

# Nashville COVID-19 Infection and Vaccination Analysis

Presented by: Nashville Software School  
Data Analytics Cohort 4

# Nashville Strong

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*"The COVID-19 pandemic has been a time of unprecedented challenge for all Nashvillians. But our community is stronger than the coronavirus, and we will see the other side of this crisis together."*

- Mayor John Cooper



# About the Data

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## Assumptions:

- First doses only
- Zip code removal
- Data error removal
- Correlation
  - Positive: More than 0.355
  - Negative: Less than -0.355

### COVID-19 Cases

- Report Date
- Zip code

### Vaccinations

- Date
- Zip code

### Income | Age | Education | Race & Ethnicity

- Zip Code
- Percent of Population per Subset

Example: 24% of the zip code population are Hispanic or Latino

# Possible Factors

## Key Events

- Holidays
- Government Mandates
- Weather

## Income

- High
- Medium
- Low

## Age

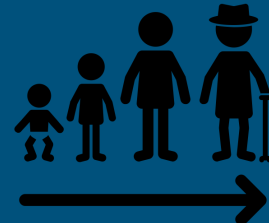
- 0 to 20
- 21 to 39
- 40 to 59
- 60 to 79
- 80+

## Education

- College Degree

## Race/Ethnicity

- American Indian and Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian and Other Pacific Islander
- Two or more races
- White
- Other


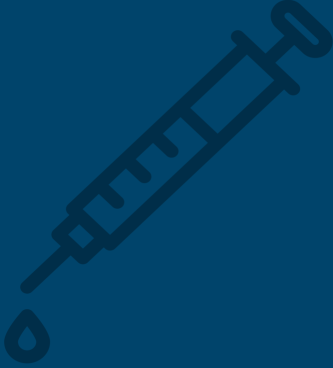


# Overview

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## Purpose:

To find possible correlations between COVID-19 cases, vaccination count, and other factors.


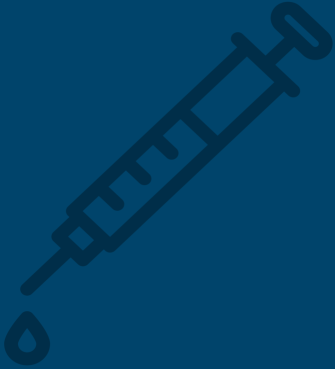
Risk Factors	
Positive Correlation	Negative Correlation
Cases	Vaccinations
	

# Overview

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## Purpose:

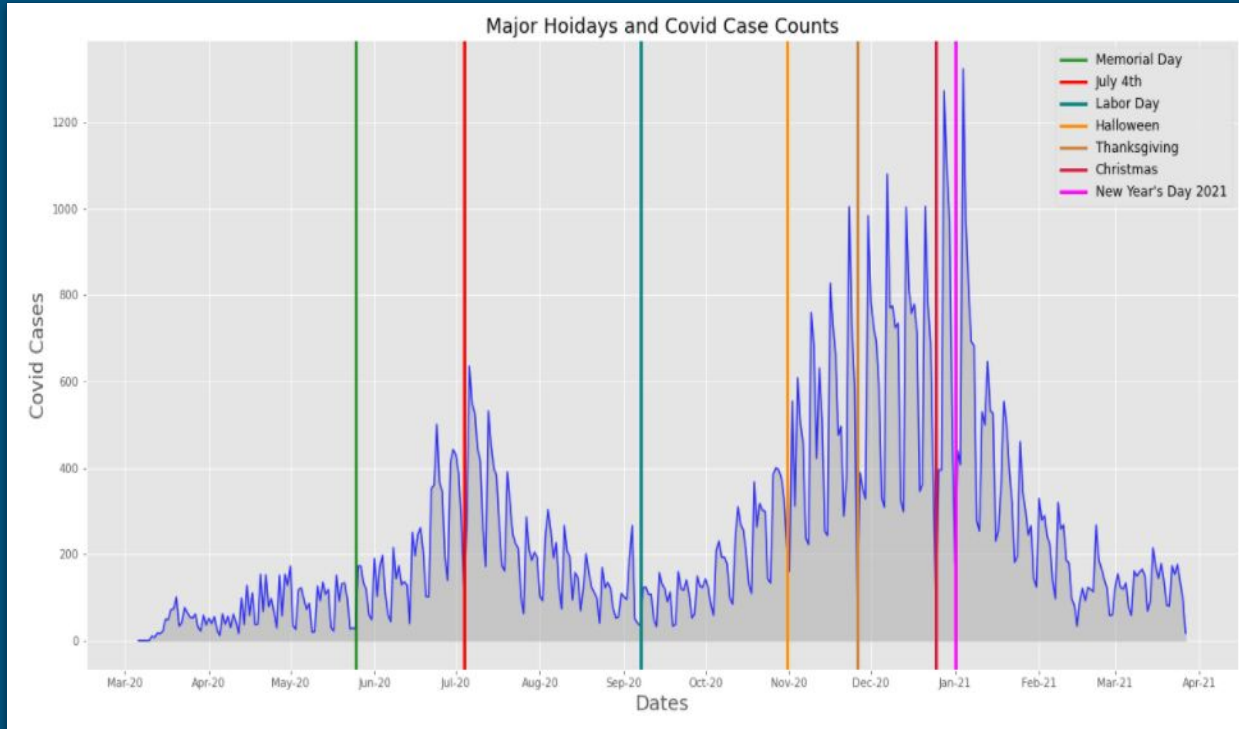
To find possible correlations between COVID-19 cases, vaccination count, and other factors.

