

The Impact of Race/Ethnicity on the Number of COVID-19 Infection and Death Rates at the State and Local Level

Zac Cheadle, Jiuhe (Rosa) Zhu, Jose Diaz, Daniel Karpowicz, Elaine Cheung

Research Questions

1. What is the impact of race/ethnicity on the number of COVID-19 infection and death rates in the state of Illinois?
2. What is the impact of race/ethnicity on the number of COVID-19 infection and death rates in the city of Chicago?
3. How do the race/ethnic differences in the number of COVID-19 infection and death rates at the state and local level compare against national averages?



Datasets Used

1. COVID Tracking Project API (Illinois COVID Data):

<https://covidtracking.com/data/api2.Chicago>

2. Illinois Census Data: <https://datausa.io/profile/geo/illinois>

3. Chicago COVID Data:

<https://data.cityofchicago.org/Health-Human-Services/COVID-19-Daily-Cases-and-Deaths/naz8-j4nc>

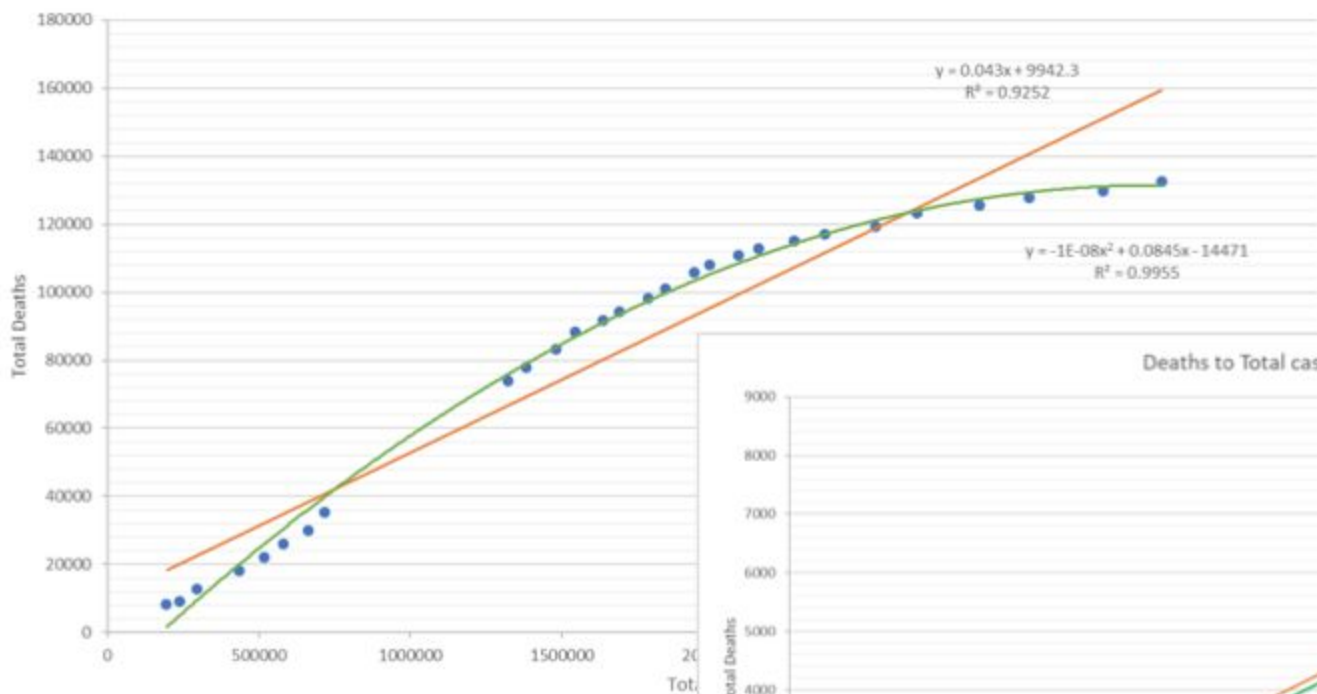
4. Chicago Census Data: <https://datausa.io/profile/geo/chicago-il>





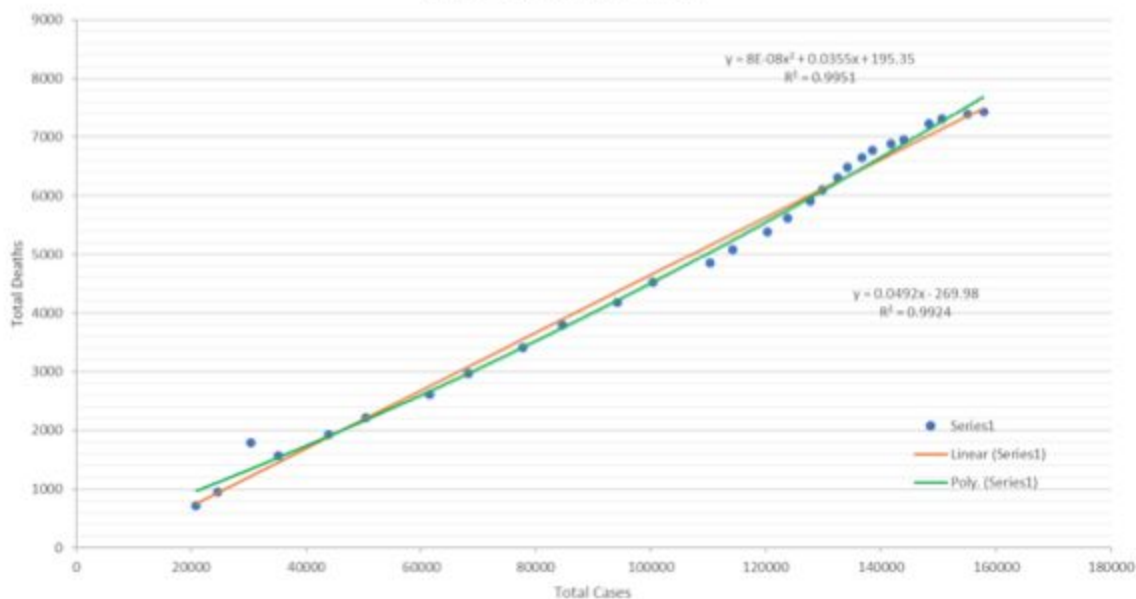
Illinois COVID-19 Infection and Death Rates by Race/Ethnicity

Deaths to Total Cases - USA



Illinois follows a different behavior than USA. **Deaths are growing faster in Illinois**

Deaths to Total cases - Illinois



Poly-line describes better the behavior of the real data
 $R^2 = 0.9955$

Impact of race/ethnicity on the number of COVID-19 infection and death rates

State of Illinois

Main findings – Tendencies, correlation and behavior

Each race tells a different story on COVID-19 infection and death rates.

WHITES:

- % of cases were decreasing but suddenly began to rise – average: 21.3%
- % of deaths is growing faster –from 1.2% to 2.2%

BLACKS:

- % of cases is decreasing and seems to stabilize – average: 18.7%
- % of deaths are stabilizing – average: 1.4%

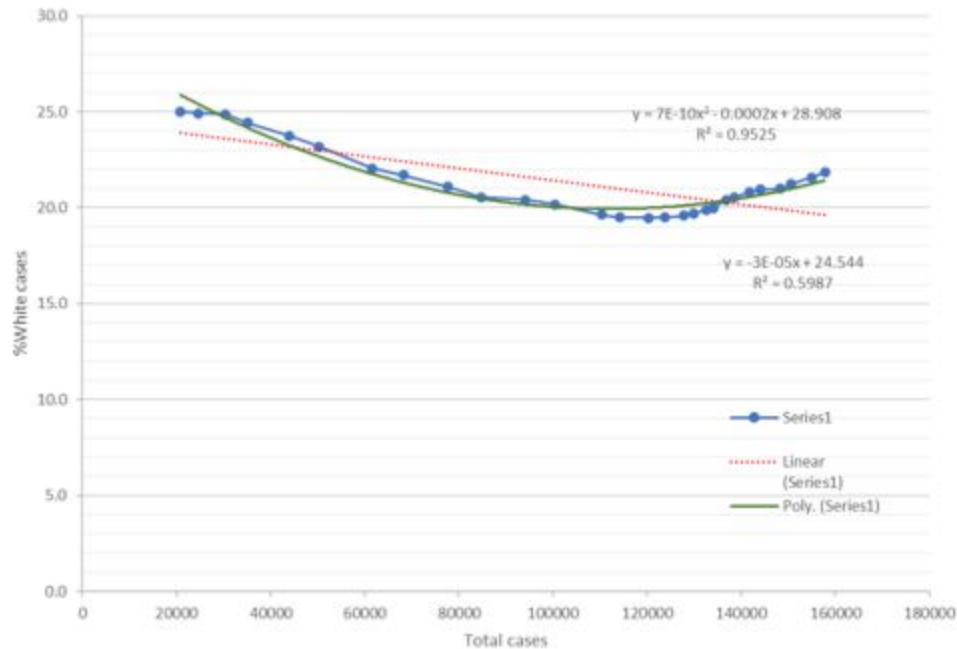
LATIN:

