Influenza Forecasting in Canada

Presented by: Jessica Moloney

Topic Outline

INTRODUCTION

MOTIVATION

WALK-THROUGH

FURTHER DEVELOPMENTS

About Me

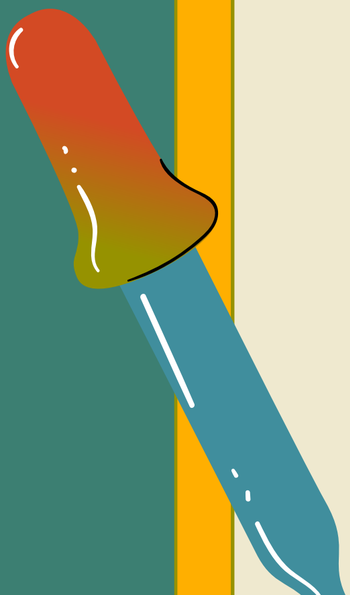
Psychology, Business Analytics and Quality Management

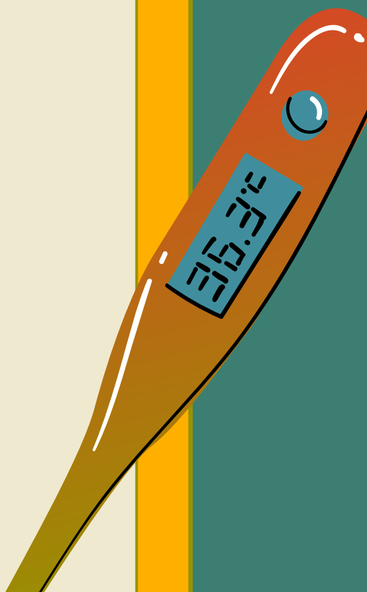
Passion for Public Health

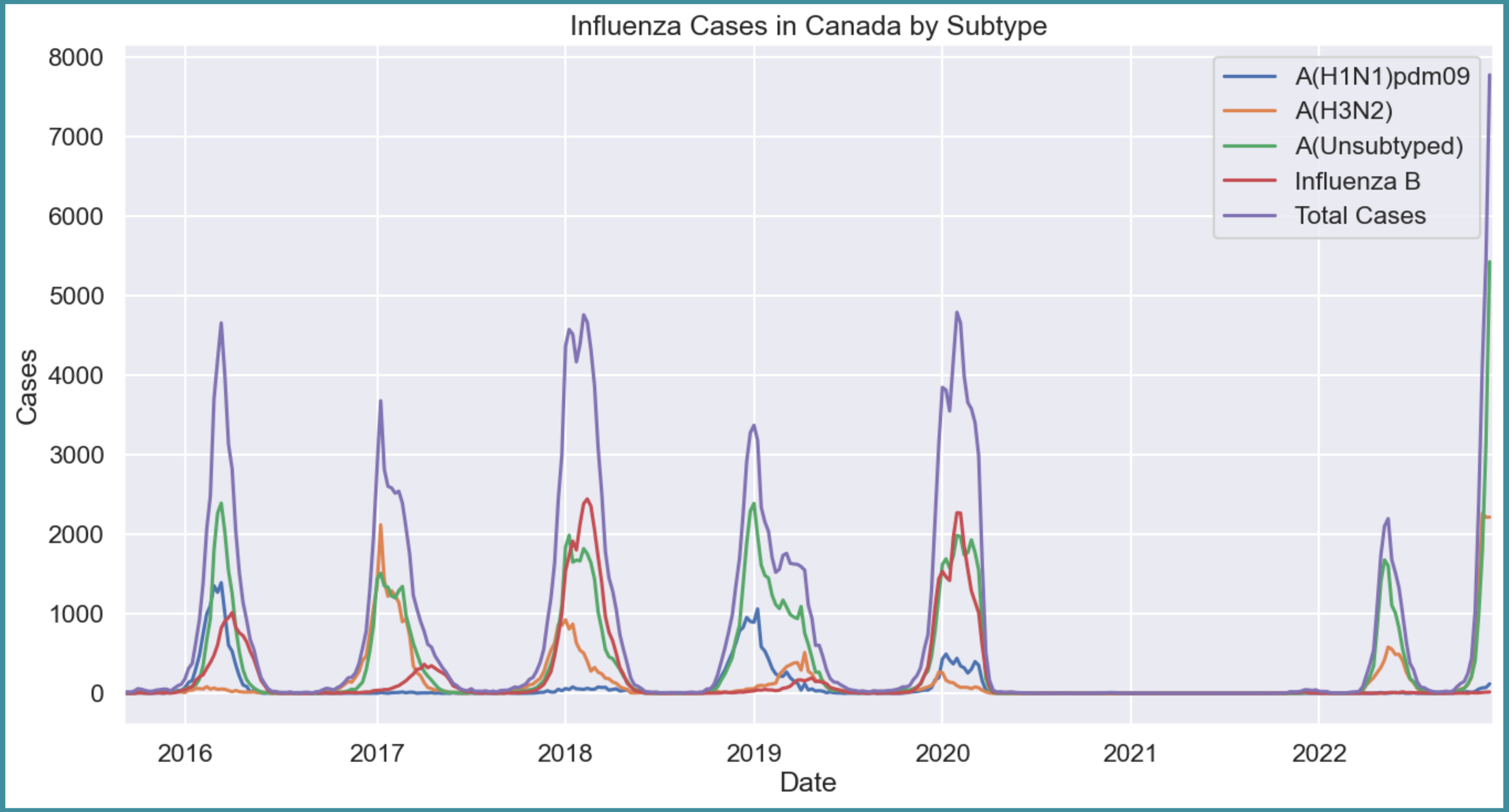
Fiddle Player!