Risk Factors	
Positive Correlation	Negative Correlation
Cases	Vaccinations
	



# COVID in Nashville over Time

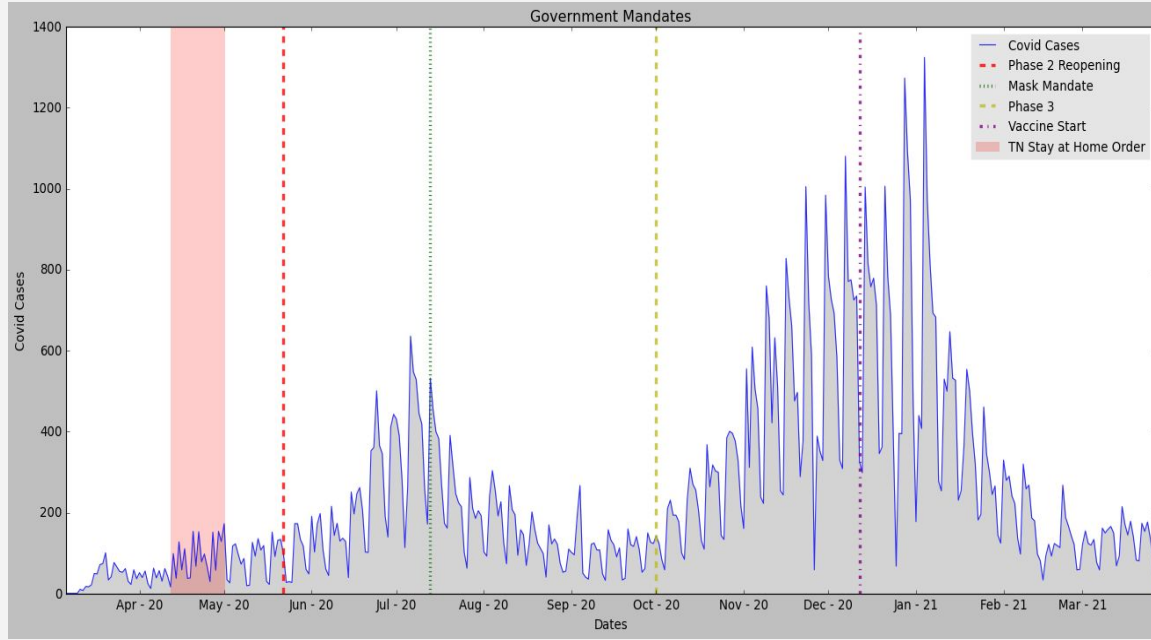
# COVID Cases Over Time -- Holidays



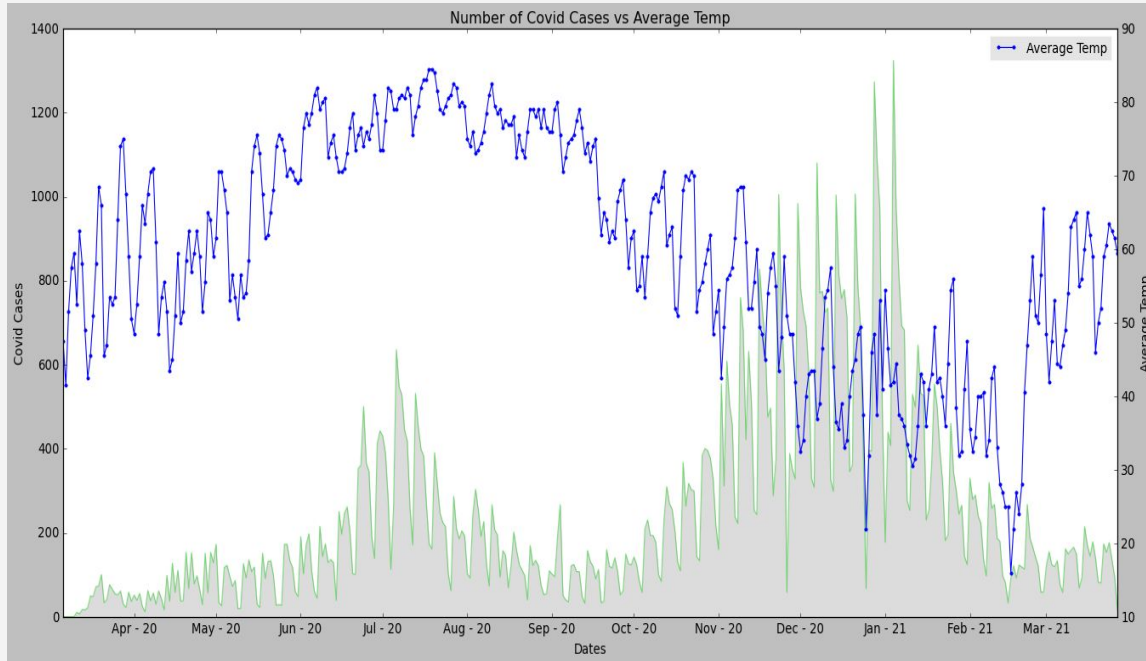


Correlation : **Yes**

# COVID Cases Over Time -- Government Mandates



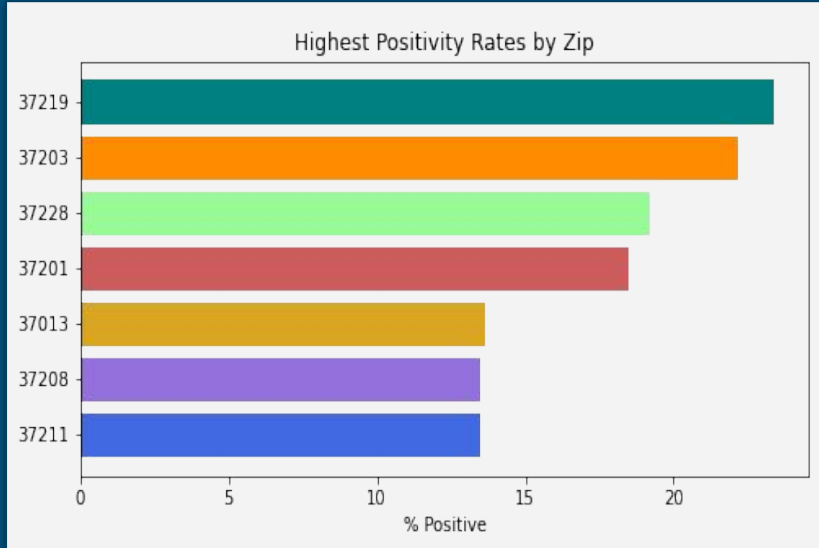
# COVID Cases Over Time -- Temperature



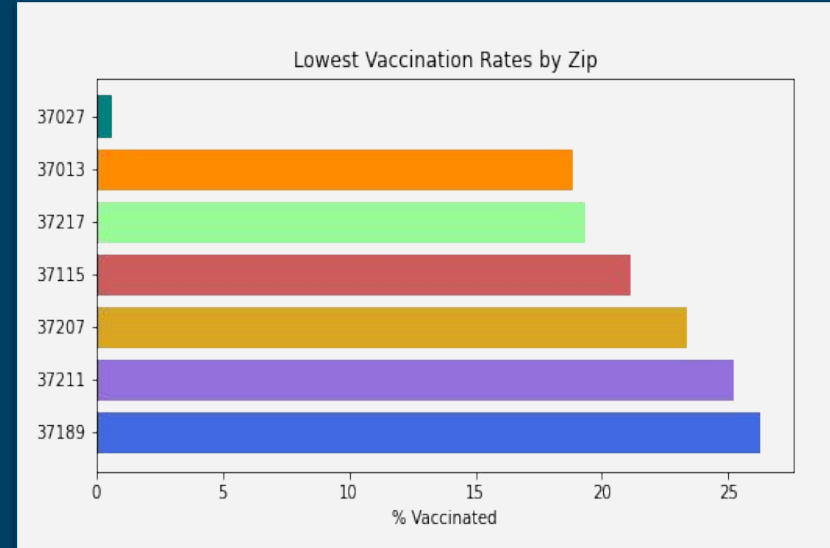


# Nashville Areas of Risk by Zip Code

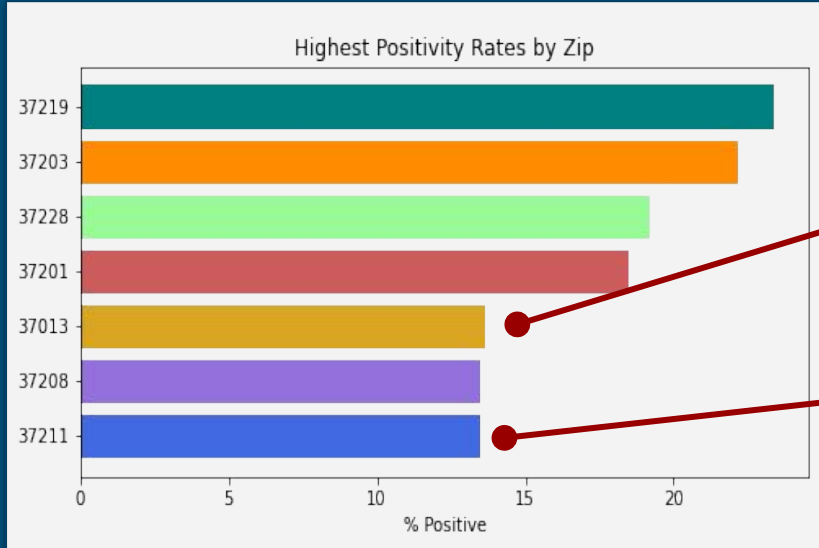
# Zip Codes with High Cases



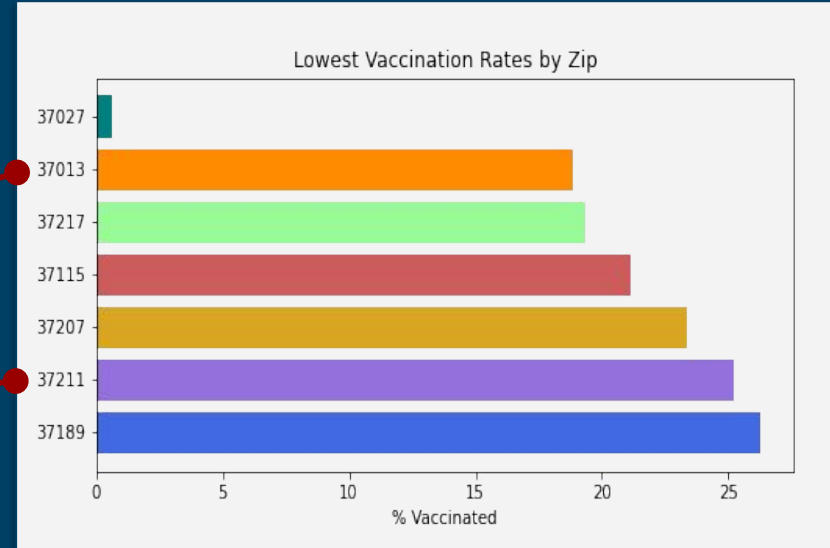
# Zip Codes with Low Vaccinations



# Zip Codes with High Cases



# Zip Codes with Low Vaccinations



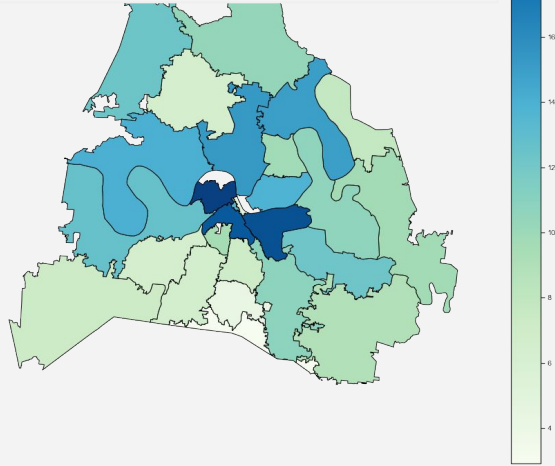
A faint, stylized graphic of a virus particle, resembling a coronavirus, is centered in the background. It has a circular core with numerous spike-like protrusions extending outwards. The entire graphic is rendered in a light blue color that blends with the dark blue background.

