

Data Documentation

Webpage 1:

1. Health Care Utilization Rate for the US and NC
 - a. **Data Source:** data for percentage of ICU beds occupied (all patients) and percentage of inpatient beds occupied for both the US and NC are from [National Healthcare Safety Network](#), [Health Data](#) and [NCDHHS](#).
 - b. **Update Schedule:** The national data from [National Healthcare Safety Network](#) stopped update after July 14, 2020. The daily national data after July 24, 2020 are from [Health Data](#), which is updated weekly on Tuesday; NCDHHS data are updated manually on a daily basis.
 - c. **Calculation:**
7-day Moving Average of {the Average of (% of ICU beds occupied (all patients), % of inpatient beds occupied (all patients))}
2. Hospitalization Rate (per 100,000)
 - a. **Data Source:** data for number of COVID-19 hospitalizations for both the US and NC is from [COVID Tracking Project](#)
 - b. **Update Schedule:** update daily
 - c. **Calculation:**
$$\text{Hospitalization Rate} = \text{COVID-19 Hospitalization} / \text{Population} \times 100,000$$
3. Death Rate (per 100,000)
 - a. **Data Source:** data for number of COVID-19 deaths for both the US and NC is from [COVID Tracking Project](#)
 - b. **Update Schedule:** update daily
 - c. **Calculation:**
$$\text{Death Rate} = 7\text{-day Moving Average of } \{ \text{Daily COVID-19 Deaths} / \text{Population} \times 100,000 \}$$
4. Positive Test Rate
 - a. **Data Source:** data for number of reported test results and number of reported positive test results for both the US and NC is from [COVID Tracking Project](#)
 - b. **Update Schedule:** update daily
 - c. **Calculation:**
$$\text{Positive Test Rate} = (\text{Number of Positive Test Results for last 7 Days}) / (\text{Number of Total Test Results for last 7 Days})$$
5. New Cases in NC (per 100,000)
 - a. **Data Source:** data for number of reported positive test results for NC is from [COVID Tracking Project](#)
 - b. **Update Schedule:** update daily
 - c. **Calculation:**
$$\text{New Cases in NC} = 7\text{-day Moving Average of } \{ \text{Daily Positive Test Results} / \text{Population} \times 100,000 \}$$

6. Death Implied New Cases in NC (per 100,000)

- a. **Data Source:** data for number of death and number of reported positive test results for NC is from [COVID Tracking Project](#)
- b. **Update Schedule:** update daily
- c. **Calculation:**¹
 - i. New Cases - Death Implied(Low)= (7-day moving average of New_Deaths lagged by 14 days)/(Infection_Fatality_Rate (Upper Bound))/(NC_Population/100,000)
 - ii. New Cases - Death Implied(Middle)= (7-day moving average of New_Deaths lagged by 14 days)/(Infection_Fatality_Rate)/(NC_Population/100,000)
 - iii. New Cases - Death Implied(High)= (7-day moving average of New_Deaths lagged by 14 days)/(Infection_Fatality_Rate (Low Bound))/(NC_Population/100,000)
 - iv. New_Deaths are from [COVID Tracking Project](#).
 - v. Infection Fatality Rate = 0.68%. It is assumed constant and is estimated by [Meyerowitz-Katz, G. and Merone, L. \(2020\)](#).
 - vi. Infection Fatality Rate (Upper Bound) = 0.82% is the upper bound of the 95% confidence interval of the point estimate.
 - vii. Infection Fatality Rate (Lower Bound) = 0.53% is the lower bound of the 95% confidence interval of the point estimate.
 - viii. NC_Population is assumed to be 10,500,000, see <https://www.census.gov/quickfacts/NC>.

7. The basic reproduction rate (R_0 or “R-naught”)

- a. **Data Source:** estimates of infection rates and the confidence intervals for NC are from [Covid Act Now](#). For the US, the same measures for each state are from the same data source and we calculate the measure for the US by doing a population weighted (by current susceptible) average across all the states.
- b. **Data Description:** The basic reproduction rate (R_0 or “R-naught”) is a measure of the contagiousness or transmissibility of the virus. The value describes the how many other people each infected person will infect on average. Numbers less than 1.0 suggest contraction of total cases and vice versa.
- c. **Update Schedule:** update weekly
- d. **Calculation:**
 - i. $State\ i\ Weight = \frac{Current\ Susceptible\ for\ the\ State\ i}{\sum_{All\ States} Current\ Susceptible}$
 - ii. $US\ Infection\ Rates = \sum_{All\ states} State\ i\ Weight \times Infection\ rate\ for\ State\ i$

¹ Meyerowitz-Katz, G. and L. Merone (2020). A systematic review and meta-analysis of published research data on COVID-19 infection-fatality rates. *medRxiv 2020.05.03.20089854*, doi: <https://doi.org/10.1101/2020.05.03.20089854>.