Why Forecast Flu?

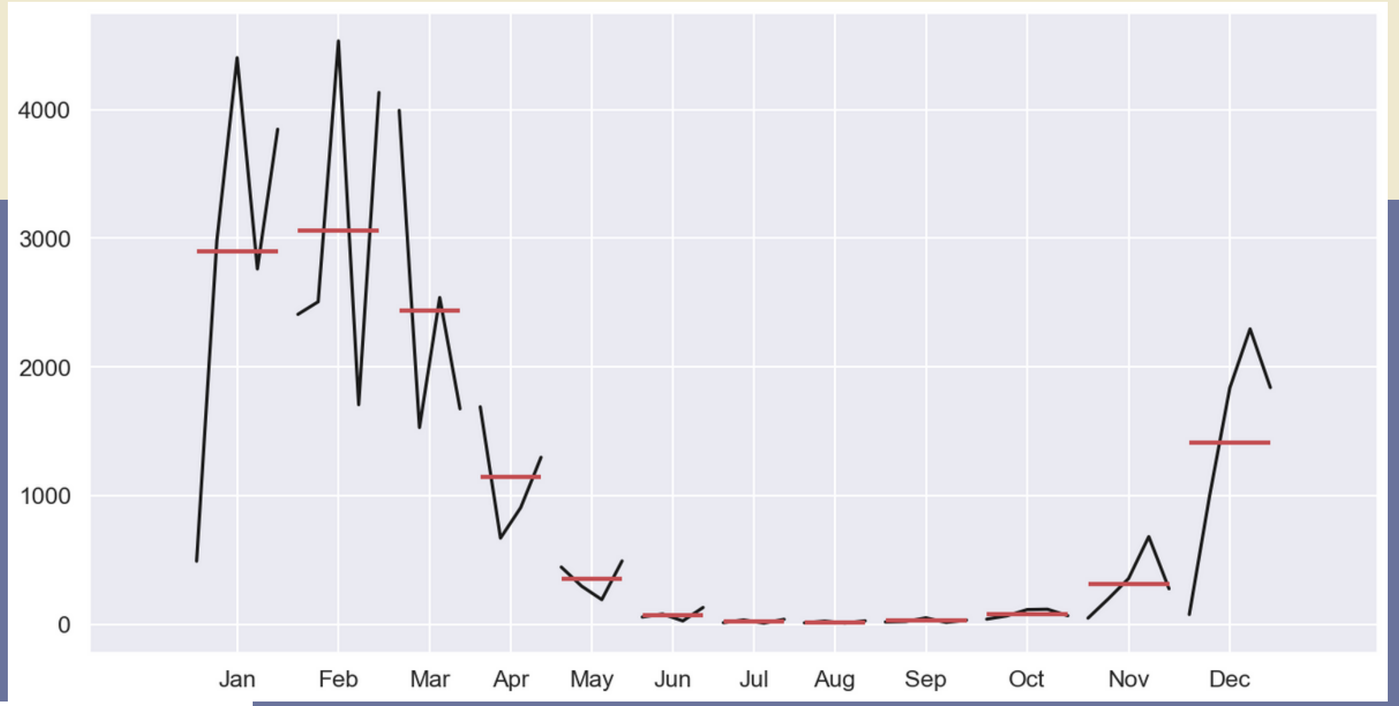
- 7,000 influenza deaths every year in Canada
- Accurate influenza predictions = more effective interventions

