Three months of informational trends in COVID-19 across New York City

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ABSTRACT

In the midst of widespread community transmission of coronavirus disease 2019 (COVID-19) in New York, residents have sought information about COVID-19. We analyzed trends in New York State (NYS) and New York City (NYC) data to quantify the extent of COVID-19-related queries. Data on the number of 311 calls in NYC, Google Trend data on the search term 'Coronavirus' and information about trends in COVID-19 cases in NYS and the USA were compiled from multiple sources. There were 1228 994 total calls to 311 between 22 January 2020 and 22 April 2020, with 50 845 calls specific to COVID-19 in the study period. The proportion of 311 calls related to COVID-19 increased over time, while the 'interest over time' of the search term 'Coronavirus' has exponentially increased since the end of February 2020. It is vital that public health officials provide clear and up-to-date information about protective measures and crucial communications to respond to information-seeking behavior across NYC.

Keywords coronavirus, public health, surveillance

Introduction

The novel coronavirus disease-2019 (COVID-19) is a potentially fatal respiratory infection that originated in Wuhan, China in December 2019 and has since rapidly spread around the globe leading to mortality rates ranging near 5% with the highest rates among the most vulnerable.[1] On 11 March, the World Health Organization (WHO) declared COVID-19 a pandemic and as of 21 April, there were 2397 217 confirmed cases and 162 956 deaths globally.[1] In the USA, the Centers for Disease Control and Prevention (CDC) expects more widespread transmission of COVID-19 via community spread and that 'most' of the US population will be exposed to the virus. As the number of confirmed cases, those placed in quarantine and the overall global spread of COVID-19 has increased, individuals have relied on public resources to gain information about COVID-19. The CDC encourages viewers on their website to 'know where to find local information' and information about 'local trends of COVID-19 cases'.[2] In the New York City (NYC), residents are being informed that widespread community transmission is occurring and for each resident to act as if they have already been exposed

to COVID-19. This has correlated to a state of emergency declaration in NYC on 12 March, the banning of large gatherings, as well as widespread school and business closures.[3] On 20 March, the governor of New York State (NYS) ordered a state-wide lockdown, requiring all nonessential business to close.[4] The dense population of NYC represents unique challenges in containing the spread of COVID-19. It is especially important for residents to have reliable information to prevent transmission of the virus, given the greater potential for spread compared to other places in the USA. In NYC, one main resource for up-to-date information on a wide variety of government services is through contacting '311', which individuals can call, text and connect with on social media.[5] In other words, while 911 is the emergency service line in NYC, the 311 Call Center is a nonemergency service line created to obtain and report information for NYC residents.

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The objective of this analysis was to analyze trends in NYC and NYS data to quantify the extent of COVID-19-related queries.

Methods

Data from NYC 311 Call Center Inquiry were downloaded from the NYC Open Data website[6] (22 January to 22 April 2020) to provide information about COVID-19-related calls across NYC. This dataset contains the date the call was placed and a brief description of each call. Calls related to COVID-19 were identified by searching for the keyword 'Virus' in the brief description of the call ($n = 50\,861$). The subset of calls was then reviewed to exclude calls related to other viruses, such as influenza ($n_{excluded} = 16$). This resulted in a repository of calls specifically related to COVID-19 ($n = 50\,845$). Data from Google Trends[7] using the search term 'Coronavirus' were extracted from 22 January to 22 April 2020, with the search region selected to NYC. This provided the search interest over time in the searches about COVID-19, scaled to the amount of searches in the time frame. Higher values correspond to more search interest relative to the time period, with an interest of 100 representing the maximum interest in that time period. The number and timeline of confirmed cases in NYC, NYS and the USA were recorded from the John's Hopkins Coronavirus COVID-19 interactive dashboard,[8] which compiles data from various government sources including the WHO and CDC. Data from these different sources were imported into R (version 3.4.1) and time series were constructed to quantify trends in COVID-19 diagnoses and informational trends over time.

