Social Determinants of Health Impact on SARS-CoV-2 (COVID-19) and Respiratory Syncytial Virus (RSV) incidence and severity in Upstate South Carolina

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Background Information

Globally:
- > 700,000 children tested positive for SARS-CoV-2
- RSV infection could result in ~100,000 pediatric hospitalizations

Locally:
- > 5000 Coronavirus Cases in Greenville County
- >300 RSV cases at Greenville Memorial Hospital in 2018

Determinants of Health
- COVID-19 disproportionately affects racial and ethnic minority groups
- RSV: Hospitalization rate 2x in least resourced areas
- Crowding risk factor

RSV: Hospitalization rate 2x in least resourced ethnic minority groups

COVID-19 in Greenville County:
- >300 Coronavirus Cases in Greenville County
- 17,000 Children Living in Poverty in Greenville

Future Directions
- Patient Engagement Studio will merge patient and provider insight in developing targeted interventions to address under resourced areas
- Identify at-risk communities to understand where interventions are most needed
- Equip Greenville County with resources and guidelines to combat future respiratory viruses
- Investigating the risks of coinfection
- Analyzing the impact of school policy on rates of COVID-19 infection

Methods

Establish case data selection query criteria
Collection of data from EMRs
Geospatial Mapping with additional data drawn from ACS and US Census
Consulting with Patient Engagement Studio
Data Analysis with Statistical Models

Data Analysis

EMR DATA
- Patient Demographics
- Clinical outcomes, treatments, and new diagnoses

Integrating with ACS
- Data Pooled from Above
- ACS and Census Community Factors Differentiated by Zip Code

Integration with ARCGIS
- ACS and Census Community Factors
- Hotspot Analysis

Query Criteria:
- Age <18, w/ positive PCR test for RSV/COVID-19

Collection of data from Electronic Medical Records:
- LOS, Highest Supplemental O2 Administered, Admitting Department, Vitals, Insurance Status, Demographic Data, Intubation, Medications, Readmission, MIS-C, Patient History

Geospatial Mapping:
- ArcGIS Software

Data from American Community Survey (ACS) and US Census
- Languages spoken, % Below Poverty Line, Average Education Level, Household Size, Racial Identities, Average Annual Income

Table 1. Risk for COVID-19 Infection, Hospitalization, Death by Race/Ethnicity in the U.S.

<table>
<thead>
<tr>
<th>Rate Ratios Compared to White, Non-Hispanic Persons</th>
<th>American Indian or Alaska Native, Non-Hispanic Persons</th>
<th>Asian, Non-Hispanic Persons</th>
<th>Black or African American, Non-Hispanic Persons</th>
<th>Hispanic or Latino Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>1.7x</td>
<td>0.7x</td>
<td>1.1x</td>
<td>1.9x</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>3.4x</td>
<td>1.0x</td>
<td>2.6x</td>
<td>2.8x</td>
</tr>
<tr>
<td>Death</td>
<td>2.4x</td>
<td>1.0x</td>
<td>2.0x</td>
<td>2.3x</td>
</tr>
</tbody>
</table>

Greenville County: 21 residential zip codes with significant variability in socioeconomic status
- 17,000 Children Living in Poverty in Greenville

Table 2. Socioeconomic Variability across Greenville County, 2018

<table>
<thead>
<tr>
<th>Zip Code (City)</th>
<th>Median Household Income</th>
<th>% High School Graduate</th>
<th>% Below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>29681 (Simpsonville)</td>
<td>$81,917</td>
<td>94.80%</td>
<td>4.70%</td>
</tr>
<tr>
<td>29615 (Wade Hampton)</td>
<td>$57,208</td>
<td>96.00%</td>
<td>8.70%</td>
</tr>
<tr>
<td>29690 (Travelers Rest)</td>
<td>$52,981</td>
<td>83.90%</td>
<td>13.10%</td>
</tr>
<tr>
<td>29609 (Greenville)</td>
<td>$43,559</td>
<td>86.00%</td>
<td>17.80%</td>
</tr>
<tr>
<td>29611 (Parker)</td>
<td>$32,073</td>
<td>70.20%</td>
<td>28.90%</td>
</tr>
</tbody>
</table>

References


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