

# Impact of Neighborhood Demographics and Emergency Department (ED), Emergency Medical Services (EMS), and Hospital Utilization

Elena Oertel

Earth and Environmental Sciences, Furman University, Greenville, SC 29613

## I. Abstract

The purpose of this study is to test whether low income and underserved neighborhoods in Greenville County, South Carolina are linked to having higher emergency department (ED), emergency medical services (EMS), and hospital inpatient utilization trends. The link between low-income communities and high ED, EMS, and hospital inpatient utilization trends have been researched and proven to exist (Bindman et. al., 1995). The link has not yet been proven to exist in Greenville County. The objective of this project would be to prove or disprove the hypothesis that there is a link between low-income and high ED, EMS, and hospital inpatient utilization trends. If there is a link, the hope would be to figure out how to decrease or stop the high rates of ED, EMS, and hospital inpatient utilization trends coming from low-income neighborhoods. The data being analyzed are the total amount of ED, EMS, and hospital inpatient utilization compared to the median household incomes within the Greenville County zip codes.

## II. Introduction/Literature Review

The purpose of this study is to test whether low income and underserved neighborhoods in Greenville County, South Carolina are linked to having higher emergency department (ED), emergency medical services (EMS), and hospital inpatient utilization trends. The link between low-income communities and high ED, EMS, and hospital inpatient utilization trends have been researched and proven to exist (Bindman et. al., 1995). The link has not yet been proven to exist in Greenville County. The objective of this project would be to prove or disprove the hypothesis that there is a link between low-income and high ED, EMS, and hospital inpatient utilization trends. If there is a link, the hope would be to figure out how to decrease or stop the high rates of ED, EMS, and hospital inpatient utilization trends coming from low-income neighborhoods. The data being analyzed are the total amount of ED, EMS, and hospital inpatient utilization compared to the median household incomes within the Greenville County zip codes.

## III. Methods

The flow chart below shows the methods involved in this research and analysis project.

