Poverty and Healthcare: Using Drive Times to Represent Access to Care
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EES201 – Introduction to Geographic Information Systems – Fall 2013, Furman University, Greenville, SC

Abstract

It is no secret that poverty is heavily correlated with health care access. One attempted means of doing so, however, is through GIS and the use of drive times as a potential way to analyze this, as it has increasingly been used to combat public health problems. The Greenville Health System wanted to see if there was a correlation between the geography and the geographically underserved. Drive times were created around hospitals to show areas of geographical underserved and this was combined with a map depicting poverty rates for Greenville County. While no strong correlations were found between geographical underserved and poverty, areas of underserved did exist. Furthermore, the hospitals in Greenville County were built during times of different wealth distribution for Greenville County, as a map of current poverty for Greenville County may not have been the most recent for creating hospital locations. A potential remedy for the sparsely populated areas of underserved are Community Health Centers (CHCs) which are not extremely expensive, but can provide care to underserved areas.

Introduction / Lit Review

It is no secret that poverty is heavily correlated with health care access (Phillips and Lindbloom 2000). In 2010, the attempted means of remedy was largely being termed the “health care reform” and had the goal of increasing access to insurance coverage to individuals (or reducing those healthcare costs. Additionally, many hospitals were started when money was distributed within the 15 minute drive time ring. Many of these hospitals were built when money was distributed within the 15 minute drive time anomaly. There are very few block groups in the 20, 25, and 30 minute drive time rings (10, 15, 20, 25, 30). A choropleth (Figure 2) was also created depicting drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital. The east area in Greenville County was within the 30 minute drive ring to a hospital. It was created in order to identify drive times for each hospital.

III. Methodology

As of the 6 locations in Greenville County providing emergency care, one hospital though is associated with the Greenville Health System, and the others are not. The Greenville Health System Locations were located and then converted to points in ArcMap. The MRDCS software used for this study. This was layered over a map of Greenville County divided into block groups, using data obtained from the 2010 census. The attributes in this data included income to poverty level ratio. A ratio of 1 corresponds to a household that is living at the poverty line. A ratio of 1.5 means the household is living at half of the poverty line. A choropleth (Figure 1) was then created indicating drive times in various parts of Greenville County. This map is used to indicate drive times to each hospital. Most areas in Greenville were within the 30 minute drive time to a hospital. The analysis of actual service by area i.e. where patients in each hospital generally come from was also performed. This was performed on the hospital patients and geocoded and converted into points in ArcMap. The drive times were created around hospitals to show areas of geographical underserved and this was combined with a map depicting poverty rates for Greenville County. While no strong correlations were found between geographical underserved and poverty, areas of underserved did exist. Furthermore, the hospitals in Greenville County were built during times of different wealth distribution for Greenville County, as a map of current poverty for Greenville County may not have been the most recent for creating hospital locations. A potential remedy for the sparsely populated areas of underserved are Community Health Centers (CHCs) which are not extremely expensive, but can provide care to underserved areas.

IV. Results and Discussion

As of the 6 locations in Greenville County providing emergency care, one hospital though is associated with the Greenville Health System, and the others are not. The Greenville Health System Locations were located and then converted to points in ArcMap. The MRDCS software used for this study. This was layered over a map of Greenville County divided into block groups, using data obtained from the 2010 census. The attributes in this data included income to poverty level ratio. A ratio of 1 corresponds to a household that is living at the poverty line. A ratio of 1.5 means the household is living at half of the poverty line. A choropleth (Figure 1) was then created indicating drive times in various parts of Greenville County. This map is used to indicate drive times to each hospital. Most areas in Greenville were within the 30 minute drive time to a hospital. The analysis of actual service by area i.e. where patients in each hospital generally come from was also performed. This was performed on the hospital patients and geocoded and converted into points in ArcMap. The drive times were created around hospitals to show areas of geographical underserved and this was combined with a map depicting poverty rates for Greenville County. While no strong correlations were found between geographical underserved and poverty, areas of underserved did exist. Furthermore, the hospitals in Greenville County were built during times of different wealth distribution for Greenville County, as a map of current poverty for Greenville County may not have been the most recent for creating hospital locations. A potential remedy for the sparsely populated areas of underserved are Community Health Centers (CHCs) which are not extremely expensive, but can provide care to underserved areas.

V. Conclusion

There is not a impoverished area of the geographically underserved as it relates to emergency health centers. While there are a few places of interest, such as the deep poverty in the 20 minute drive time, there are very few block groups that fall within this category. Furthermore, the north part of Greenville County has to do with 25 minutes or more to reach a hospital. Thus, a possible analysis of the population of this area and would constitute the building of a new hospital with an emergency care center.

VI. I.V. Future Research

A second analysis of the geographically underserved that mapping where hospital patients are actually coming from may elucidate areas of geographically underserved due to the fact that they can not afford private healthcare. Specifically, those closest to St. Francis Downtown are most likely not the patients of this hospital, due to the high level of improvement at this hospital.

Current results, there is no geographic problem with hospital placement in Greenville County. Geographically, all levels of income are served equally when not accounting for level of insurance required to be a patient at a certain hospital. Hospitals are placed evenly throughout the county, and serve the community quite equitably.

VII. References/ Data Sources

Sellers- for specific data and the opportunity to do such interesting research.
Wade Shepard for setting up Business Analyst.

Greenville County Poverty

Table 1: Table displaying the results of aggregation of drive times to income to poverty ratio.

<table>
<thead>
<tr>
<th>Drive Time</th>
<th>Income To Poverty Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.5</td>
<td></td>
</tr>
<tr>
<td>0.5-1.0</td>
<td></td>
</tr>
<tr>
<td>1.0-1.25</td>
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<tr>
<td>1.25-1.49</td>
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</tr>
<tr>
<td>1.5-1.84</td>
<td></td>
</tr>
<tr>
<td>1.85-1.99</td>
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</tr>
</tbody>
</table>

VII. Acknowledgements

Phillips, K. (2013), Combining ArcMap and Delphi Analysis for Analyzing Spatial Relationships. Contact(s) at the Greenville Health System- Anna Case, Kristin Clanfield, and Rebecca Roediger- for specific data and the opportunity to do such interesting research.

Dr. Daniel Muthukumar for making the site look as good as possible.