- % of cases are growing – **from 12.1% to 32.6%**
- % of deaths are growing – from 0.3% to 1%

ASIAN:

- % of cases are decreasing – from 3.3% to 2.8%
- % of deaths are stable – average: 0.2%

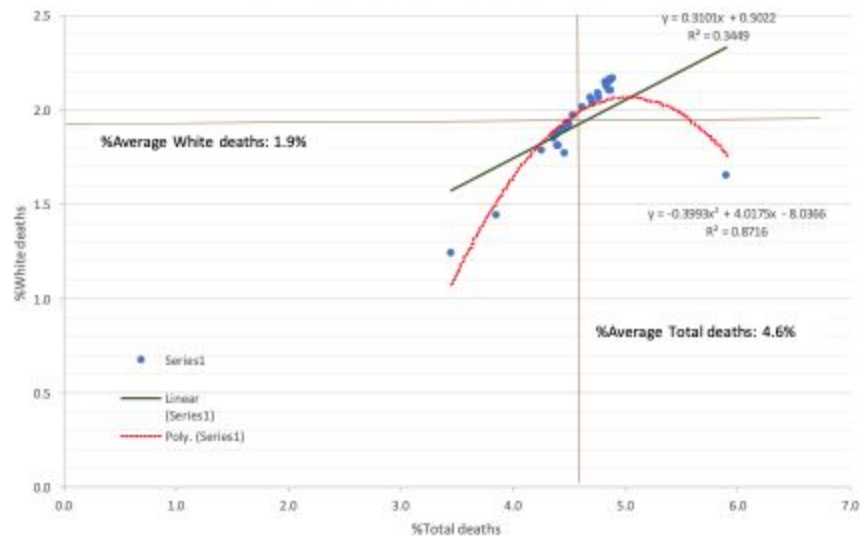
%White cases to Total cases - Illinois



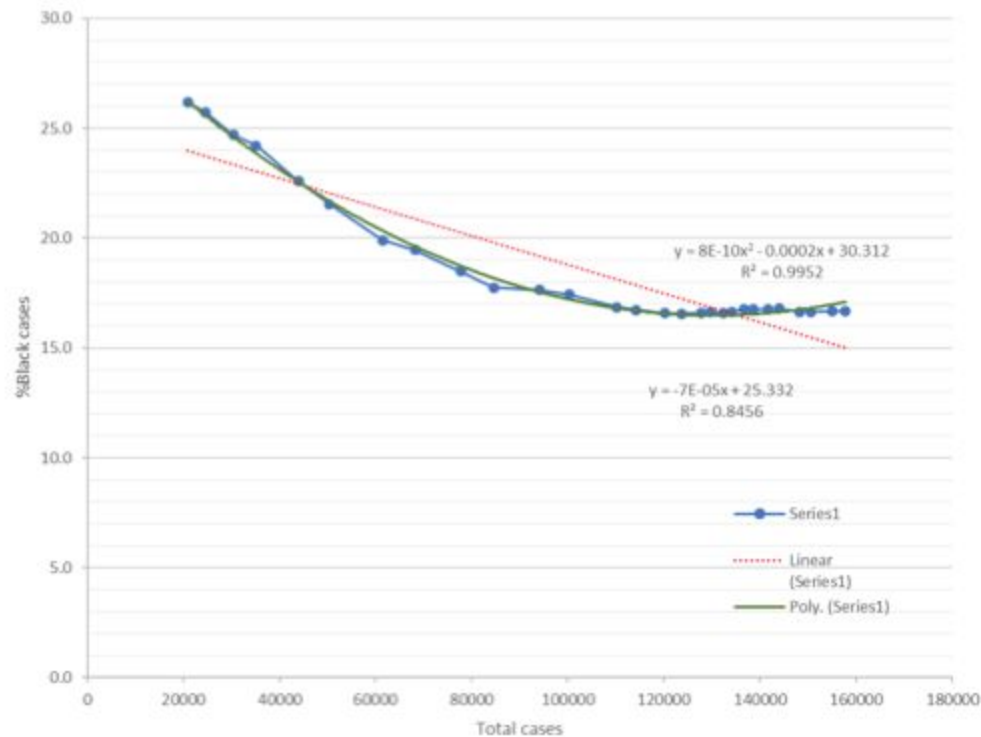
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%White deaths to %Total deaths - Illinois

