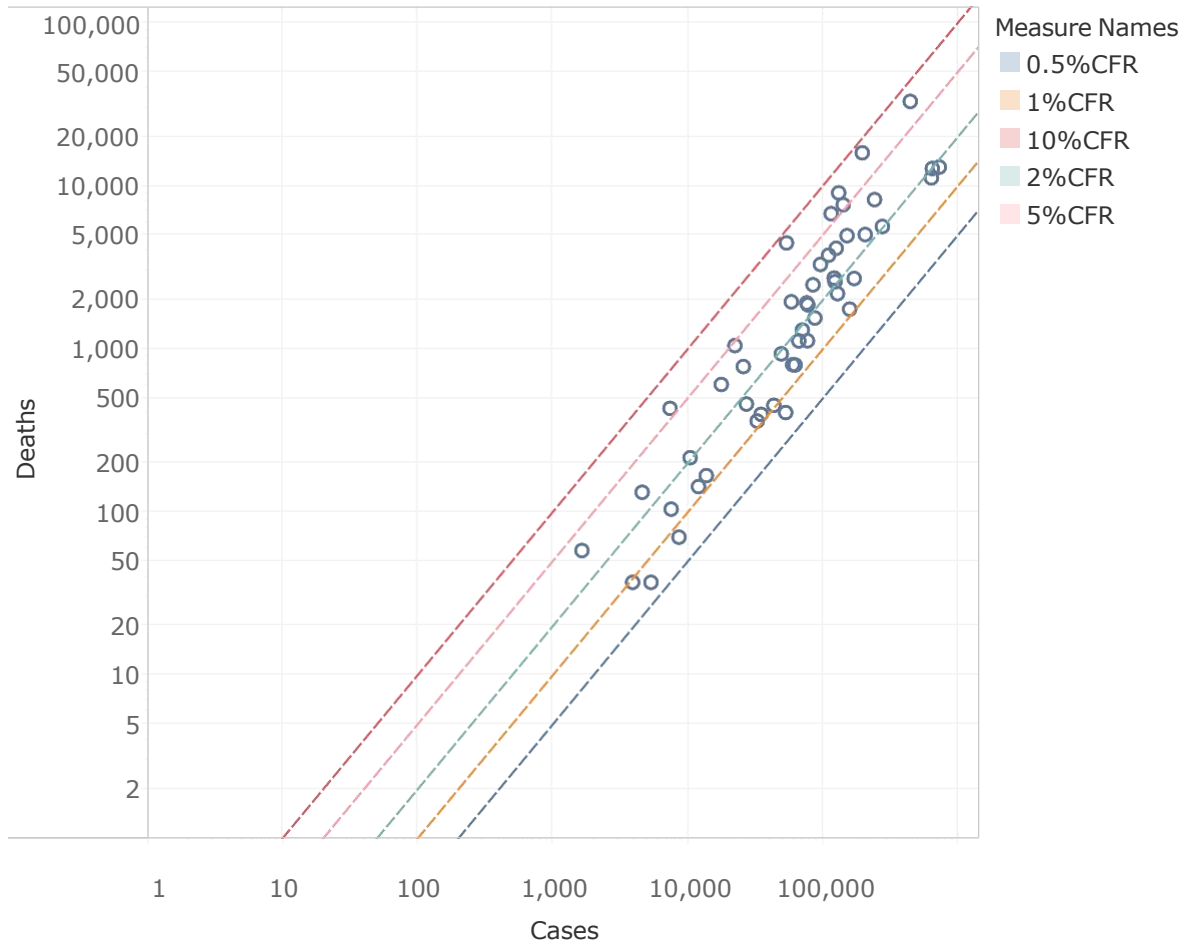


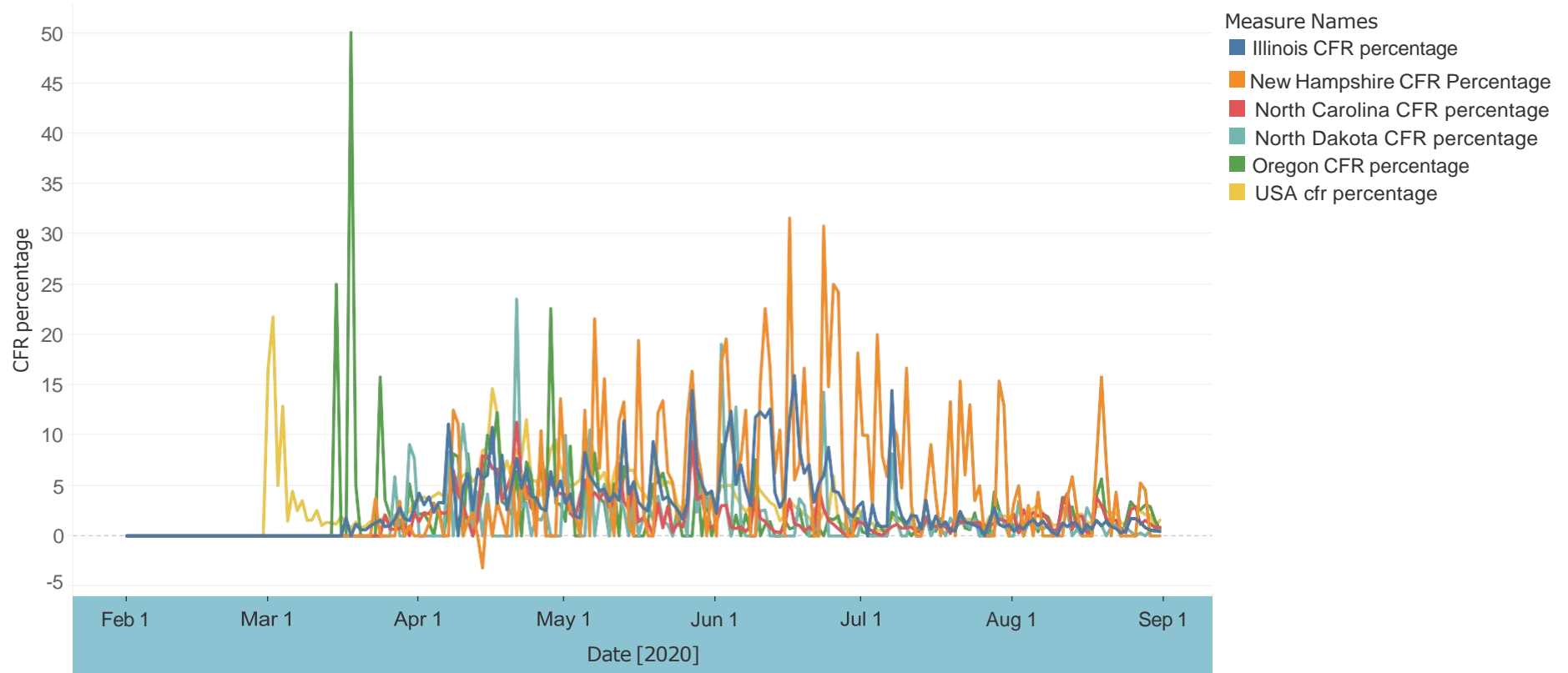
Student Name - Sameera Koushik

Total Deaths vs Cases



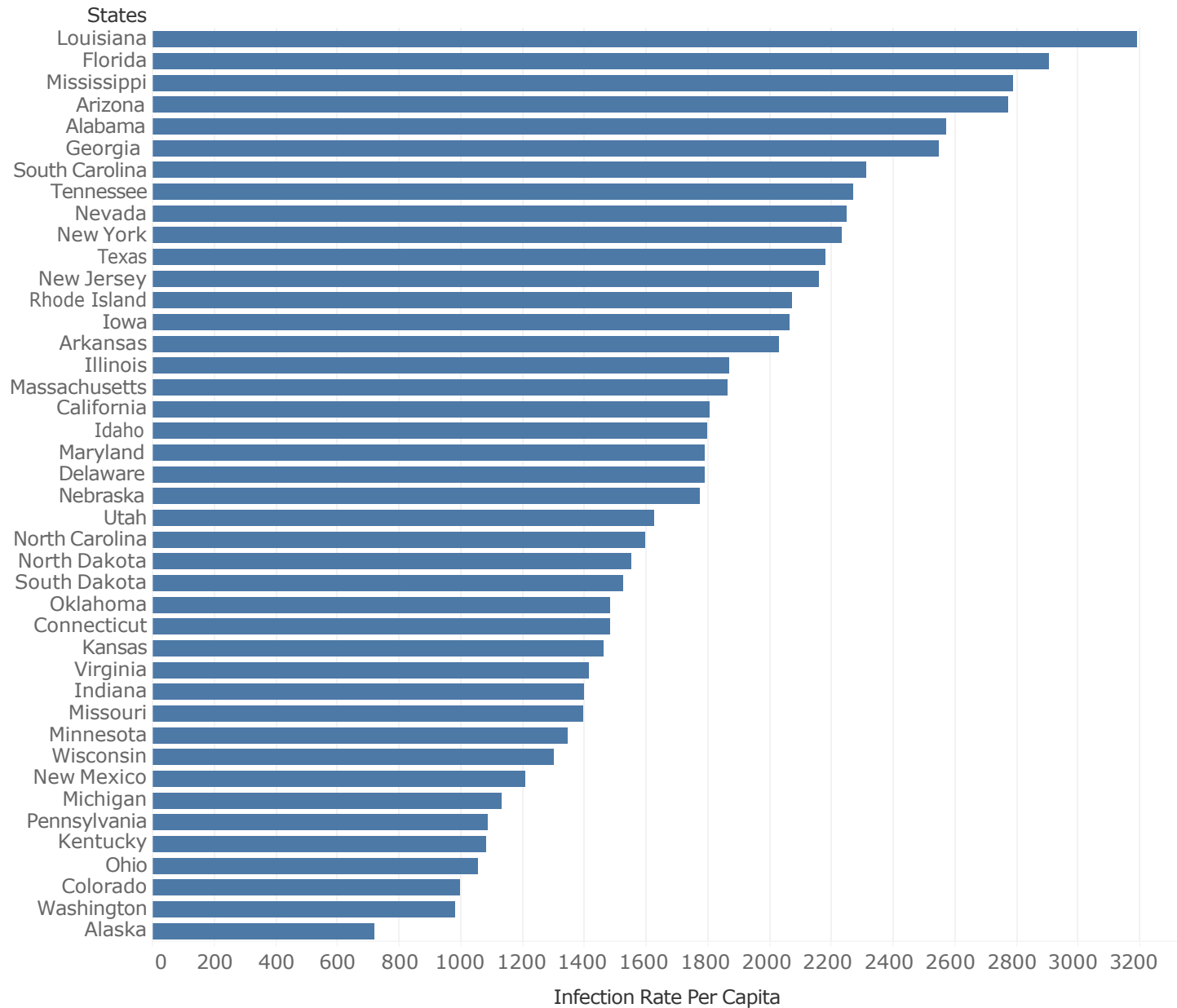
Cases vs. Deaths, 0.5%CFR, 1%CFR, 10%CFR, 2%CFR and 5%CFR. Color shows details about 