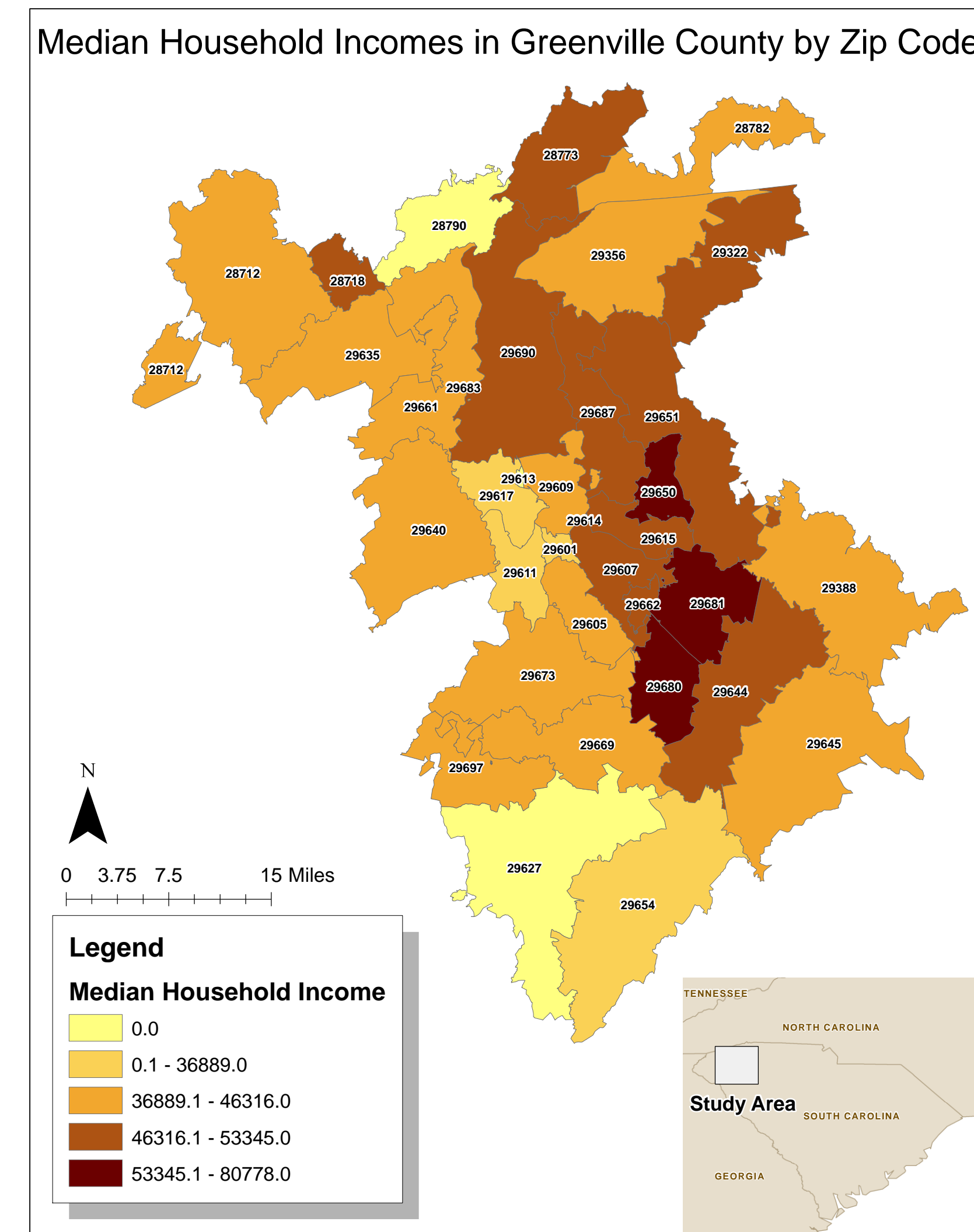
