

# **Covid Cases and Deaths EDA in Pennsylvania**

SURE 2024

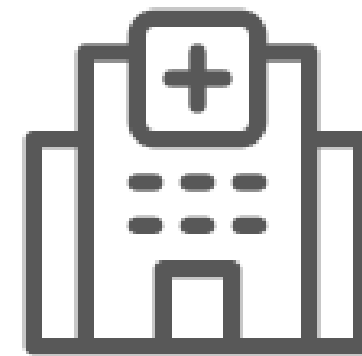
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# Understanding 2020 COVID-19 trends will improve future health crisis readiness

**Current COVID-19 Impact:** 1 - 3% of all deaths in early 2024

## Why this analysis matters:

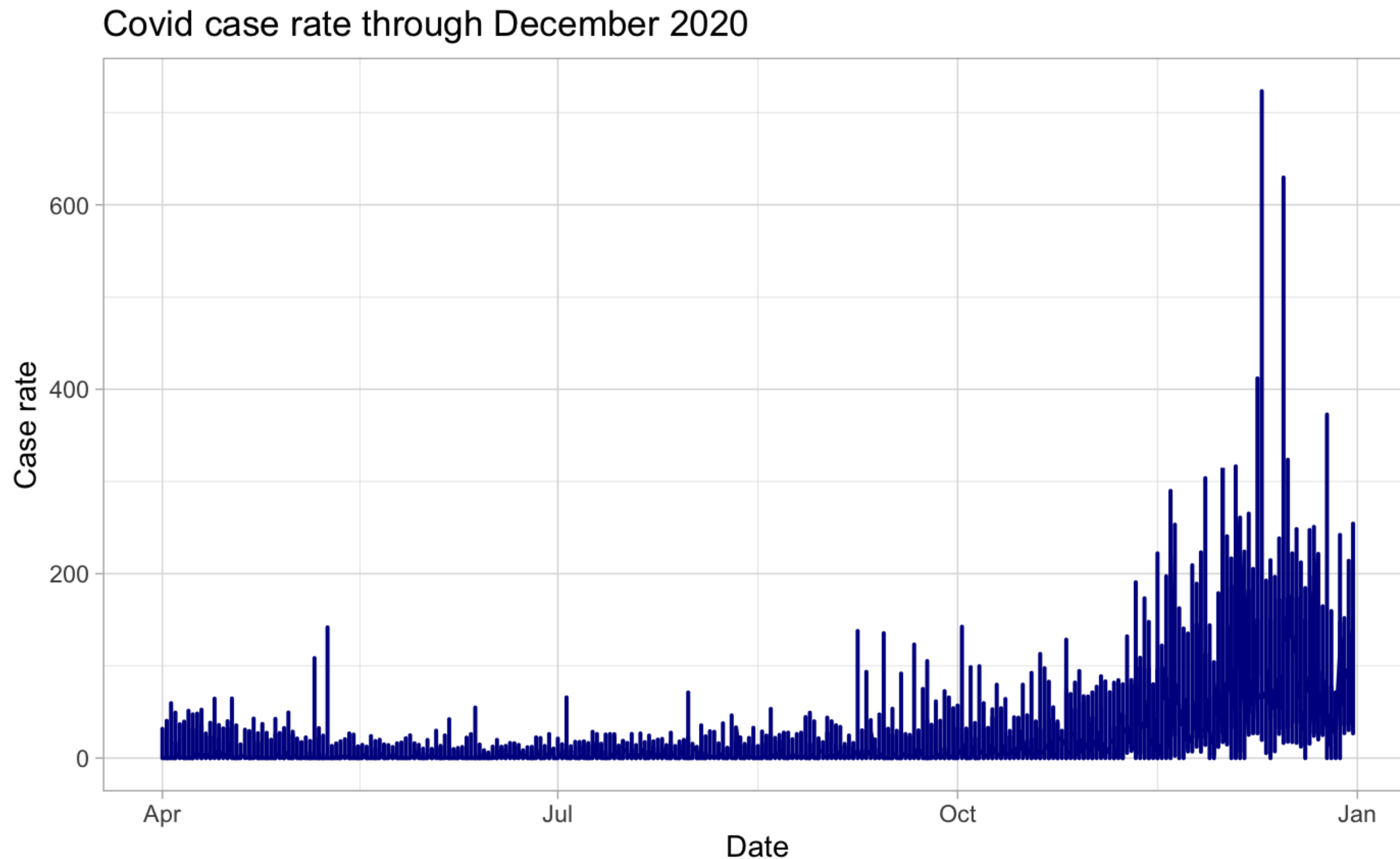
- Improve healthcare management:
  - Identify stress points to better manage crises.
- Inform targeted public health interventions
  - Identify which areas are most affected



# Key Variables

- **Case Rate** - new confirmed and probable cases reported that date per 100,000 population
- **Cumulative Case Rate** - number of cumulative confirmed and probable cases reported through that date per 100,000 population
- **Death Rate** - new deaths per 100,000 population
- **County**
- **Population**

