Modeling and Visualization of the COVID-19 Outbreak in Ontario

Statistics Canada

May 26, 2020

Sofia Bahmutsky (Presenter)
Kaitlyn Hobbs
Ngan Lyle
Shreeram Murali

Team

Ngan KT Sofia

Shreeram

Statistics Canada Statistique Canada

Introduction

- Client
  - Statistics Canada
    - Bruno St-Aubin, Team Lead and GIS Developer
    - Marian Radulescu, Unit Head and Analyst
- Requirements
  - Assess the quality and possibly improve upon StatCan open data sources
  - Build a product that shows that StatCan open source data are useable in complex analytical cases

Purpose

- Analyze the COVID-19 Outbreak in Ontario
  - Spread in long term care (LTC) homes
    - In the media
  - Association between disease activity in different (Public Health Unit) PHU regions and StatCan proximity measures

e Star Edition
ANGE LOCATION

THE STAR

CANADA POLITICS WORLD OPINION LIFE SPORTS ENTERTAINMENT BUSINESS

Federal Politics Provincial Politics Political Opinion

FEDERAL POLITICS

82% of Canada's COVID-19 deaths have been in long-term care, new data reveals

HEALTH

Coronavirus: Canadian military arrives at 5 Ontario long-term care homes struggling with COVID-19

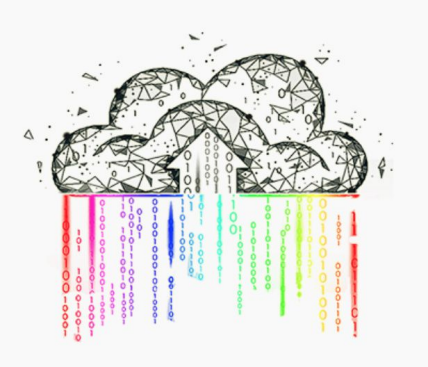
BY JESSICA PATTON - GLOBAL NEWS

Posted April 24, 2020 9:15 am
Updated April 24, 2020 4:51 pm

Objectives

1. Produce an inferential statistical model of factors that may be associated with the COVID-19 outbreak in LTC homes in Ontario
2. Produce an inferential statistical model of proximity factors that may be associated with COVID-19 outbreaks at the level of PHU regions in Ontario

Data

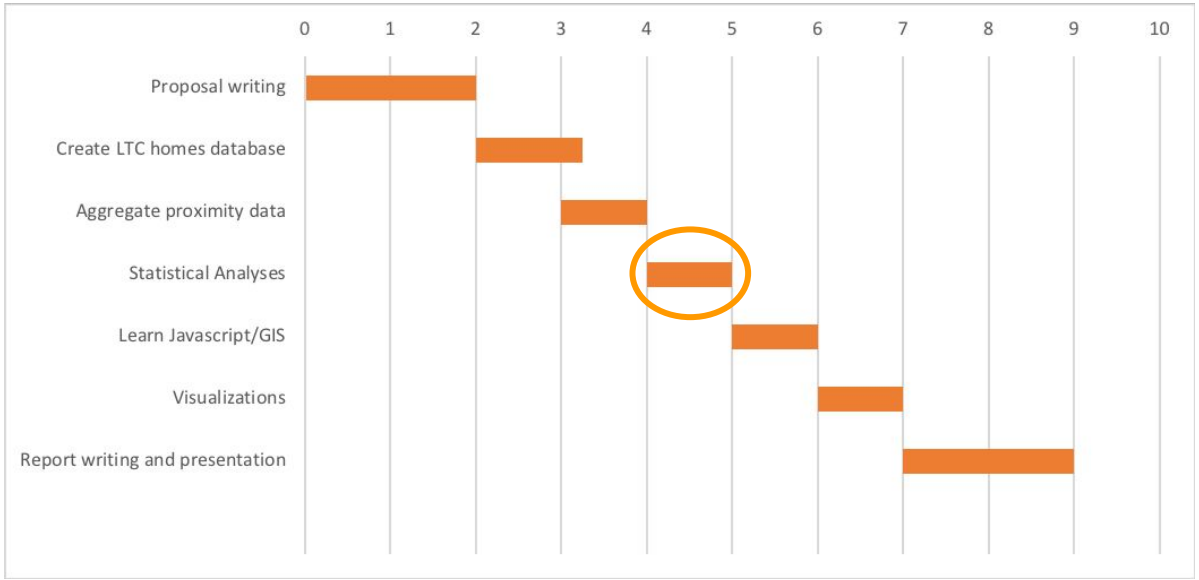


- StatCan Sources
  - Open Database for Health Facilities
    - Linkable Open Data Environment (LODE)
      - Data Exploration and Integration Lab (DEIL)
  - Proximity data for transit, health care, and pharmacies
- Other Sources
  - COVID-19 Data by Health Regions
    - Natural Resources Canada
    - Government of Ontario
  - Data about LTC homes in Ontario will be scraped from government websites

Tasks of Current Week

1. **Determine a method to aggregate the DB proximity measurements to a larger scale PHU-level.**
2. **Statistical Analysis**
    a. **Research, reading of previous courses**
    b. Correspondence with Jeff (prof) and Joyce (TA)
    c. Complete analysis/modelling for LTC data and PHU data.
3. **If time allows, begin Javascript dashboard.**

Schedule



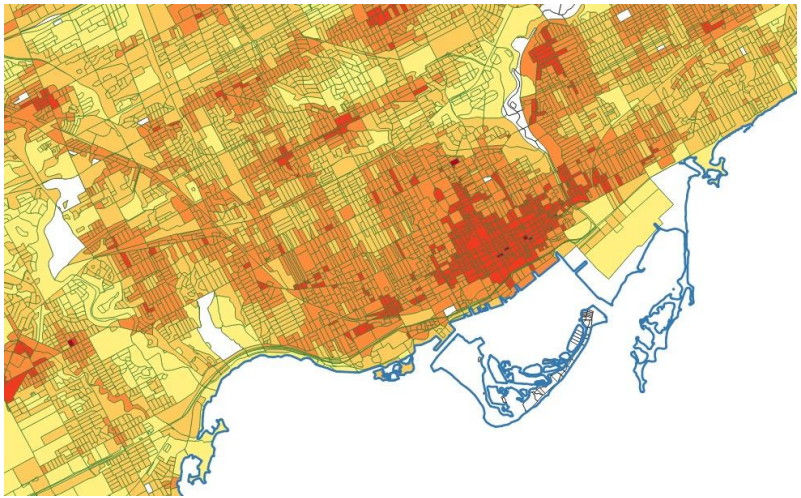
https://trello.com/b/BOM8D6zv

Deliverables

- A database of LTC homes in Ontario
  - Update StatCan ODHF
- A method to aggregate proximity data to the PHU region level
- Two inferential statistical models
  - Association between LTC home characteristics factors and COVID-19 outbreaks
  - Association between proximity factors and COVID-19 outbreaks among different Ontario PHU regions.
- Visualizations
- Report
  - Explore connections between the LTC homes data, the proximity data, and the COVID-19 data

Summary of Individual and Team Work Logs For Week 4

- Data cleaning and scraping is complete
- QGIS portion of project is nearly complete
- Statistical Analysis is started



Agenda for Week 5

- Statistical Analysis
  - Need to determine optimal modelling method for our data
  - Want to incorporate the dimensionality-reduced or principle components to a clustering/classification scenario.

Potential Limitations

1. We have mixed data types
2. Data need to be scaled, but this is causing some problems with analysis

Thanks!