

Section V. Medical Care Resources

Prevention of diseases, illness, and deaths are fundamental goals of public health efforts. Public health professionals distinguish between primary and secondary prevention. Primary prevention involves improvements in social conditions and reduction of risk factors that cause disease and illness (Barnett *et al*, 1998). Secondary prevention involves treatment and rehabilitation of persons with established disease and those at high risk of developing disease.

Accessibility to adequate medical care is a critical element of secondary preventive efforts to reduce disease morbidity and mortality. In much of rural Appalachia, there are significant barriers to adequate medical care including physical distance, terrain, lack of public or private means of transportation to providers, lack of health insurance, and inability to pay for prescription drugs (Behringer, 1994).

In addition to reducing disease morbidity and mortality, medical efforts are devoted to improving the quality of life by minimizing the poor quality associated with chronic and other diseases to the relief of pain, disfigurement, and disability (Bunker, 2001).

In this analysis we examine the geographic distribution of medical care resources in order to help identify counties and regions which have deficiencies in resources. Combined with mortality and morbidity analyses, analyses of medical care resources may aid in identifying relationships between

population health and proximity, to various elements of the health care system.

The presence of medical care facilities, however, does not guarantee that access and utilization of these facilities is equal among resident populations. A number of factors influence utilization of medical resources and services, including health insurance to defray the cost (Williams-Pickle and Su, 2002), trust in both the medical care delivery system and individual provider (Hall, 2001), severity of disease or illness, and physical proximity of medial resources.

Data and Methods

Data on medical care resources and health professionals has been taken from the Area Resource File (February 2001 edition). The Area Resource File (ARF) contains more than 6,000 county-specific health resource variables. ARF includes information on health facilities, health professions, resource scarcity, economic activity, and geographic codes and descriptors for all counties and county equivalents in the U.S. This file is compiled from multiple sources, including the American Medical Association Physician Master File, by the Office of Health Professions Analysis and Research, Department of Health and Human Services. We have examined the following variables for this analysis:

General

- Health Professional Shortage Areas
- Health Service Areas

Hospital-Based Services

- Hospitals
- Population ratio per Hospital Bed
- Short-term Hospitals
- Population ratio per Short-term Hospital Bed
- Hospitals with Cardiac Intensive Care Units (CICUs)
- Population ratio per CICU
- Hospitals with Cardiac Catheterization Lab
- Hospitals with Rehabilitation Care

Special Physicians

- Population ratio to Physicians active in Patient Care
- Population ratio to CVD Specialty Physicians
- Population ratio to Pulmonary Disease Physicians
- Population ratio to Colon/Rectal Surgery MDs
- Population ratio to Diagnostic Radiology MDs
- Population ratio to Emergency Medicine MDs
- Population ratio to Pathology MDs
- Population ratio to Physical Medicine/Rehab MDs
- Population ratio to General Preventive Medicine MDs
- Population ratio to Public Health MDs
- Population ratio to Radiology MDs

We have utilized these variables to construct the general landscapes of medical care resources. In order to enable an assessment regarding the relative adequacy of each medical care resource, we have calculated population ratios rather than for example, examining the number of, physicians in each county. Difficulty in making comparisons between urban and rural counties would result from examining only the

number of each resource. On the other hand, many hospitals serve much larger populations than exist in their individual counties and increasing mobility of physicians may improve the relative accessibility of their services.

With the exception of counties which have no medical care resources (of any particular type), the maps presented in this section are generated so that darker colors represent more adverse conditions in regards to medical care resources.

Health Professional Shortage Areas

Health Professional Shortage Areas (HPSAs) are designations which identify areas for which the primary care physician-to-population ratio is less than 1:4000. Counties have been classified into three categories: those for which there is no shortage, those for which a shortage exists in part of a county, and those for which a shortage exists in the entire county.

A map showing the distribution of HPSA codes for the year 2000 is presented on page 210. Of the 406 Appalachian counties used in this analysis, 108 counties have health professional shortages throughout the county, 189 counties have shortages in part of the county, and 109 counties have no shortages. Fairly large regions, identified by clusters of counties that have shortages for the whole county, are located in Central West Virginia, Eastern Kentucky, Northeastern Mississippi, and Central Alabama.

Health Service Area Codes

A health service area is defined as one or more counties that are relatively self-contained with respect to the provision of

routine hospital care. Service areas that include more than one county are characterized by travel between the counties for routine hospital care. Because many hospitals have health service specialties, their service area may be much broader than indicated by these health service area codes.

A map representing health service areas is shown on page 210.

Hospitals

All hospital data in the ARF are from the *AHA Annual Survey of Hospitals*, reporting for a twelve-month period: preferably October 1 through September 30 of the following year (ARF, 2001). To be reported as a "hospital", an institution must have at least six inpatient beds, cribs or pediatric bassinets which shall be continually available for the care of patients

A map showing the distribution of hospitals in 1999 within the Appalachian region is shown on page 211. There were 81 counties in the region that had no hospitals and 203 had a single hospital. Appalachian counties with large metropolitan areas, such as Pittsburgh and Birmingham have medical schools, teaching hospitals, and are represented by large numbers of hospitals, relative to other Appalachian counties.

Population ratio per Hospital Bed

A map showing the population ratios for all 1999 hospital beds is shown on page 211. Population-to-hospital bed ratios provide an indication of the overall medical care resources available in a local area. More favorable population-to-hospital bed ratios are found in counties with metropolitan

areas, but are also found in non-metropolitan counties throughout the region.

No clear clustering of unfavorable population-to-hospital bed ratios is apparent within the region.

Short-term Hospitals

Short-term hospitals are defined as hospitals that may provide either non-specialized or specialized care, and the majority of their patients stay for fewer than 30 days. A map showing the distribution of short-term hospitals is shown on page 212.

Population ratio per Short-term Hospital Bed

A map showing the population ratios for all 1999 short-term hospital beds is shown on page 212. The distribution of population to short-term hospital beds is roughly similar to the population-to-hospital bed ratio shown on page 211. Differences in these distributions may reflect tendencies of hospitals in counties with smaller populations to focus more on routine medical services.