Results

There were 1 228 994 total calls to 311 between 22 January and 22 April 2020, with 50 845 calls specific to COVID-19 in the study period, constituting 4.14% of all calls made to 311 in this time window. The volume of cumulative COVID-19-related calls increased over time through March and April, while daily 311 calls decreased in April (Fig. 1), as did the proportion of all calls related to COVID-19: after 22 January: 51 COVID-19 calls, 0.03% of all 311 calls; February: 853, 0.21%; March: 37 089, 8.7%; through April 22: 12 852, 5.3%. Most calls were placed to gather information on the coronavirus (25 272 calls, 49.7%), followed by people requesting information about symptoms, prevention and testing for coronavirus (24 572 calls, 48.3%). Remaining calls were associated with gathering information regarding recent travel to Hubei Province in China or the Middle East (951 calls, 1.9%).

This spike in 311 calls corresponds to an increase in 'interest over time' of the search term 'Coronavirus' across NYC according to Google Trends, which has exponentially increased since the end of February 2020 and peaked in mid-March, while decreasing in April (Fig. 1).

Confirmed diagnoses of COVID-19 cases in NYS has also increased drastically over time with this trend. The first case was recorded on 1 March, and as of 22 April there were 263 292 confirmed cases in NYS and 147 297 cases in NYC, with the majority of non-NYC cases in Nassau County (31 555; 27.2%), Suffolk County (28 854; 24.9%) and Westchester County (25 276 cases; 21.8%). As of 22 April, there were 839 523 confirmed cases in the USA.

Discussion

Main finding of this study

This is the first analysis to report on COVID-19 informational trends in NYC. Our main finding is that interest in and queries about COVID-19 have increased sharply since 22 January, when the first case was reported on US soil, and information-seeking behavior in COVID-19 has peaked in mid-March across NYC and NYS.

What is already known on this topic

To our knowledge no study exists on information-seeking trends regarding COVID-19. Although other large databases tracking COVID-19 report on cases and deaths at both the global and national scale,[8] they do not include measures of information-seeking behavior among populations. In NYC, the COVID-19 data repository contains trends over time in COVID-19 tests performed, positive cases, hospitalizations and deaths.[9] However, understanding how people respond to social-distancing policy, as well as where to be tested, is vital in reducing COVID-19 infections.

What this study adds

This analysis provides a supplementary resource for policy makers and public health professionals to understand how the NYC population reacted to COVID-19 in real time, since January 2020. Since trends in information-seeking behavior have peaked as the virus has spread throughout the NYC and NYS, it is vital that accurate information be disseminated before the sharp increase in cases proceeds. This appropriate and timely information will help people better prepare for the next few months, understand the gravity of the situation and continue to avoid widespread panic as NYC
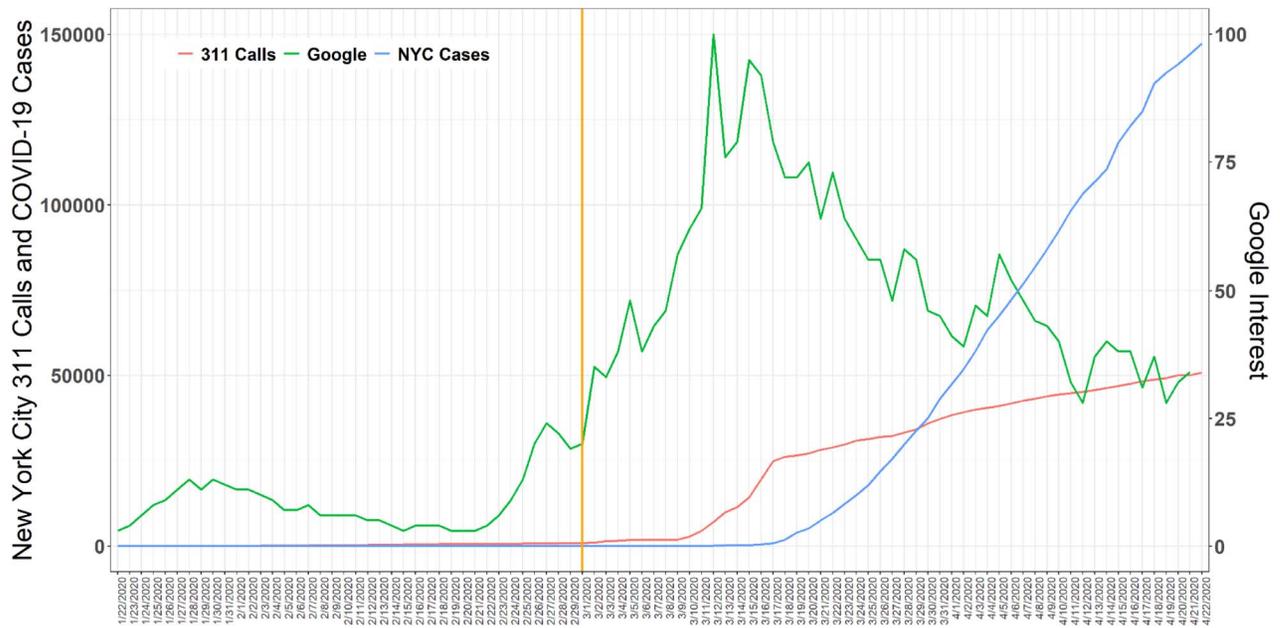
Fig. 1 Cumulative frequency of 311 Calls (solid line) and cumulative confirmed cases in NYC (dotted), as well as the interest in 'Coronavirus' according to Google Trends (two-dash). The black vertical line represents when the first case was confirmed in NYS (1 March).

