Introduction

- Novel coronavirus has emerged as one of the world’s largest public health crises of the century.¹
- It has infected over 11 million people and caused over $3.5 trillion in economic impact.²
- With such a large impact, it has become imperative to identify high risk populations in order to slow the spread of disease.
- The CDC has identified obesity status, diabetes, heart conditions, and kidney and liver cancer to be overall risk factors for experiencing severe illness from coronavirus.³
- Identifying which risk factors are most applicable to Louisiana would allow policy makers in Louisiana to more effectively cater interventions for Louisiana.

Objective

- The study objective is to identify possible COVID-19 risk factors for Louisiana.
- Hypothesis: Not all the CDC identified risk factors will be statistically significant for Louisiana.

Methods

Figure 1: Figure depicting the order in which the data was collected and analyzed.

- Collected race, gender, poverty, and age percentage data for each parish from the U.S. Census database.
- Collected hypertension, diabetes, obesity, and kidney and liver cancer incidence rates for each parish from the Louisiana Department of Health Database.
- Used Statistical Analysis System to run bivariant t-test for each of CDC identified COVID-19 risk factors.
- Over 1,900 data points were collected to calculate the average COVID-19 death rate. The COVID-19 death rate was defined as the number of COVID-19 deaths per 100,000 people.
- Incidence rate for kidney and liver cancer was defined as the 2010 annual incidence rate per 100,000 people.
- T-tests and linear regression models were used to analyze the data for significance.

<table>
<thead>
<tr>
<th>Louisiana COVID-19 Risk Factor Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manal Malik¹ and Dr. Donna Williams²</td>
</tr>
<tr>
<td>Tulane University¹, LSUH-New Orleans School of Public Health²</td>
</tr>
</tbody>
</table>

Table 1: Significant data for parishes with top three COVID-19 death rates compared to Louisiana and U.S. averages.

<table>
<thead>
<tr>
<th>Parish</th>
<th>COVID-19 Death Rate</th>
<th>Aged Over 65</th>
<th>Diabetes</th>
<th>Obesity</th>
<th>Hypertension</th>
<th>Liver Cancer Incidence Rate</th>
<th>Kidney Cancer Incidence Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. John the Baptist</td>
<td>193.3</td>
<td>17.7%</td>
<td>14.4%</td>
<td>35.8%</td>
<td>41.6%</td>
<td>8.7</td>
<td>29.3</td>
</tr>
<tr>
<td>Bienville</td>
<td>179.3</td>
<td>21.7%</td>
<td>14.0%</td>
<td>38.2%</td>
<td>45.5%</td>
<td>&lt;3</td>
<td>26.6</td>
</tr>
<tr>
<td>East Feliciana</td>
<td>161.4</td>
<td>18.4%</td>
<td>17.2%</td>
<td>42.1%</td>
<td>43.2%</td>
<td>&lt;3</td>
<td>24.1</td>
</tr>
<tr>
<td>Louisiana Average</td>
<td>54.0</td>
<td>17.0%</td>
<td>12.9%</td>
<td>36.1%</td>
<td>40.2%</td>
<td>7.4</td>
<td>21.5</td>
</tr>
<tr>
<td>United States Average</td>
<td>33.9</td>
<td>16.5%</td>
<td>10.5%</td>
<td>40.0%</td>
<td>45.0%</td>
<td>8.3</td>
<td>16.1</td>
</tr>
<tr>
<td>P-Value</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.005</td>
<td>&lt;.05</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

Risk Factor Analysis (Table 1):

- P-Values listed indicate significant correlation between COVID-19 death rate and the tested risk factor.
- In comparing the U.S. averages to the Louisiana averages, Louisiana had a significantly higher average COVID-19 death rate.
- Louisiana was also found to have significantly higher percentages of those aged over 65, diabetics, and kidney cancer incidence rates.
- St. John the Baptist parish had the highest COVID-19 death rate and kidney cancer incidence rate in the state.

Results

Analysis of Correlation (Figures 2 and 3):

- Significant correlation was found between percent black populations and COVID-19 death rates.
- No significant correlation was found between percent white populations and COVID-19 death rates, indicating a racial disparity within the state.
- Significant correlation to the Louisiana COVID-19 death rate was also found with lung cancer, percent with college education, and percent in poverty.

Conclusions

- Overall, all the CDC identified risk factors were found to be statistically significant for Louisiana populations.
- Other factors such as lung cancer incidence, poverty percentage, and percent with college education were also found to be correlated.
- The black population percentage was significantly correlated with higher COVID-19 death rates, but no such correlation was found for white populations. This may indicate a racial disparity.
- St. John Parish had the highest overall COVID-19 death rate in the state and had the highest kidney and liver cancer rate of the top three parishes, which may be related to chloroprene production in the region.

References


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