Hospitals with Cardiac Intensive Care Units (CICUs)

The availability of cardiac intensive care, through cardiac intensive care units (CICUs), can reduce in-hospital deaths from myocardial infarction by approximately 30% (AHA, 1997). A maps showing the distribution of hospitals with CICUs is shown on page 213.

There were 296 counties in the region with no CICU, and fairly large areas for which there are large distances to the nearest CICU. More metropolitan areas within the region, such as Pittsburgh, Knoxville, and Birmingham have comparatively large numbers of CICU hospitals.

Population ratio per CICU

To assess the adequacy of CICU hospitals relative to local populations, we examined the population ratio per CICU bed. A map showing the population-to-CICU bed is shown on page 213.

Geographic differences in the number of CICU and the population-to-CICU bed provide an indication of the relative size of CICU units in each respective county.

Hospitals with Cardiac Catheterization Labs and Rehabilitation Care

Hospitals with specialized medical services are critical for decreasing fatality as well as improving the quality of life for individuals who have suffered from chronic disease and illness. A map showing the distribution of specialized cardiac services (cardiac catheterization and rehabilitation) is shown on page 214.

There were 318 counties that did not have hospitals with at least one cardiac catheterization lab and 326 counties that did not have at least one county with a cardiac rehabilitation unit. Large areas within the region do not have ready access to these critical services. Counties with

metropolitan areas have a greater number of hospitals that offer these specialized services.

Specialty Physicians

Hospital-based services provide a general indicator of medical care availability but do not account for office-based physician practices that may provide critical preventive and treatment services at the local level. A series of maps showing the distribution of physicians of various specialties are presented on pages 215 to 219.

In each case we have examined the population-to-physician ratio to assess the relative adequacy of physician services in local areas.

The ratio of the population to physicians active in patient care in 1999 is shown on page 215. Favorable population-to-physician ratios were found throughout the region. Counties with less favorable ratios are found primarily in Southeastern Ohio, Southern and Central West Virginia, Eastern Kentucky, and North-Central Mississippi. There were 6 Appalachian counties with no physicians active in patient care in 1999.

The distribution of specialty physicians largely reflects the distribution of hospitals (and those with specialty services), however there is considerable variability among the distributions of specialty physicians. More common physician specialties, such as cardiovascular disease, emergency medicine, diagnostic radiology, and pathology, are widely dispersed throughout the region. However large areas within the region are lacking these specialty medical services. There appear to be a regional concentration, in Western Pennsylvania,

of physicians specializing in pulmonary disease and physical rehabilitation. Physician specialties that occur very sparsely among Appalachian counties are colon and rectal surgery, general preventive medicine, and public health.

Summary

Medical care resources are unevenly distributed among counties in the Appalachian region. These data suggest that counties with metropolitan areas have greater access to general medical services. In addition, hospitals and physicians offering services of a specialized nature tend to aggregate in more metropolitan and urban areas.

Many counties in Appalachia do not have ready access to critical resources for cardiovascular care and rehabilitation, which may contribute to excesses in cardiovascular related mortality identified in Section I.

References

Barnett E, Elmes GA, Braham VE, Halverson JA, Lee JY, Loftus S. *Heart Disease in Appalachia: An Atlas of County Economic Conditions, Mortality, and Medical Care Resources*. Prevention Research Center, West Virginia University, Morgantown, WV: June 1998.

Behringer B. Chapter 4: Health Services in Appalachia, In: Couto RA, Simpson NK, Harris G (eds.). *Sowing Seeds in the Mountains: Community-Based Coalitions for Cancer Prevention and Control*. NIH Publication No. 94-3779. Bethesda, MD: National Cancer Institute, 1994.

Bunker JP. The Role of Medical Care in Contributing to Health Improvements Within Societies. *International Journal of Epidemiology*. 2001;30:1260-1263.

Williams-Pickle L and Su Y. Within-State Geographic Patterns of Health Insurance Coverage and Health Risk Factors in the United States. *American Journal of Preventive Medicine*. 2002 Vol. 22, No.2: 75-83.

Hall MA. Do Patients Trust Their Doctors?-Does it Matter? *North Carolina Medical Journal*. July/August 2001, Vol. 62 No. 4: 188-191.

User Documentation for the Area Resource File (ARF), February 2001 Release.