# COVID & Nashville Demographics

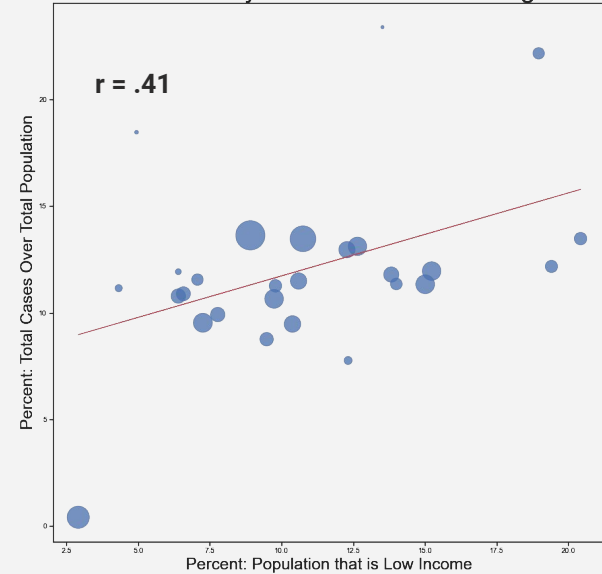
# Income - Low

Correlation : **Positive**

Percentage of Low Income Population  
by Zip Code



Infections by Low Income Percentage



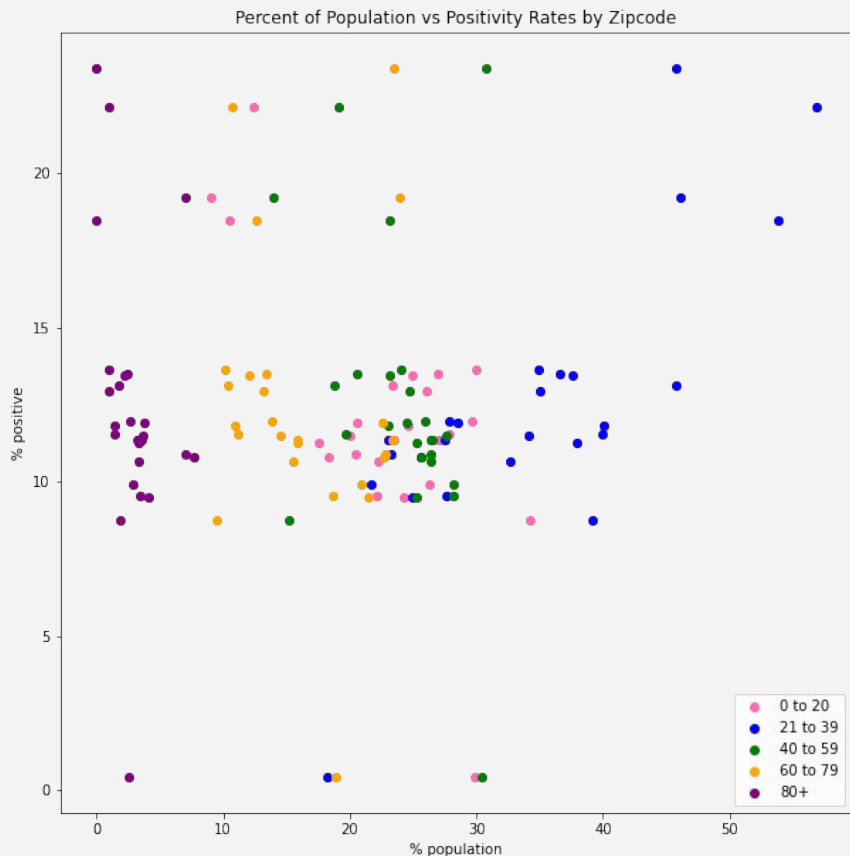
# Age - Overview

--Divided Nashville population into five age groups

--Compared density of each age group in a zip to the percentage of that zip's population who have contracted COVID

--One positive correlation

--Four negative correlations





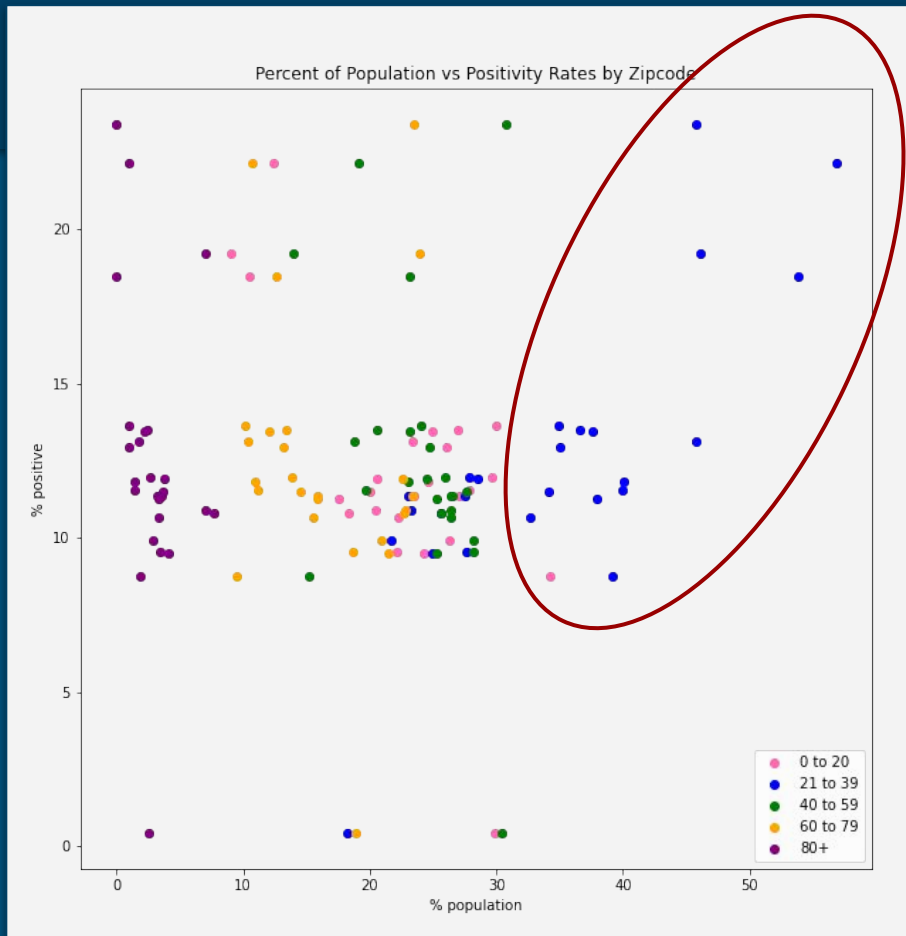
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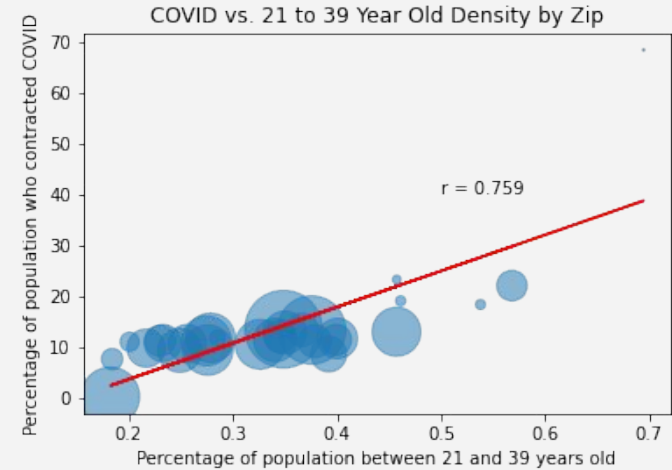
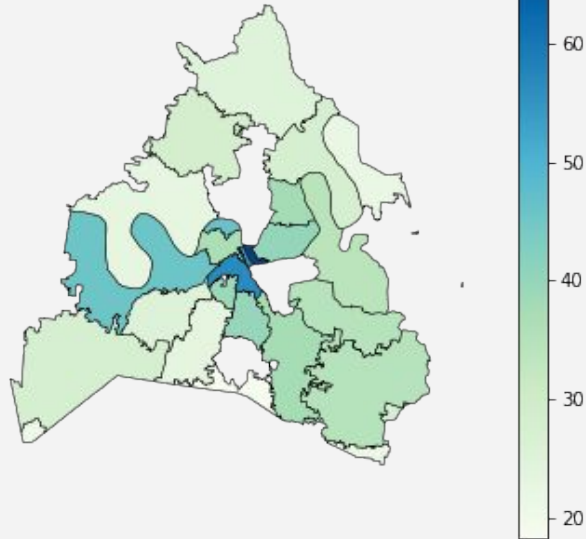
--Four negative correlations



