On the Contribution of Communicable Diseases Other Than COVID-19 to Outbreaks in Healthcare Institutions in Ontario*

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This paper examines the contribution of COVID-19 to the total number of outbreaks within healthcare institutions in Ontario over all months in 2023. It was found that COVID-19 was in fact the highest contributor to outbreaks for the aforementioned year.

1 Introduction

The introduction of vaccines and boosters is what got us out of the COVID-19 pandemic and enabled society to return back to normal. However 4 years and a couple booster shots later, it was found that COVID-19 is still at large in Ontario, attributing to the majority of outbreaks within local healthcare institutions.

Outbreak data from various healthcare institutions (including different floors/departments within these institutions) in Ontario for the year 2023 was analyzed, and a total of 18 diseases (along with some cases left as Pending) attributing to the outbreaks were found, which will be listed out in detail in the Data section. Of all 18 possible diseases, COVID-19 was found to be the highest contributor to outbreaks in 2023 by far.

In subsequent sections, the data will be examined closely, cleaned and contributions from each disease will be analyzed over all the months in 2023. There will be more focus towards COVID-19 however, as we cannot conclude simply from it being the highest contributor overall, that it had a uniformly maximum contribution over all the months in 2023.

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*Code and data are available at: https://github.com/FFFiend/outbreaks_in_toronto

2 Data

The outbreak data is from "Outbreaks in Toronto Healthcare Institutions" on the Open Data Toronto website (Gelfand 2022).

All data anlaysis was done using the R programming language (R Core Team 2022), on the R-Studio platform (Posit team 2023). Furthermore, the libraries tidyverse (Wickham et al. 2019) and here (Müller 2020) were also used.

The year chosen to examine is 2023, and the raw csv has the following columns.

```
 [1] "_id"              "Institution Name"    "Institution Address"
 [4] "Outbreak Setting"  "Type of Outbreak"   "Causative Agent-1"
 [7] "Causative Agent-2"  "Date Outbreak Began" "Date Declared Over"
[10] "Active"
```

The focus will be on the the "Date Outbreak Began" and "Causative Agent-1" columns. The "Causative Agent-2" column will be ignored as some entries are missing values in the aforementioned column. Since the identity of each entry (i.e the institution name and address) are of no consequence in our analysis, they will also be ignored.

3 Results

We first begin by plotting the number of cases contributed by each of the 18 unique diseases responsible for outbreaks in 2023. The "Pending" category has also been included and the following histogram is obtained.

Figure 1: Number of Cases by Causative Agent−1 in 2023

Causative Agent−1
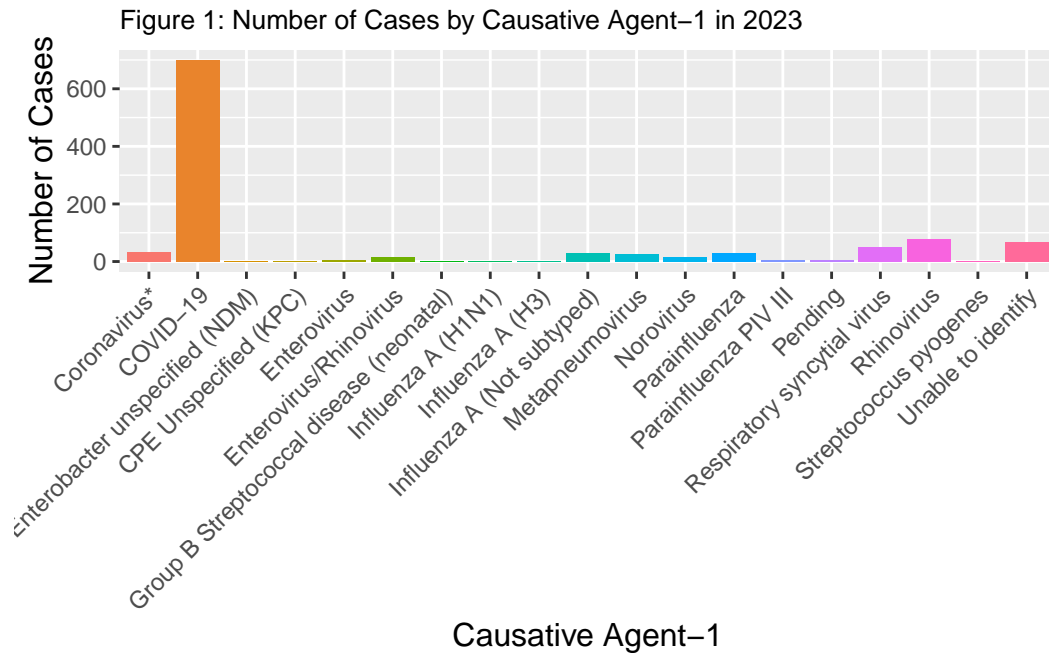
It can be observed in Figure 1, that COVID-19 was the highest contributor to outbreaks in 2023 by far, with exactly 700 out of the total 1066 outbreaks (or 65.66%) in Ontario. Further investigation can be done to observe the spread of COVID-19 cases throughout the year as follows:

