Covid Rates in Toronto's Historic Neighbourhoods

Emily Moffat and Nick Chan

Background

- Before June 14, 2022, there were 1,314,447 confirmed cases of COVID-19 in Ontario, with 13,351 recorded deaths
- 66.5% of individuals older than 6 months of received their last dose a COVID-19 vaccine prior to the end of 2023

City of Toronto. (November 2023). *COVID-19 Clinic Sign* [Image]. City of Toronto. https://nowtoronto.com/wp-content/uploads/2023/11/Untitled-design-78-2048x1044.webp

Goals

- Analyze how the accessibility of vaccination clinics correlates with COVID-19 infection rates.
- Evaluate the spatial distribution of COVID-19 infections in relation to the proximity of vaccination centers.

Fayette County PA. (2021). *COVID-19 Vaccine Graphic* [PNG Image]. Fayette County PA. https://www.fayettecountypa.org/CivicAlerts.aspx?AID=120&ARC=316

Literature

Distance to trauma centres among gunshot wound victims: identifying trauma 'deserts' and 'oases' in Detroit

Giovanni M Circo

Correspondence to Dr Giovanni M (

RESEARCH REPORTS

Disparities in COVID-19 Mortality Rates: Implications for Rural Health Policy and Preparedness

Grome, Heather N. MD, MPH; Raman, Rameela PhD; Katz, Benjamin D. MPH; Fill, Mary-Margaret MD, MPH; Jones, Timothy F. MD; Schaffner, William MD; Dunn, John DVM, PhD

Author Information

Journal of Public Health Management and Practice 28(5):p 478-485, September/October 2022. | **DOI:** 10.1097/PHH.0000000000001507

COVID-19 death rates in urban and rural areas : United States, 2020

10/25/2022

By Curtin, Sally C. ; Heron, Melonie

https://dx.doi.org/10.15620/cdc:121523

Series: NCHS data brief ; no. 447

Available access | Other | First published online August 14, 2008

Parolees' Physical Closeness to Social Services: A Study of California Parolees

John R. Hipp, Jesse Jannetta, [...], and Susan Turner (+1) View all authors and affiliations

Volume 57, Issue 1 | https://doi-org.myaccess.library.utoronto.ca/10.1177/0011128708322856

RESEARCH ARTICLE | COVID-19

HEALTH AFFAIRS > VOL. 42, NO. 2: BEHAVIORAL HEALTH, NURSING HOME WORKFORCE & MORE

Community Health, Health Care Access, And COVID-19 Booster Uptake In Massachusetts

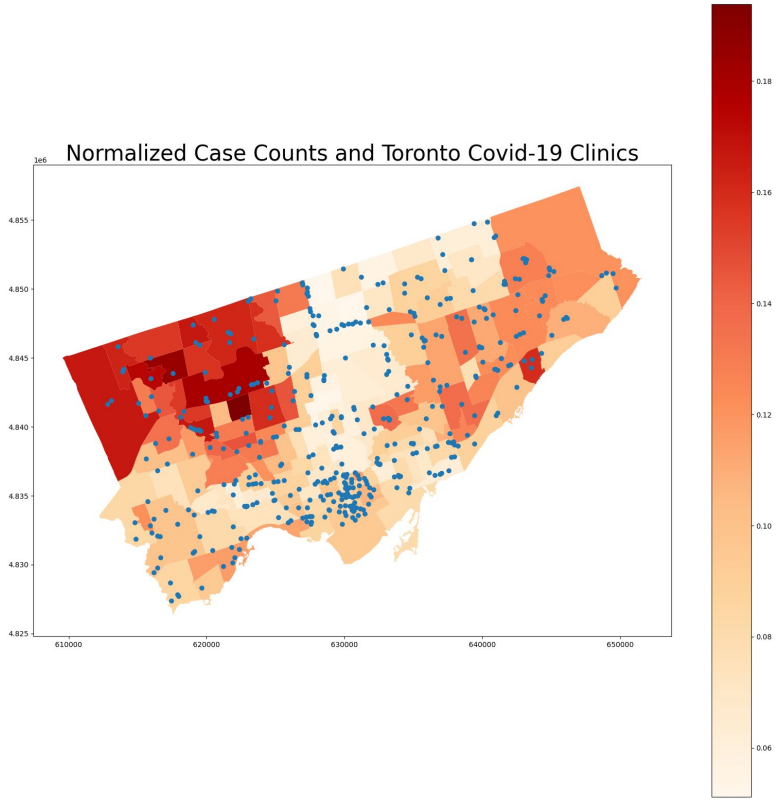
Adam Gaffney, Steffie Woolhandler, Jacob Bor, Danny McCormick, and David U. Himmelstein

