Abstract

We explored social media as a potential data source for acquiring realtime information on opioid use and perceptions in Canada. Twitter messages were collected through a social media analytics platform between June 15, 2017, and July 13, 2017, and analyzed to identify recurring topics mentioned in the messages. Messages concerning the medical use of opioids as well as commentary on the Canadian government's current response efforts to the opioid crisis were common. The findings of this study may help to inform public health practice and community stakeholders in their efforts to address the opioid crisis.

Keywords: *opioids, Twitter, use and perceptions, Canada*

Introduction

Across North America, the number of opioid-related deaths, hospitalizations and overdoses has increased in recent years.^{1,2} In Canada, the rate of hospitalizations, cumulative of all age groups, due to opioid poisoning increased more than 30% between 2007 and 2016 to just below 16 hospitalizations per 100 000 persons.³ In 2016, there were 2861 opioid-related deaths in Canada.⁴ By 2017, all the provinces continued to see large increases in the number of opioid-related deaths.⁵⁻⁷ Timely data on opioid-related overdoses would be invaluable in monitoring trends and supporting effective responses to the crisis.

Traditional methods of surveying opioid use across Canada include nationwide surveys and administrative databases documenting opioid-related deaths and overdoses.^{3,6} Although informative, limitations to these sources include delay in the access to data or in the publication of results, response bias affecting survey

results, and the lack of detailed information on the context surrounding opioid use.

Social media has been previously used as a tool to provide data on urgent public health issues.⁹⁻¹² Previous studies have utilized social media for the epidemiological monitoring of diseases and to gauge public reactions to health promotion efforts.⁶⁻⁸ In recent years, the use of Twitter in research has increased, compared with other social media, due to the high volume of tweets and ease in accessing and searching Twitter data.⁹

With the current opioid crisis, the public perceptions and documented use of opioids by the Canadian Twitter user population (or "twitterati") could inform responses to the crisis and identify Twitter users' reactions towards current efforts. This study examines Twitter data to do with opioid use and perceptions in Canada.

Methods

Twitter data were collected by the social analytics company Nexalogy (Montréal,

Highlights

- Messages concerning personal medical use of opioids were predominant, with morphine, oxycodone and codeine the most referenced opioids; recreational or illegal use was not frequently mentioned.
- Community impacts such as seeing opioids being used and stray needles in public, as well as personal connections to overdoses, were discussed.
- Many messages expressed sentiments about the government's lack of action in addressing the opioid crisis.
- Twitter may be a useful tool for gauging public opinion on the opioid crisis and the medical use of opioids.

Quebec) between June 15, 2017, and July 13, 2017. This period was selected because of the growing number of opioid-related deaths across the country in the preceding months.^{5,6,7} To create a search strategy, common generic terms, brand names and slang terms to do with opioid drugs were identified from the literature and through Google (<https://www.google.ca/>) and the Urban Dictionary (<https://www.urbandictionary.com/>).^{13,14} We conducted preliminary searches of the opioid terms on Twitter using Nexalogy; terms yielding five or more tweets related to opioid use or perceptions about opioid use were included in the final search strategy (Box 1).

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BOX 1

Search terms used to collect Twitter data

fentanyl
oxycontin
opioid
oxycodone
oxy
vicodin
hydromorphone
hydrocodone
morphine
methadone
percocet
codeine
heroin
“Tylenol 3”
vikes
percs
“codeine cough syrup”
“drinking lean”

Included tweets were geotagged in Canada or were tweeted by users whose profile indicated they were located in Canada. Since it is difficult to attribute with certainty the context of a retweet, all retweets were excluded.

Once the messages were downloaded, we excluded irrelevant messages pertaining to: news stories shared by news corporations or health organizations, messages with opioid terms in the user's name but not their messages, duplicate messages, and messages comprising numbers and characters instead of text. When the source or intent of the message was unclear, we reviewed links to the original tweets (which were provided along with the Twitter messages) to determine the relevance of the tweet.

A broad coding scheme from the literature, based on recurring words, phrases and themes found in the messages, was devised. The two main themes, “use” and “perception,” were mutually exclusive; this scheme was utilized in a previous qualitative opioid-related Twitter study.¹⁴ As Twitter messages were re-read multiple times, the coding scheme was redefined into subcategories under each of the two

main themes and modified until all messages could be accurately categorized; subcategories were mutually exclusive.¹⁵ All messages were coded accordingly. Two researchers reviewed all the messages, and any discrepancies were resolved through discussion and/or with the help of a third researcher. The frequencies of each theme were calculated.

Results

A total of 2602 tweets matching the search strategy were extracted. Of these, 1776 tweets were excluded after a manual review determined that they were irrelevant. The final dataset included 826 messages: 148 were related to opioid use and 678 were related to perceptions about opioids.

