MUSC COVID-19 Epidemiology Intelligence Project
Situation Assessment

MUSC COVID-19 Modeling Team:
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web.musc.edu/epidemiology
March 9, 2020 (5 weeks ago)

80,735 Total Confirmed Cases

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US Status
11am March 10, 2020

Total Confirmed: 603

<table>
<thead>
<tr>
<th>Total Deaths</th>
<th>Total Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>8</td>
</tr>
</tbody>
</table>

- **17 deaths**
  - King County, WA US
  - Grant County, WA US
  - Lee County, FL US
  - Placer County, CA US
  - Sacramento County, CA US
  - Santa Rosa County, FL US
  - Snohomish County, WA US

- **2 recovered**
  - Cook County, IL US
  - Madison, WI US
  - Maricopa County, AZ US
  - San Diego County, CA US
  - Santa Clara County, CA US
  - Suffolk County, MA US

Coronavirus COVID-19 Global Cases by Johns Hopkins CSSE

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3,553 Confirmed Cases
April 15th

SC today has ~6 times the number of cases the entire US had 1 month ago.

DHEC estimates up to 9x more cases may be present and unidentified.

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Number of Confirmed Cases: Charleston Area
(Charleston, Berkeley, & Dorchester counties)

Many / most cases are likely not confirmed.
DHEC estimates actual number of cases is ~3,218
Confirmed cases per 1,000 population: Charleston Area

For comparison, here are values from other locations:

- New York – 10.94
- New Orleans – 9.49
- Lombardy region, Italy – 5.45
- Wuhan, China – 4.51
- Seattle – 1.57
- Albany, GA – 1.35
- Charleston, SC – 0.68
Change in growth rate of new cases: Charleston Area

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Charleston Area COVID-19 Growth Rate by Case Count per 1,000 Population

The closer the values are to the lower left the better.

In the lower left you have both a low growth rate of infections together with a small number of infections.

Values in this upper right area of the graphic represents the worst-case scenario.

Having both a high growth rate of infections together with a large number of infections leads to explosive growth.
Average daily change in confirmed cases by cases per 1,000 population

Charleston Area COVID-19 Growth Rate by Case Count per 1000 Population

AVERAGE DAILY CHANGE IN TOTAL CASES, OVER THE PREVIOUS 7 DAYS

High Prevalence & High Transmission

Lower Prevalence & Lower Transmission

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Social Mobility: Charleston County

Charleston Area Trends in Change in Mobility

Weekends

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Change in Social Mobility Across Cities

Change in Mobility Across Cities: Charleston, Los Angeles, Seattle

% of baseline (Tri-County)  % of baseline (LA)  % of baseline (Seattle)
Change in growth rate of new cases

This suggests that about 3 weeks before - last week of Feb and first two weeks of March - was a time of very high transmission of the virus.

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Change in Social Mobility Across Cities

Change in Mobility Across Cities: Charleston, Los Angeles, Seattle

Likely High Transmission Period

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When will it start?

IHME Model

Hospital resource use

Resources needed for COVID-19 patients on peak date
- All beds needed: 593 beds
- ICU beds needed: 146 beds
- Invasive ventilators needed: 128 ventilators

15 days until peak resource use on April 30, 2020

Charleston Area Confirmed COVID-19 Cases

Charleston Area COVID-19 Growth Rate by Case Count per 1,000 Population

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MUSC COVID-19 Situation Assessment

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Indicator</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope of epidemic</td>
<td>Prevalence of infections (cases per 1,000 population)</td>
<td>Stable – GREEN</td>
</tr>
<tr>
<td>Scope of epidemic</td>
<td>Identified super spreader events (nursing homes, prisons, cluster outbreaks, etc.)</td>
<td>None identified – GREEN</td>
</tr>
<tr>
<td>Epidemic control</td>
<td>Growth rate of confirmed cases</td>
<td>Stable but still growing – YELLOW</td>
</tr>
<tr>
<td>Epidemic control</td>
<td>Growth rate of cases by prevalence of cases</td>
<td>Stable – GREEN</td>
</tr>
<tr>
<td>Epidemic control</td>
<td>Social mobility</td>
<td>Slight increase, only moderate level achieved – YELLOW</td>
</tr>
<tr>
<td>Health system capacity</td>
<td>Availability of general hospital beds, ICU beds, ventilators</td>
<td>Adequate – GREEN</td>
</tr>
</tbody>
</table>

About this Project

Prevalence of Infection
This graph indicates the prevalence of COVID-19 in the Charleston area by showing the number of cases per 1,000 people.

Growth Rate of Confirmed Cases
This graph shows the growth rate of confirmed cases compared to the day before.

Growth Rate by Prevalence
This graph shows the growth rate based on the number of total cases in the Charleston area and indicates if the community is flattening the curve.
Main Points

• There is evidence that in the past 3 weeks social distancing has reduced the growth of new cases substantially.

• We do expect a surge of patients with COVID-19 entering hospitals beginning in the next few weeks.

• This surge of patients is not expected to exceed the capacity of MUSC University Hospital to provide high quality care.

• Vigilance is needed to assure that the COVID-19 transmission remains controlled:
  • If social distancing is reduced new cases could grow quickly.
  • Future waves are possible.
  • “Super spreader” events and cluster outbreaks can rapidly change epidemic trajectory.

• We are closely tracking key leading indicators:
  • Our analyses are now available to the public at: web.musc.edu/epidemiology.
Disclaimer

The attached models, including the underlying data, assumptions, and methods ("Models") were developed by the Medical University of South Carolina ("MUSC") as a planning tool for the Medical University Hospital Authority (collectively with MUSC, "MUHA" or "We") in response to the COVID-19 pandemic. These Models were developed, in part, using data provided by your Institution, and We are in turn sharing these Models with your Institution in an effort to provide information about what demands COVID-19 may place on hospital capacity and resources with the hopes that our Institutions may better prepare.

These Models were ultimately developed in order to further protect the safety, health and well-being of our care team members and patients. Please note that this is a very fluid situation and our Models may change as additional information becomes available.

The research behind the Models has not been peer reviewed. The peer review process is a vital part of assessing new research and identifies weaknesses in its assumptions, methods and conclusions. These Models are provided “as is.” In providing the Models, MUHA does not make any express or implied warranties, representations or endorsements whatsoever (including without limitation warranties of title or non-infringement, or the implied warranties of merchantability or fitness for a particular purpose) with regard to the Models. In no event will MUHA be liable to you or anyone else for any decision made or action taken by you or anyone else in reliance upon the information provided through the Models.

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