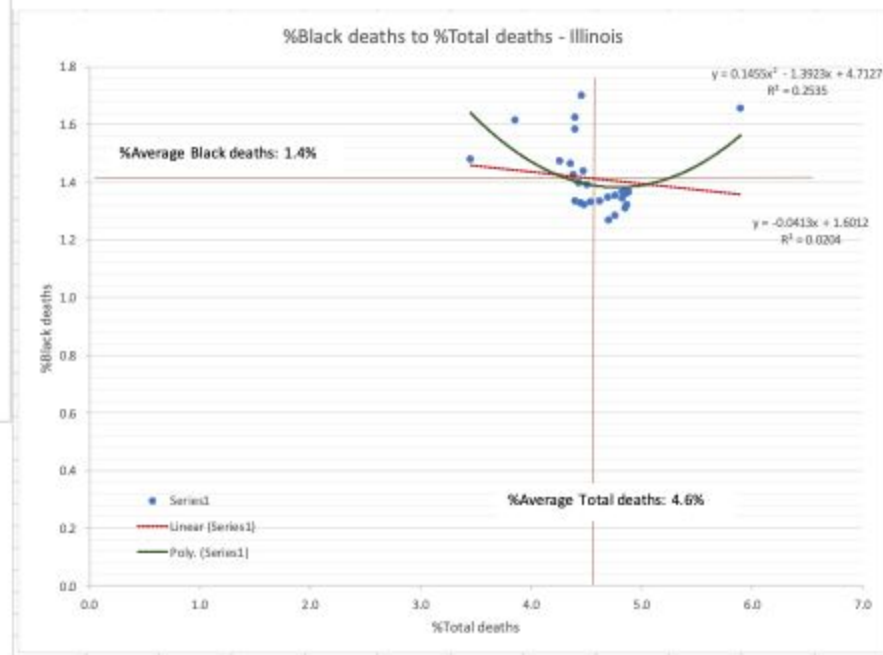


%Black cases to Total cases

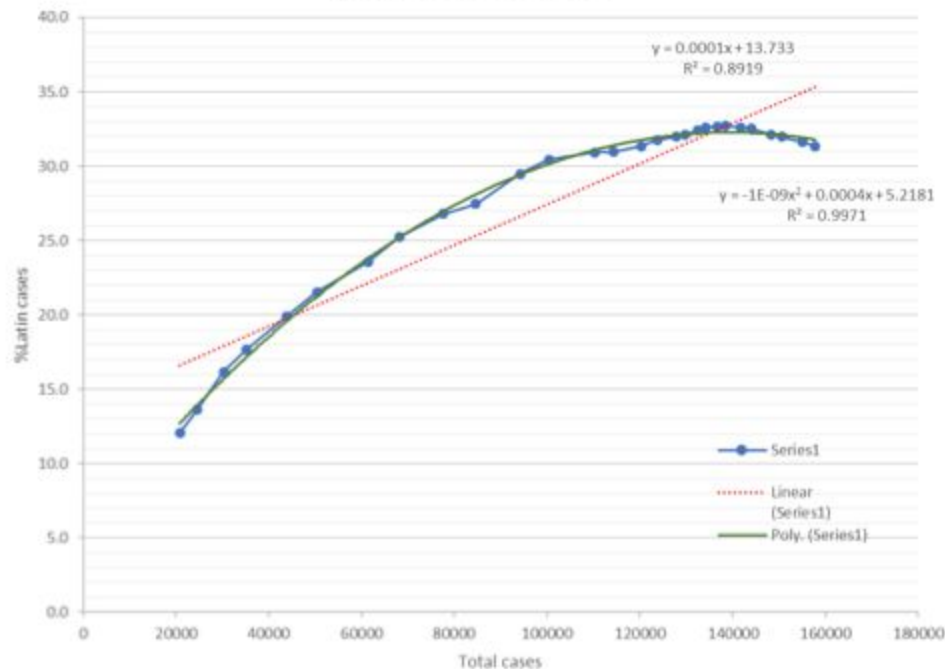


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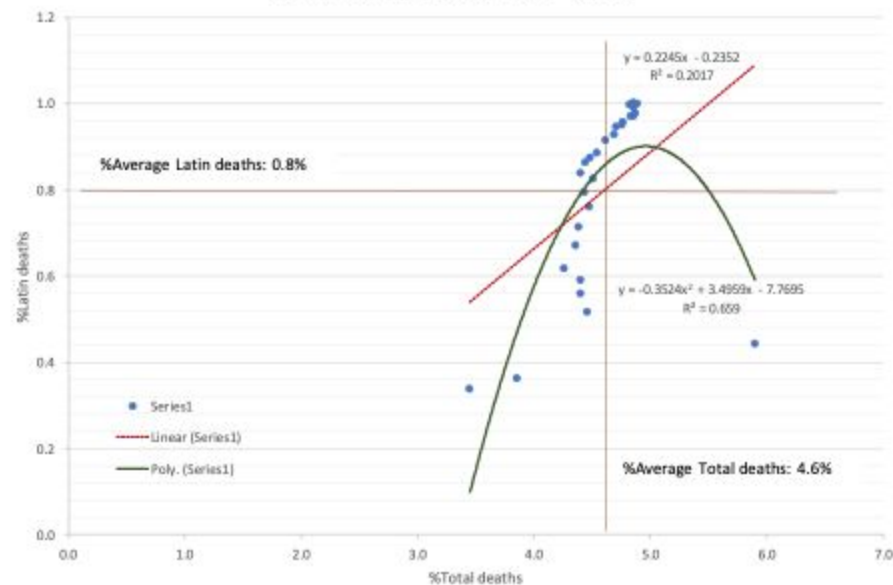
%Latin cases to Total cases



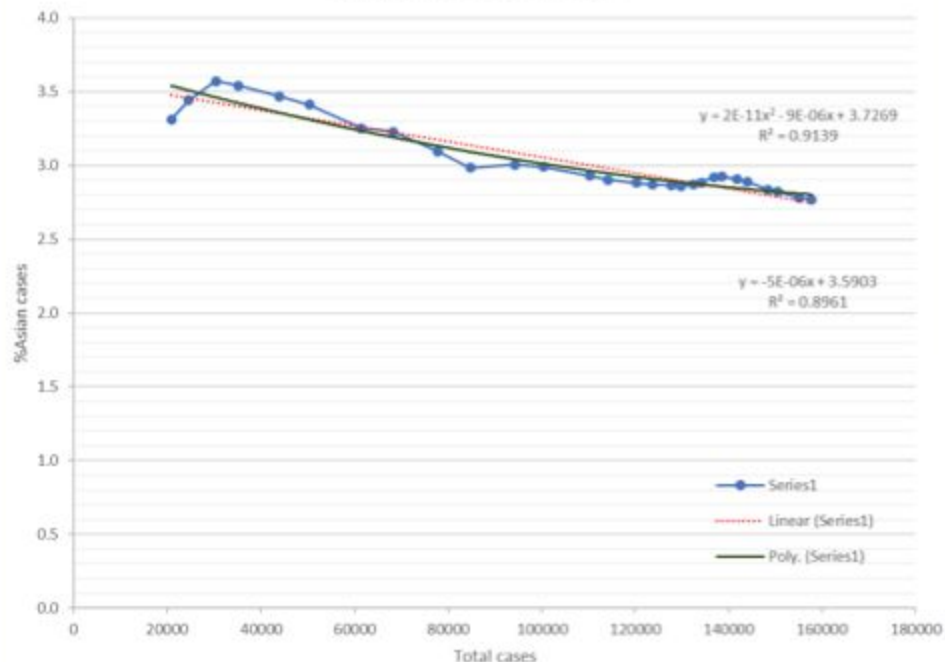
LATIN:

- .- % of cases are growing – **from 12.1% to 32.6%**
- .- % of deaths are growing – **from 0.3% to 1%**

%Latin deaths to %Total deaths - Illinois



%Asian cases to Total cases

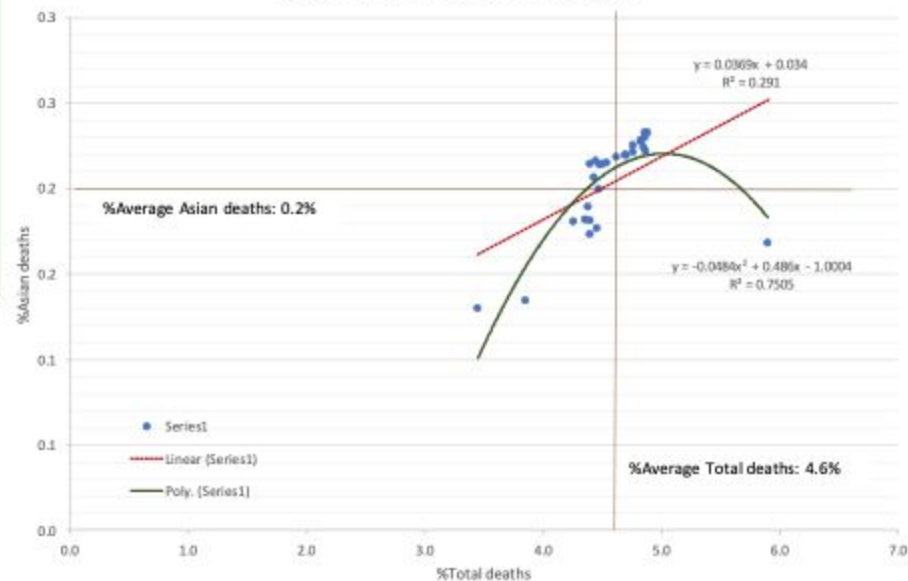


ASIAN:

.- % of cases are decreasing – from 3.3% to 2.8%

.- % of deaths are stable – average: 0.2%

%Asian deaths to %Total deaths - Illinois



More Analysis

Merged Illinois COVID-19 tracking dataset with Illinois Census data to determine the rates of COVID-19 infection and death by race/ethnicity relative to the race/ethnicity breakdown of the population

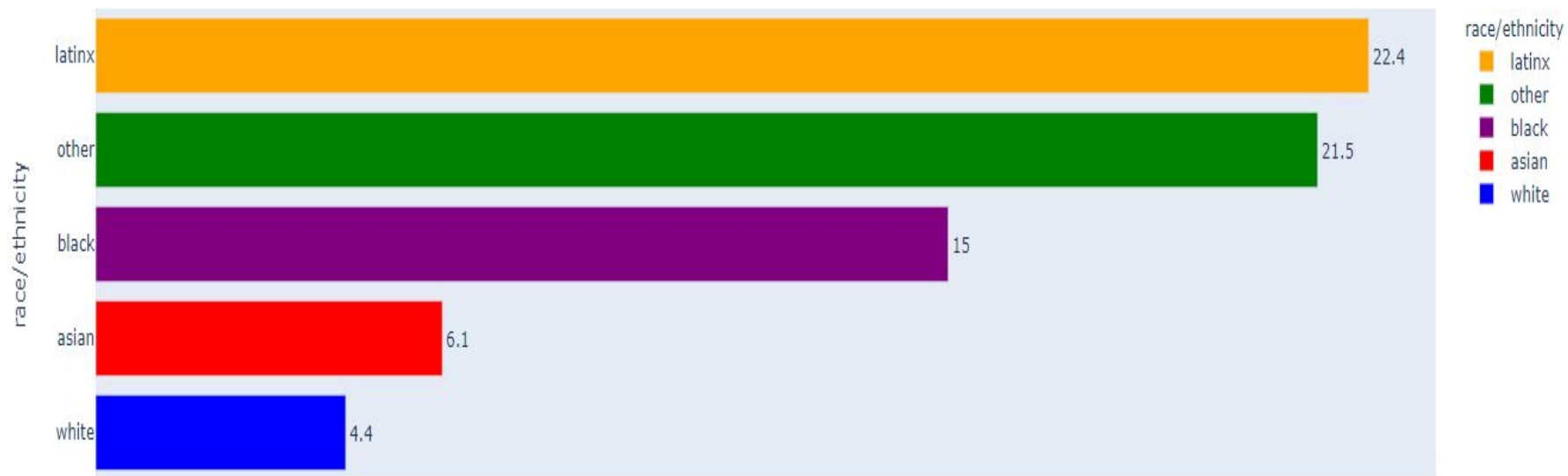
- a. Population by Race/Ethnic Category in Illinois
- b. Cases per 1000 people in Race/Ethnic Category in Illinois
- c. Deaths per 1000 people in Race/Ethnic Category in Illinois