# Age - 21 to 39

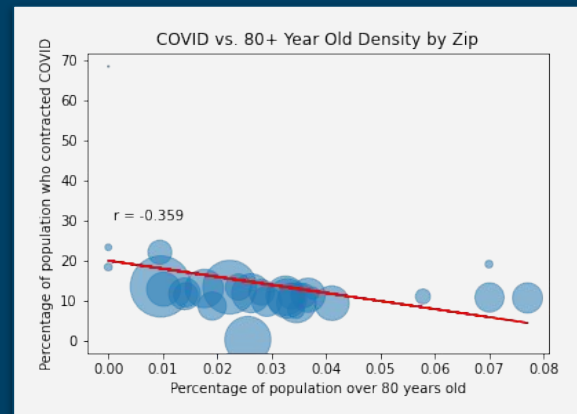
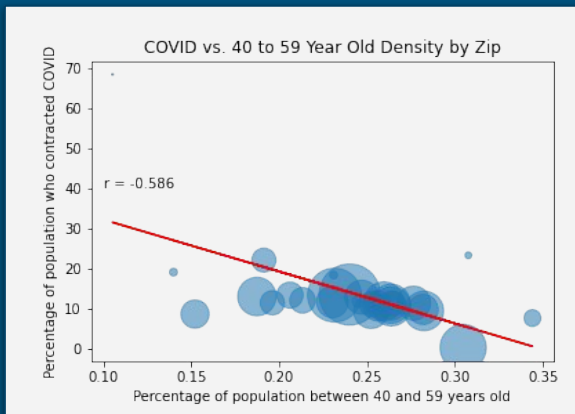
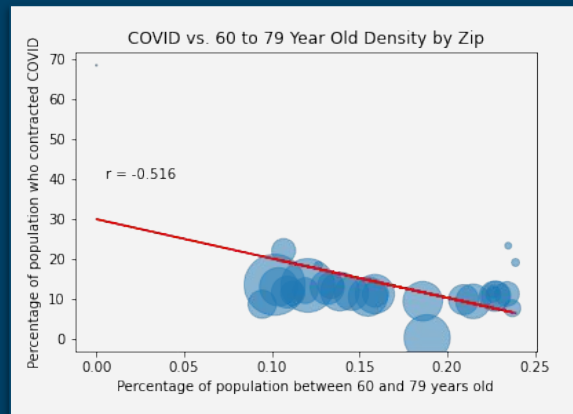
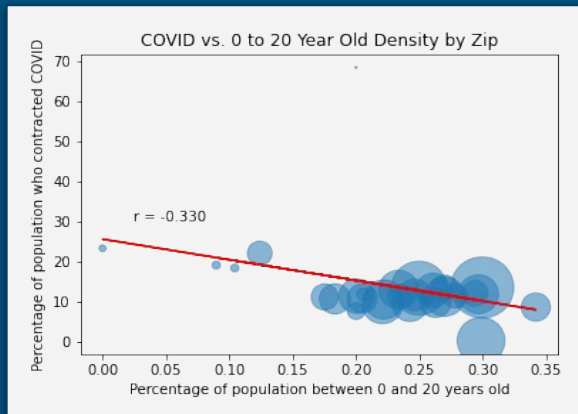
Correlation : **Positive**

Percent of 21 to 39-year-olds by Zipcode



# All Other Ages

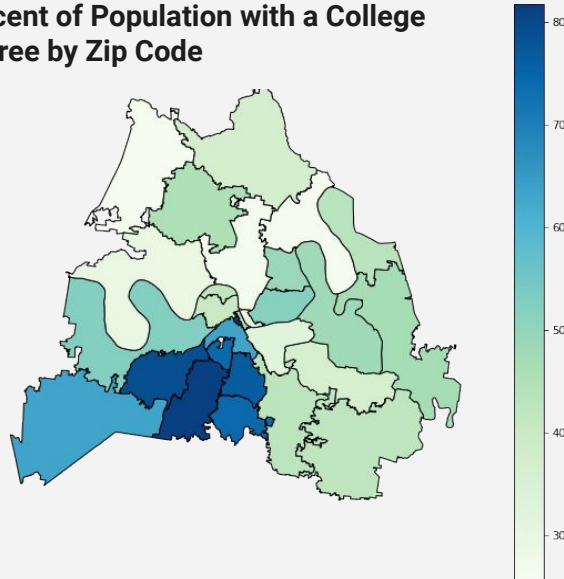
Correlation : Negative



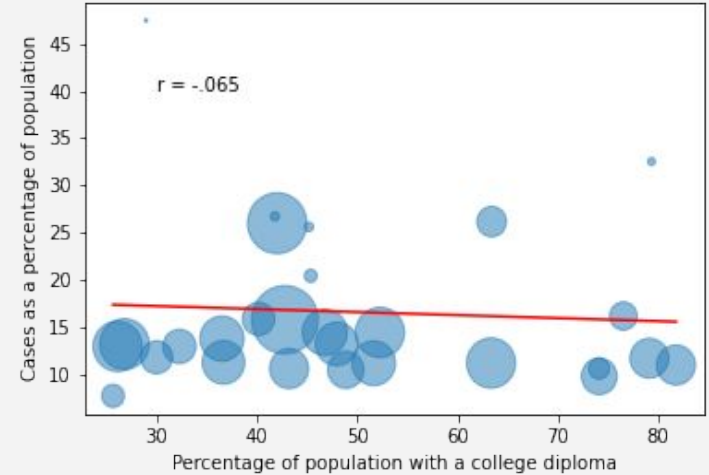
# Education

Correlation : No

Percent of Population with a College Degree by Zip Code



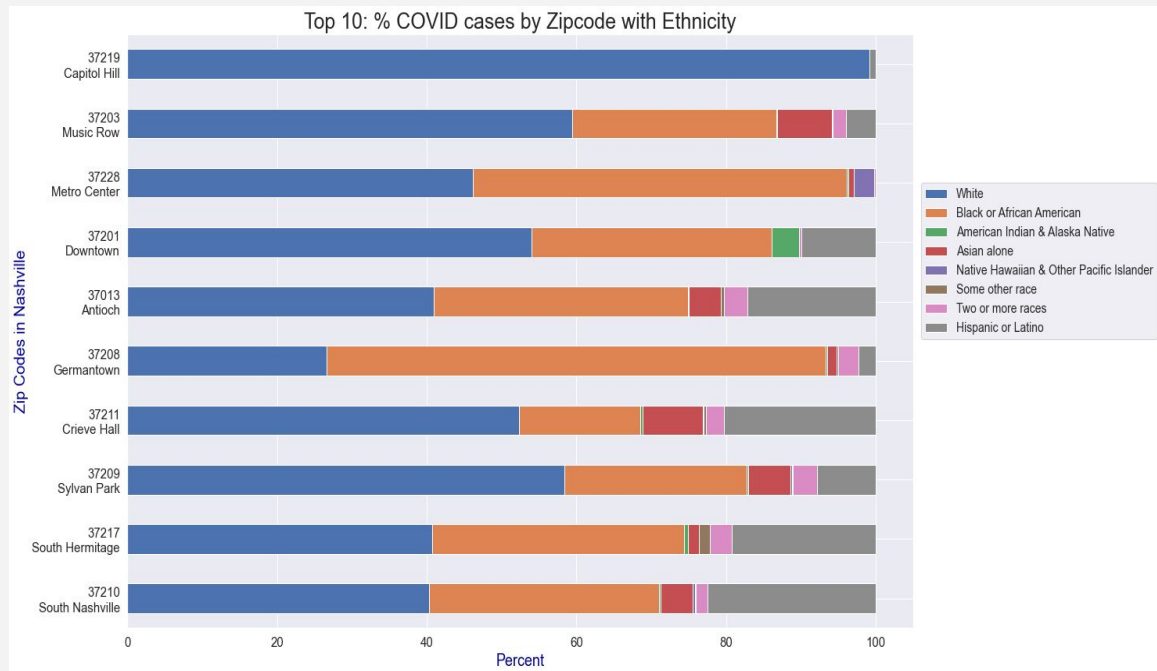
Cases vs. Education Level



# Race and Ethnicity

--Capitol Hill is in the top ten and predominantly white, however in 2019 the population of 37219 was about 1,100 people.

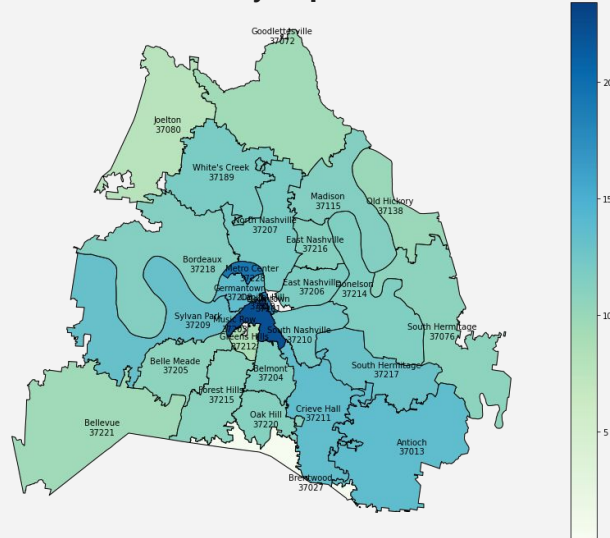
--Our COVID case data did not include specific race and ethnic identifiers, therefore we are inferring from the zip code population data.