0.5%CFR, 1%CFR, 10%CFR, 2%CFR and 5%CFR. Details are shown for States.

Student Name -Sameera Koushik
Case Fatality Rate over time



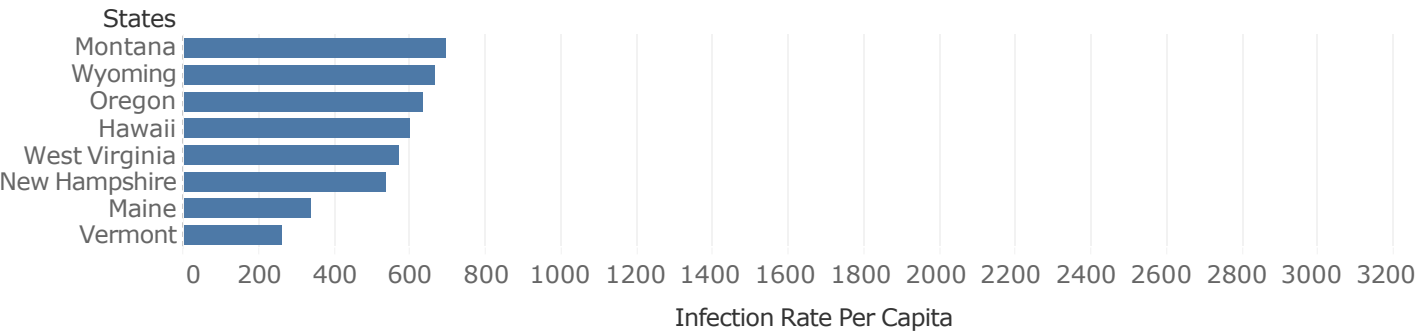
The trends of Illinois CFR percentage, New Hampshire CFR Percentage, North Carolina CFR percentage, North Dakota CFR percentage, Oregon CFR percentage and USA cfr percentage for Date. Color shows details about Illinois CFR percentage, New Hampshire CFR Percentage, North Carolina CFR percentage, North Dakota CFR percentage, Oregon CFR percentage and USA cfr percentage.