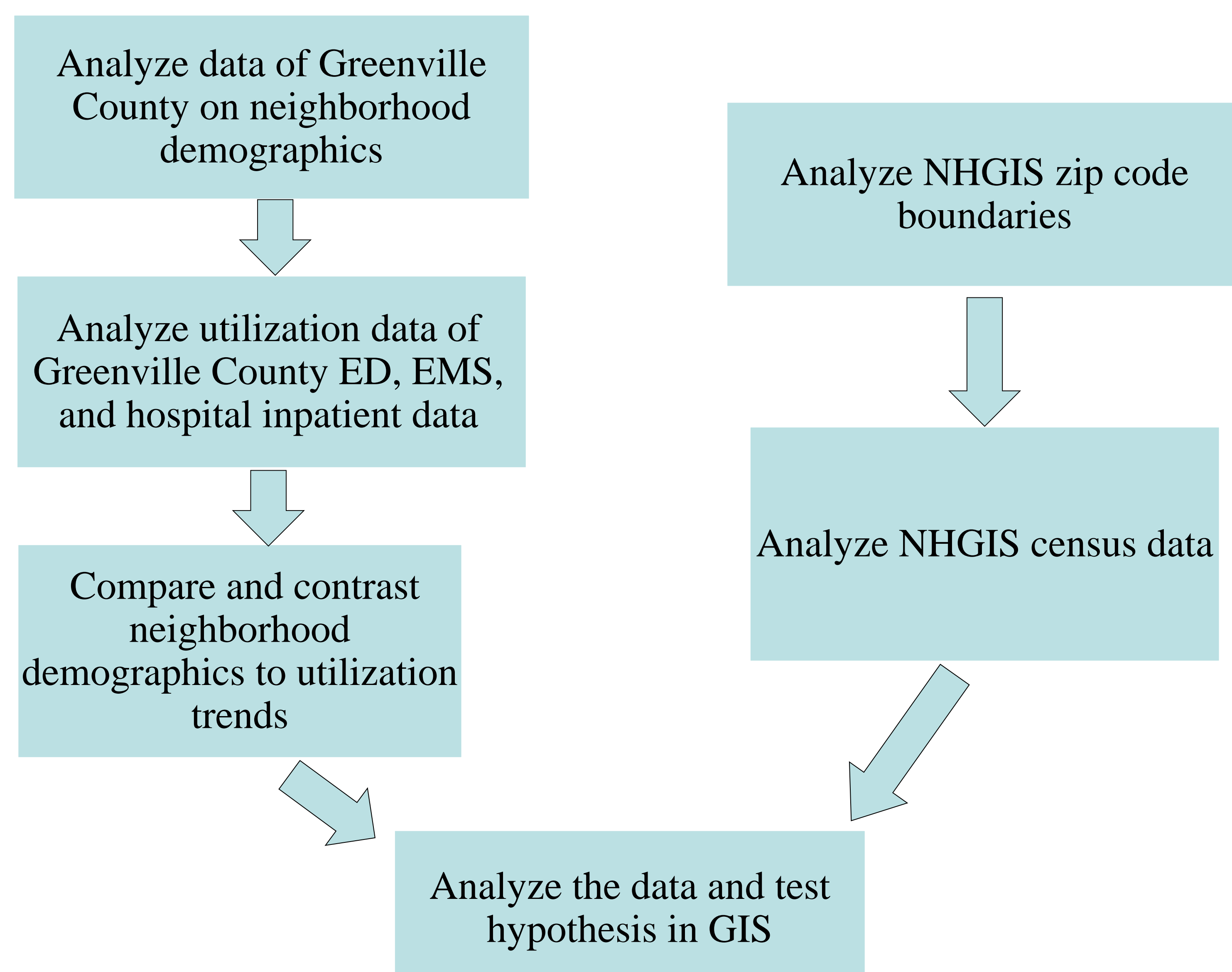
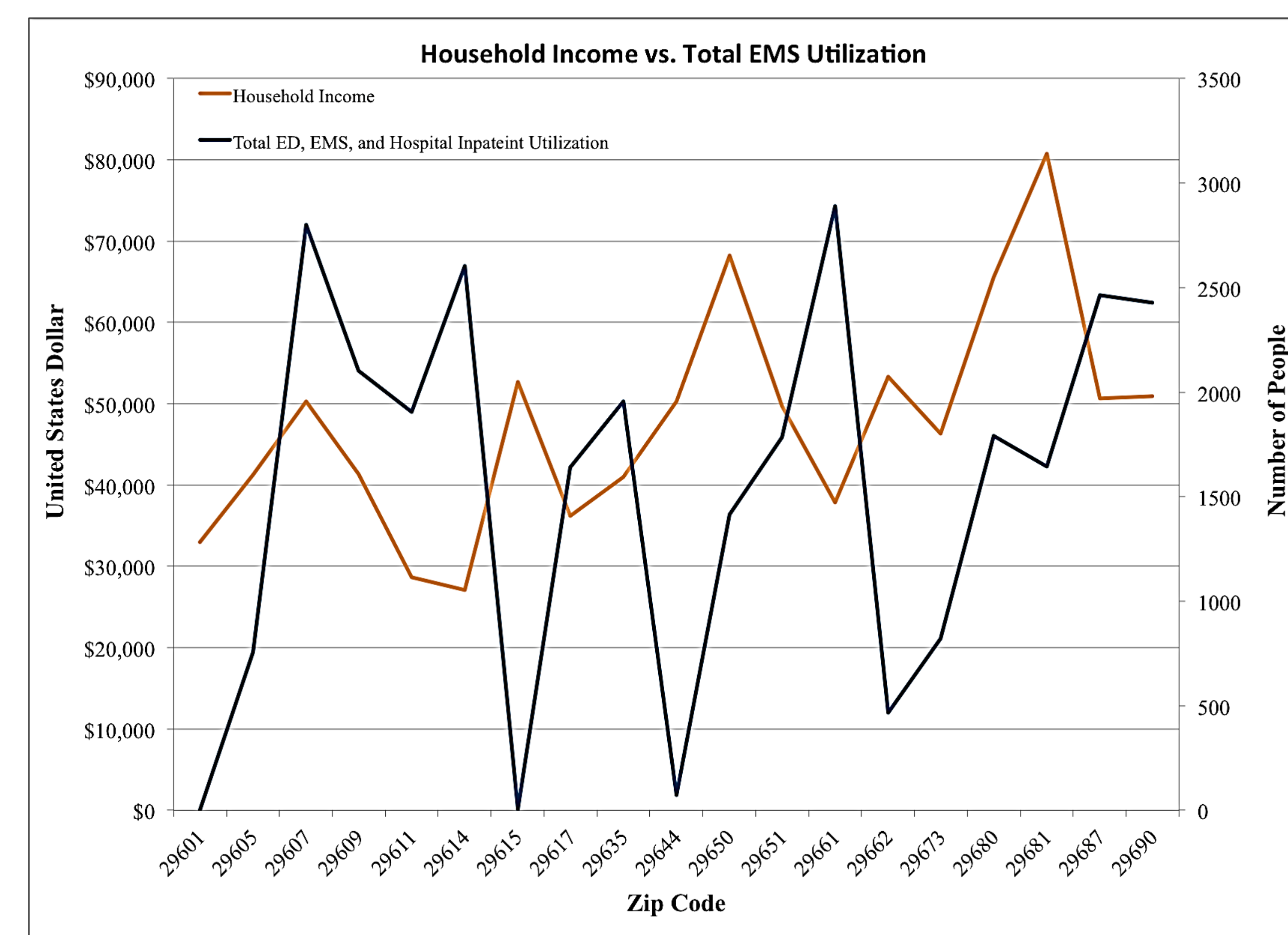