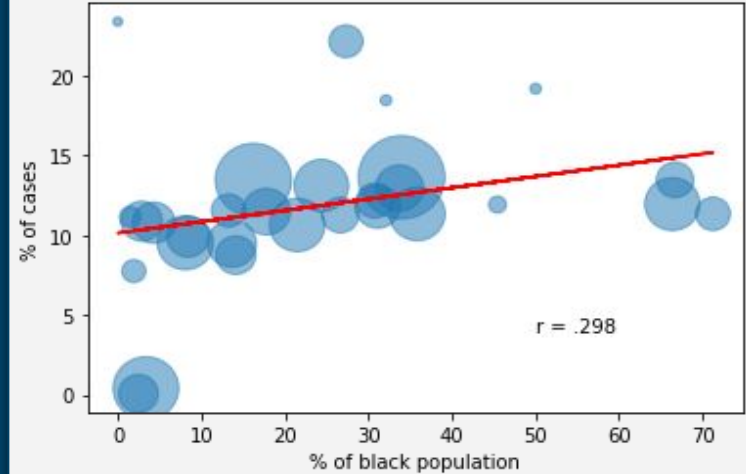
# Race and Ethnicity

Correlation : No

COVID Cases by Population



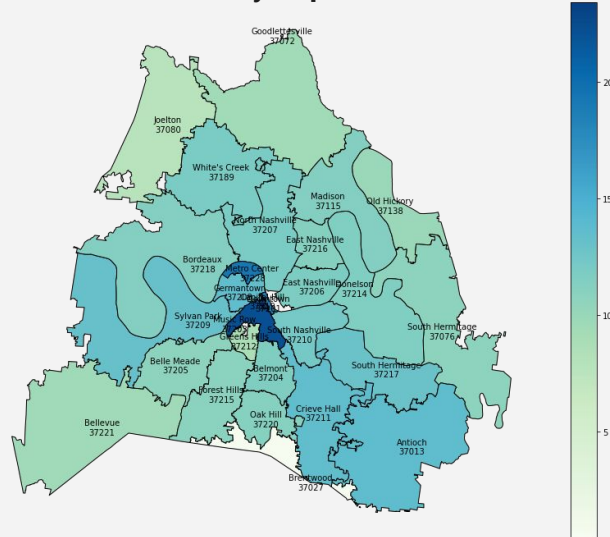
COVID Cases vs. Black Population



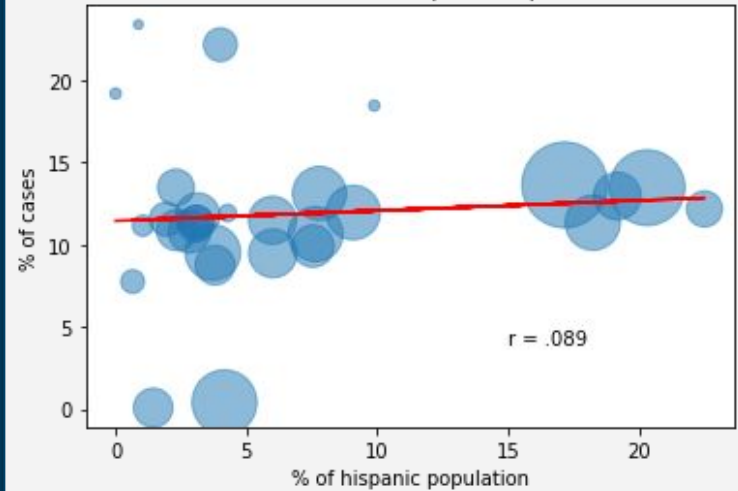
# Race and Ethnicity

Correlation : No

COVID Cases by Population



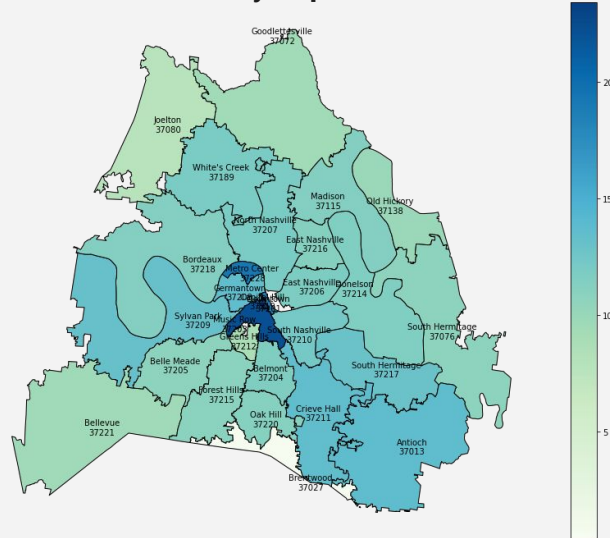
COVID Cases vs. Hispanic Population



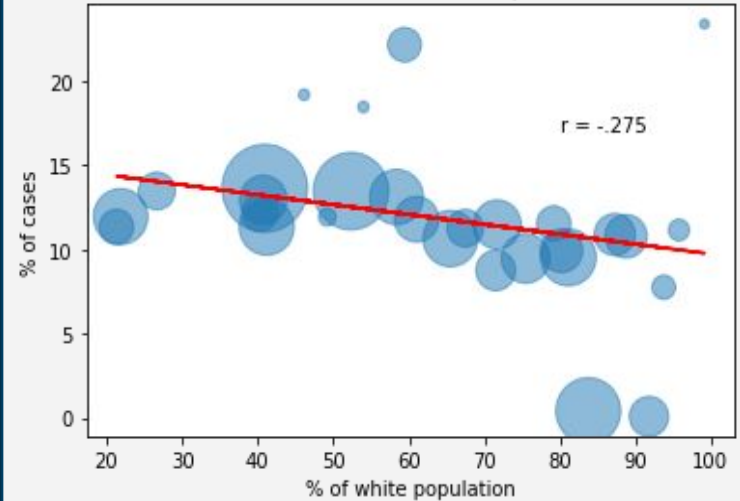
# Race and Ethnicity

Correlation : No

COVID Cases by Population



COVID Cases vs White Population



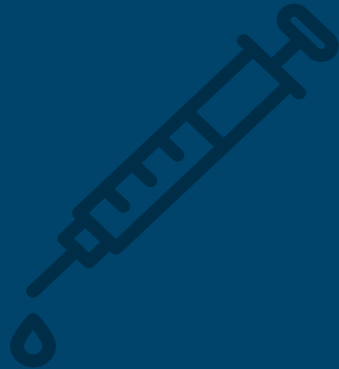


# Overview

--Our data showed the likelihood of a positive correlation between COVID cases and the population ages 21 to 39 as well as the low-income population

--Our data showed the likelihood of a negative correlation between COVID and all other age groups

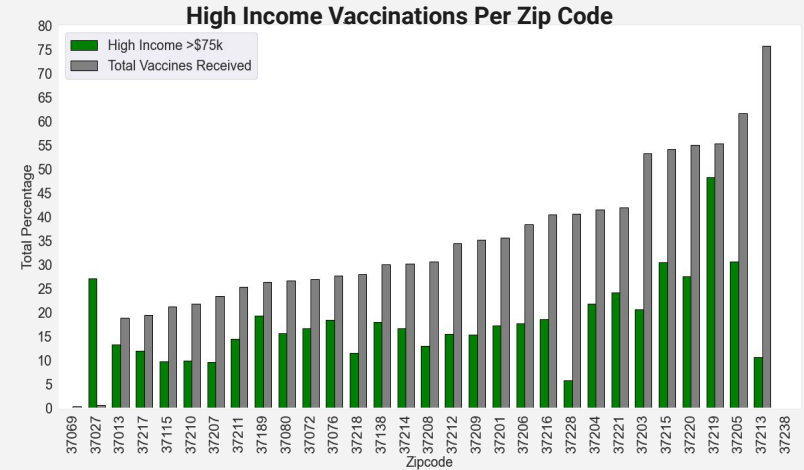
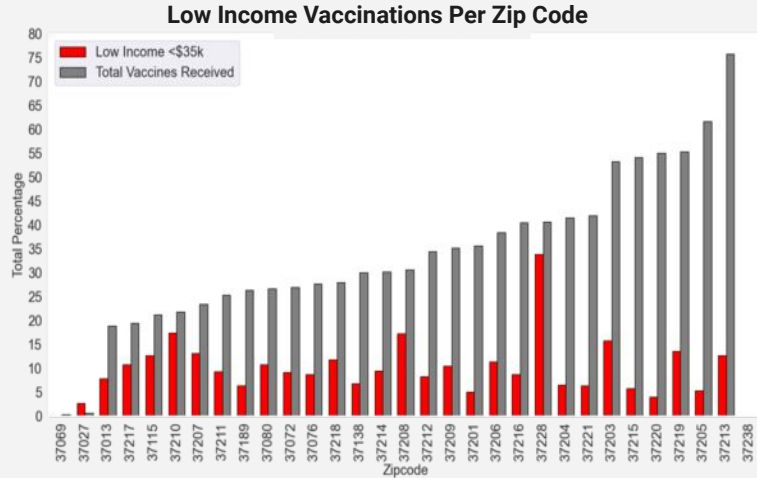
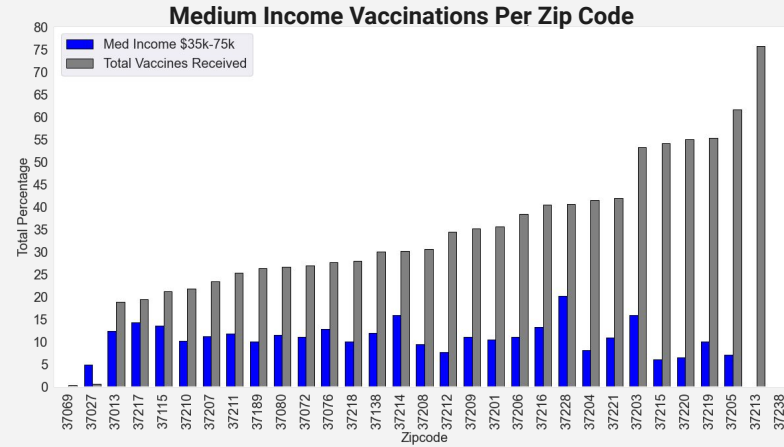
--The correlation for COVID cases and race and ethnicity as well as COVID cases and education level lie outside the correlation thresholds set for our data set