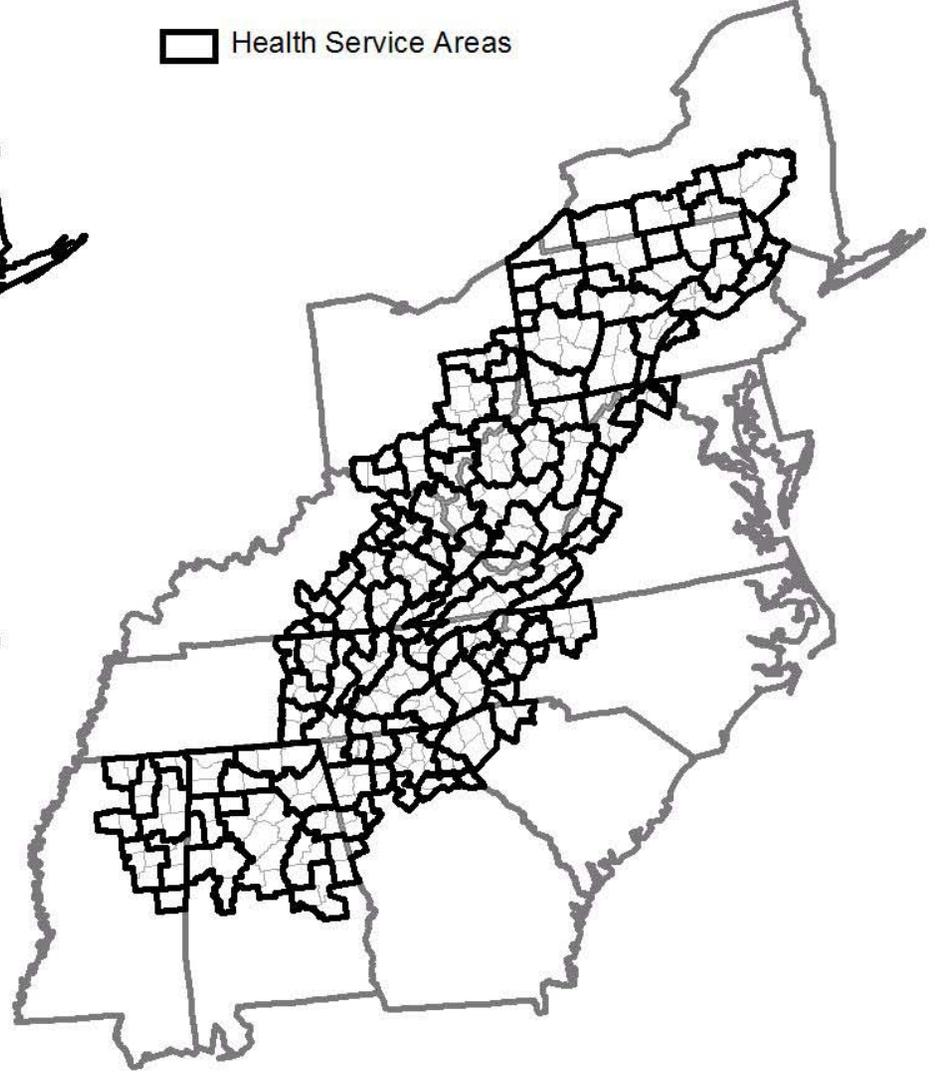
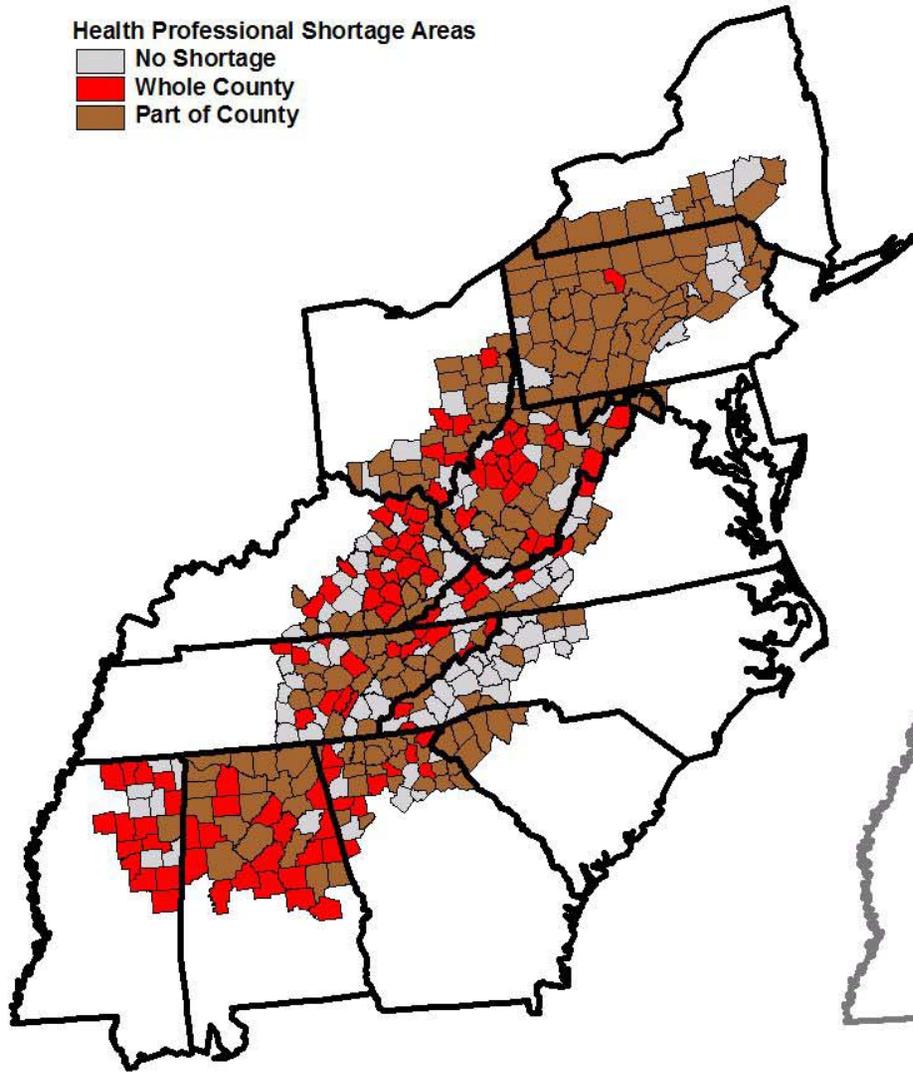
American Heart Association. *1998 Heart and Stroke Statistical Update*. Dallas, TX: American Heart Association, 1997.