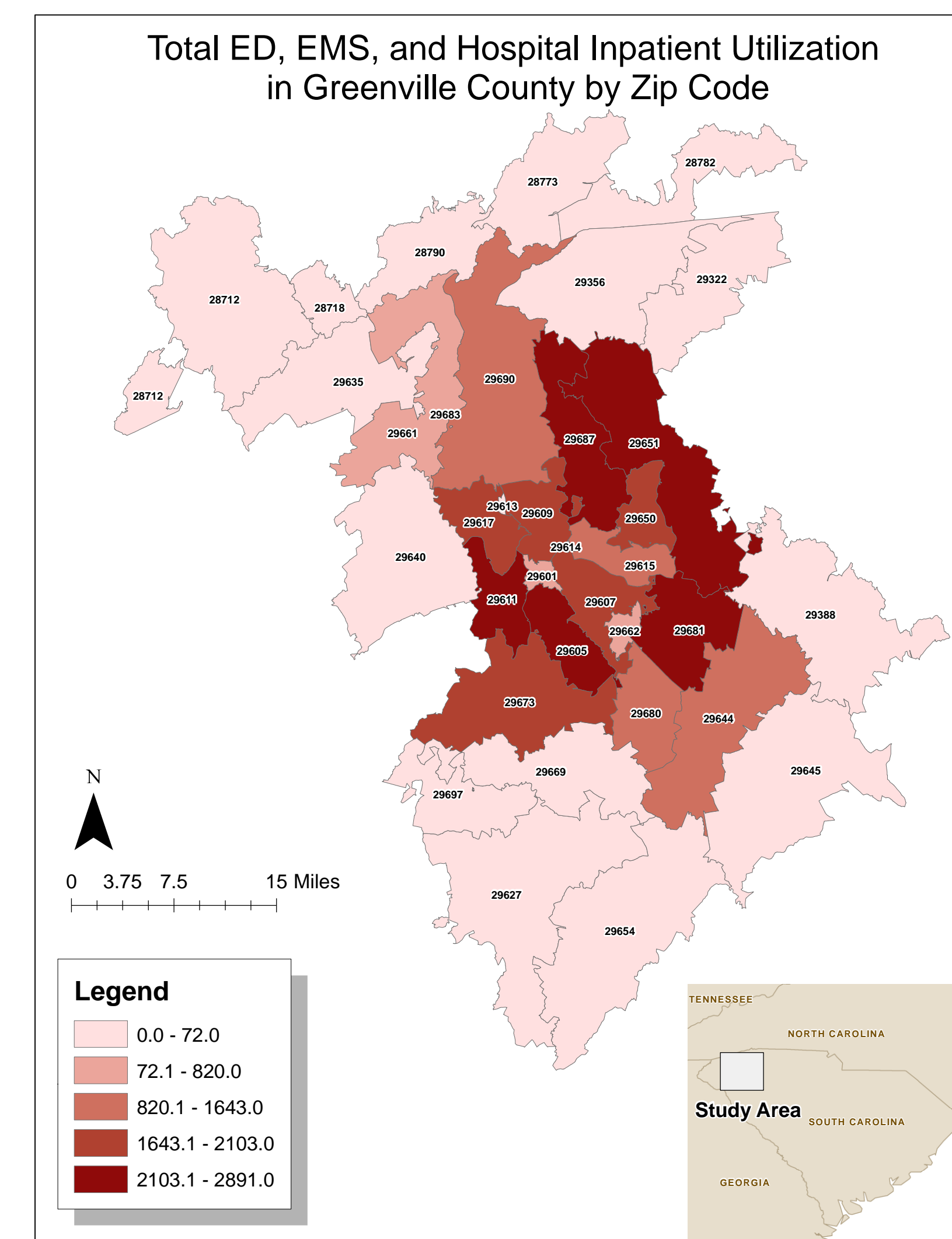