Risk Factors	
Positive Correlation	Negative Correlation
Cases	Vaccinations
<ul style="list-style-type: none"><li>• Holidays</li><li>• Low Temperature</li><li>• Low Income</li><li>• Age Bracket 21 - 39</li></ul>	



# Vaccinations & Nashville Demographics

# Income



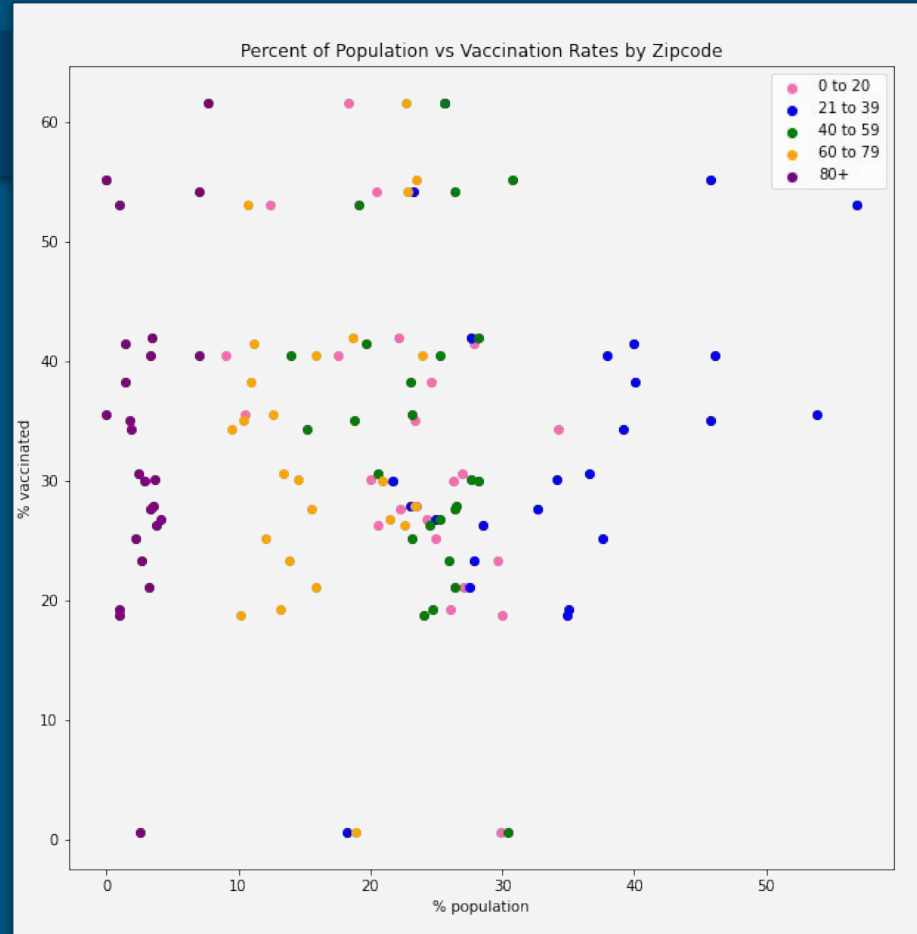
# Age - Overview

--Divided Nashville population into five age groups

--Compared density of each age group in a zip to the percentage of that zip's population who have begun their vaccination protocol

--One positive correlation

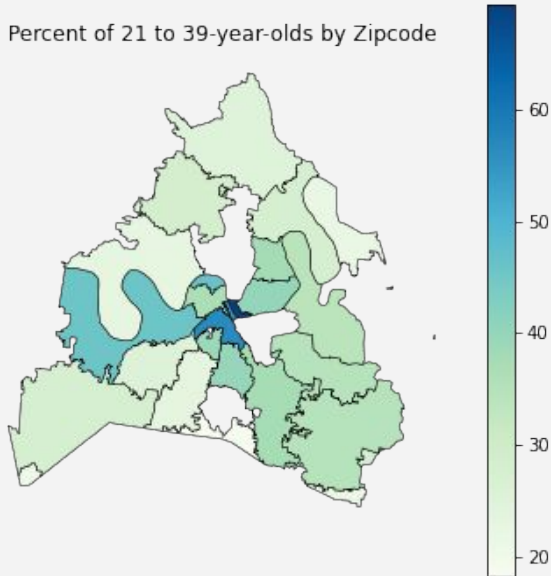
--Two negative correlations



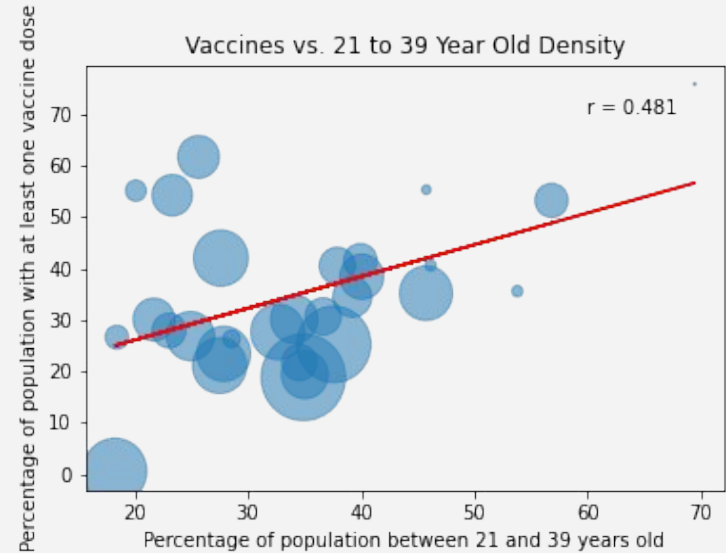
# Age - 21 to 39

Correlation : Positive

Percent of 21 to 39-year-olds by Zipcode

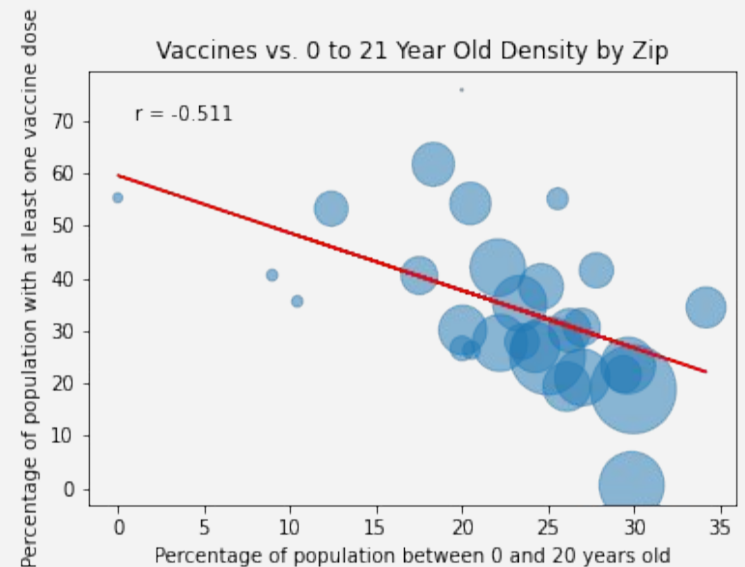
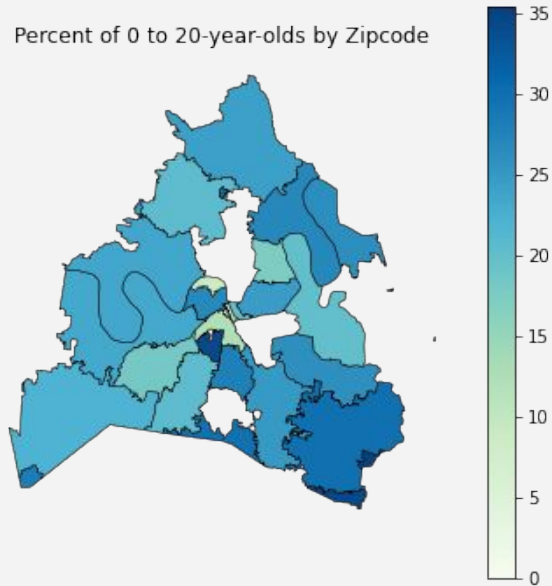


