Major Findings

**Is there a statistically significant difference in Covid-19 infection rates between U.S. States?**

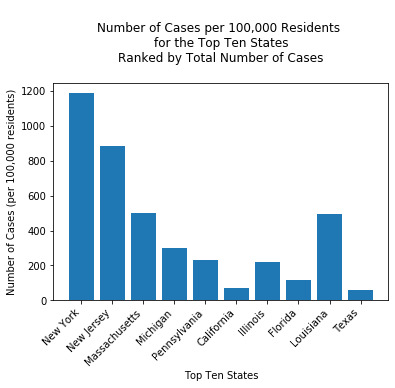
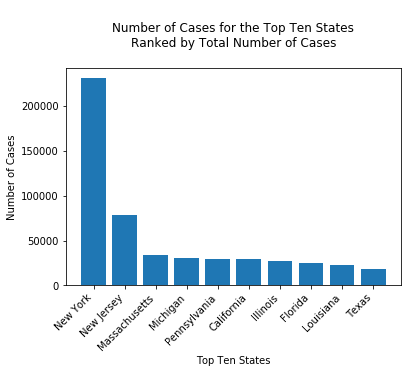
We conducted a chi-squared analysis to show that the difference between infection rates for individual states versus the national average was statistically significant.

Our chi-squared test-statistic (1309982.674) was larger than the critical value (66.339). We can reject the null hypothesis that there is no difference in infection rates between states. While this test tells us that the difference between the number of cases per state and their expected values is unlikely to be caused by chance alone, it does not offer additional insight as to why this difference occurred.

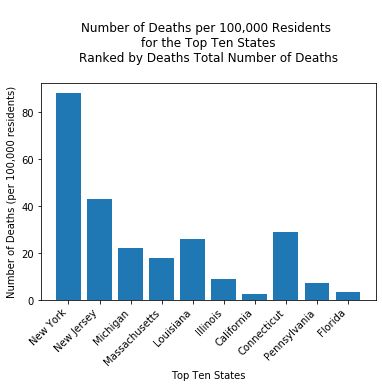
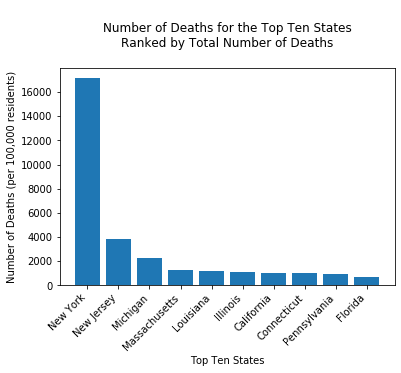
Knowing that the difference between state infection rates is significant allows us to continue our analysis. Had we been unable to reject the null hypothesis then the rest of our analysis would be irrelevant due to the lack of difference between states.

After determining that there was a difference between states, we first looked at the top ten states by total number of cases and plotted them as a bar chart to visualize the difference.

For each of those ten states we also plotted the number of cases per 100,000 residents to visualize how each state differed in terms of infection rate. See figures below.



Next we took the top ten states by total number of deaths and then plotted the number of deaths, and the number of deaths per 100,000 residents for each of these states to see how each state differed in terms of death rates per capita. See figures below.



From these charts and our chi-squared analysis we can see that states are experiencing significantly different rates of infection. This analysis also helped to show the difference between total numbers and numbers per capita. One motivation for this analysis was to standardize numbers based on population to contrast the abundance of media reports of statistics without a valid basis for comparison (ie. headline news about USA passing Italy for number of cases when the two countries have very different total population counts).

**How does California compare to the rest of the nation?**