# Pennsylvania saw higher COVID-19 case rates during the holidays

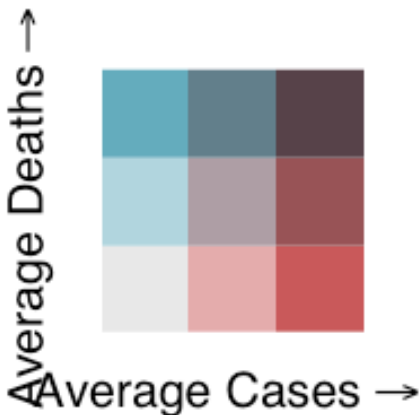
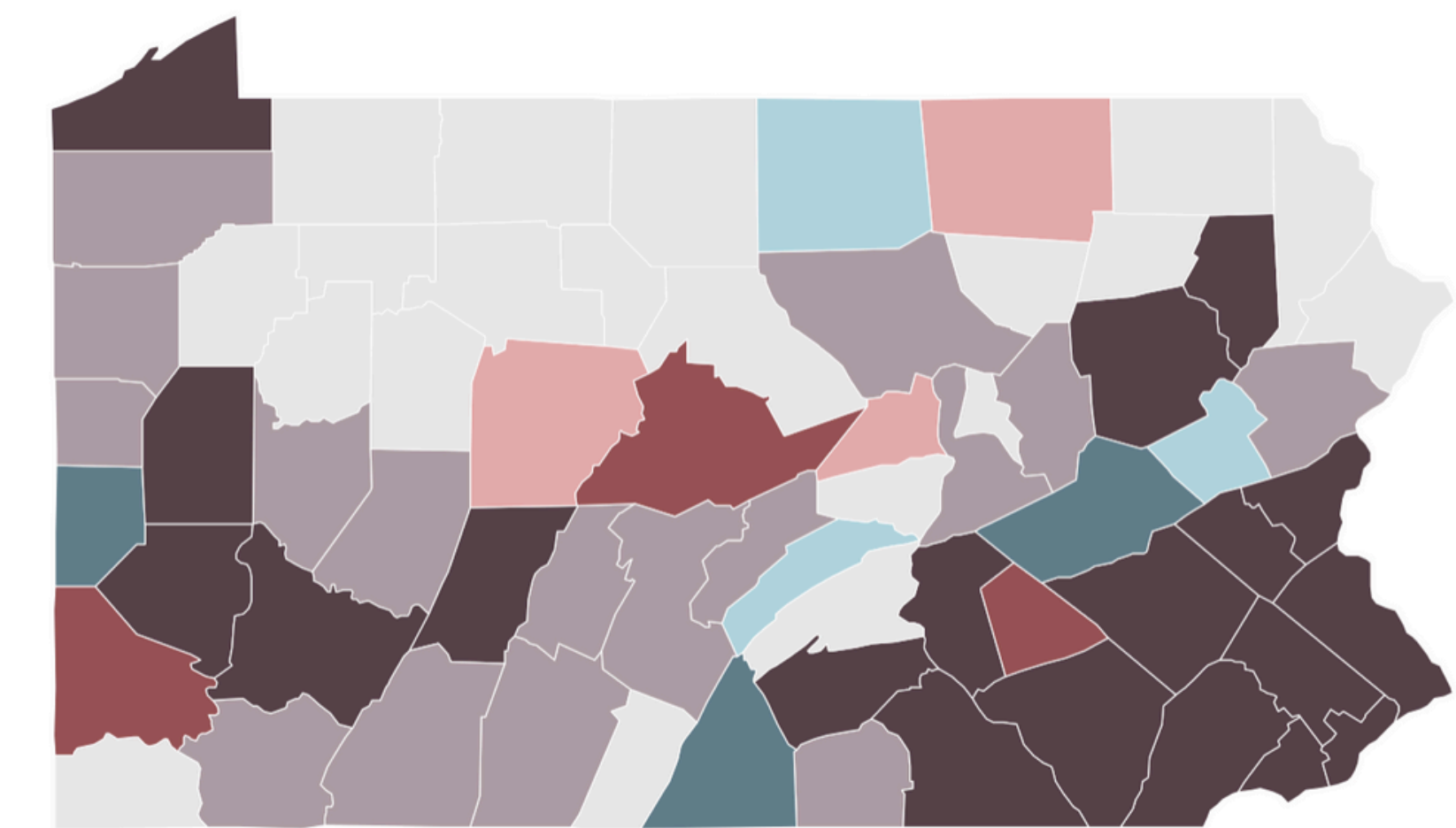


Higher covid cases during holidays - Why?

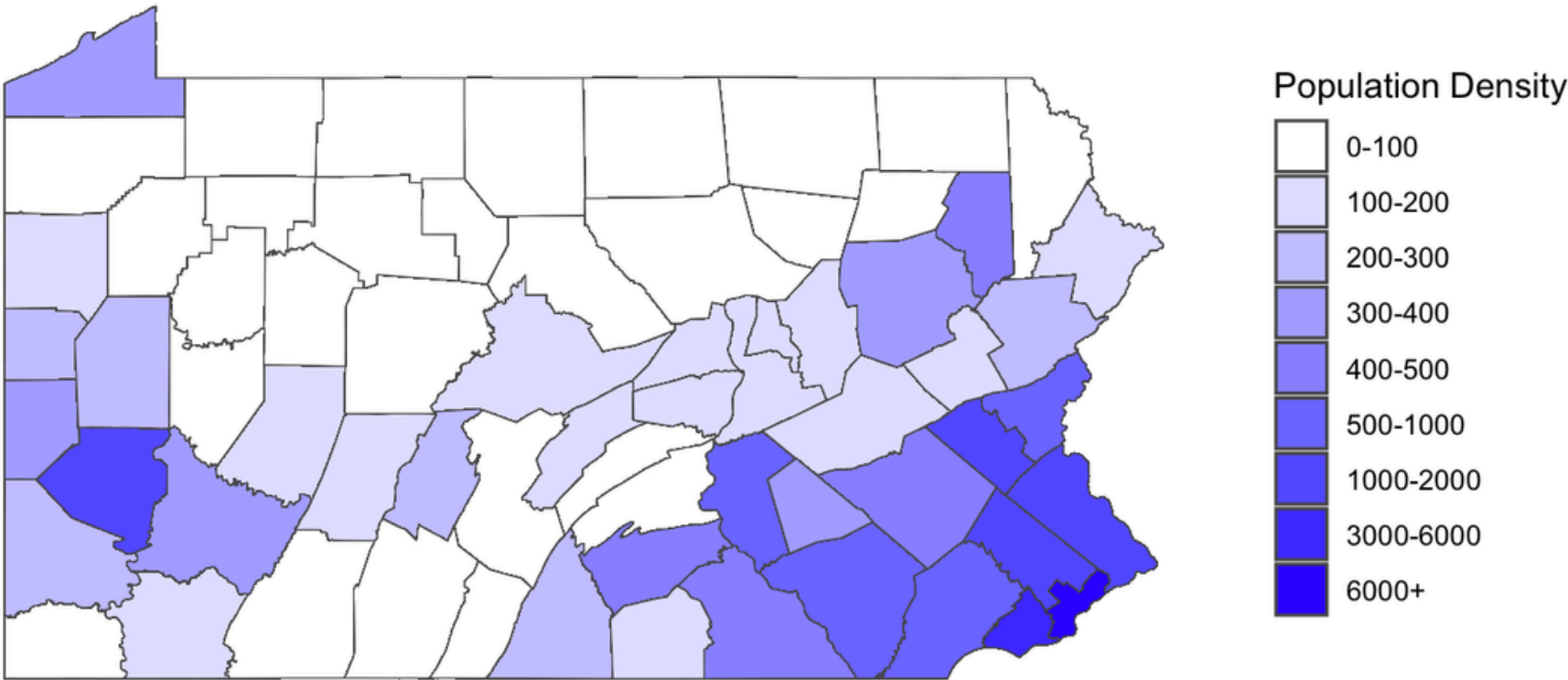
- Increased family gatherings
- High airport traffic and travel