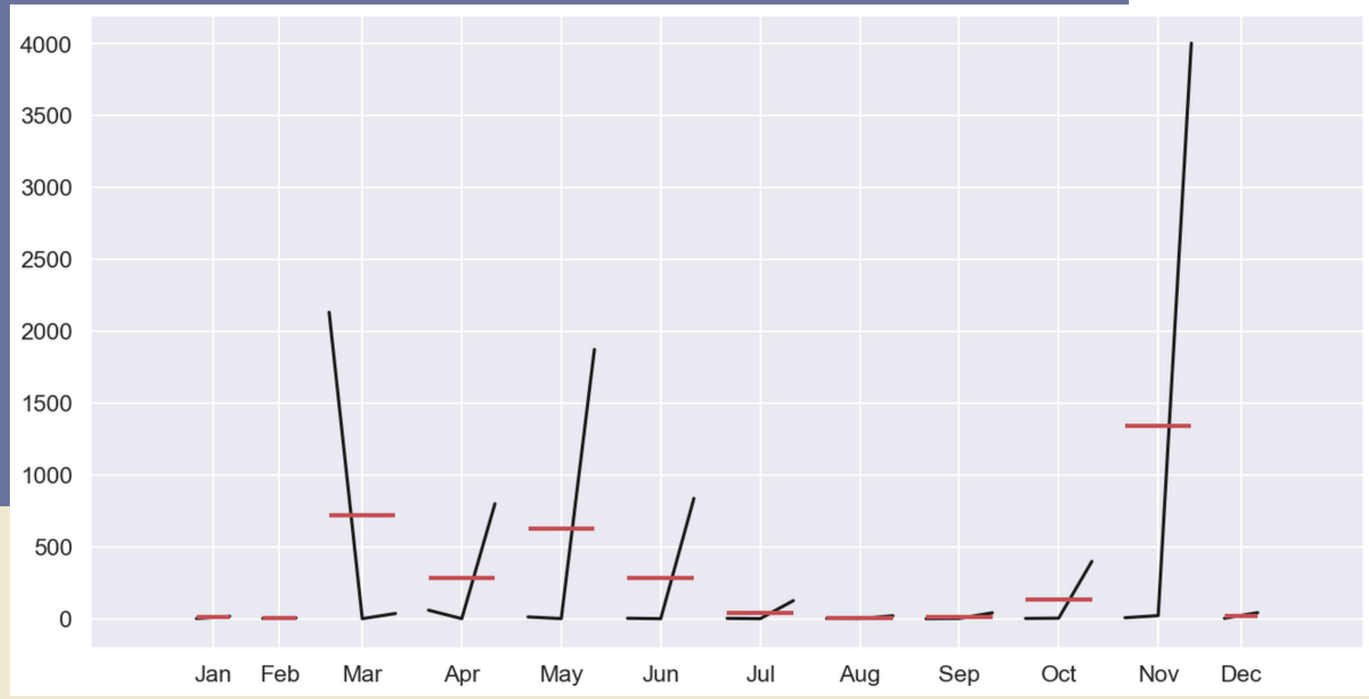





Influenza Cases in Canada by Subtype
8000
7000
6000
5000
4000
3000
2000
1000
0
Cases
2016
2017
2018
2019
2020
2021
2022
Date
A(H1N1)pdm09
A(H3N2)
A(Unsubtyped)
Influenza B
Total Cases