is reopened. However, if people do not feel that they are receiving clear information from trusted public officials, the desire to be informed and respond may create the potential for the spread of misinformation and disregard. Accordingly, it is vital that public health officials provide clear and up-to-date information about protective measures and crucial communications.

Limitations

This study is not without limitations. Because of the deidentified nature of this public dataset, individual-level data were not available that could provide the geographic location of callers within the NYC area. This could help identify if there were specific populations or areas that had specific queries about COVID-19.

Conflicts of Interest

None declared.

References

1 World Health Organization. *Coronavirus Disease 2019 (COVID-19) Situation Report—92.* https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200421-sitrep-92-covid-19.pdf?sfvrsn=38e6b06d_6%20. (21 April, 2020, date last accessed).

2 Centers for Disease Control and Prevention. *Coronavirus Disease 2019 (COVID-19) How to Prepare.* https://www.cdc.gov/coronavirus/2019-ncov/prepare/index.html. (15 April, 2020, date last accessed).

3 McKinley, J. *Ban on Large Gatherings in N.Y. as Coronavirus Cases Rise Sharply.* https://www.nytimes.com/2020/03/12/nyregion/coronavirus-nyc-event-ban.html. (29 March, 2020, date last accessed).

4 The New York Times. *43 Coronavirus Deaths and Over 5,600 Cases in N.Y.C.* https://www.nytimes.com/2020/03/20/nyregion/coronavirus-new-york-update.html?action=click&module=Spotlight&pgtype=Homepage#link-162c31f8. (25 March, 2020, date last accessed).

5 New York City 311. *Coronavirus (COVID-19) Health and Safety · NYC311.* https://portal.311.nyc.gov/article/?kanumber=KA-03288. (29 March, 2020, date last accessed).

6 311 Call Center Inquiry. *NYC Open Data.* https://data.cityofnewyork.us/City-Government/311-Call-Center-Inquiry/tdd6-3ysr. (22 April, 2020, date last accessed).

7 Google Trends. *'Coronavirus' across New York State* https://trends.google.com/trends/explore?date=2020-01-22%202020-03-20&geo=US-NY&q=%2Fm%2F01cpyy. (22 April, 2020, date last accessed).

8 Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis* 2020;**20**(5):533–4. doi: 10.1016/s1473-3099(20)30120-1.

9 NYC Department of Health and Mental Hygiene. *NYC Coronavirus Disease 2019 (COVID-19) Data.* https://github.com/nychealth/coronavirus-data. (22 April, 2020, date last accessed).