Health Professional Shortage Areas, 2000

Health Service Areas, 1988

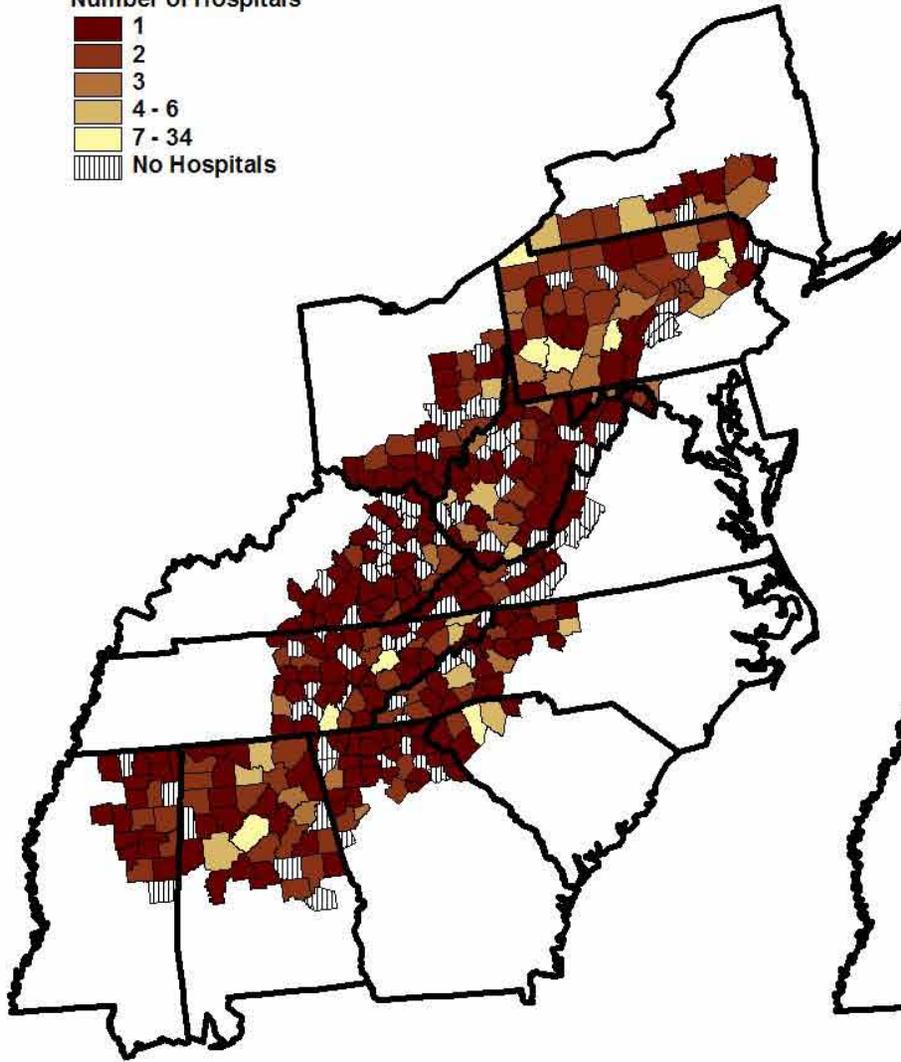
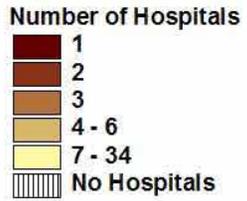
Health Professional Shortage Areas
No Shortage
Whole County
Part of County

Health Service Areas

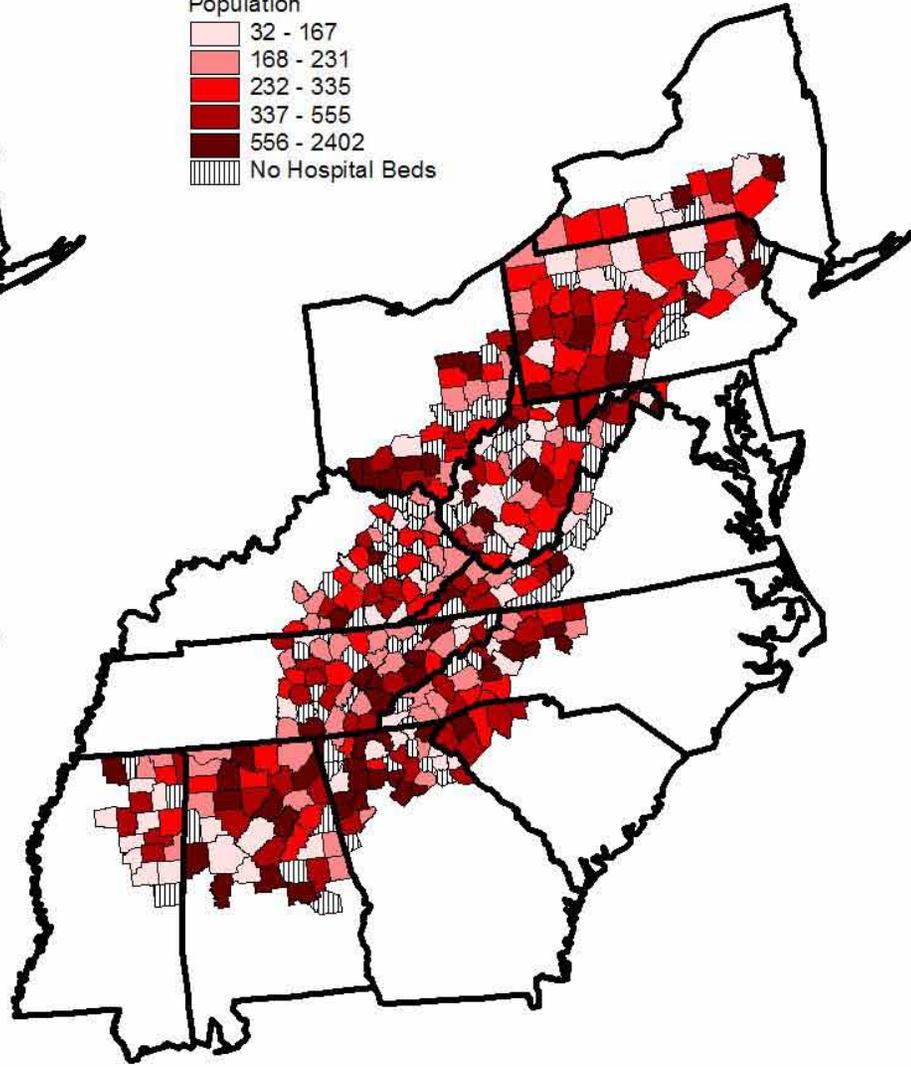
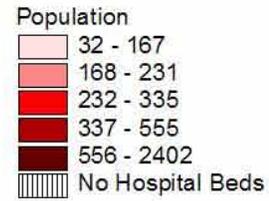