# High population density corresponds to high COVID case rate and death rate

Average COVID-19 cases and deaths of counties in Pennsylvania

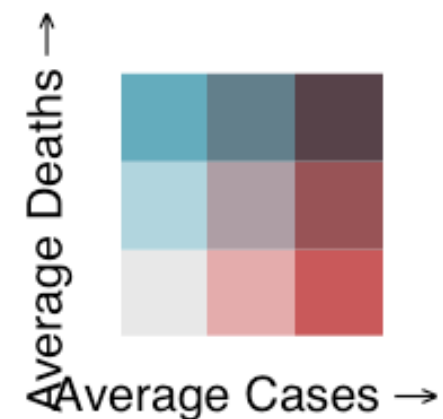
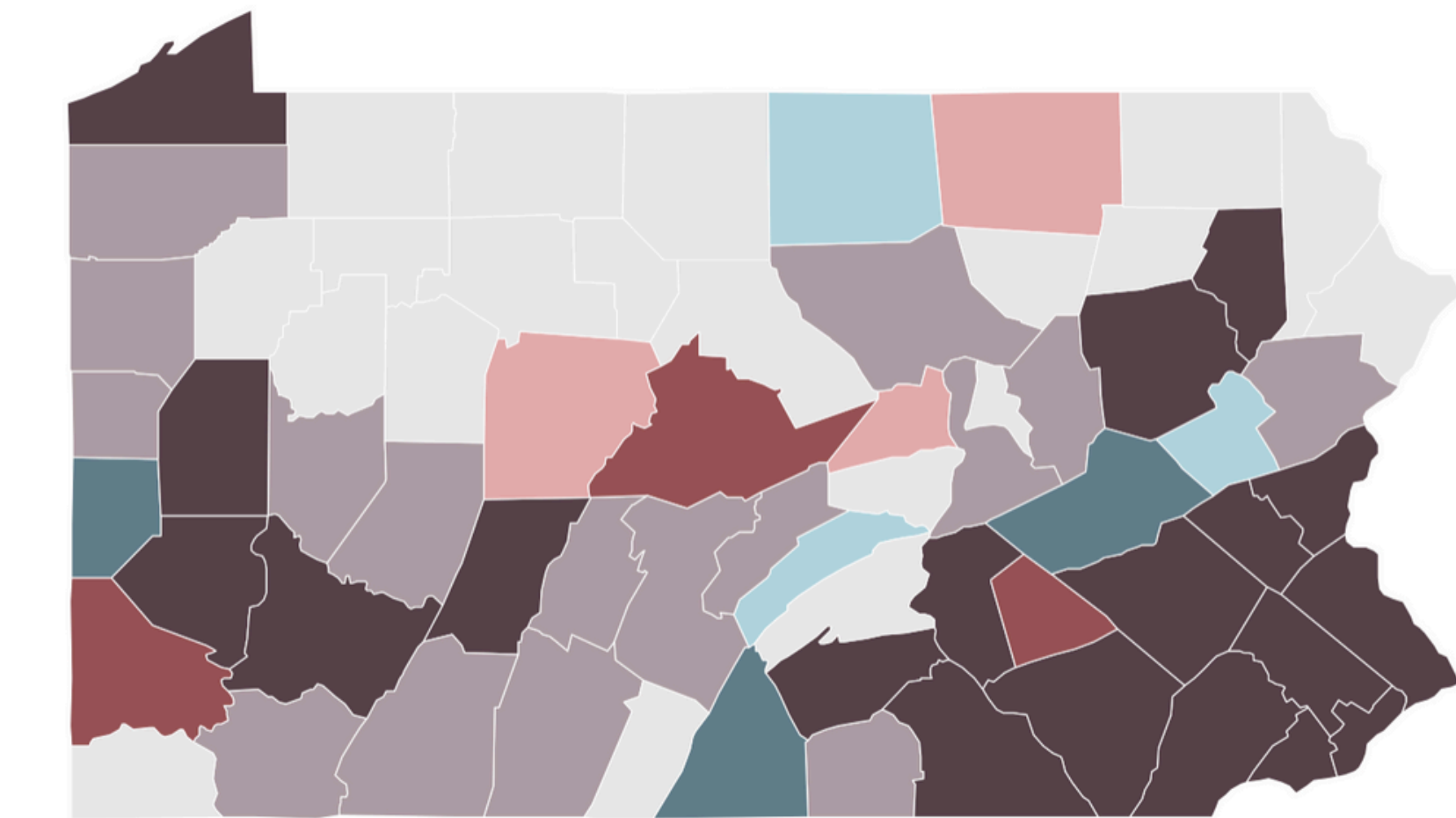


Population density of counties in Pennsylvania



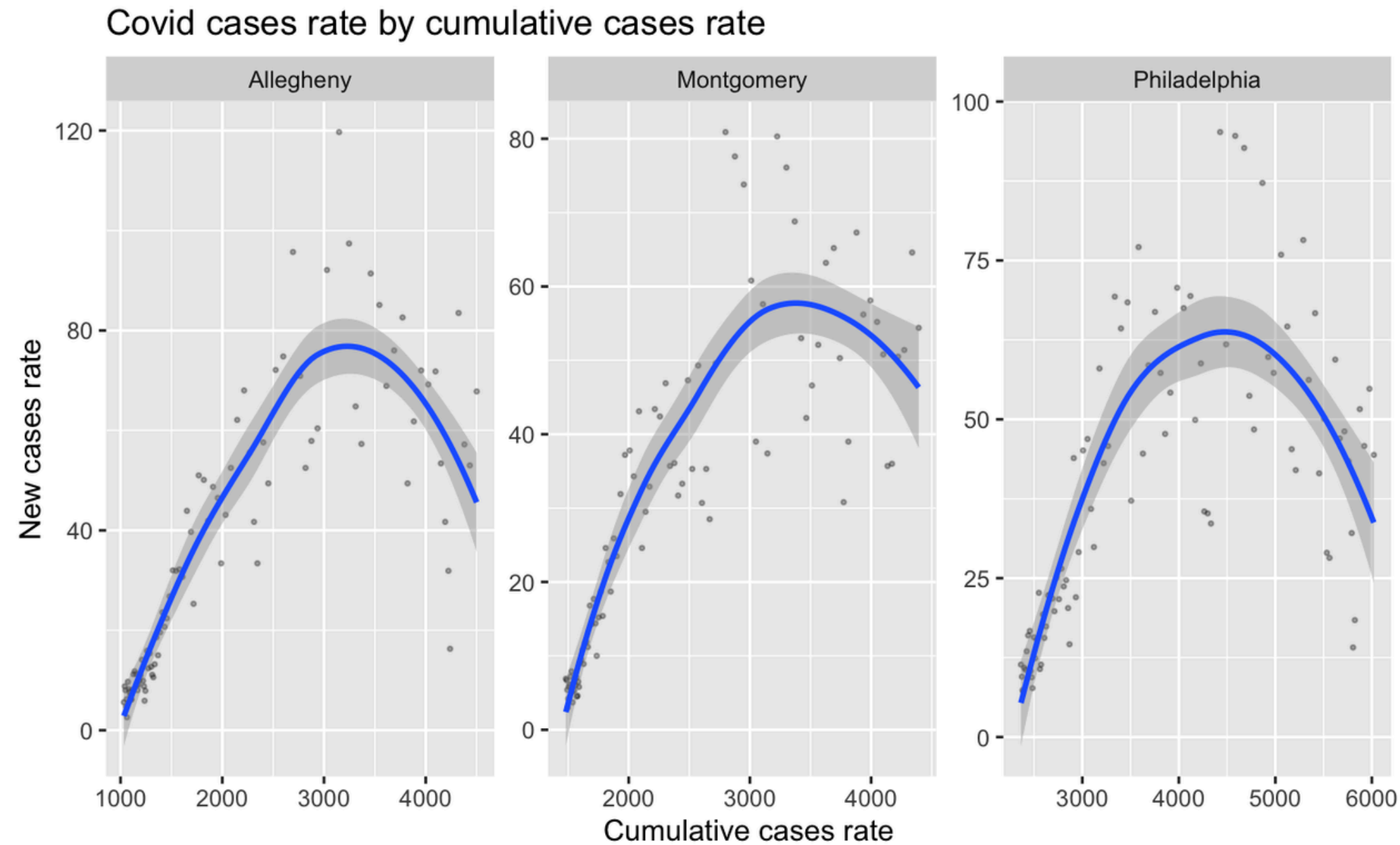
# High population density does correspond to high COVID case rate and death rate

Average COVID-19 cases and deaths of counties in Pennsylvania



- High population counties have higher average deaths and cases.
- Medium population counties have higher average cases or deaths.
- Low population counties have lower average deaths and cases.