Student Name -Sameera Koushik Per Capita Case rate by each state in US



Sum of Infection Rate Per Capita for each States.

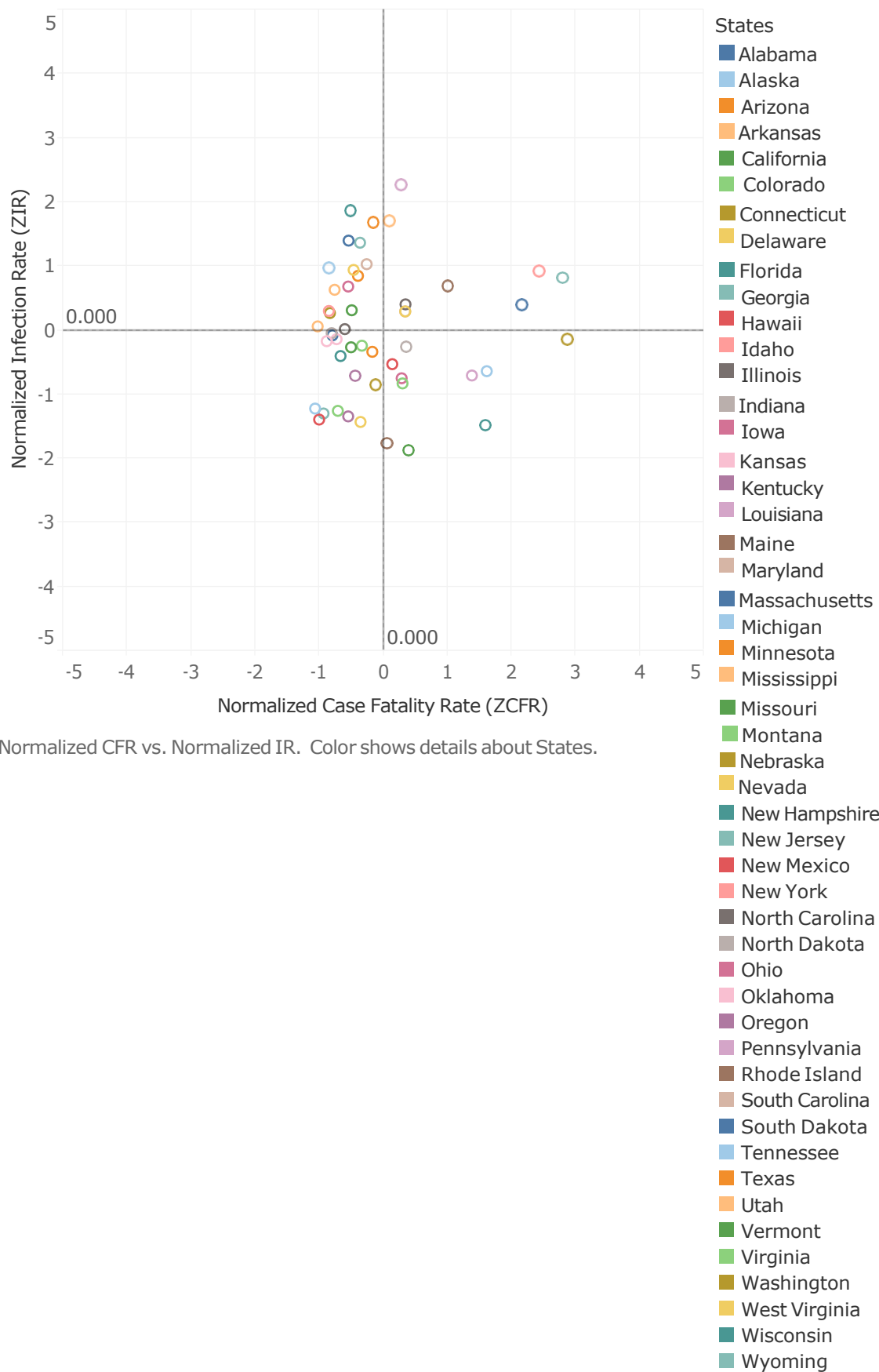
Student Name -Sameera Koushik Per
Capita Case rate by each state in US



Sum of Infection Rate Per Capita for each States.