Hospitals

Number of Hospitals, 1999



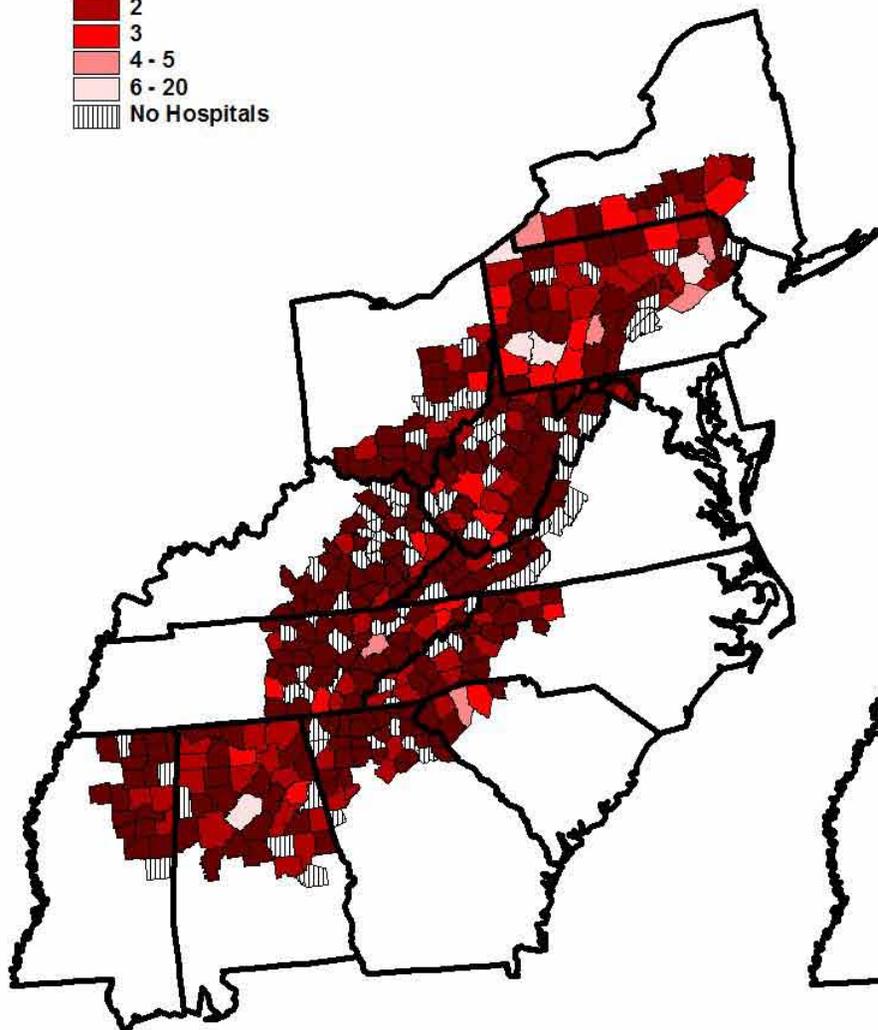
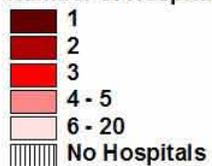
Population per Hospital Bed, 1999



Short-Term Hospitals

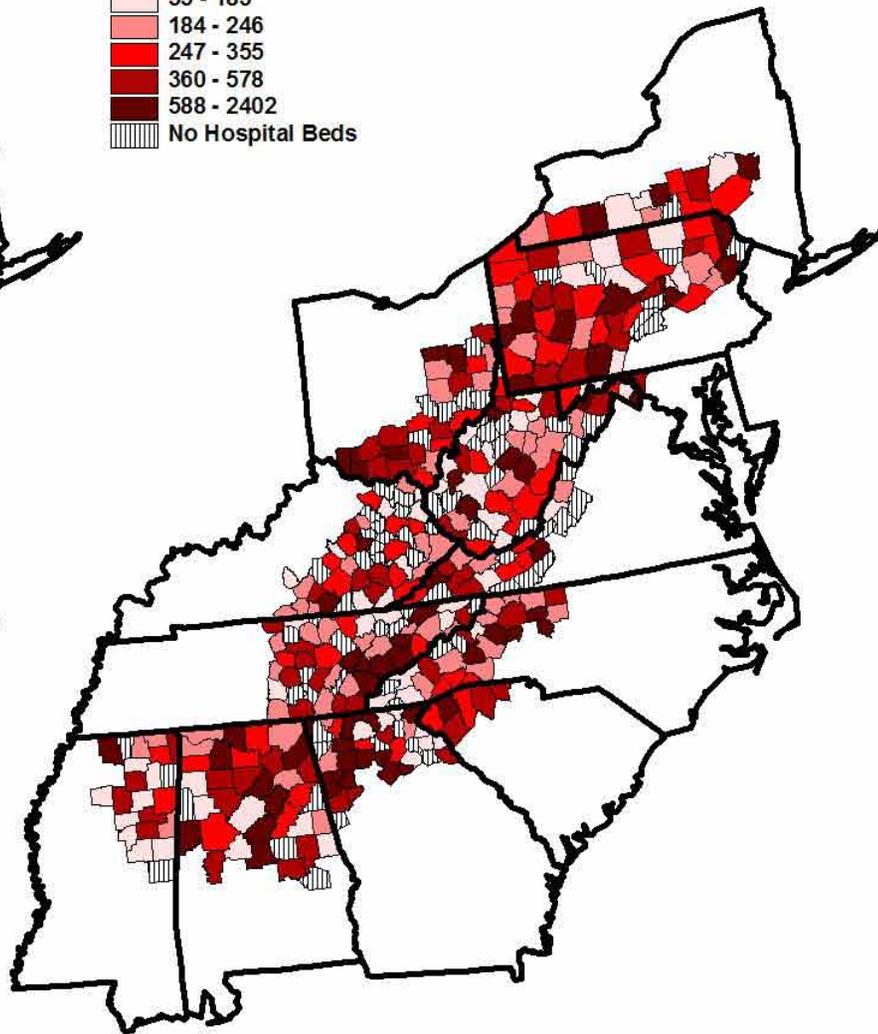
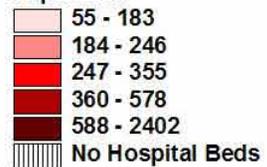
Short-Term General Hospitals, 1999