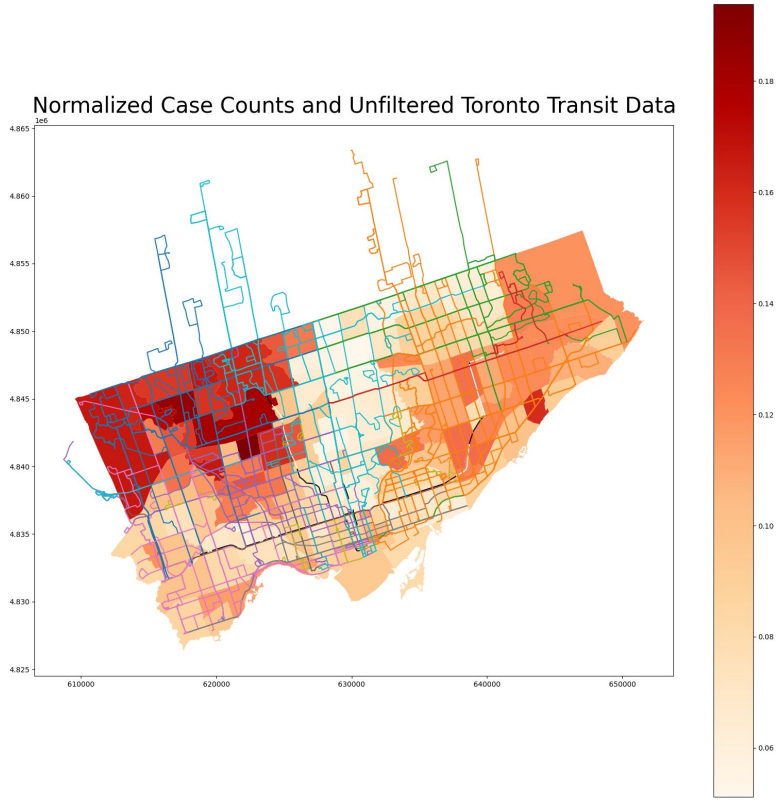
Packages Used in Analysis

In [1]:

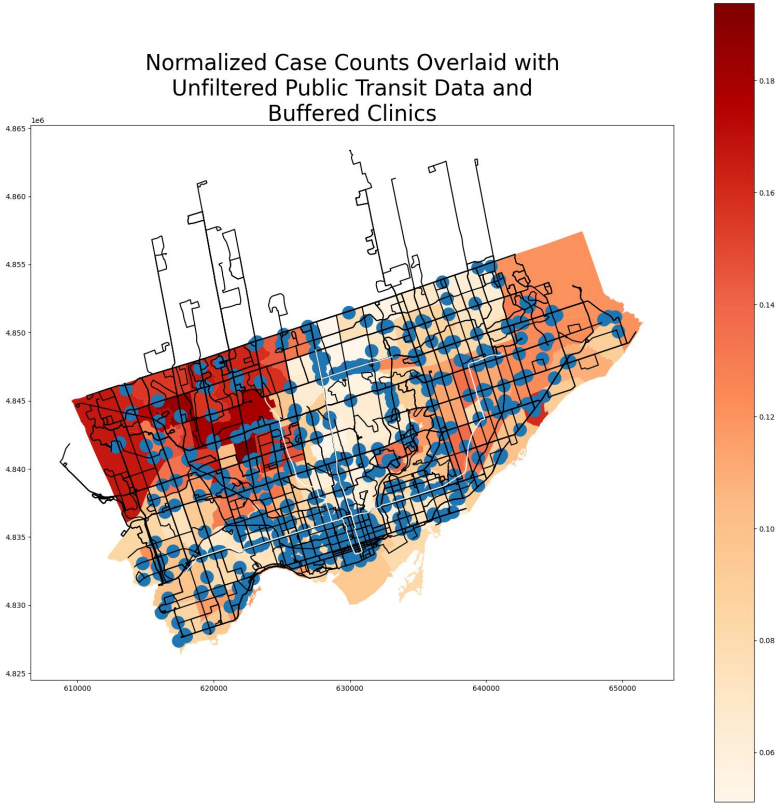
```
import os
import numpy as np

#for creating plots
import textwrap
import matplotlib.pyplot as plt

#geospatial analysis
import geopandas as gpd
import shapely.geometry

#statistical analysis
from libpysal.weights import Queen
from esda.moran import Moran
from esda.moran import Moran_Local
from esda.getisord import G_Local
from splot.esda import moran_scatterplot, plot_local_autocorrelation
from splot.esda import lisa_cluster
```