Figure 1. represents the median household incomes in Greenville County based on zip code. The darker that the area is, the higher the income is within the zip code boundary.

Figure 2. represents the total amount of ED, EMS, and hospital inpatient utilization in Greenville County based on zip code. The darker that the area is, the higher amount of ED, EMS, and hospital inpatient utilization is in that particular zip code.



Graph 1. represents the total household income and the total ED, EMS, hospital inpatient utilization trends based on zip code values.

## IV. Results & Discussions

After analyzing the data and comparing the two maps, there does not seem to be a direct correlation to a higher amount of ED, EMS, and hospital inpatient utilization trends and lower-income communities. The two figures do not show any signs that having lower-income will directly mean that there is a higher ED, EMS, and hospital inpatient trend. On the contrary, the maps show that the high-income areas actually have a higher amount of ED, EMS, and hospital inpatient trend. The line graph (Graph 3.) shows the trend of high-income areas having high ED, EMS, and hospital inpatient utilization trends more clearly.

## V. Conclusion & Future Research

Comparing each map and analyzing the data, we can disprove the hypothesis that there is a link between low-income and high ED, EMS, and hospital inpatient utilization trends within the Greenville County, SC, zip codes. According to the data, in Greenville County, there is a link between high-income areas having higher ED, EMS, and hospital inpatient utilization trends. This link in Greenville County could be due to the broadness of the zip codes and the different income disparities within the zip codes that are not represented. Since zip codes are such a broad area to study, it seems that the specificity, precision, and accuracy of the data is lost. For future research on this subject, I would recommend using more data from within the Greenville County block groups. Focusing in on Greenville County block groups would remove the uncertainty of the ranges of household income within the zip codes. This would allow for more specific research to be completed.

## VII. References and Data Sources

- Bindman AB, Grumbach K, Osmond D, Komaromy M, Vranzian K, Lurie N, Billings J, Stewart A. (1995). Preventable Hospitalizations and Access to Health Care. *The Journal of the American Medical Association*. 1995; 274(4):305-311.
- Moy E, Chang E, Barrett M. Potentially Preventable Hospitalizations – United States, 2001-2009 [Internet]. Washington (DC): Centers for Disease Control and Prevention; 2013 Nov 22 [cited 2014 Jun 26]. Available at <http://www.mass.gov/anf/docs/hpc/cost-trends-july-2014-section-c.pdf>.
- Torio CM, Elixhauser A, Andrews RM. Trends in Potentially Preventable Hospital Admissions Among Adults and Children, 2005-2010, Statistical Brief #151. Rockville (MD): Agency for Healthcare Research and Quality; 2013 Mar.
- NHGIS Greenville County Zip Code Boundaries and U.S. Census Data (median household income) and obtained from <https://www.nhgis.org>.

## VIII. Acknowledgements

I would especially like to thank Dr. Mike Winiski and Dr. Suresh Muthakrishnan for the support, encouragement, and help throughout the making of this project. I would also like to thank Candice Hipp for providing the ED, EMS, and hospital inpatient utilization data for Greenville County. Lastly, I'd like to thank Peter Wilson and Max Jaskwich for their unconditional support.