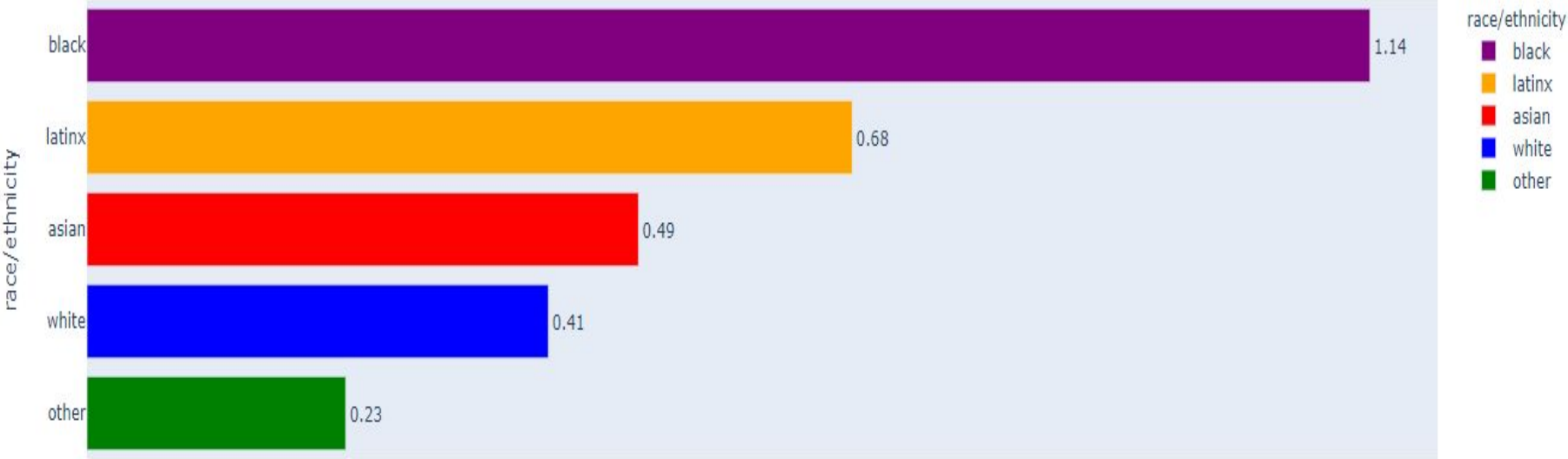
Population by Race/Ethnic Group in IL



Cases per 1000 People by Race/Ethnic Group in IL



Deaths per 1000 People by Race/Ethnic Group in IL





Chicago COVID-19 Infection and Death Rates by Race/Ethnicity

Data Exploration and Cleanup Process

Data Retrieval

- Retrieved the data from **COVID-19 Daily Cases and Deaths** through Soda API and saved the dataset into "covid_chicago.csv" file
- Created data frames by extracting corresponding columns from covid_chicago.csv

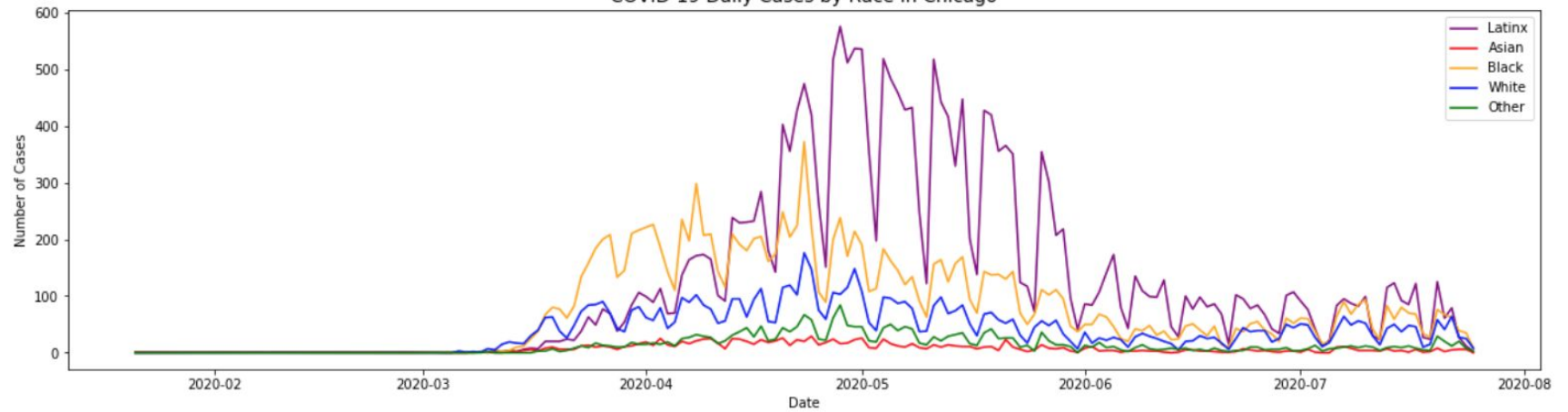
Data Cleaning

- Dropped rows containing any empty cells

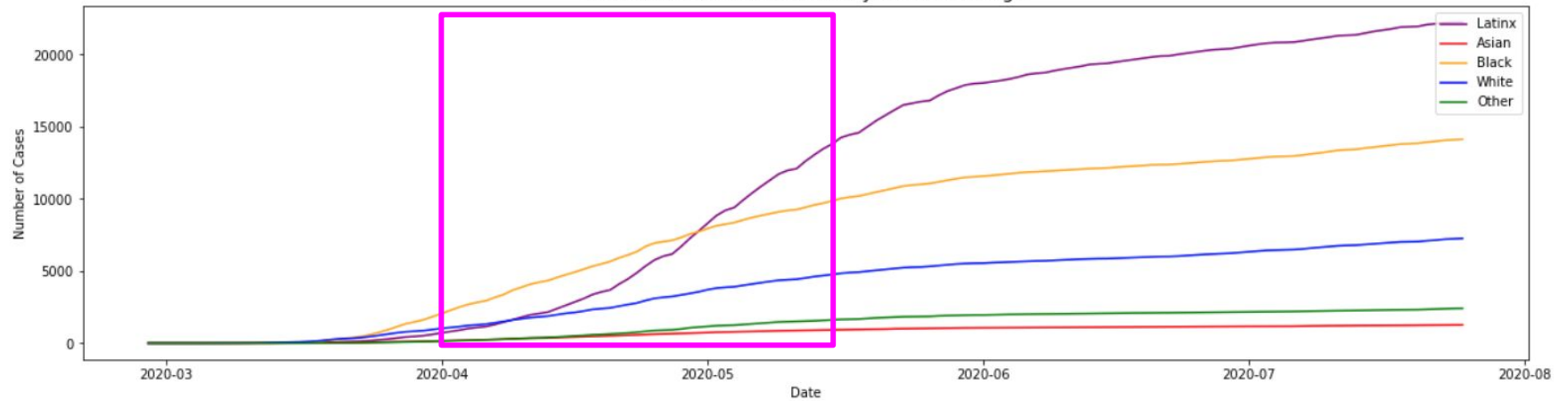
Data Formatting

- Changed data type from **str** to **int**
- Removed **time** from **date&time** variable