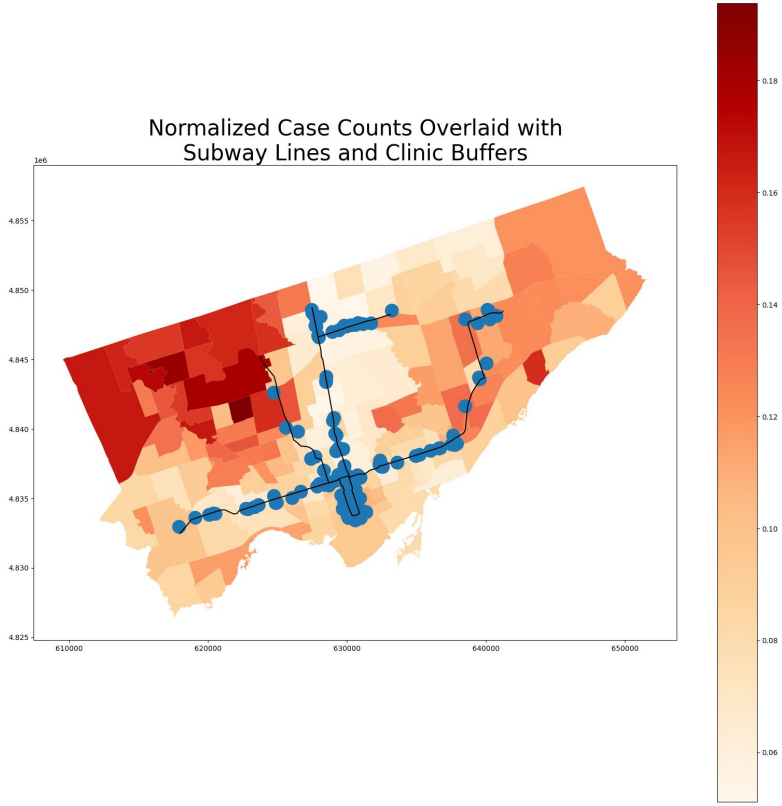
Plotted Data





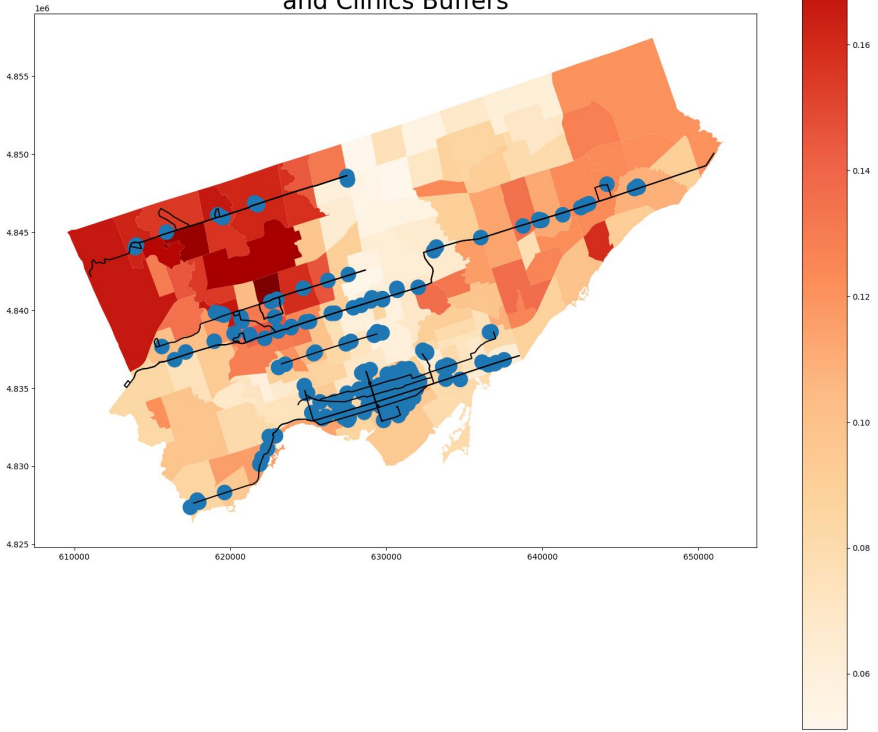
Buffer maps


Normalized Case Counts Overlaid with
Unfiltered Public Transit Data and
Buffered Clinics
1e6
4.865
4.860
4.855
4.850
4.845
4.840
4.835
4.830
4.825
610000
620000
630000