# The decrease in new case rates suggests a potential herd immunity effect



- Chose 3 most highly populated counties
- New case rates decline towards end of year
- Suggests potential herd immunity effect but there could be other explanations

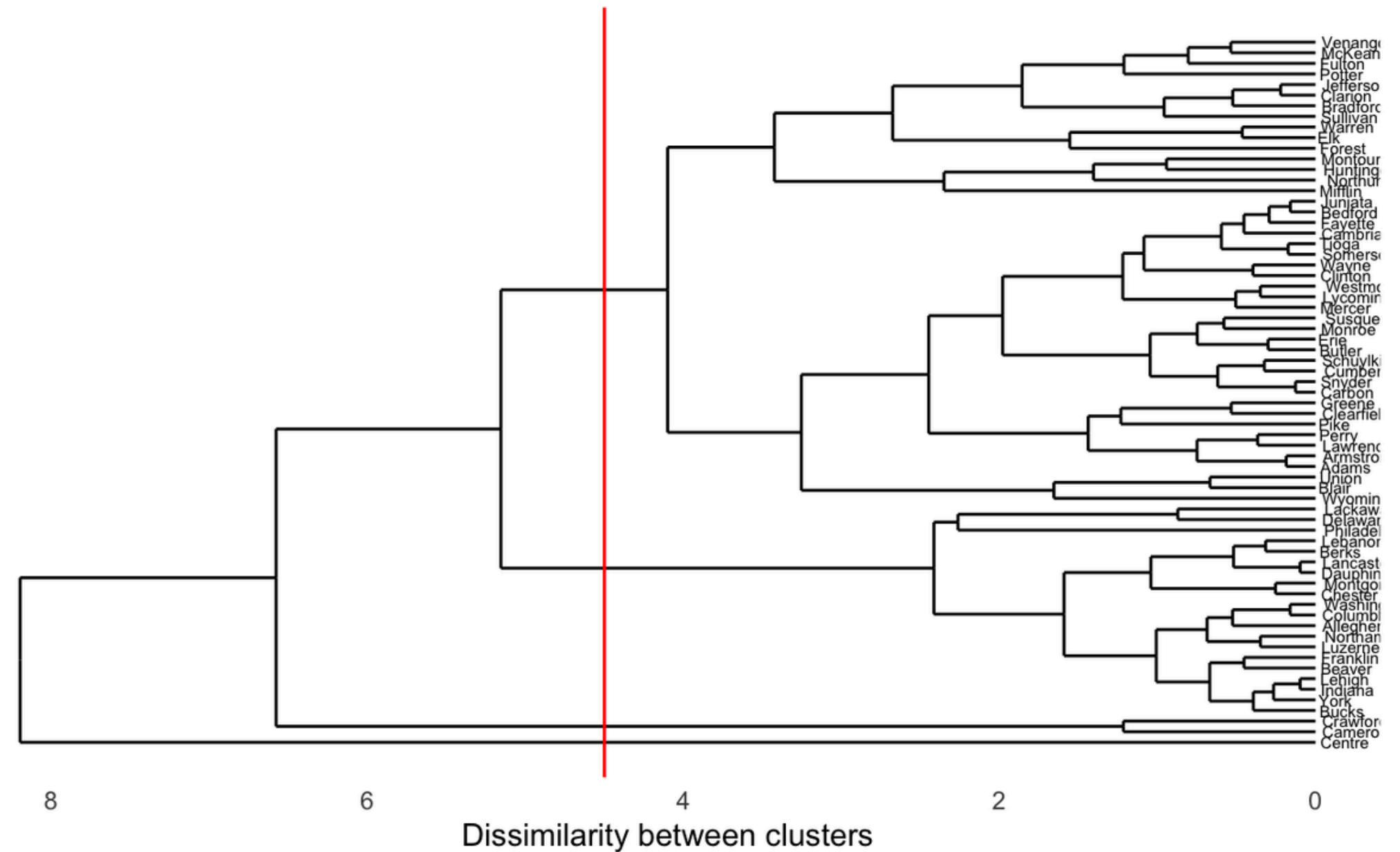


# Which counties share similar trends in the progression and rates of COVID-19 cases?

Variables clustering by:

- max case rate
- date of max case rate
- median case rate

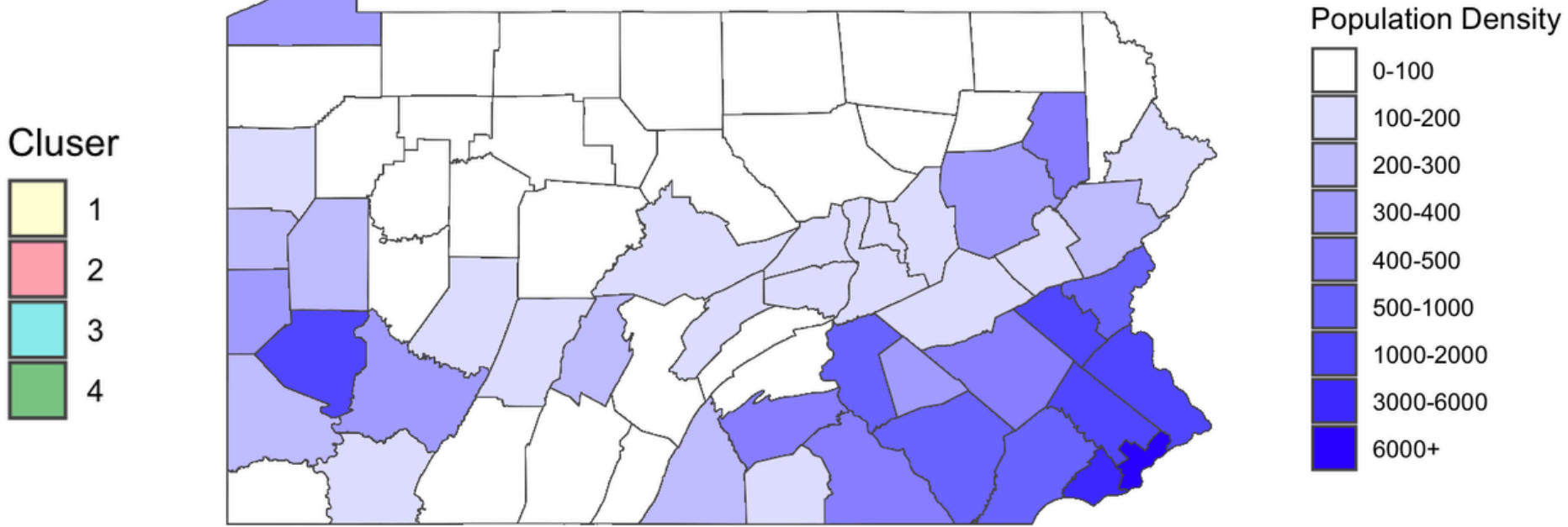
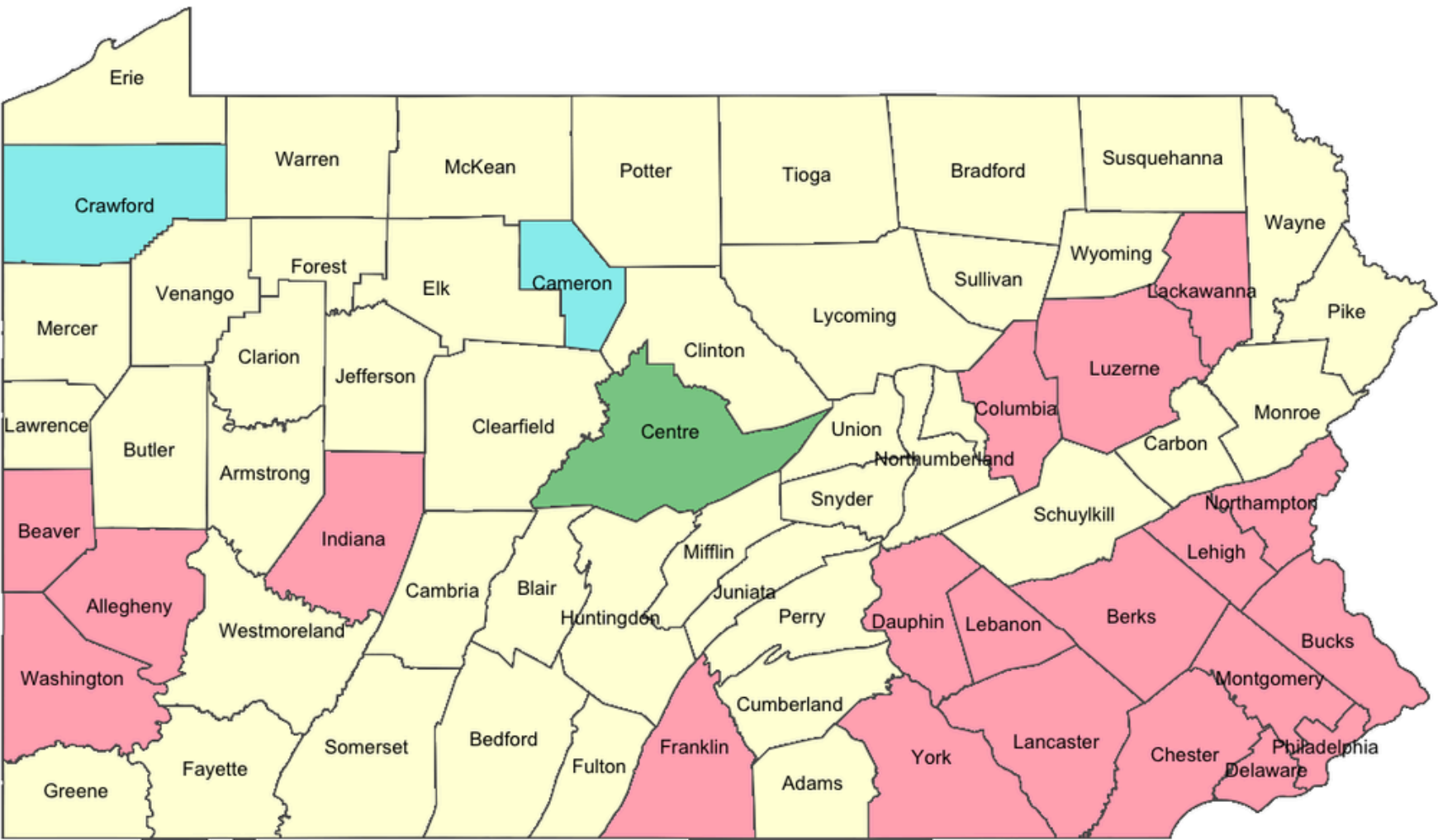
Dendrogram of County Clustering Based on COVID-19 Metrics





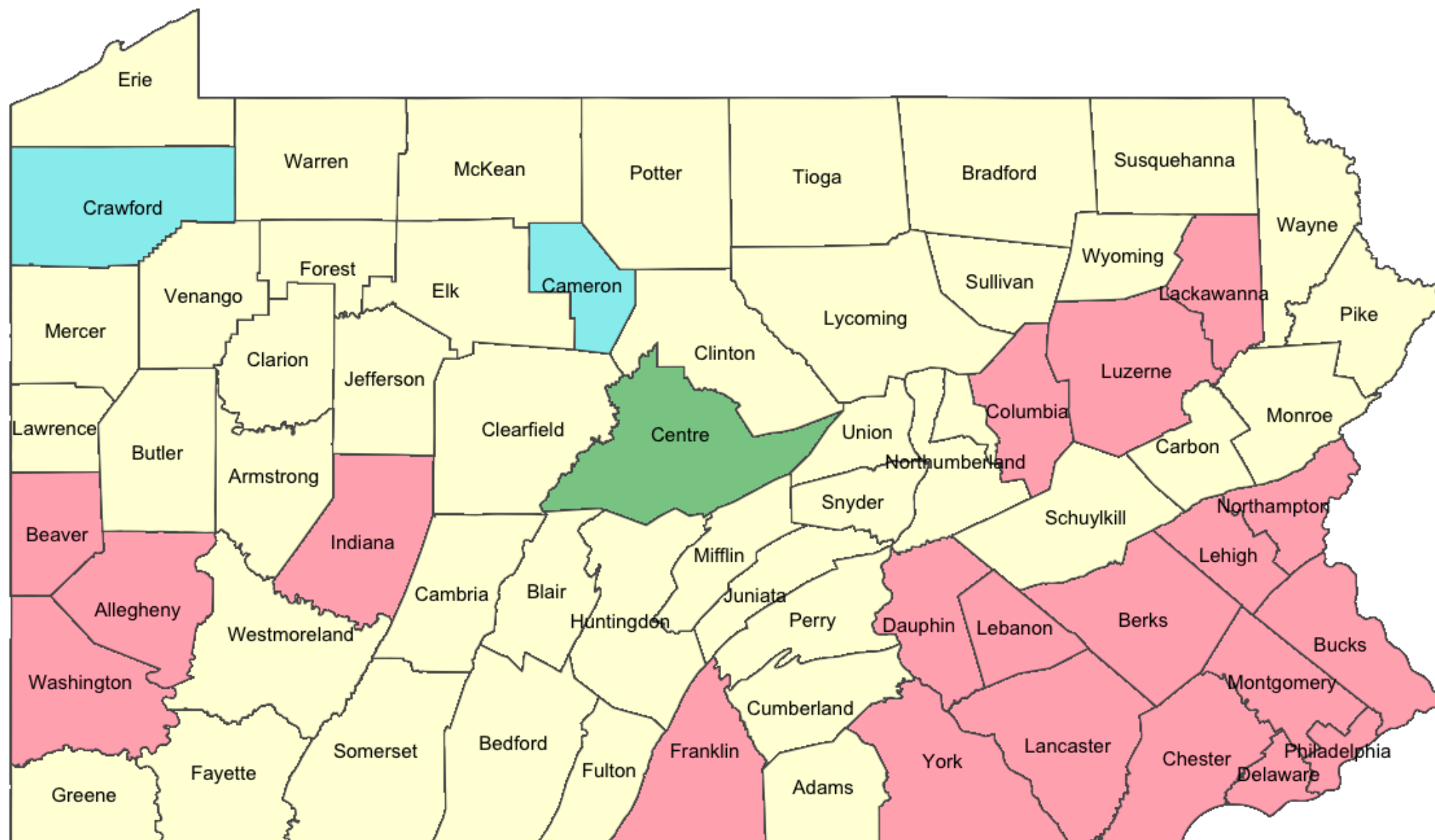
# Counties with similar population density had similar COVID trends