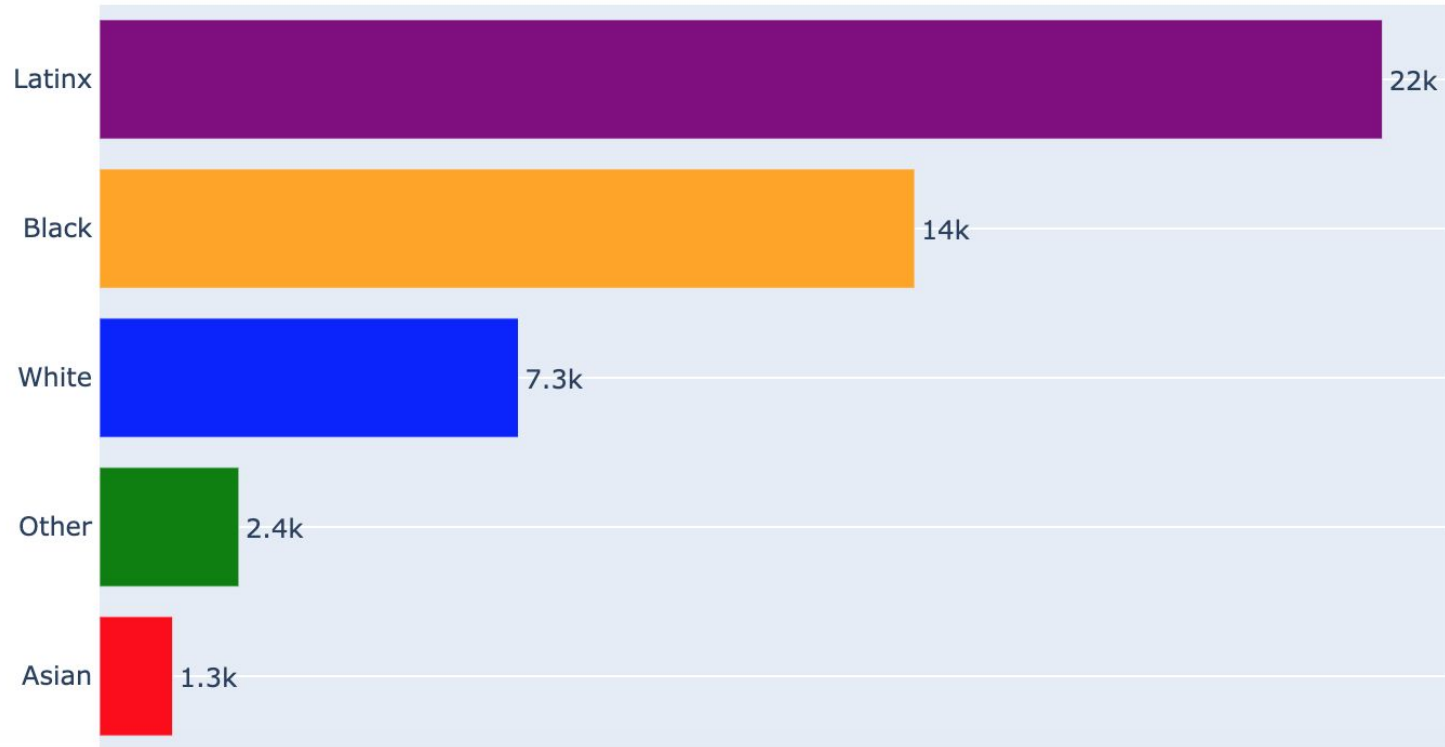
COVID-19 Daily Cases by Race in Chicago



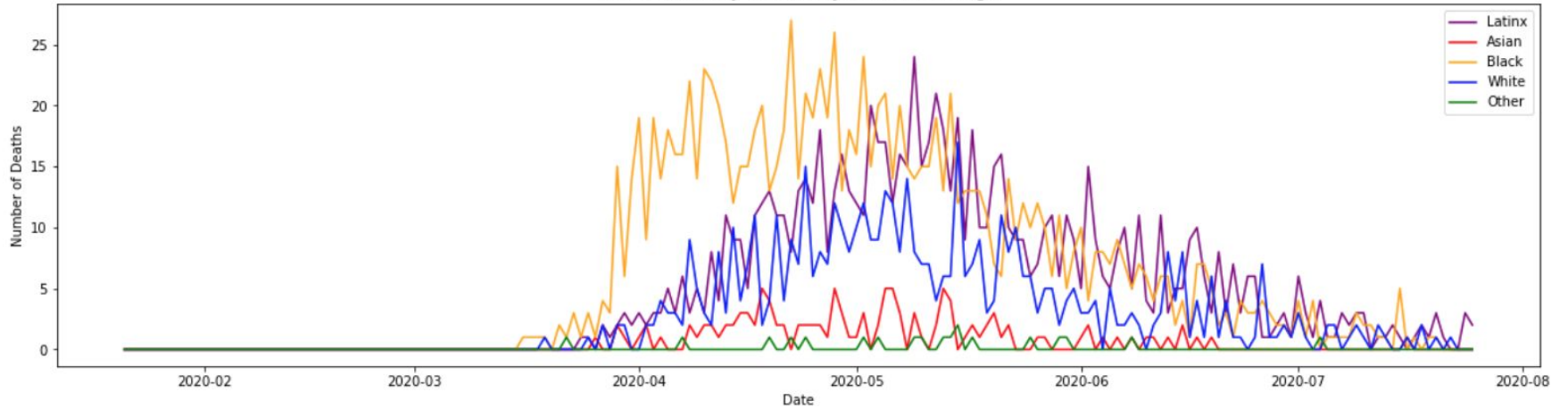
COVID-19 Cumulative Cases by Race in Chicago