640000
650000
0.18
0.16
0.14
0.12
0.10
0.08
0.06

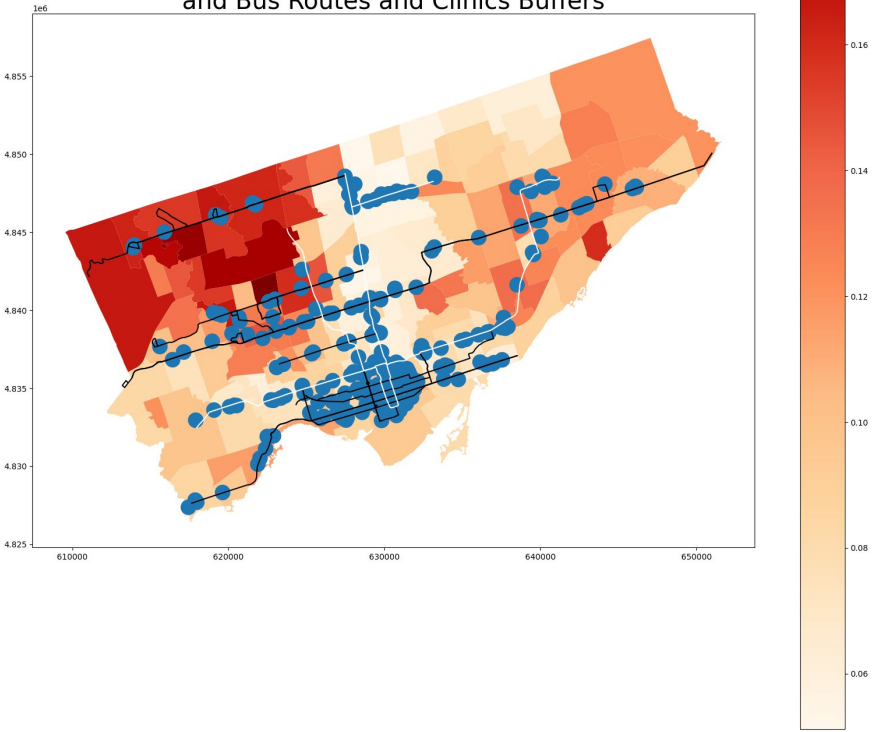

Normalized Case Counts Overlaid with
Subway Lines and Clinic Buffers
1e6
4.855
4.850
4.845
4.840
4.835
4.830
4.825
610000
620000
630000
640000
650000
0.18
0.16
0.14
0.12
0.10
0.08
0.06