Before March 2020





After March 2020

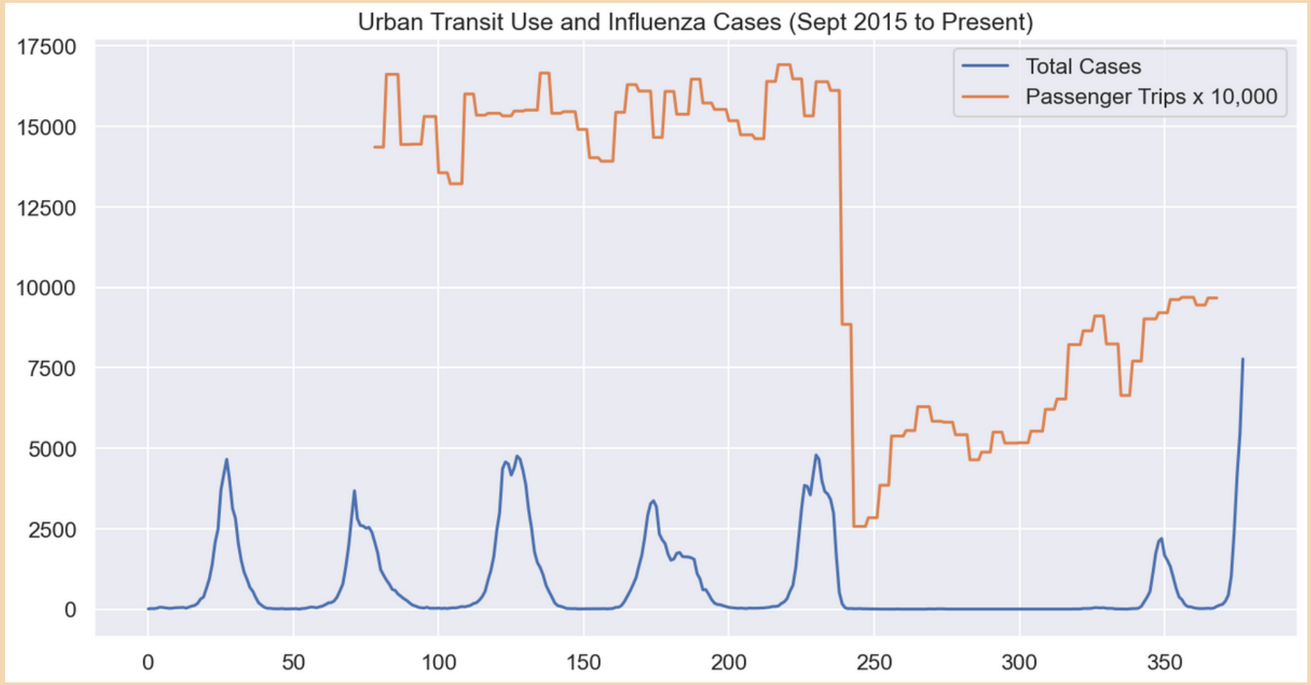
Correlated with Flu?