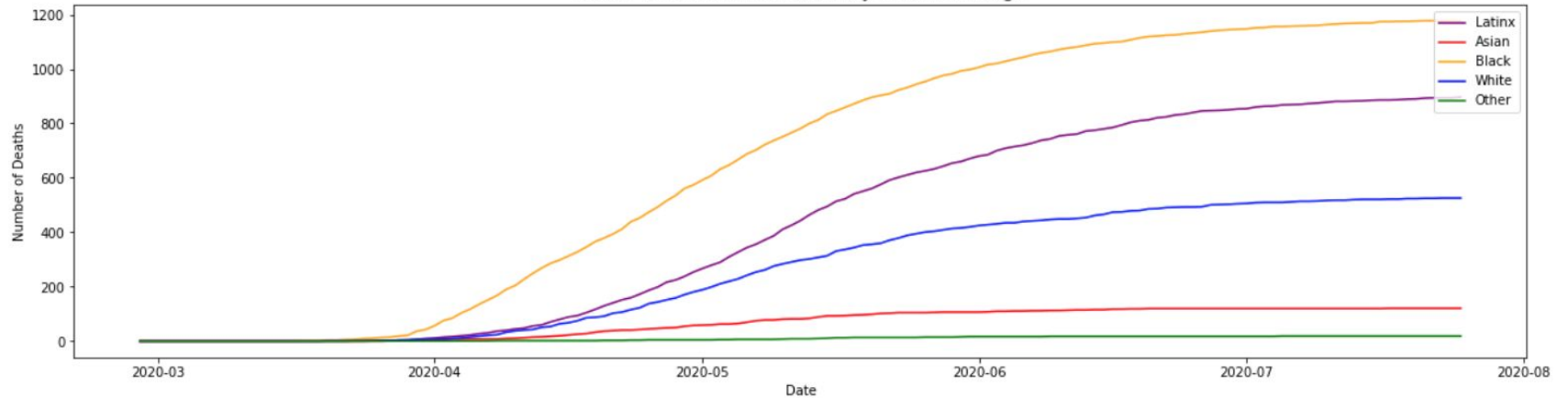
COVID-19 Cases by Race in Chicago



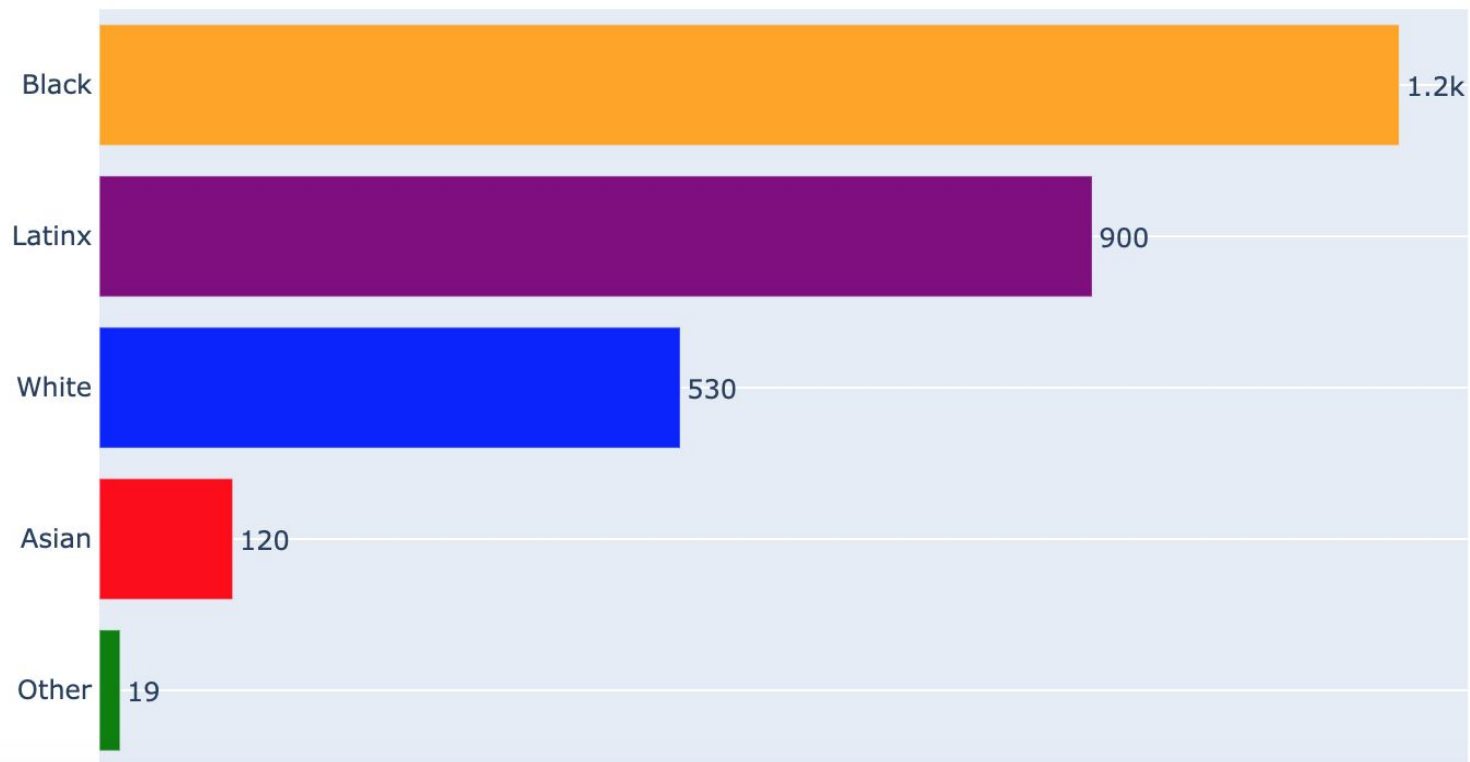
COVID-19 Daily Deaths by Race in Chicago



COVID-19 Cumulative Deaths by Race in Chicago



COVID-19 Deaths by Race in Chicago



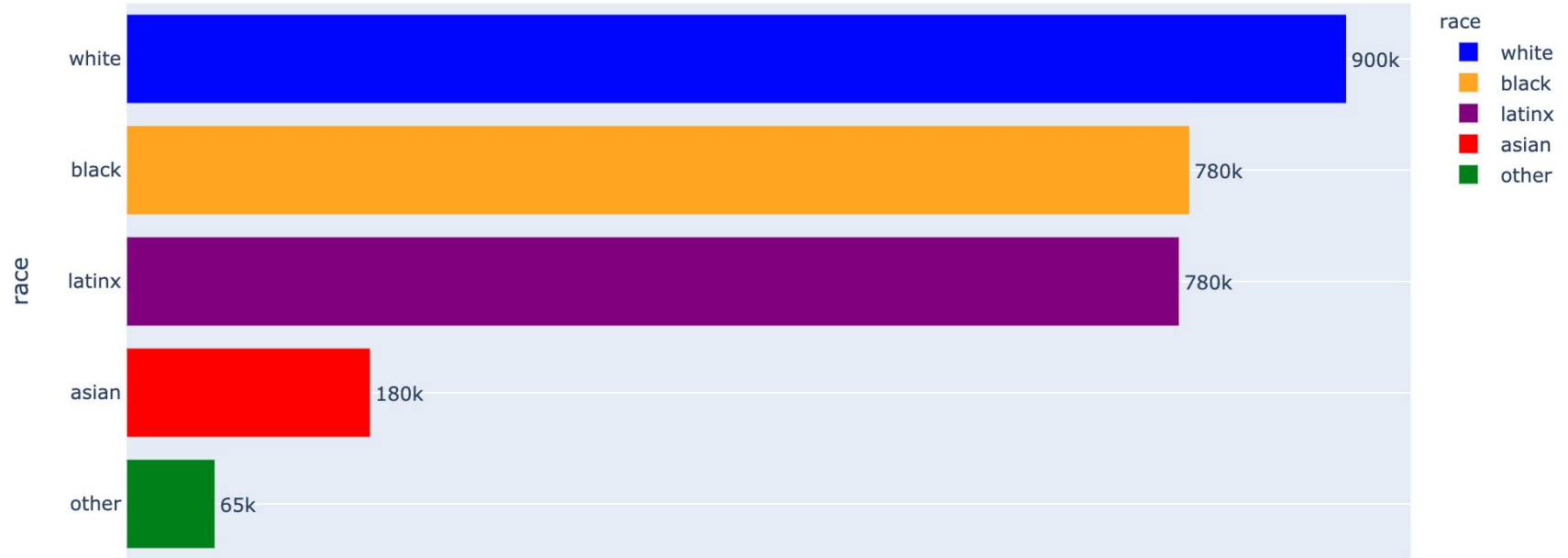
More Analysis

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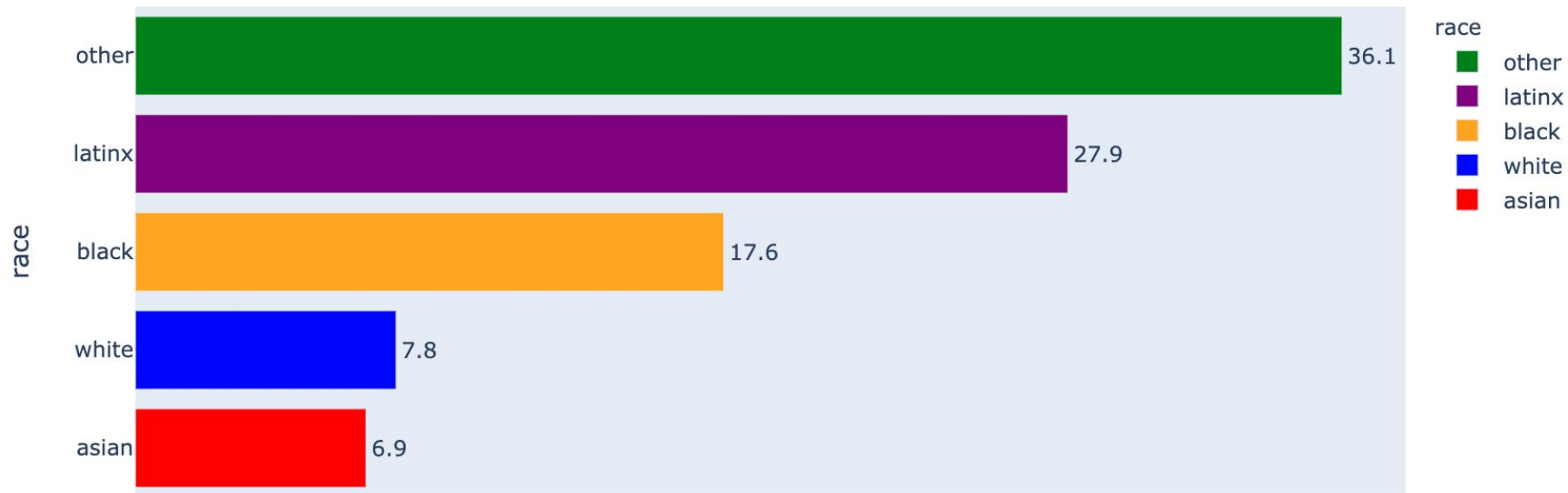
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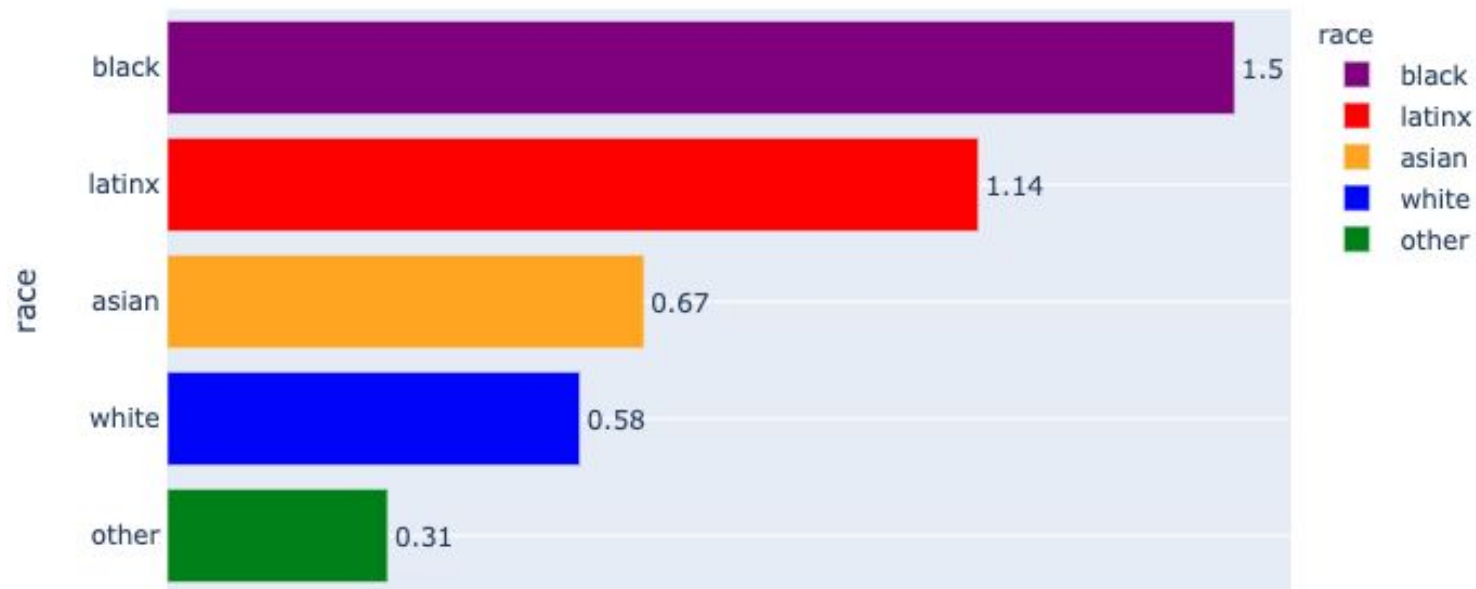
Population by Race/Ethnic Group in Chicago