Data Processing

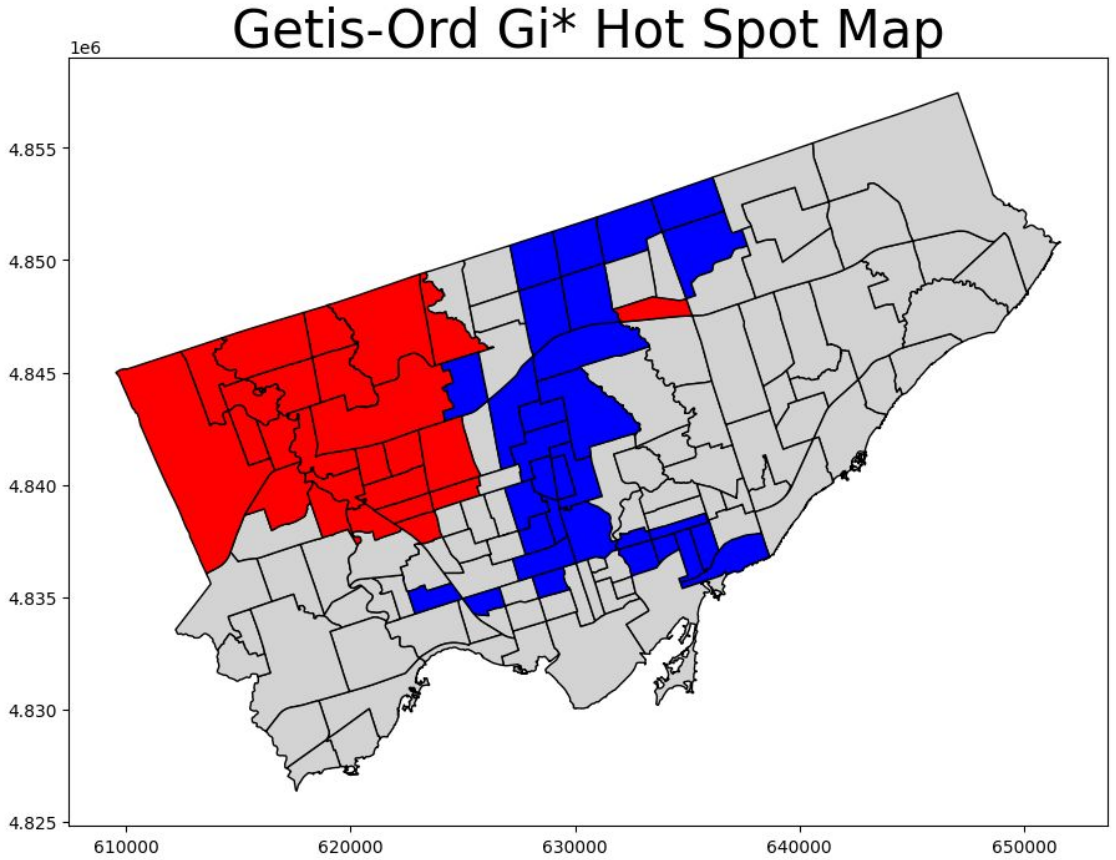
Normalized Case Counts Overlaid with Highest Traffic Streetcar and Bus Routes and Clinics Buffers



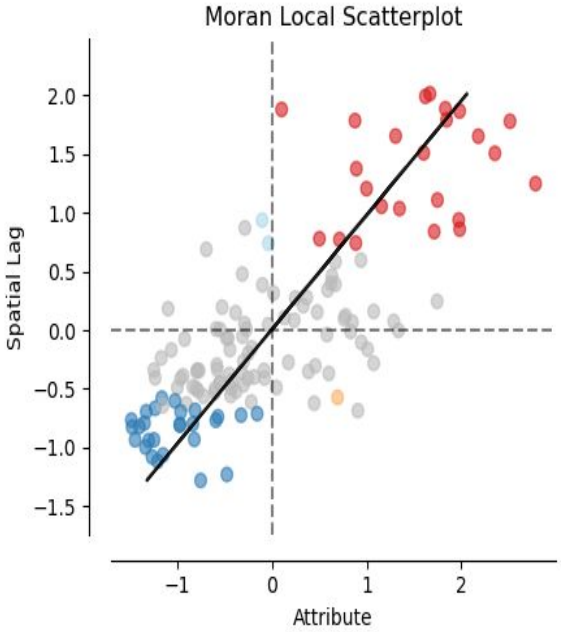
Normalized Case Counts Overlaid with Subway data, Highest Traffic Streetcar and Bus Routes and Clinics Buffers