Choropleth Map of Pennsylvania Counties by Cluster

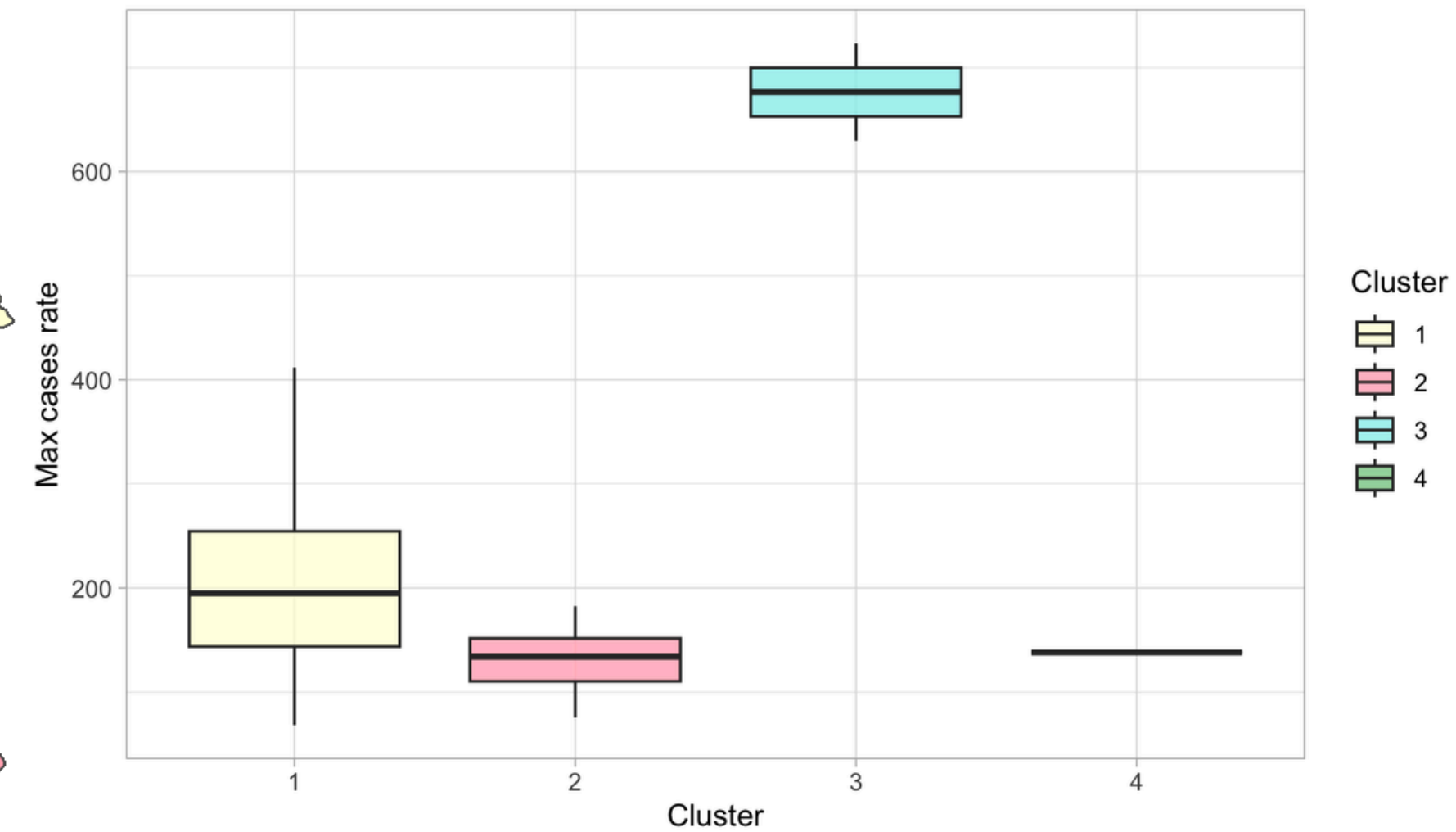


# Counties with high population density have lower peak case rates

## Choropleth Map of Pennsylvania Counties by Cluster

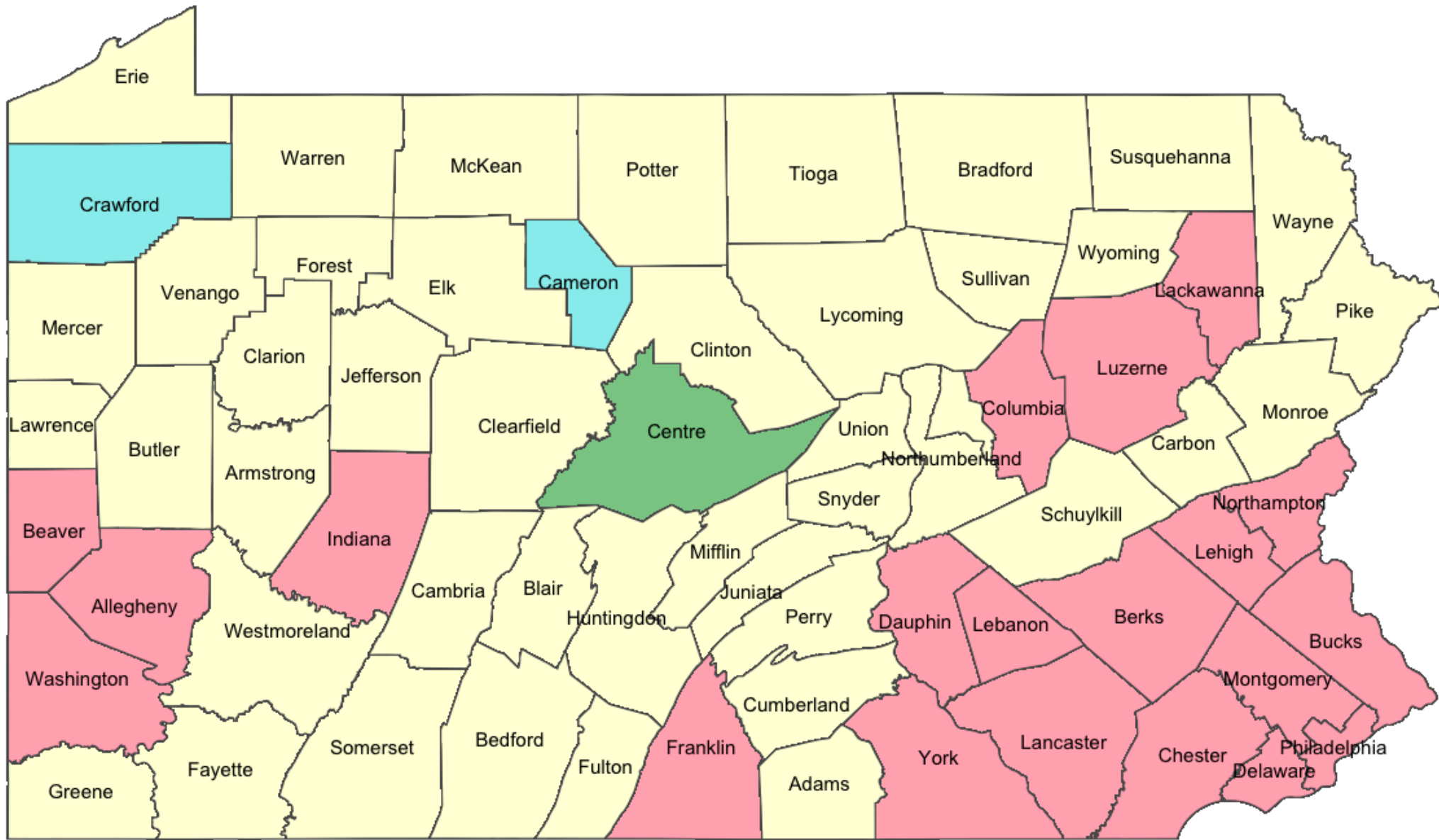


### Distribution of max cases rate by cluster

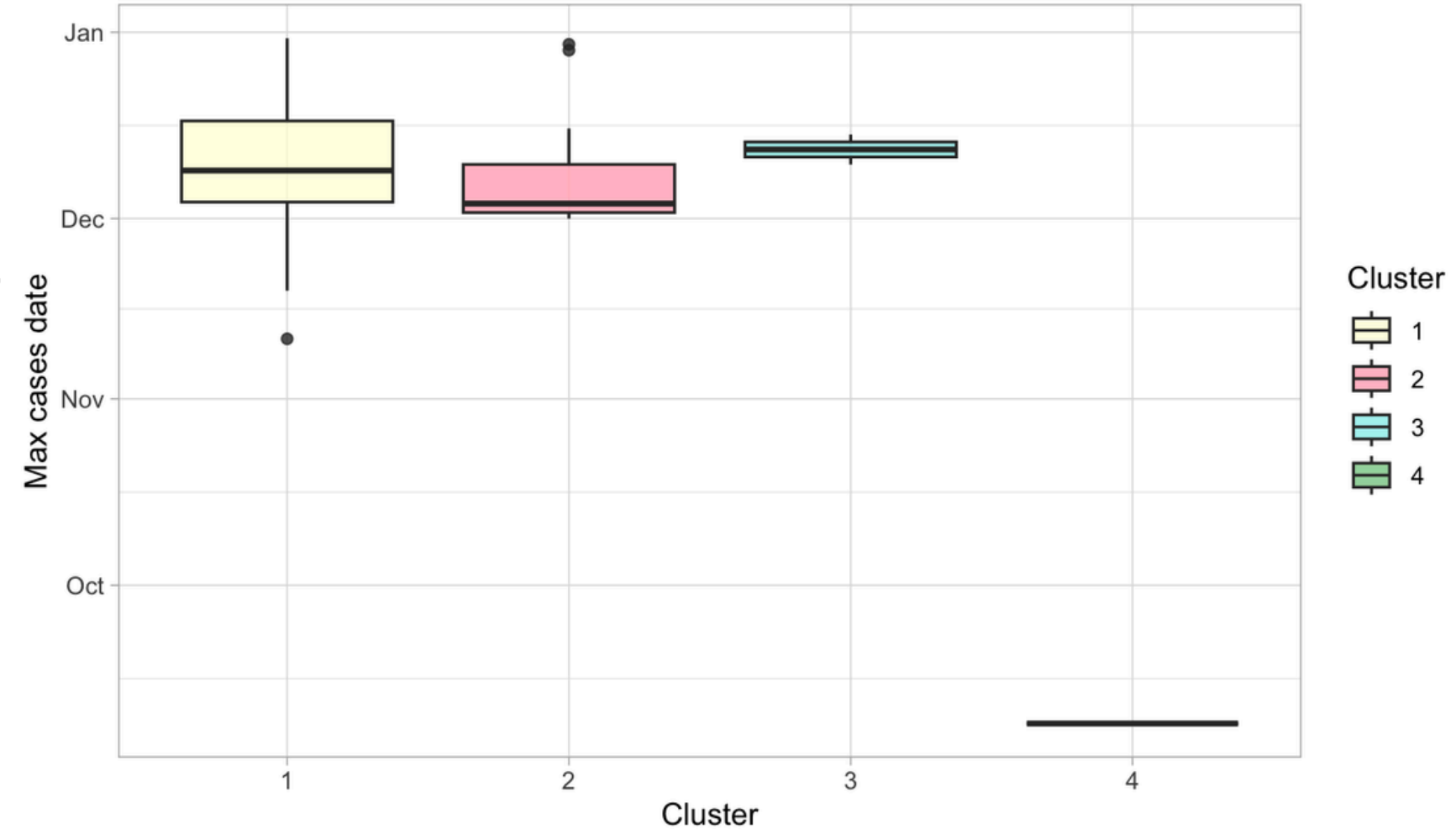