Opioid use messages

Of all the messages related to opioid use, morphine was referenced in 37 (25%), oxycodone in 29 (20%), codeine in 30 (20%) and opioid-acetaminophen products in 33 (22%). Overdoses were discussed in 10 messages, with 8 of these commenting on another individual's use.

Medical use of opioids was commonly referenced ($n = 70$; 67%), with negative sentiments slightly more common ($n = 15$; 42%) than positive ones ($n = 13$; 36%) (Table 1). Morphine was mentioned in 27 (39%) medical use messages.

Of the messages commenting on the use of opioids by others, the number of messages that focussed on the impact of opioid use on friends and family ($n = 23$; 52%) approximately equaled the number that focussed on interactions with drug use in public spaces ($n = 21$; 48%). For example, two messages mentioned finding needles in the neighbourhood (Table 1).

Opioid perception messages

Of the messages to do with perceptions about opioids, “heroin” was the term used the most often ($n = 203$; 30%), followed by “fentanyl” ($n = 184$; 27%) and “opioids” ($n = 150$; 22%).

Commentary on the opioid crisis accounted for 318 (47%) messages related to perceptions of opioids. Of those, 173 (54%) messages stated opinions and facts about the

crisis, while 129 (41%) detailed specific sentiments to do with the crisis (Table 2).

The majority of sentiments were directed at officials and their efforts in the opioid epidemic; 20 (15%) messages were directed at the Canadian government or police officials and 35 (27%) at the United States of America government and police officials; 18 (14%) blamed or expressed anger with pharmaceutical companies and doctors (Table 2).

Harm reduction accounted for 48 (15%) messages; 22 (46%) of these were specific to legalizing prescription heroin for opioid dependency treatment programs, while marijuana legalization accounted for 13 (27%) (Table 2).

Commentary on opioids and opioid users accounted for 122 (18%) perception messages (Table 2). A majority of opioid commentary messages ($n = 62$; 50%) were opinions and facts, such as discussions about research focused on opioids. Positive sentiments about opioids, or their effectiveness, accounted for 31 (25%) messages while negative sentiments accounted for 30 (25%) messages. There was no association between the type of opioid referenced and the associated sentiment.

Discussion

Our study demonstrated that Twitter provides context on the use of medical opioids and insight on the attitudes of the Canadian public regarding opioids.

The high prevalence of morphine, oxycodone and codeine mentioned in tweets about opioid use is consistent with reports stating that these are the most commonly prescribed opioids.¹⁶⁻¹⁸ Surprisingly, recreational use of opioids was not frequently mentioned. Although Twitter provides users with the option to remain anonymous, other social media sites (e.g. Instagram) are more popular for sharing stigmatized and illegal behaviours, such as underage drinking and marijuana use, especially within the younger populations.^{19,20}

Messages that discussed opioid use by others provided insight into community-level impacts of the opioid crisis, for example, evidence of opioid use in public and seeing needles on the ground. Similarly, in perception-related messages,

TABLE 1
Messages about opioid use (N = 148) among Canadian Twitter users, June–July 2017

Theme	Frequency n (%)	Example of a message
Own use	104 (70)	
Medical	70 (67)	Had a migraine from hell, now I'm a limp noodle on the couch, thanks percocet! I think that codeine is finally kicking in, headache is retreating [twitter handle] I'm on codeine for it but it's making me so sick that I'm just taking the pain like a man
Recreational	10 (10)	Fentanyl and chill Secret [you] haven't told many; I did heroin and wanted to get addicted Gassing up on lean and good percs
Unknown	24 (23)	I'm high on life and codeine. Can't forget that [twitter handle] Funny story I overdosed on codeine once and now I can't get a prescription anymore lol (not actually... Found my codeine pills, time [to] down the bottle
Use by others	44 (30)	
People they know	23 (52)	He said he was aware of risks of #Fentanyl but figured that odds were it wouldn't be him, he was wrong and almost died I know people who "took as directed" and medicated themselves into an opioid coma [twitter handle] I had a friend pass away taking a [fentanyl] pill pressed to look like oxy 80, thank you for telling this story
Drug use in public spaces	21 (48)	Some kid just walked up to me and asked if I had any percs... You know it's a [bad] day when an obvious heroin addict accidentally gives you a used bloody needle cap when he hands you his change There's heroin needles on the bus #sudburyprobs #sudbury-buses

Twitter users provided details, through statistics or personal opinion, on how the opioid crisis has affected their city. An interesting finding was the discontent expressed about the Canadian government, police and pharmaceutical companies. A majority of the messages either blamed these institutions and organizations for causing the opioid crisis or expressed disappointment in their efforts to combat the crisis. Such commentary on community impacts and opinions concerning the opioid crisis may help to inform community stakeholders and municipal governments on the public response to current efforts addressing the opioid crisis.