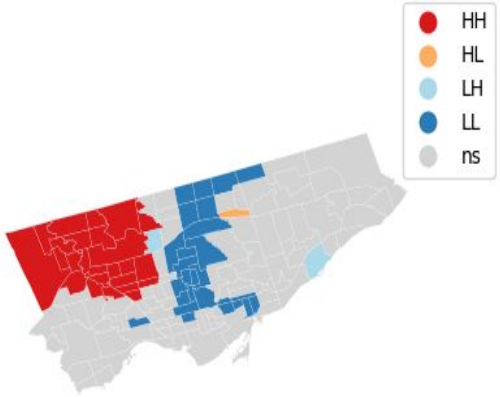


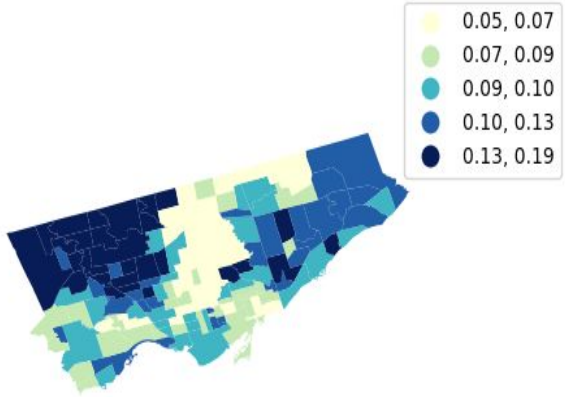
Getis-Ord Gi* Hot Spot Map



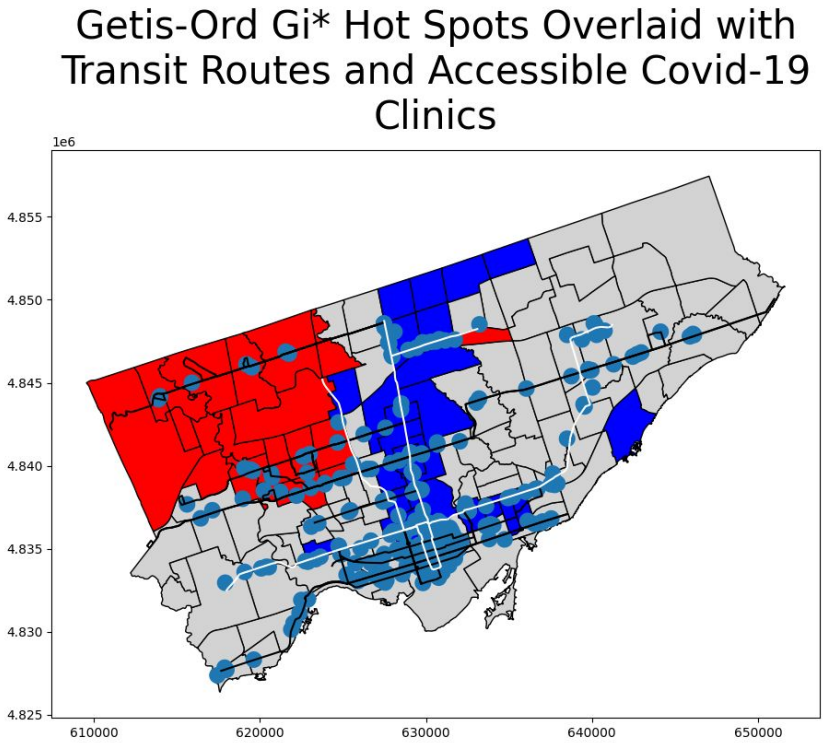
Morans


Moran Local Scatterplot
Spatial Lag
Attribute
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−1
0
1
2


HH
HL
LH
LL
ns


0.05, 0.07
0.07, 0.09
0.09, 0.10
0.10, 0.13
0.13, 0.19

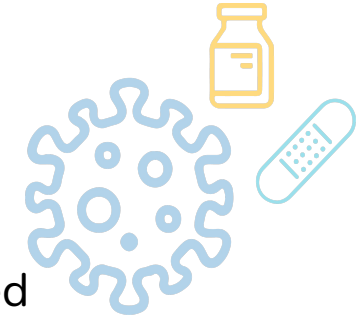
Analysis



Observations

- High levels of infection correlate with low amounts of Covid-19 vaccination clinics
- Low levels of infection correlate with high amounts of Covid-19 clinics that are easily accessible

Conclusion



- **Clinic Accessibility and Infections:** Correlation was noted between accessible vaccination clinics and COVID-19 rates. More infections correlate with fewer accessible clinics; fewer infections correlate with more accessible clinics.

- **Correlation Caution:** Noted correlation, not necessarily causation. To strengthen findings, further details on travel time, vaccination frequency, and transport modes to clinics would be necessary

- **Improving Analysis:** To solidify conclusions, studying travel time, vaccination frequency, and transport modes concerning COVID-19 infections is crucial for a more complete understanding.

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