

Logbook – COVID Conundrum

Name: Nikhil Srivalsan – Grade 10

Title: The COVID Conundrum

October 2, 2020 – Why did I pick this topic? - The world changed overnight. The novel coronavirus has taken over our lives. We have not learned lessons from SARS and H1N1. Lack of public health strategy, testing kits and guidelines, PPE, timing and degree of social distancing measures affected the spread of disease. Covid-19 was initially screened for common symptoms like fever, cough and shortness of breath symptoms. Subsequently, Anosmia and Dysgeusia have been added to CDC screening guidelines. I wanted to assess the prevalence of Anosmia and Dysgeusia in Covid-19 patients as new research indicates that it is very specific symptom for Covid-19 screening.

The other aspect that caught my attention was the largest outbreak in Canada at Cargill Meat Plant. I was wondering how this happened.

Oct. 3, 2020

Met with a community physician to find out if I can get some data for my study. The physicians were very helpful and they asked me to come up with a proposal to gather the required data. I was told that I couldn't meet patients directly. Hence, I was asked to give my questions and the community physician will help in responding.

Decided that I will go and do a project on COVID and proposed title is the COVID Conundrum. Began researching various articles to get a grasp of the impact of COVID on our daily lives.

October 4, 2020:

“Coronavirus Disease (Covid 19): Symptoms and

treatment”-<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/symptoms.html>

Reviewed government of Canada symptoms and treatment

Oct. 4, 2020:

“Symptom of coronavirus”

<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

- Anyone can have mild to severe symptoms.
- **Older adults and people who have severe underlying medical conditions** like heart or lung disease or diabetes seem to be at higher risk for developing more serious complications from COVID-19 illness.

Centre for Disease Control states symptoms may appear after 2-4 days after exposure to virus. It also gives preliminary guidelines for screening. Previously loss of taste or smell was not a specific symptom. However, CDC added this to the specific symptom list based on research carried out in the month of July to September

Oct. 5, 2020

“ What is the impact of covid 19pandemic on immigrants and their children”

<http://www.oecd.org/coronavirus/policy-responses/what-is-the-impact-of-the-covid-19-pandemic-on-immigrants-and-their-children-e7cbb7de/>

Both the experience from previous economic crises and first indications on labour market and social outcomes during the current pandemic suggest that the COVID-19 crisis is likely to have a disproportionate impact on immigrants and their children.

Now, I am curious why immigrants are more affected. I thought of adding this to my hypothesis.

Oct. 6 2020

“ Number of novel coronavirus deaths by country”

<https://www.statista.com/statistics/1093256/novel-coronavirus-2019nc>

Cov-deaths-worldwide-by-country/

215 countries and territories affected. Virus is getting critical. Shows number of deaths by country.

Oct. 8, 2020

“ Clinical features of Covid19” [https://www.uptodate.com/contents/](https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-clinical-features?)

[coronavirus-disease-2019-covid-19-clinical-features?](https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-clinical-features?)

This topic will discuss the clinical features of COVID-19. The epidemiology, virology, prevention, and diagnosis of COVID-19 are discussed elsewhere.

Very useful and good reference.

Oct. 11, 2020

“Coronavirus Disease(Covid 19) : how is it transmitted”

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/questi>

on-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted

Very good website by WHO about the disease spread and other important statistics.

Oct. 12, 2020

I was not in a good mood to carry out research. Felt lazy

Oct. 14, 2020

“ Covid-19 : What proportion are asymptomatic”

<https://www.cebm.net/covid-19/covid-19-what-proportion-are-asymptomatic/>

This paper talks about how much percentage of people will be asymptomatic.

“The implications of silent transmission for the control of COVID-19 outbreaks” <https://www.pnas.org/content/117/30/17513>

Our results indicate that symptom-based isolation must be supplemented by rapid contact tracing and testing that identifies asymptomatic and presymptomatic cases, in order to safely lift current restrictions and minimize the risk of resurgence.

Oct. 18, 2020

“COVID-19 Scientific Advisory Group Rapid Response Report”

<https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-asymptomatic-transmission-rapid-review.pdf>

Significant asymptomatic transmission of SARS-CoV-2 would reduce the effectiveness of public health control measures that are related to symptom onset (isolation, face masks and enhanced hygiene for symptomatic persons, and parameters of contact tracing). • There is a lack of clarity and common usage of the terms asymptomatic, presymptomatic, and paucisymptomatic states in the COVID-19 literature.

Good article by AHS

Oct. 19, 2020

Started formulating my questions to be meet with physician. Planning to capture at least 10 sets of data questions for my project.