Figure 2: Number of COVID−19 Cases Over Months in 2023
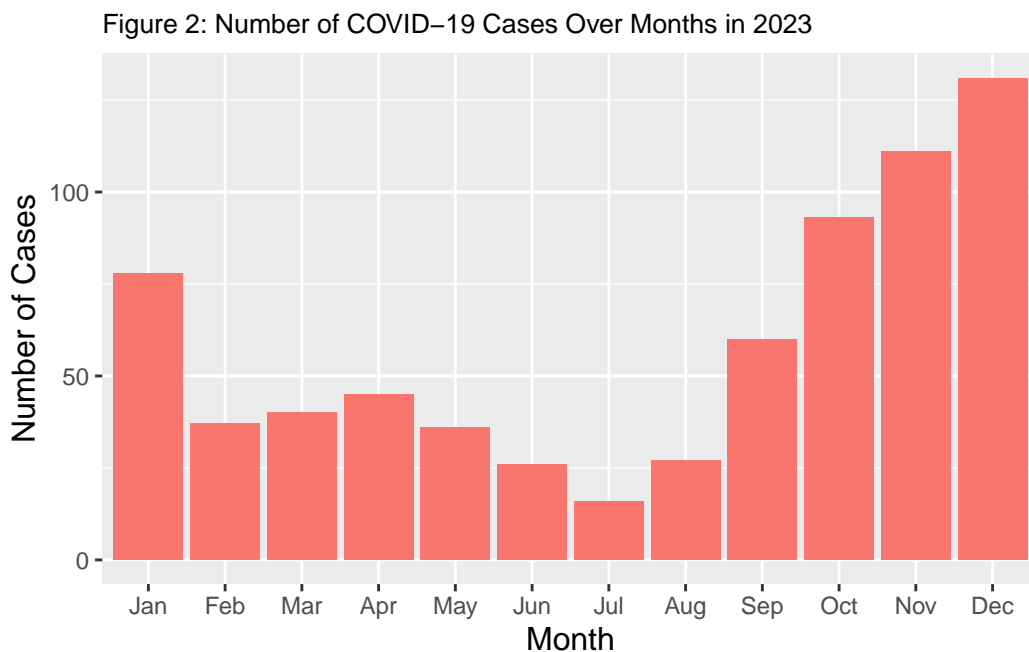
It can be observed in Figure 2, that most of the COVID-19 outbreaks occurred around the

start of Winter towards the end of the year. A detailed breakdown of outbreaks attributed to the 19 categories of diseases (including Pending) within healthcare institutions between the months of February and August can be seen below:

Cases per Month and Disease (Feb to Aug 2023)
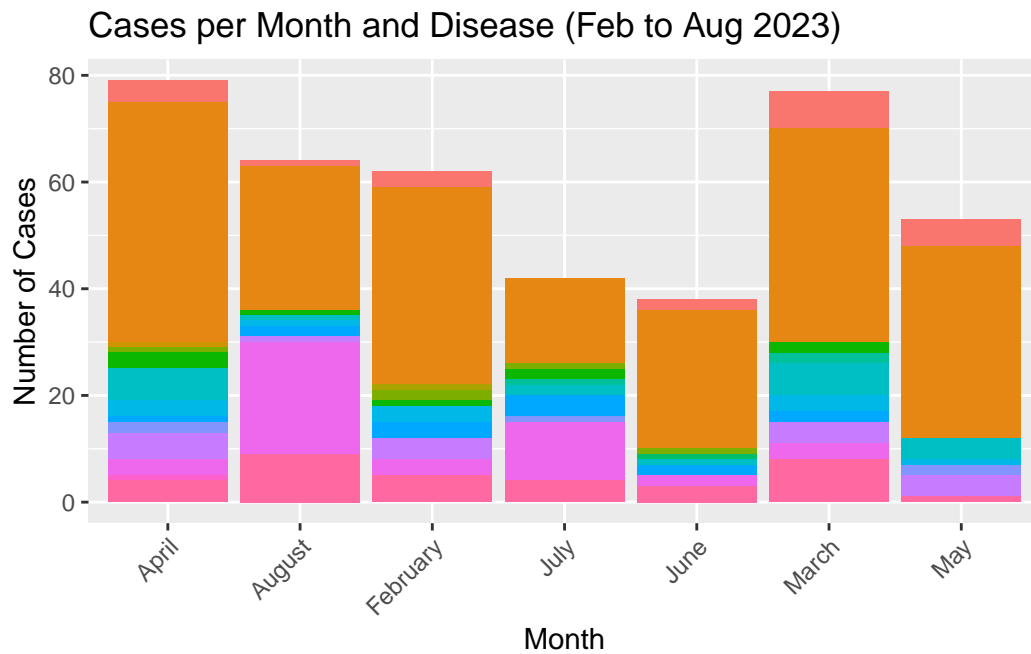
It can be seen that even among months where COVID-19 was seemingly not spiking (i.e in the middle of the year) it still made up the majority percentage of all outbreaks within those months.

References

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