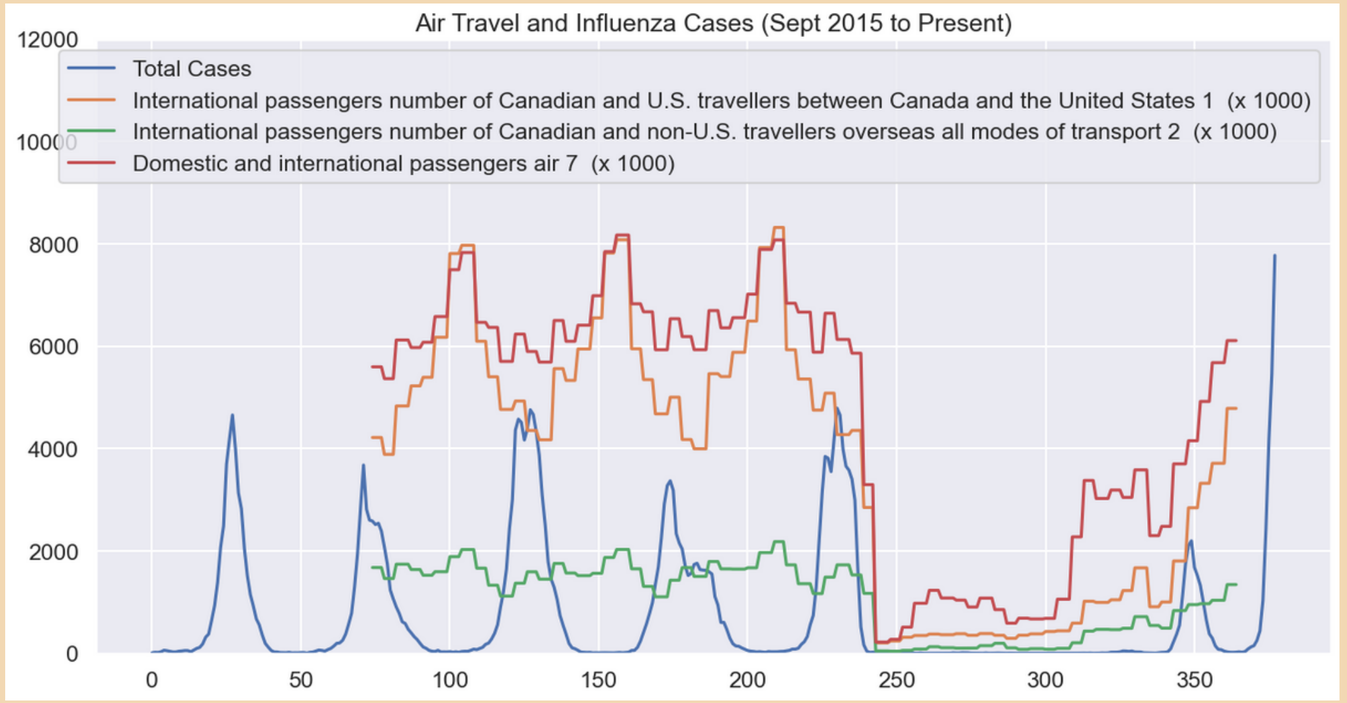
Flu Symptom Google Search

Influenza Vaccination

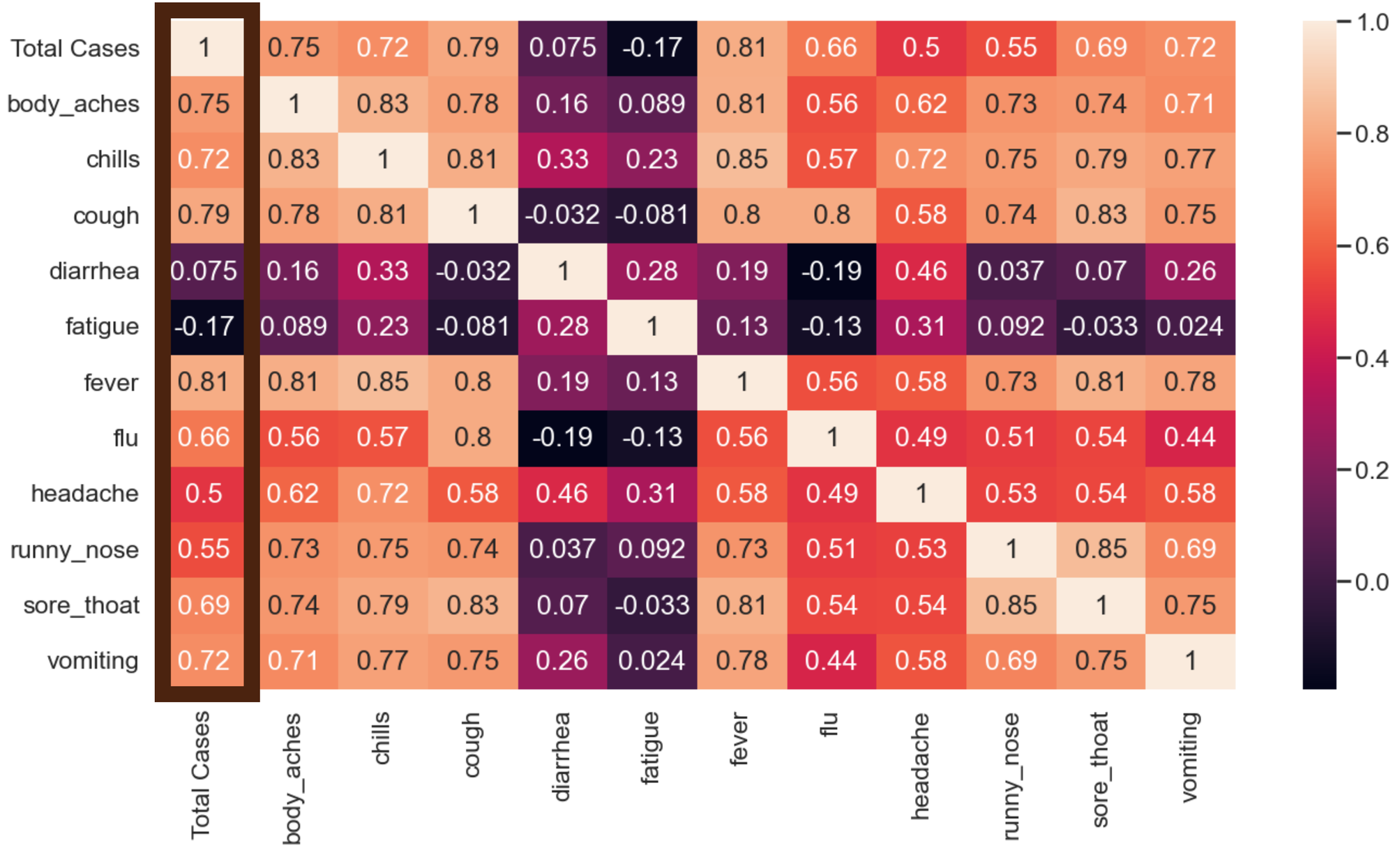
COVID Term Google Search

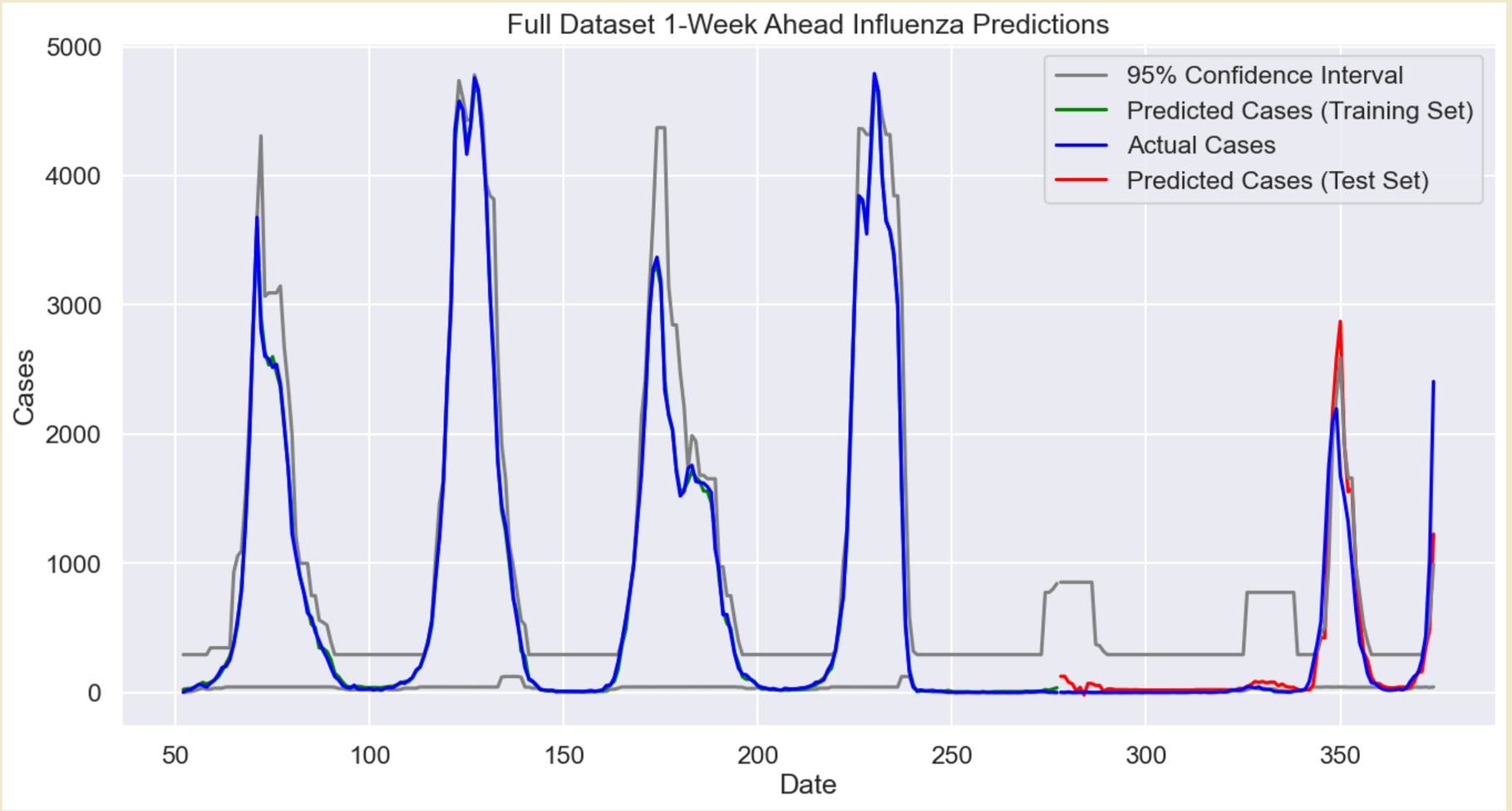
Movement of People


Urban Transit Use and Influenza Cases (Sept 2015 to Present)
Total Cases
Passenger Trips x 10,000
17500
15000
12500
10000
7500
5000
2500
0
0
50
100
150
200
250
300
350