“Coronavirus disease (COVID-19): How is it

transmitted?”[https://www.who.int/news-room/q-a-detail/q-a-how-is-covi](https://www.who.int/news-room/q-a-detail/q-a-how-is-covid-19-transmitted)

d-19-transmitted

This is a good guideline by the WHO to reduce the risk

Oct. 20, 2020

<https://www.cmaj.ca/content/192/26/E702>

Anosmia and dysgeusia have been reported as potential symptoms of coronavirus disease 2019. This study aimed to confirm whether anosmia and dysgeusia are specific symptoms among those who tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

This is an interesting article and I plan include in my hypothesis based on this concept.to hypothesis.

<https://f1000research.com/articles/10-40>

This is another interesting article on symptoms like loss of smell/taste and the importance of screening measures to be modified.

Oct. 22, 2020

Prepared a detailed questionnaire to show it to the physician and collect data based on my research. I plan to meet with physician on 23rd or 24th of October and get additional inputs.

Oct. 23, 2020

Met with physician and shared my study plan. Physician informed me that we can try to collect data from 1 Mar 2020 to 31 Dec 2020. It will be a retrospective study. We will compile the data in Feb. 2021.

Oct. 25, 2020

- If symptoms of Covid-19 are analyzed, then ANOSMIA and DYSGEUSIA are specific symptoms among those tested positive for Covid-19 and can help in the early detection of infection.
- Finally, I have to decide upon hypothesis.
- If there is a community outbreak of Covid-19,
 - Then immigrants (mostly first generation) are more at risk of acquiring Covid-19 because of socio-economic factors.
 - Then the rate of asymptomatic infection will be close to 40%, because some individuals with a robust immune system may not exhibit symptoms.

Oct. 26, 2020

Prepared my testable questions that I should focus on?

In a community clinic.

What is the incidence of Anosmia and Dysgeusia?

What are the risk factors of contracting Covid-19?

Where there any immigrant community at higher risk of Covid-19 exposure and infection?

Oct. 28, 2020

The spread of the virus is incompletely understood. Transmission is through respiratory droplets by coughing , sneezing and social interaction within 6 feet distance. The infectivity is very high.

Transmission through airborne route is controversial, but has been proposed as well.

Asymptomatic COVID 19 transmission is a major concern which is a deterrent in curtailing the spread of the virus. The lack of symptoms is classified as a) Asymptomatic b) Pre-symptomatic c) Pauci-symptomatic.

It is imperative that we correctly evaluate the numbers of asymptomatic transmission so that further public health measures and enhanced testing can be implemented at public places for these potential spreaders who do not carry any symptoms.

NAAT- Nucleic Acid Amplification testing from nasal or nasopharyngeal swabs

RT-PCR (Reverse Transcriptase- Polymerase chain reaction) from nasal or nasopharyngeal swabs

Antigen testing – Not much done due to high number of false negative cases

Serology (Antibody) testing- Done to detect previous COVID 19 infection

Nov. 21, 2020

Met with physician to check the progress of my work and seek clarification to my doubts.

Modified some of my questions based on feedback. Asked me to study the impact of Cargill and the socioeconomic factors. Carried out a detailed research on why the outbreak at Cargill spread.

Dec. 2, 2020

Monitored the progress with physician and started thinking about any improvements.

Dec. 19, 2020

Started getting inputs from the clinic . Still more inputs to be complied. Approx, 120 COVID are noted, expecting a few more by Dec. 31, 2020. Look forward to my Christmas break.

Jan. 9, 2021

Total:155 cases

Approximate males: 78 and females: 77

Jan. 23, 2021

Started summarizing my findings based on my question

Total number of patients enrolled in the study : 155

Gender Distribution

Males : 78 (50.3%)

Females : 77 (49.6%)

Age Distribution

1. Infants : One

2. Between 1-5years : 10 (6.4%)

3. Between 6-12years : 10 (6.4%)

4. Between 13-19years : 12 (7.7%)

5. Between 20-40years : 49 (31.6%)

6. Between 41-60years : 66 (42.5%)

7. Between 61-70years : 4 (2.5%) 8. More than 70years

Symptoms

Cough : 76 (49%)

Fever : 28 (18%)

Rhinorrhoea : 26 (16.7%)

Myalgia/Headaches : 23 (14.8%)

Sore Throat : 20 (12.9%)

Anosmia : 58 (37.4%)

Dysgeusia : 61 (39.4%)

Anosmia & Dysgeusia : 63(40.6%)

Gastrointestinal symptoms : 3 (1.9%)

Shortness of Breath : 7 (4.5%)

ASYMPTOMATIC : 31(20%)

Duration of Symptoms

Less than one week : 7 (4.5%)