Number of Hospitals



Population per Short-Term Hospital Bed, 1999

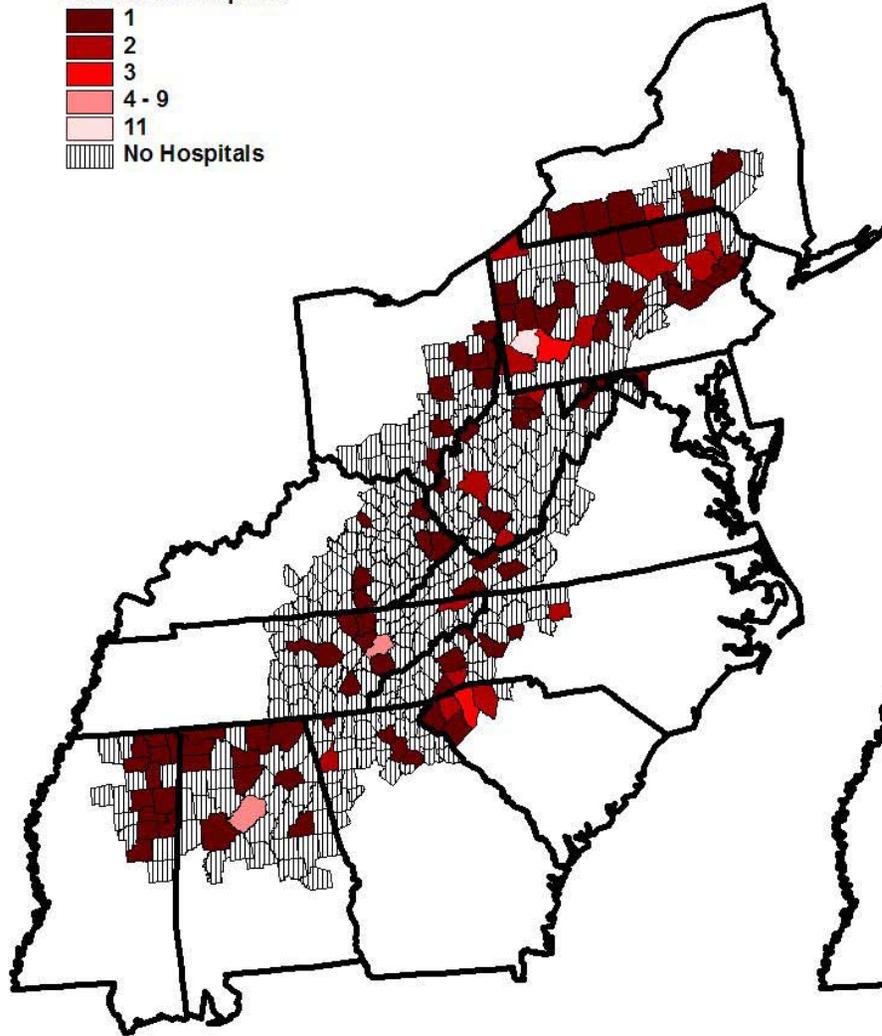
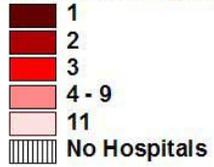
Population



Hospitals with Cardiac Intensive Care

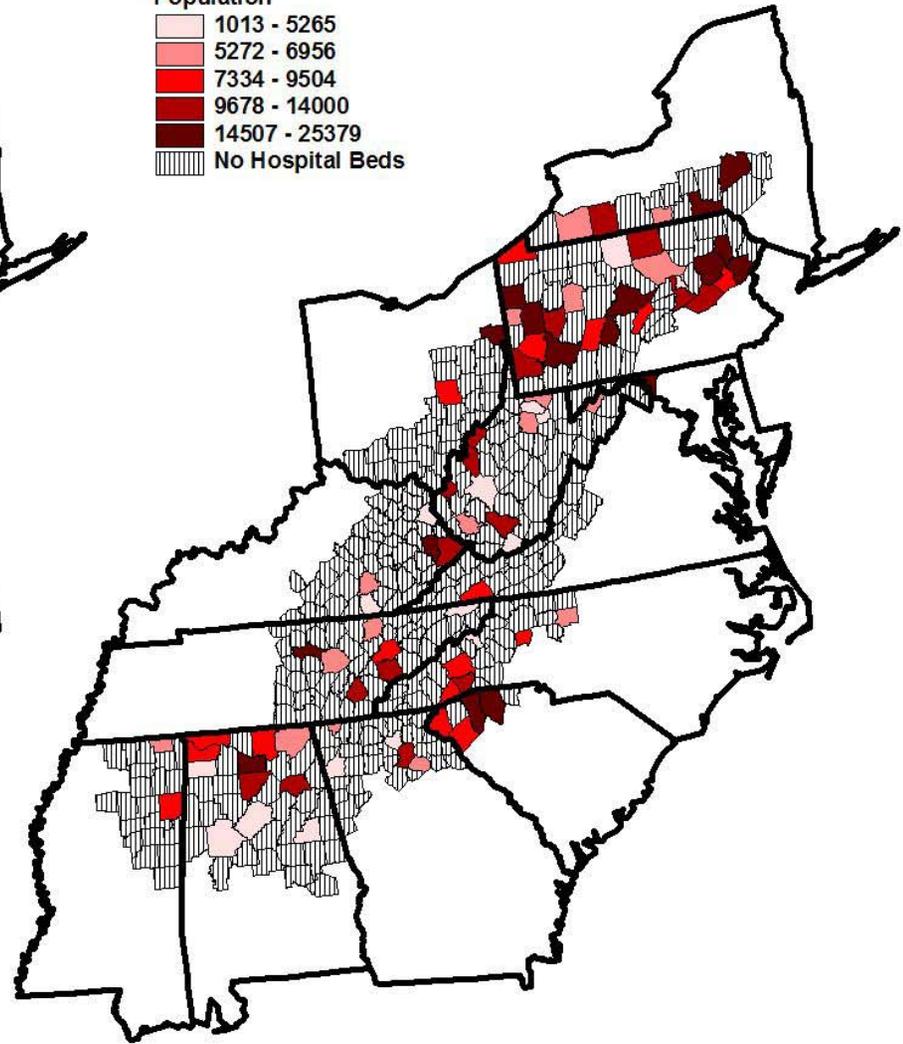
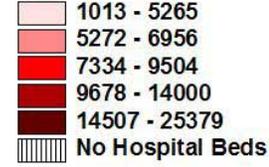
Hospitals w/Cardiac Intensive Care Unit, 1999