Strengths and limitations

This is the first study to explore opioid-related attitudes and behaviours through social media in the Canadian context. It provides relevant details about Canadian experiences of the opioid epidemic. This study benefitted from full access to Twitter data by utilizing Nexalogy, thereby ensuring all relevant posts were collected. As well, the use of detailed themes provided an in-depth exploration into both the sentiment and the context of the Twitter messages.

A major limitation is the absence of demographic and geographical characteristics

of those posting at the time of the study. Future studies will look at extracting a user's location, age and sex/gender. Understanding the distribution of opioid-related use and perceptions by sex/gender, age and location could help to inform future educational and use-prevention strategies, to ensure the populations engaging in risky behaviours are correctly educated about opioids. In addition, the brief data collection period limited the number of messages collected, as well as the number of news stories about the opioid crisis to which Twitter users could react. Future studies should have a longer recording period in order to examine trends in use and perception.

Twitter as a data source presents additional limitations. Since only a subset of the Canadian population utilizes Twitter, the data are not from a random sample, which reduces the generalizability of these results. Furthermore, because we could not obtain the total number of tweets posted during the data collection period, we were unable to calculate the prevalence of messages about opioids posted by the Canadian Twitter user population. Finally, the thematic analysis methodology was tedious. If Twitter data are to be utilized for public health practice, thematic analysis software, such as NVivo, should be applied to improve timeliness of data analysis, thereby improving the timeliness of a public health response.²¹

Conclusion

Although further validation is needed, overall our analysis of the Twitter data appears to be a useful tool for gauging public opinion on the opioid crisis and the medical use of opioids in a timely manner.

Conflicts of interest

The authors of this study had no conflicts of interest.

Authors' contributions and statement

ST contributed to study conceptualization, data collection, analysis and interpretation, and manuscript drafting; VC contributed to data analysis and interpretation, and manuscript revision; MD, WT and CD contributed to study conceptualization and manuscript revision.

TABLE 2
Messages about opioid perception (N = 678) among Canadian Twitter users, June–July 2017

Theme	Frequency n (%)	Example of a message
Commentary on opioid crisis	318 (47)	
Questions	16 (5)	[twitter handle] they can't just buy fentanyl on the street?
Opinions/Facts	173 (54)	Those under 15 yrs and those over 65 yrs experience the highest accidental opioid poisonings.
Statistics on overdoses/deaths	18 (10)	Multi overdoses at [correctional centre] in the last 10 days... #fentanyl #crisisin-corrections
Sentiments	129 (41)	
Cautionary	32 (25)	If you party, you can never be on what you get. Watch your friends.
Directed at Canadian government/police	20 (15)	[twitter handle] You flooded #Canada with #OxyContin...
Directed at US government/police	35 (27)	Very telling...Shows U.S. world where [US politician's twitter handle] priorities lie...
Blame/angry with doctors/pharmaceutical companies	18 (14)	...I understand that the vast majority of opioid usage comes from legal prescription sources
Sad/scared about crisis	22 (17)	This is so scary! #pei #drugs #fentanyl
<i>Other themes</i>		
US-related messages	97 (31)	[twitter handle] Well all except West Virginia. They're a heroin addict.
Positive sentiment for effort of Canadian government/police	17 (5)	So thankful for our police officers. Can't begin to imagine what they face every day.
Fentanyl has affected home town	15 (5)	Some neighbours say #fentanyl is a big problem in the area. #hamont
Importation of fentanyl from China	11 (3)	[twitter handle] Fentanyl shipped from China as part of the economic genocide plan
Harm reduction	48 (15)	[twitter handle] The fentanyl patch return program is ineffective and hazardous
Legalize/Prescription heroin discussion	22 (46)	And, to think that Vancouver, B.C. officials are aiming to legislate 'Free Heroin'
Legalize weed discussion	13 (27)	[twitter handle] legalized pot will lead to a drop in opioid dependency
Commentary on opioids in general	122 (18)	
Positive	31 (25)	Morphine makes the holy known
Negative	30 (25)	If you drug someone with fentanyl you should be SHOT
Opinions/Facts/Questions	62 (50)	TIL that in Switzerland there is a program that gives a heroin addict heroin with prescription!
Questions	9 (15)	[twitter handle] wait is dope pot or heroin, I get confused
Research	7 (11)	Fascinating study found CBD had no analgesic or antiemetic effects alone
Medical discussion	8 (13)	[twitter handle] Specific to ACS chest pain. Do you find any significant difference in response to morphine or fentanyl?
Opioids are not the main topic	238 (35)	
General conversations/jokes	159 (67)	I fell asleep and they injected heroin into me, haha good joke guys
Reference to entertainment	59 (25)	She's morphine, queen of my vaccine my love, my love
Celebrity use	20 (8)	In 1986, Culture Club singer Boy George was charged in London with heroin possession.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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