Cases per 1000 People in Race/Ethnic Category in Chicago

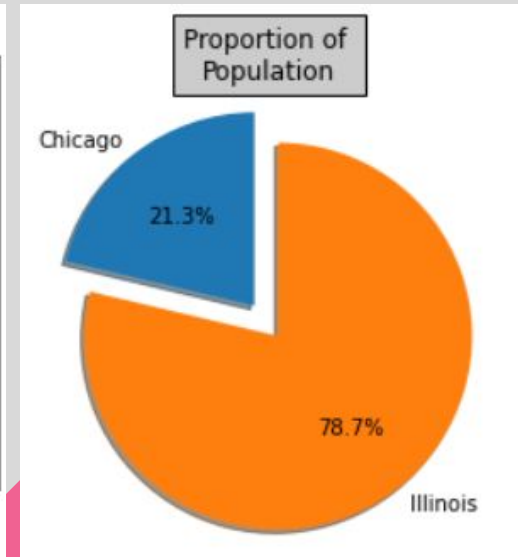
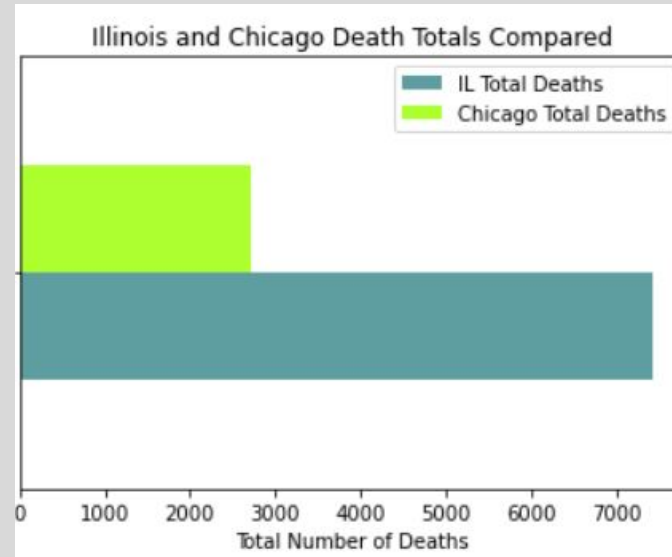
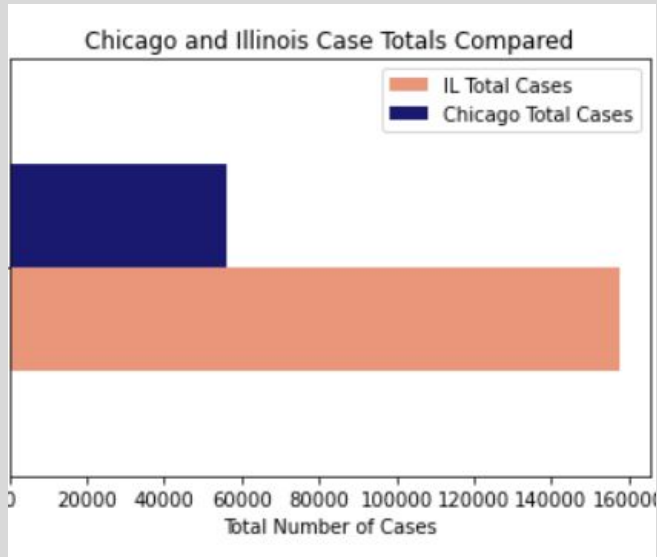


Deaths per 1000 People in Race/Ethnic Category in Chicago



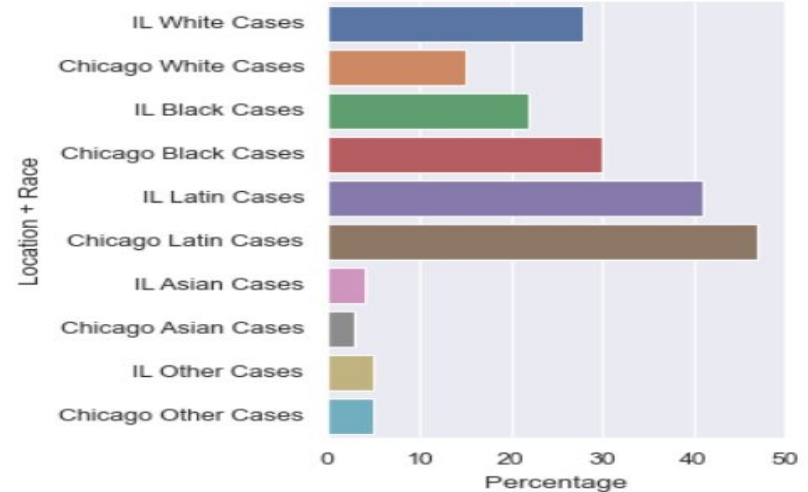
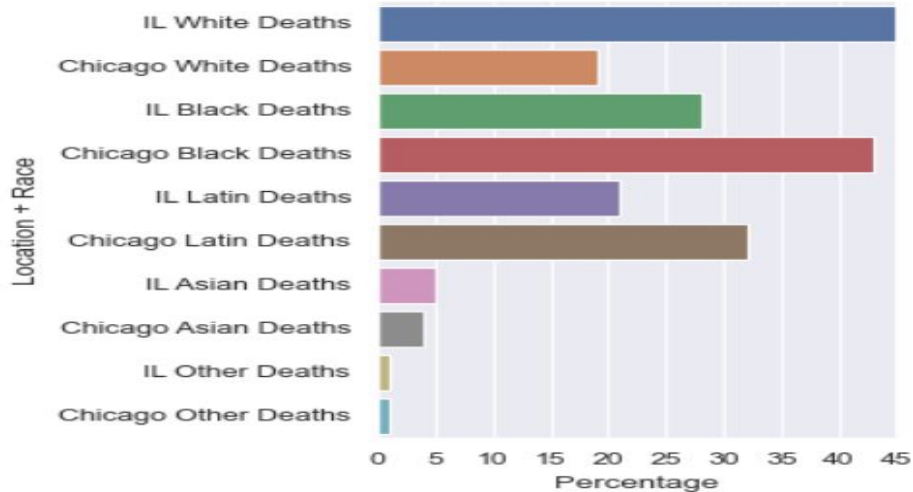
State vs. City: Population Dynamics