Student Name - Sameera Koushik

Normalized Case Fatality Rate vs. Normalized Infection Rate





NAME: SAMEERA KOUSHIK.

Questions

Answer the following questions in complete sentences. Describe your answer in enough detail to make your point clearly, but concisely. Use the provided COVID-19 data and your analysis to inform your answers and use references to support your work, where applicable.

1. Define the case fatality rate, the crude mortality rate, and the infection fatality rate with respect to COVID-19. Describe the differences in each and their interpretations. Provide formulas as appropriate. Which is the most appropriate metric to answer the question “If someone is infected with SARS-COV-2, what is the likelihood that they will die?”

- Case fatality rate case fatality rate is the proportion of persons with particular condition who die from that condition. It is measured of the severity of the condition.

Case Fatality rate = $\frac{\text{Number of deaths}}{\text{Number of cases}}$

- Crude Mortality Rate – The crude mortality rate is the number of deaths occurring among population of a given geographical area during a given year.

Case Motility Rate = $\frac{\text{Total Residents Deaths}}{\text{Total Population}} \times 100,000$

- Infection Fatality Rate – Infection fatality rate is defined as the number of individuals who die of the disease among all infected individuals.

Infection Fatality Rate = $\frac{\text{Number of deaths from disease}}{\text{Number of infected individuals.}} \times 100$

2. Which 3 states showed the highest case fatality rate? Which 3 states showed the lowest case fatality rate? Describe why you think these states have high and low case fatality rates.

- 3 States with highest CFR

New York
New Jersey
Connecticut

- 3 States with lower CFR

Alaska
Utah
Hawaii

In states New York, New Jersey and Connecticut rate of infection rates are high because case fatality rates are high. In states Alaska, Utah, Hawaii rate of infection rates are low because fatality rates are low.

3. Which 3 states showed the highest crude mortality rate? Which 3 states showed the lowest crude mortality rate? Describe why you think these states have high and low crude mortality rates.

3 states with higher crude motility rate

New jersey

New York

Massachusetts

3 states with lowest crude mortality rate.

Alaska

Wyoming

Hawaii

States with higher crude mortality rate are larger in area and population is high. And the states with low crude mortality rate are smaller in area and population is low.

4. Describe the trend of the case fatality rate of COVID-19 over time from February through August. What do you suspect is the reason for this trend over time?
- Cases picked up from March to April rapidly but, later taken precautions and implemented lock down so, the cases are low.
5. Is the CFR a good metric to use to estimate the risk of death during a pandemic? Why or why not? What is/are better metrics to use and why?
- No, the case fertility rate is not a ideal metrics to estimate the risk of death but it indicate what is the percentage among the population. For measuring or estimating the risk of death, IFR would be a good metrics. It gives information about the spreading of disease and death probity.
6. Using your normalized CFR vs. normalized infection rate graph, identify what each of the four quadrants means based on the sign of the data point (i.e., the upper right quadrant has a positive Z_{CFR} and positive Z_{IR} – what does that mean?). Describe 1-2 states that fall into each quadrant (or identify if there are none).
- From this graph I observed most states are positioned under first top and left bottom quadrant and very few fall under top right and bottom right of the quadrant. It means both CFR and IFR Are less or in negative than there is less chance of getting Infection or probability or death. If even one value is in positive there is a chance of infection or death.

New York which is occupied in the right top with the normalized CFR 2.428 and normalized IR 0.922. New Jersey with normalized CFR 2.797 and normalized IR 0.818. States fall in top left corner are Idaho is normalized CFR -0.851 and normalized IR 0.300. California is normalized CFR -0.494 and normalized IR 0.311. States fall in the bottom left are West Virginia with normalized CFR -0.357 and Normalized IR - 1.431. Oregon state has normalized CFR -0.550 and normalized IR -1.344. States fall in the bottom left quadrant are New Hampshire with normalized CFR 1.594 and normalized IR -1.483. and Vermont with normalized CFR 0.391 and normalized IR of -1.872

7. Why is the infection fatality rate so difficult/nearly impossible to accurately calculate?
 - Infection Fatality rate is difficult to calculate because it includes sick healthy infected And with undetected disease.
8. It is often important to compare the per capita infection rate between states instead of the absolute number of cases. Why is this the case? In what situations can per capita rates misrepresent the relative severity of a disease?
 - It is important to compare the per capita infection rate between states rather of the absolute Number of cases because just watching the absolute number of cases it is difficult to understand the proportion of actual case.