Vaccines vs. 21 to 39 Year Old Density



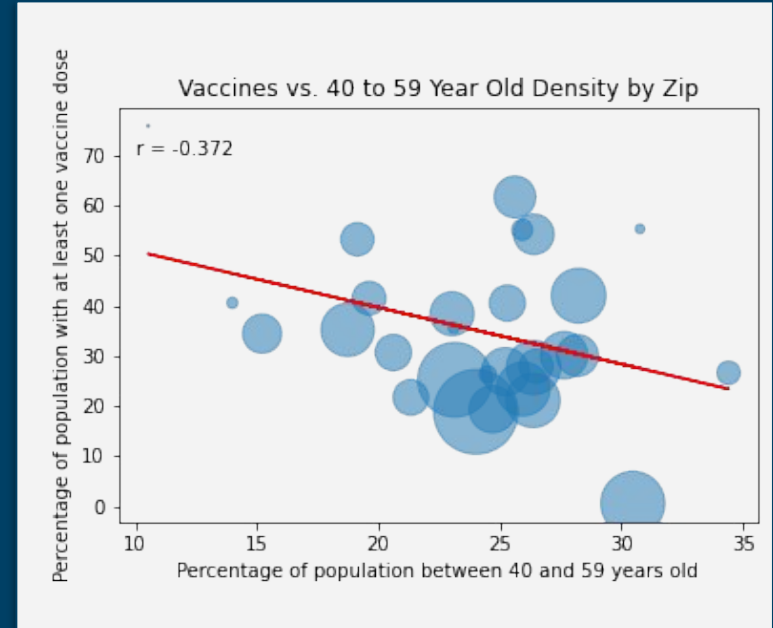
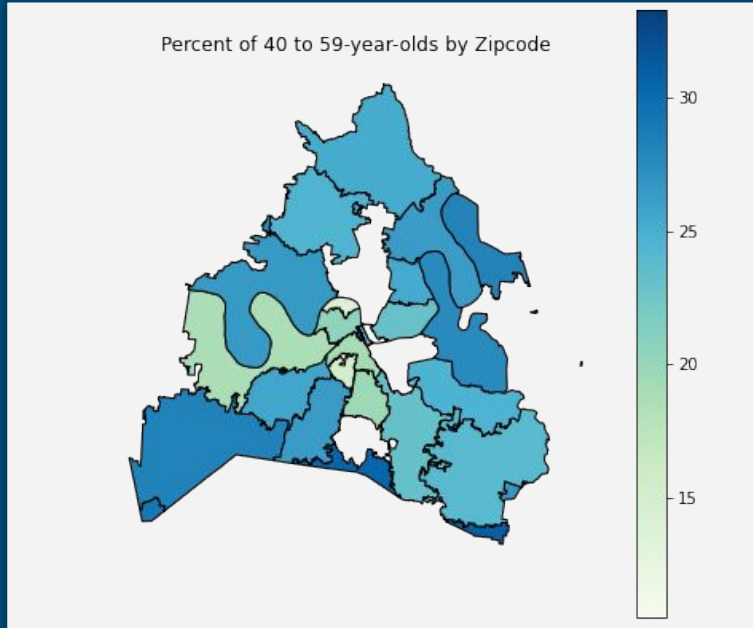
# Age - 0 to 20

Correlation : **Negative**



# Age - 40 to 59

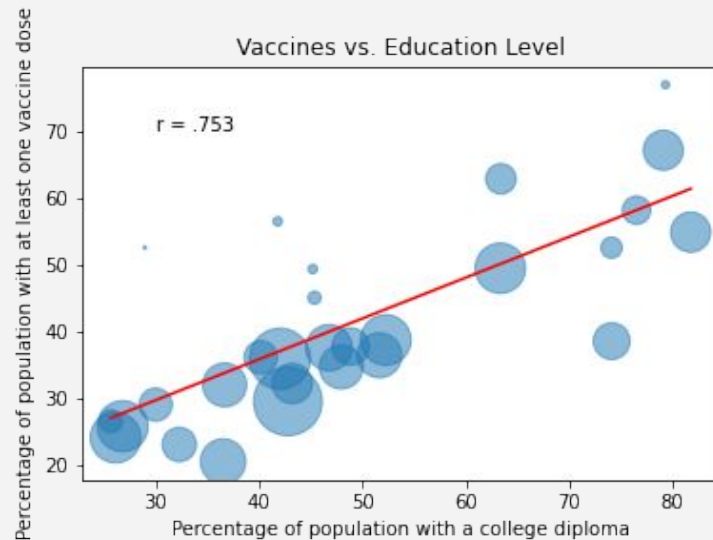
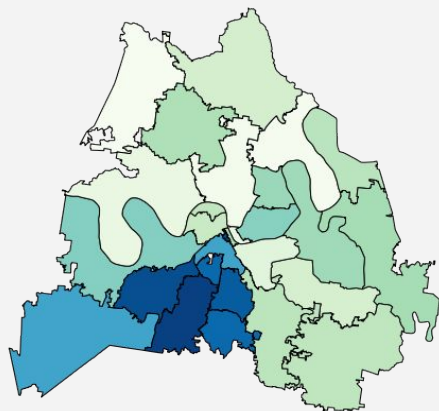
Correlation : **Negative**



# Education - College

Correlation : Positive

Percent of Population with a College Degree by Zip Code

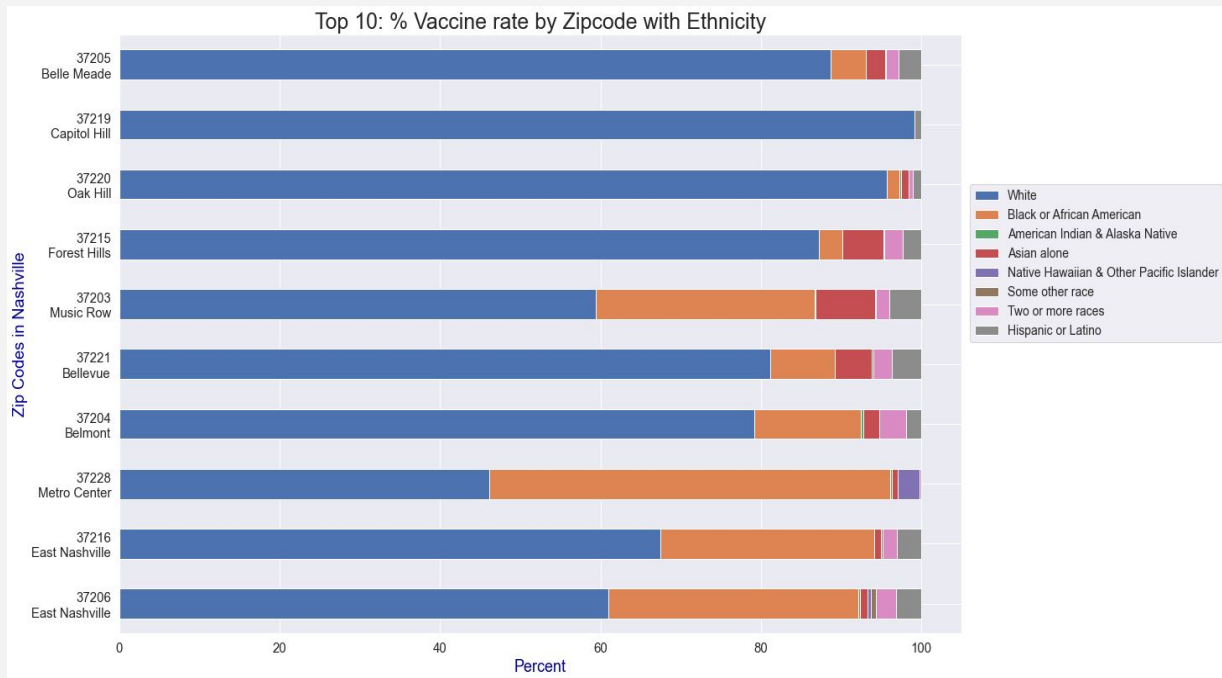




# Ethnicity

--Capitol Hill is in the top ten and predominantly white, with a population of 1,100 people as of 2019.