- **Major Takeaway:** Despite only constituting 21.3% of the Illinois population, Chicago represented 35.7% of total cases and 36.6% of total deaths in Illinois.
- Discussion:
 - Do urban centers create environments more conducive to the spread of the virus?
 - Is it that urban centers are less prepared as suggested by KFF Health Tracker System (ref: <https://www.healthsystemtracker.org/brief/urban-and-rural-differences-in-coronavirus-pandemic-preparedness/>)



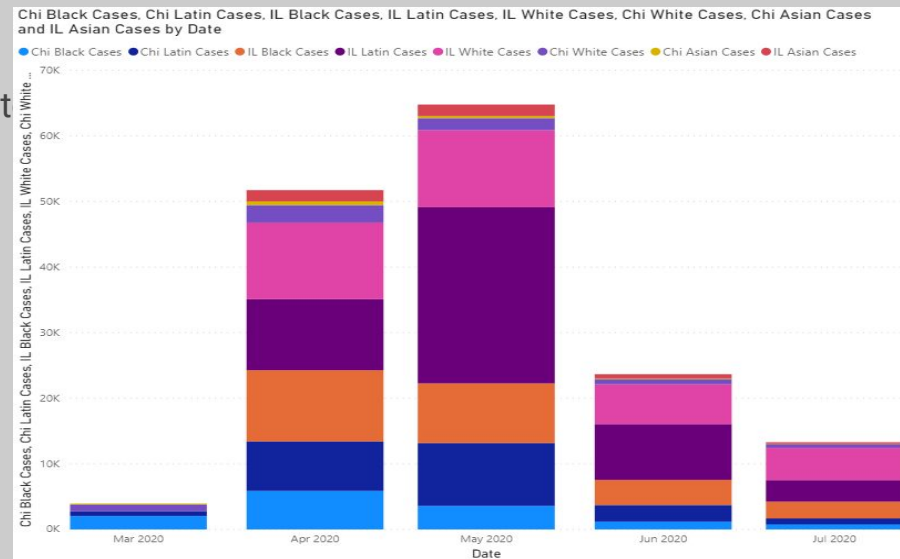
State vs. City: Racial Disparities

- **Major Takeaway:** Racial disparities are amplified in urban centers. This is made clearer when comparing against the state data and visualizations. For instance, black residents of Chicago represented 43% of the city's COVID19 deaths despite only constituting 30% of the city's population. We do not see a similar effect on the state level.
- Discussion:
 - Is this related to the acknowledged disparity between health facilities and outcomes for various racial groups in the city? (ref: <https://today.uic.edu/new-report-details-chicagos-racial-ethnic-disparities>)
 - How does a public health crisis like COVID19 help us identify and address pre existing disparities?



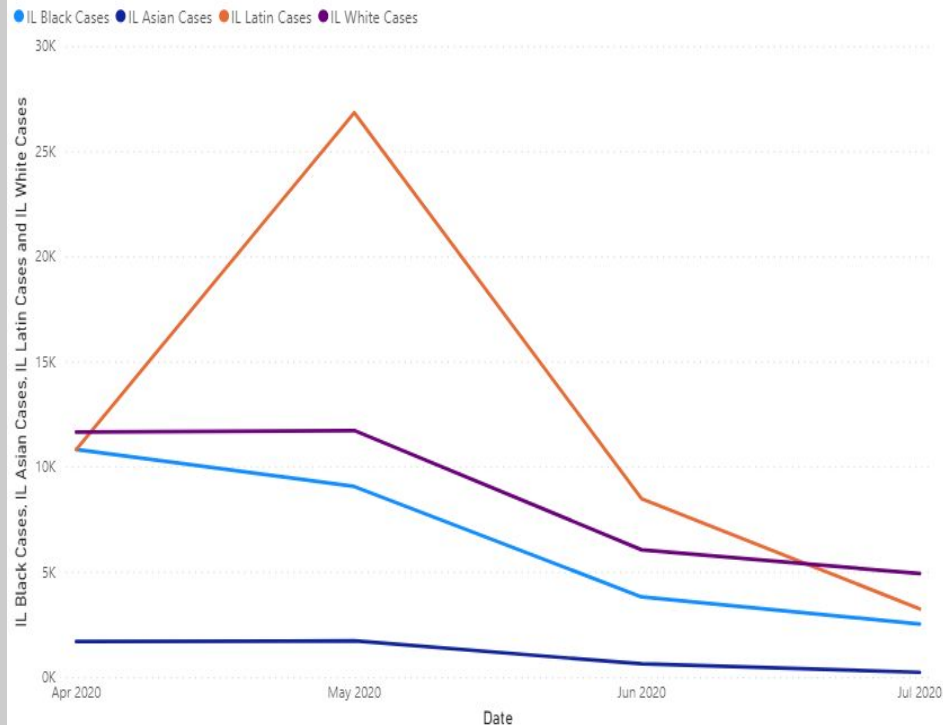
State vs. City: Case Trends

- **Major Takeaway:** The Latin community experienced significant spikes in COVID19 cases from the outset for both Chicago and Illinois data sets. Also, it is interesting to note that the spike we see in Chicago Black cases is not reflected in the Illinois data set.
- Discussion:
 - In general, the trend lines suggest that our efforts are indeed flattening the curve in terms of case numbers. However, many fear that we may see a resurgence in cases and the data from John Hopkins (ref: <https://coronavirus.jhu.edu/data/new-cases-50-states>) suggests Illinois along with many other states are beginning to see that resurgence manifest in data.

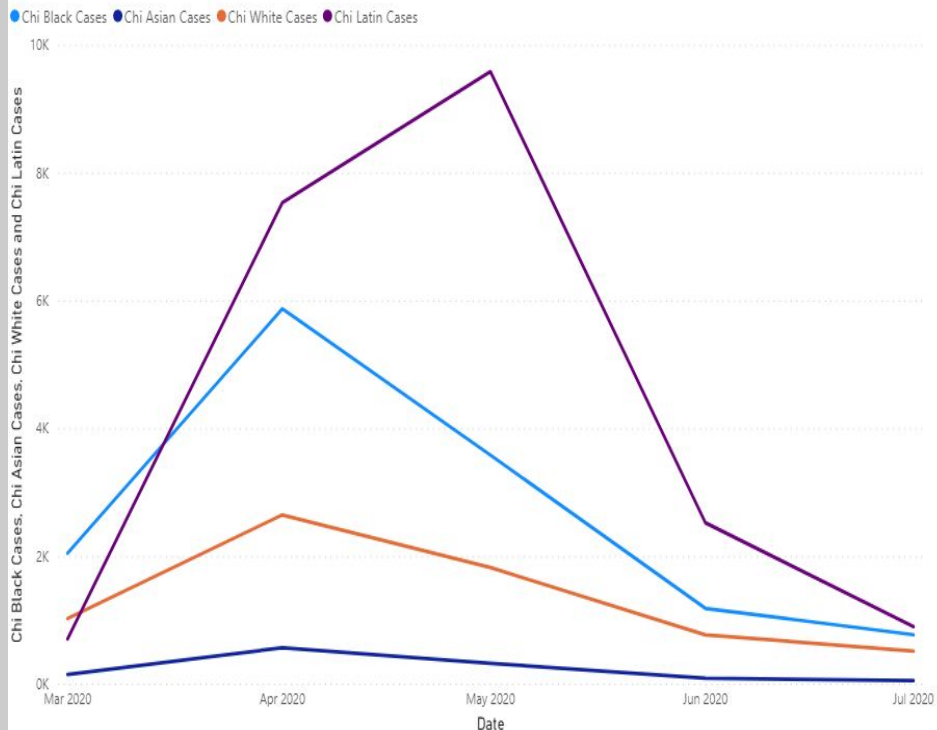


State vs. City: Additional Visualizations

IL Black Cases, IL Asian Cases, IL Latin Cases and IL White Cases by Date



Chi Black Cases, Chi Asian Cases, Chi White Cases and Chi Latin Cases by Date



IN SUMMATION

- Urban centers have a disproportionate impact on COVID19 Cases and Deaths.
 - For a variety of reasons, the virus appears to impact Chicago more heavily than Illinois.
- Racial disparities are amplified in urban centers.
 - In particular, the Black and Latin communities here in Chicago have suffered a considerably greater impact than the city White population.
- The trend lines for Chicago and Illinois suggest we have been somewhat successful in terms of flattening the curve. However, only by consistently monitoring and modeling the data, we can make informed policy decisions related to COVID19 at state and local levels.
- COVID19 data is still quite novel and rife with potential discoveries. Government officials and policymakers would do right to carefully consider the data from the fallout of this health crisis to positively impact future health and development planning throughout the United States.

THANK YOU!