Number of Hospitals



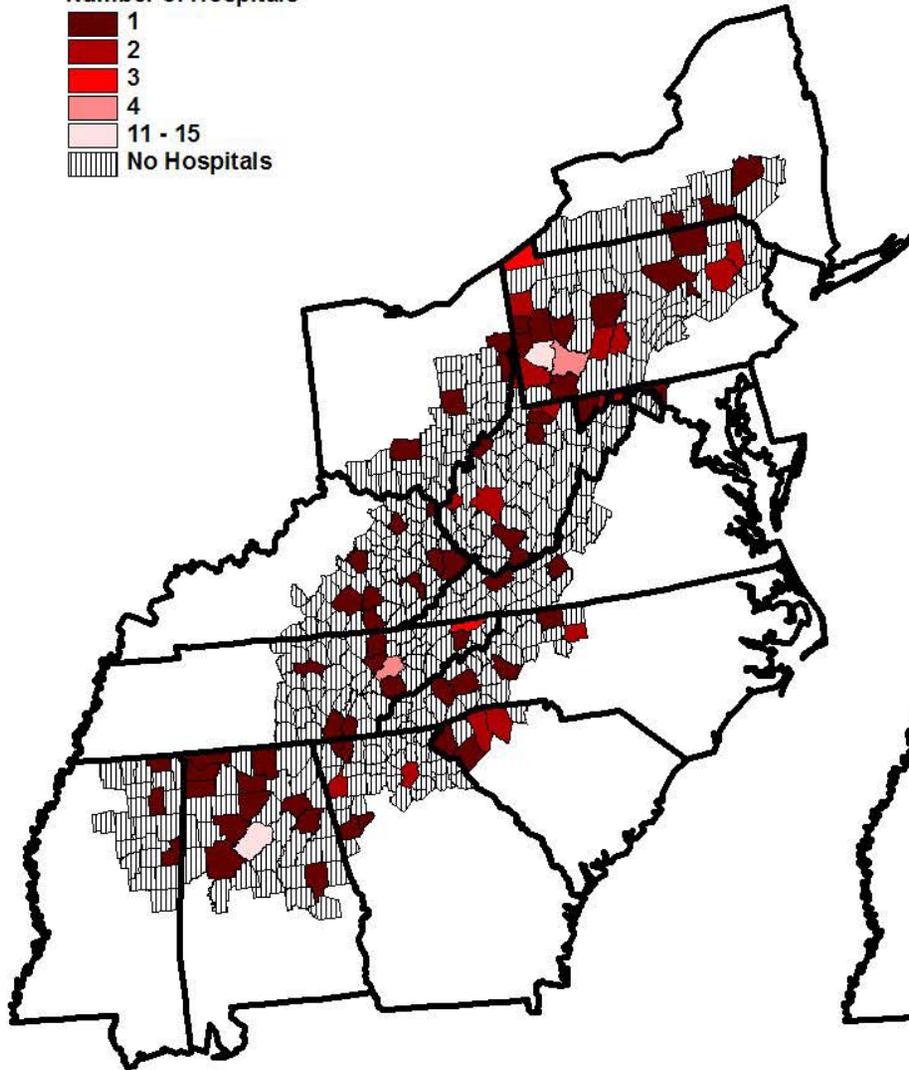
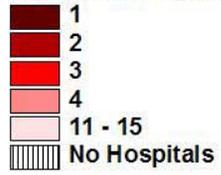
Population Per Cardiac ICU Bed, 1999

Population



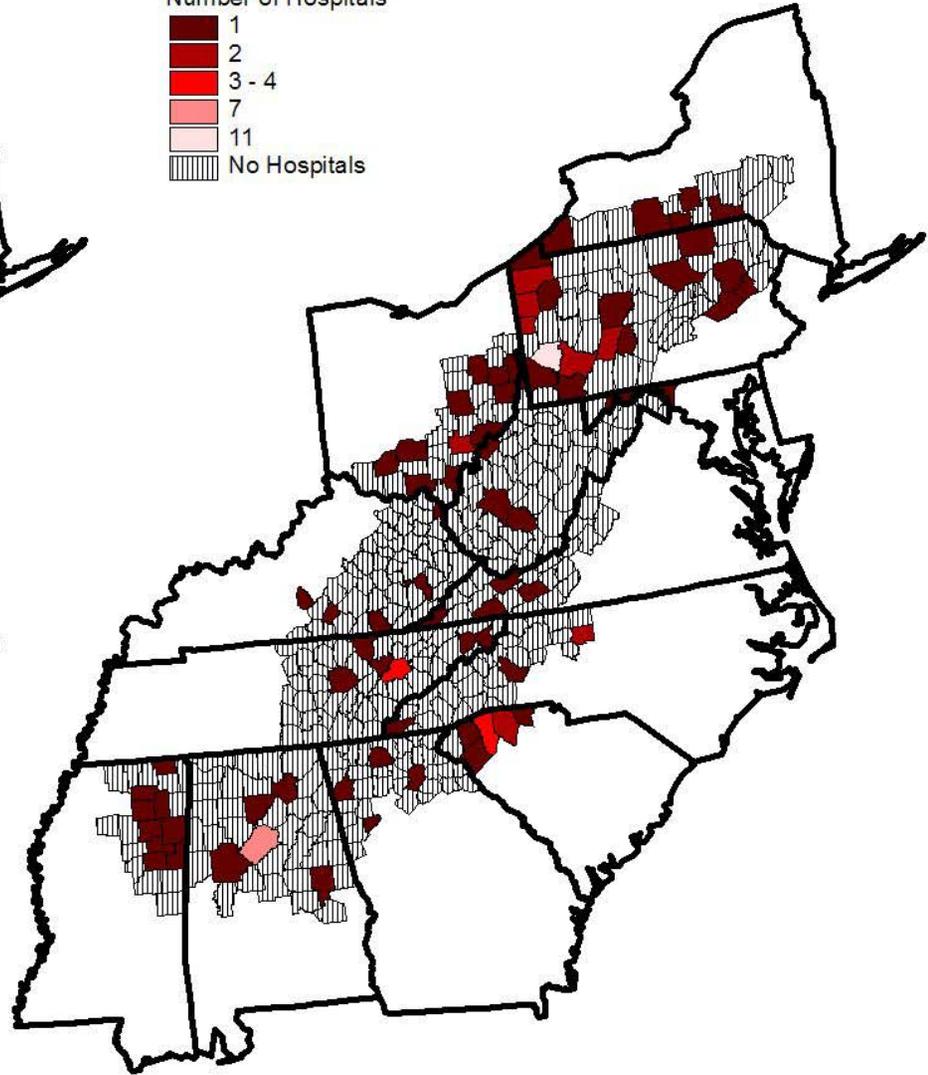
Hospitals with Cardiac Catheterization Lab, 1999