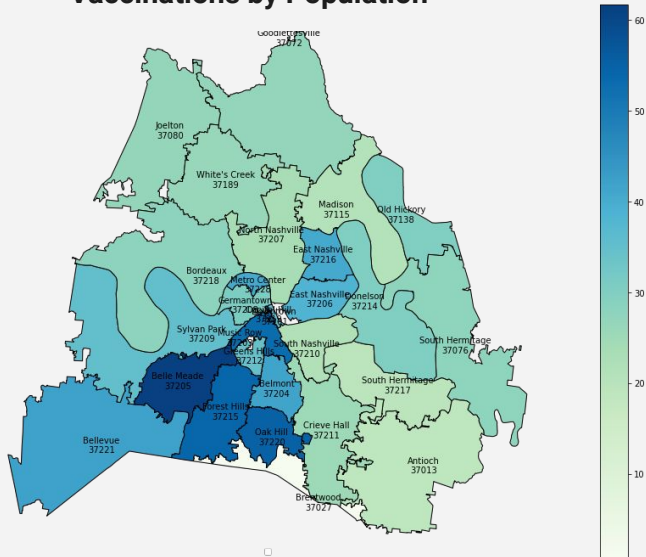
--Recent construction and housing developments may have added to and diversified Capitol Hill population.



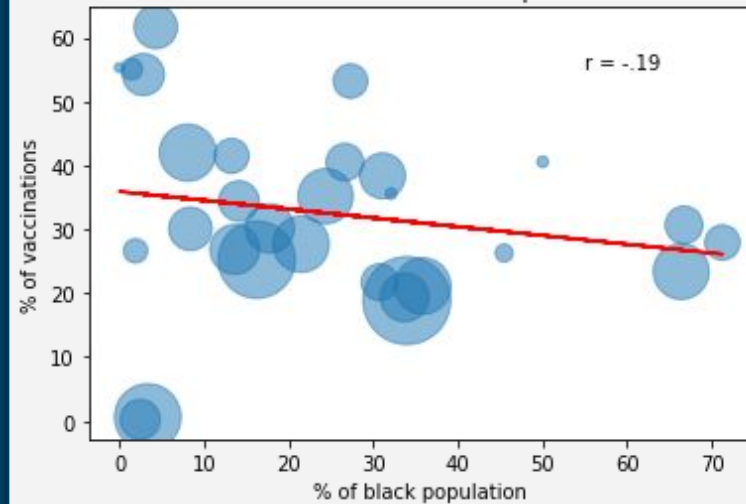
# Ethnicity

Correlation : No

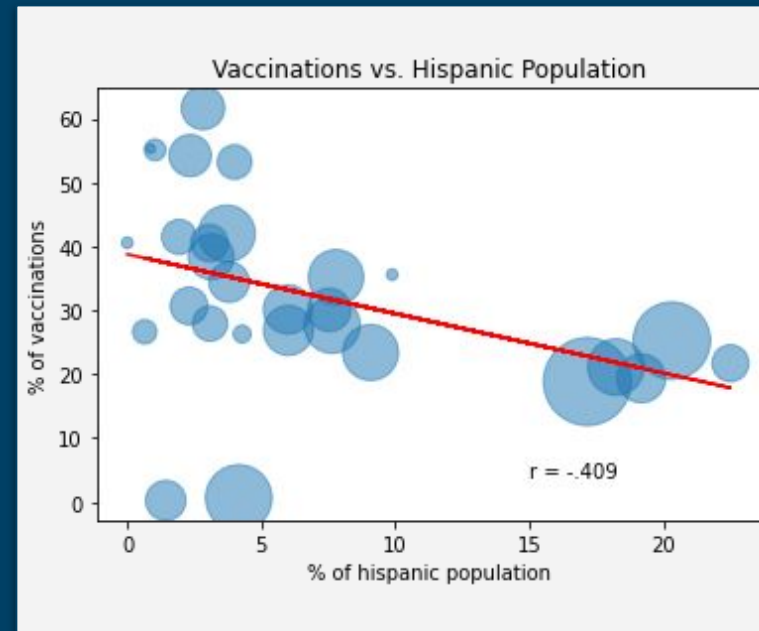
Vaccinations by Population



Vaccinations vs. Black Population



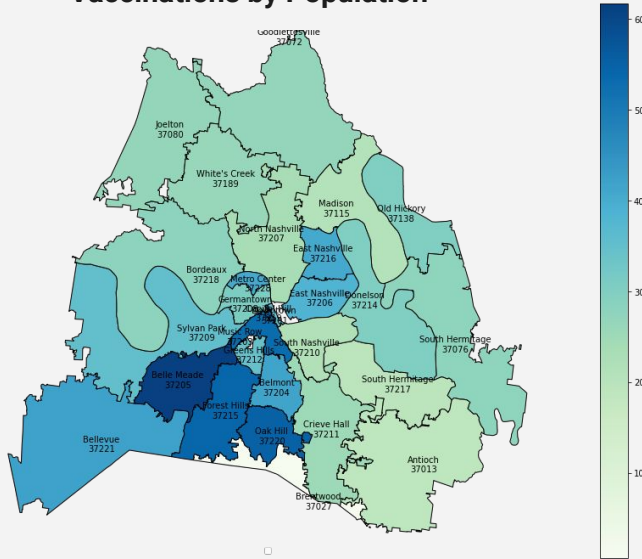
Correlation : **Negative**



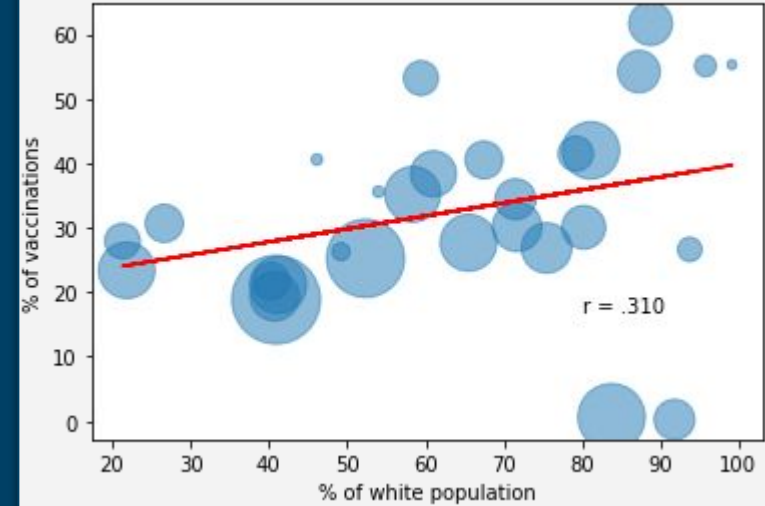
# Ethnicity

Correlation : No

Vaccinations by Population



Vaccinations vs. White Population



# Takeaway

--COVID spread seems primarily tied to behavior (eating out, nightlife, indoor meetups) and working conditions

--Low vaccination rates do not seem to have a common thread; however, the highest-risk demographics that we found are listed here

--More detailed demographics regarding who is getting vaccinated would help clarify the relationship between vaccinations and race/ethnicity.

Risk Factors	
Positive Correlation	Negative Correlation
Cases	Vaccinations
<ul style="list-style-type: none"><li>• Holidays</li><li>• Low Temperatures</li><li>• Low Income</li><li>• Age Bracket 21 - 39</li></ul>	<ul style="list-style-type: none"><li>• Age Bracket 0 - 20*</li><li>• Age Bracket 40 - 59</li><li>• Hispanic Ethnicity</li><li>• Education Below College Level</li></ul>

\*Vaccinations given to ages 16+ at the time of data collection.

# Data References

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Metro Public Health Department of Metro Nashville/Davidson County (2021). *Covid Cases CSV data*.

Metro Public Health Department of Metro Nashville/Davidson County (2021). (2021). *Vaccine and Protocol CSV data*.

U.S. Census Bureau (2015-2019). Household Income in the Past 12 Months (In 2019 *Inflation-adjusted Dollars*) *American Community Survey 5-year estimates*. Retrieved from <<https://censusreporter.org>>

U.S. Census Bureau (2015-2019). *Hispanic or Latino Origin by Race American Community Survey 5-year estimates*. Retrieved from <<https://censusreporter.org>>

U.S. Census Bureau (2015-2019). *Sex by Age American Community Survey 5-year estimates*. Retrieved from <<https://censusreporter.org>>

U.S. Census Bureau (2015-2019). *Sex by Educational Attainment for the Population 25 Years and Over American Community Survey 5-year estimates*. Retrieved from <<https://censusreporter.org>>

Wikipedia (2021). *COVID-19 pandemic in Tennessee*. Retrieved from <[https://en.wikipedia.org/wiki/COVID-19\\_pandemic\\_in\\_Tennessee](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Tennessee)>

ZipAtlas (2020). *Population Density in Nashville, TN by Zip Code*. Retrieved from <<https://zipatlas.com/us/tn/nashville/>>