Air Travel and Influenza Cases (Sept 2015 to Present)
Total Cases
International passengers number of Canadian and U.S. travellers between Canada and the United States 1 (x 1000)
International passengers number of Canadian and non-U.S. travellers overseas all modes of transport 2 (x 1000)
Domestic and international passengers air 7 (x 1000)
12000
10000
8000
6000
4000
2000
0
0
50
100
150
200
250
300
350

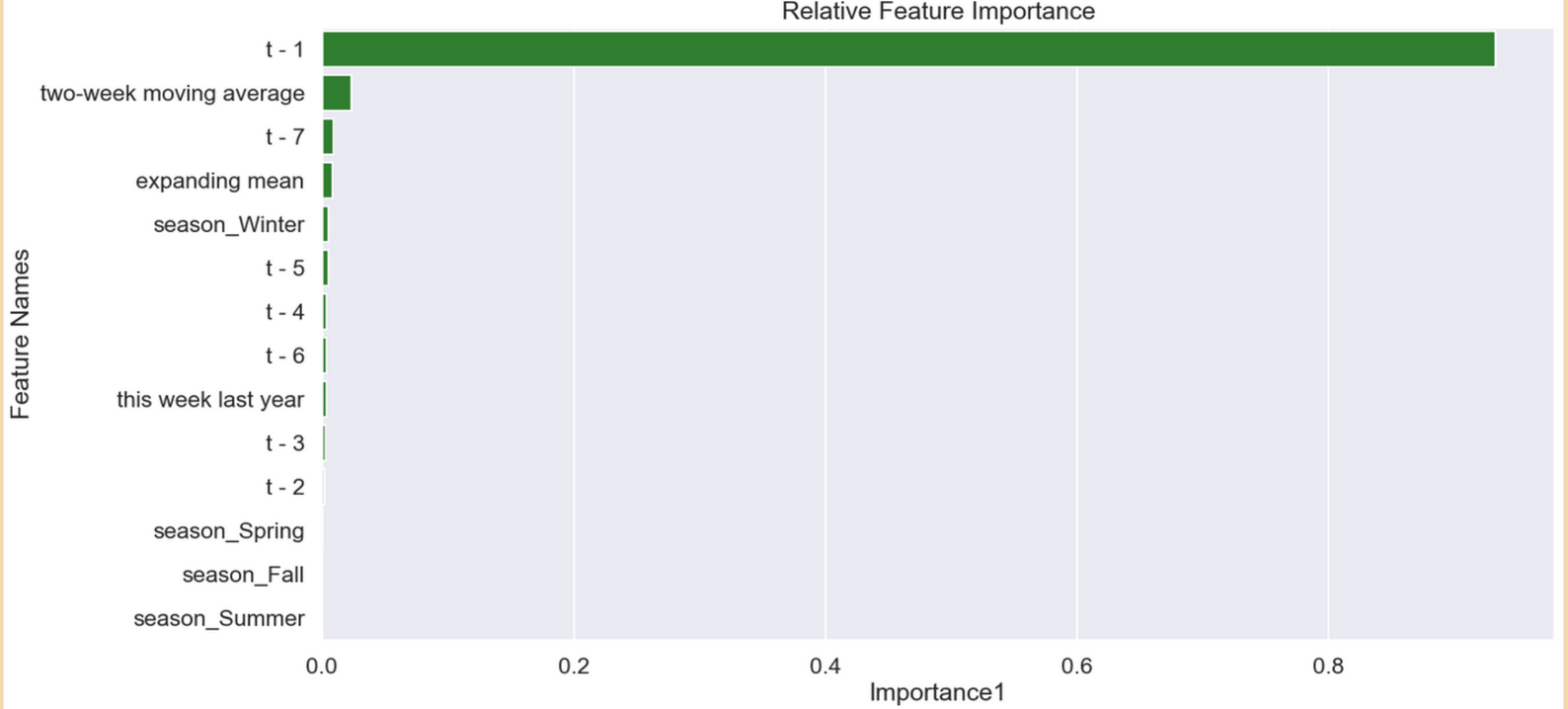
Flu Symptom Searches & Cases




Full Dataset 1-Week Ahead Influenza Predictions
95% Confidence Interval
Predicted Cases (Training Set)
Actual Cases
Predicted Cases (Test Set)
Cases
Date
5000
4000
3000
2000
1000
0
50
100
150
200
250
300
350