**Most counties had peak cases around December, except Centre county which peaked early**

## Choropleth Map of Pennsylvania Counties by Cluster

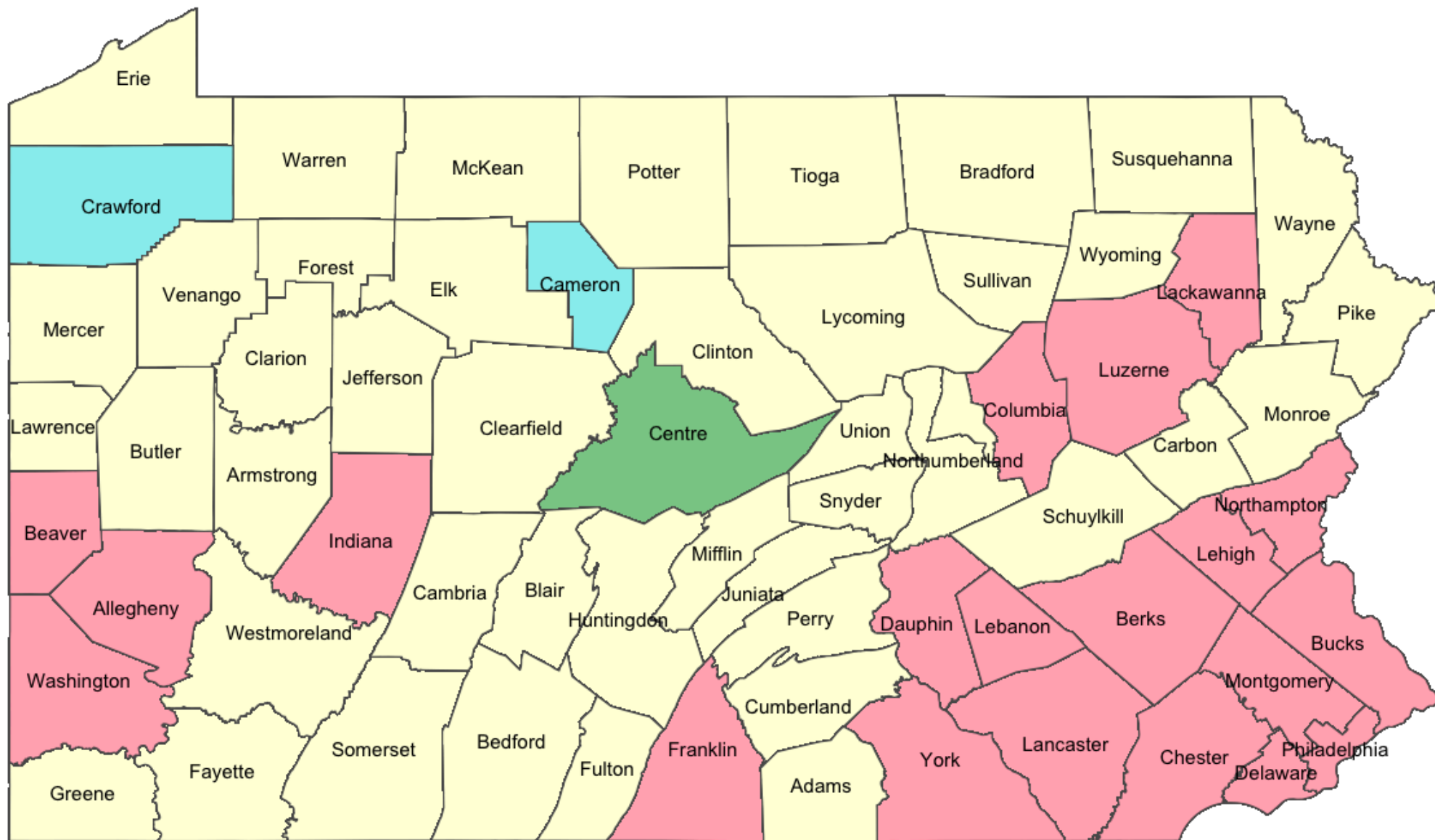


### Distribution of max cases date by cluster

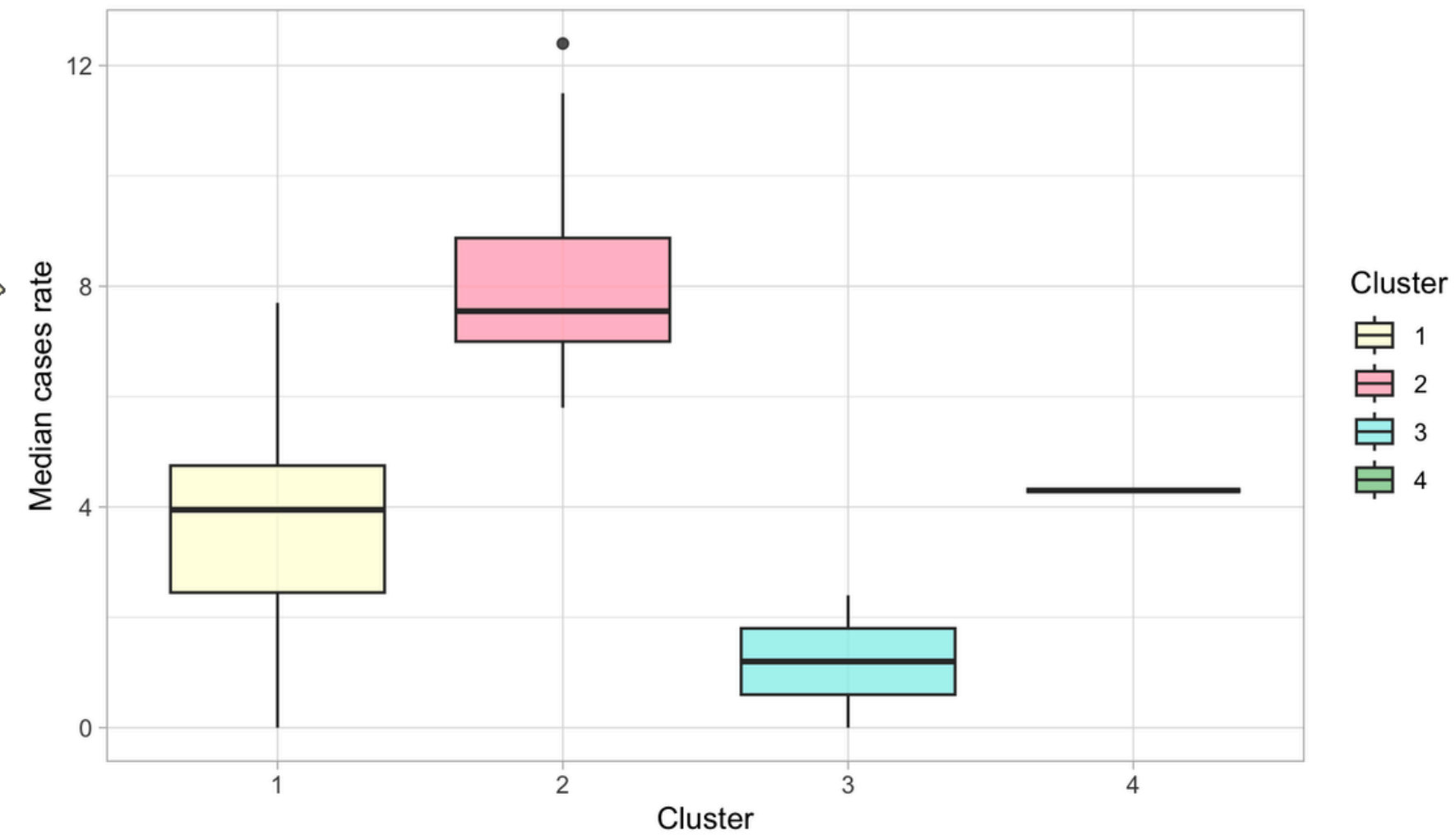


# High population density counties had higher median case rates

## Choropleth Map of Pennsylvania Counties by Cluster



### Distribution of median cases rate by cluster





# Takeaways and Limitations

- Counties with high population density do have higher rates of cases and deaths
- High density counties have higher case rates in general, but lower peaks
- Limited variables
- Data over a single year