1-2 weeks : 78 (50.3%)
2-4 weeks : 33 (21.2%)
> 1month : 6 (3.8%)
ASYMPTOMATIC : 31 (20%)

Status of the Patient

Isolated at home : 153 (98%)

Hospital admission : 2

ICU : 1

Death : None

Feb. 2, 2020

Risk Factor Assessment

Diabetes : 16 (10.3%)

Cancer : 0

Asthma/COPD : 5 (3.2%)

Morbid Obesity : 6 (3.8%)

Smoker : 11 (7%)

Congestive Heart Failure : 1

Chronic Kidney Disease : 2 (1.2%)

Pregnancy : 1

Seniors (age > 65) : 7 (4.5%)

Timing of Positive Covid Swabs

March : 8 (5.1%)

April : 96 (61.9%)

May : 8 (5.1%)

June : 2 (1.2%)

July : 1

Aug : 4 (2.5%)

Sep : 1
Oct : 7 (4.5%)
Nov : 15 (9.6%)
Dec : 13 (8.3%)

Patient Origin

North America - 5
Central America - 0
South America – 3
East Asia – 1
South Asia – 10
South East Asia – 120
Central Asia – 0
North Asia – 0
Middle East – 6
North Africa – 0
East Africa – 3
West Africa – 5
Southern Africa – 0
Eastern Europe- 2
Western Europe – 0
Oceania - 0

Source of Infection

Meat Plant (Cargill) : 49 (31.6%)(Direct Exposure)
Lilydale Chicken Plant : 5 (3.2%)
Church : 2 (1.2%)
School : 5 (3.2%)
Birthday Party : 5 (3.2%)
Healthcare : 6 (3.8%)
Daycare : 1 (0.6%)
Travel through the US : 1 (0.6%)
UNKNOWN sources : 30 (19.3%)
From sick contacts : 51 (32.9%)(Household members)

Feb. 12, 2021

Started working on my observations

The symptoms of Anosmia and Dysgeusia are quite prominent in patients with Covid-19.

The rate of asymptomatic infection in my study was 20%, which is much lower than other studies and CDC current best estimate of 40%.

In my cohort, the highest number of infections were from the 'Outbreak at the Cargill Meat Plant' at High River in April 2020. Multiple family members of the employees working at the meat plant also got infected. Children were the least affected with the infection. Based on the research, this could be due to lower density of ACE2 receptors in the nasal mucosa.

Only a few seniors were affected by the infection (4.5%). It is because of the demographics in the clinic.

Cough was the predominant symptom(49%), followed by Anosmia and Dysgeusia (40.6%), fever (18%), rhinorrhoea (16%), Myalgia/headache (14.8%). The least common symptom were diarrhoea and dyspnoea

Maximum number of cases were in April as a results of the 'Cargill' Meat Plant Outbreak . 61% of the patients became positive in April. The second highest is in Nov , about 10% where there was a resurgence in COVID cases

Feb. 20, 2021

There is a strong association between Anosmia and Dysgeusia symptoms and SARS –Cov 2 positivity in line with my hypothesis. This distinctive symptom when present should help guide screening and testing for the virus. The number of asymptomatic patients were about 20%. This is much lower than other studies and the CDC's best estimate of 40% and deviates from my hypothesis. This gap in number could also mean that we have to modify our screening protocols to catch these potential asymptomatic spreaders. The third part of my hypothesis is true. In my study 96% of patients who acquired Covid-19 infections were immigrants. Immigrants work in labour intensive jobs and service sectors where there is overcrowding and reduced adherence to health guidelines. Further, socio-economic factors played a key role in the spread.

In my study, two out of the three hypotheses were proved to be true.

Feb. 26, 2021

My title has been slightly modified (as follows) to make it more meaningful with my hypothesis

“The COVID Conundrum: Symptomatology and Determinants in an Outbreak

How my study can be used or applied?

Analysis of specific symptoms like Anosmia and Dysgeusia is very important for early detection of Covid-19.

The information gained from this study would help me better understand this complex viral illness and its implications.

This study would hopefully stimulate more research into how some of the identified socio-economic factors can be addressed by public health agencies to mitigate them in the future

Since immigrants have been predominantly affected in my study, hopefully public health policies and measures can be **taken to improve their working condition** .

I want to include my project..??

Include a higher number of patient population to get a larger sample by extending the study to get data from

other community clinics located in the city.

Assess the symptom of Anosmia and Dysguesia using a control population with negative Covid-19 tests, but had flue like illness.

Feb. 28, 2021

Due to COVID constraints, meeting people at clinic and collecting data is a challenging task. However, I am happy I could complete my study despite all the constraints. I thank all those who supported me in my study.