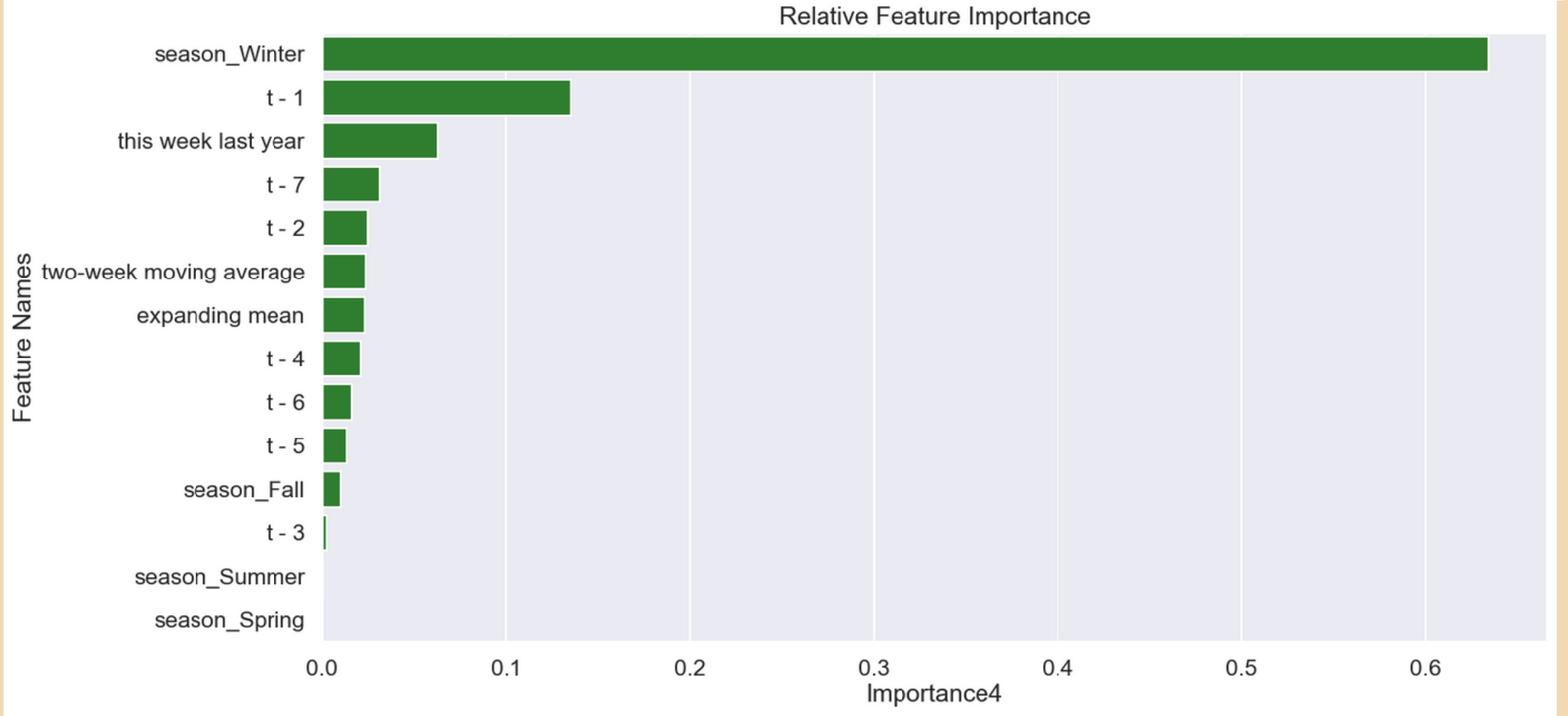
1-week forecast:

Most important feature = previous week



4-week forecast:

Most important feature = winter



Model	RMSE	MAE	R Squared
Gradient Boosting Regressor	222.63	94.66	0.81

Compared With

Baseline - Moving Average	481.41	190.93	0.73
Benchmark			0.88

Thank you for listening!

Don't hesitate to ask any questions!