Number of Hospitals

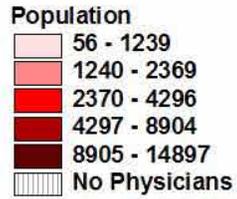


Hospitals with Rehabilitation Care, 1999

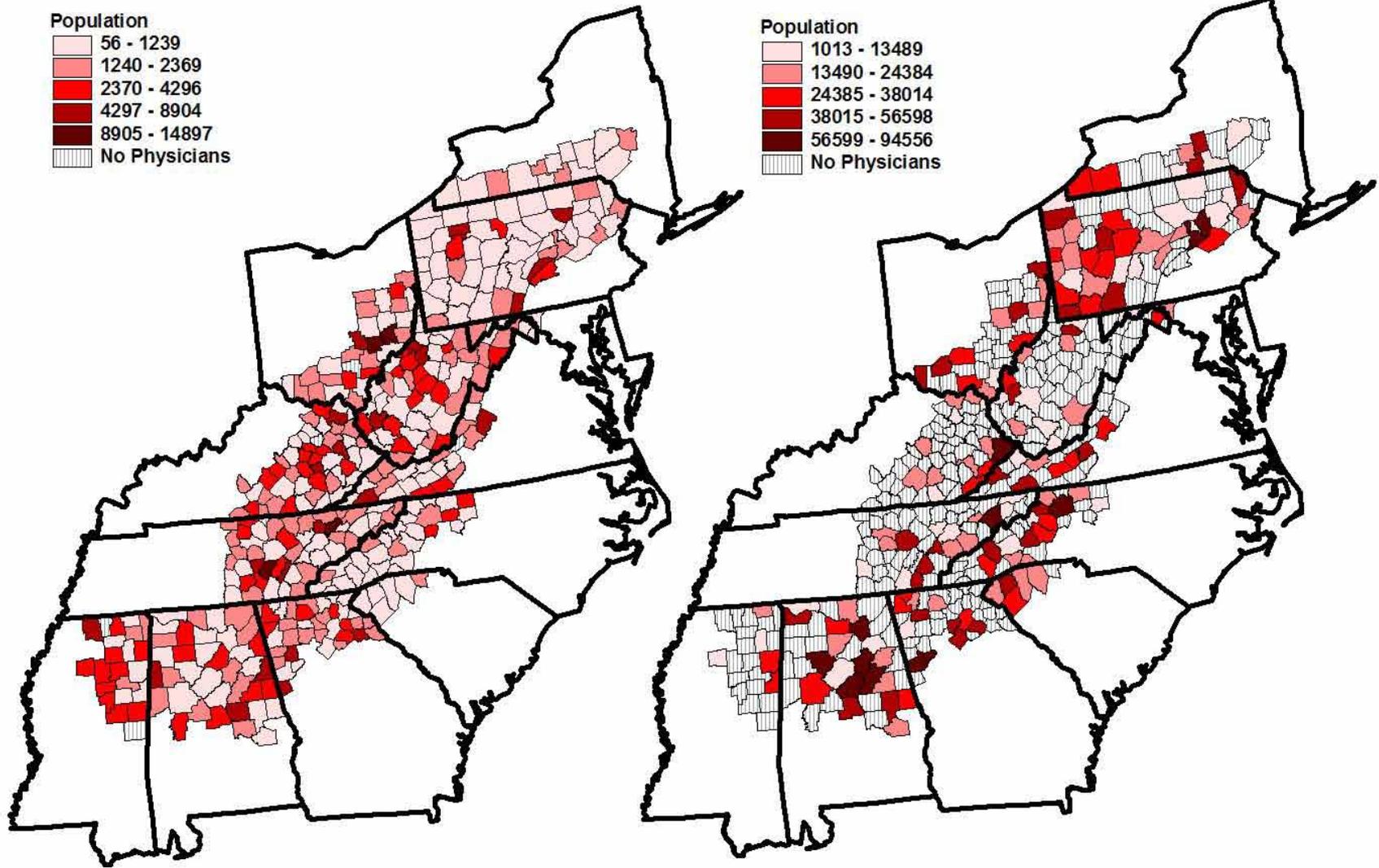
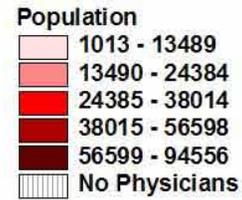
Number of Hospitals



Total Population per Physician in Patient care, 1999



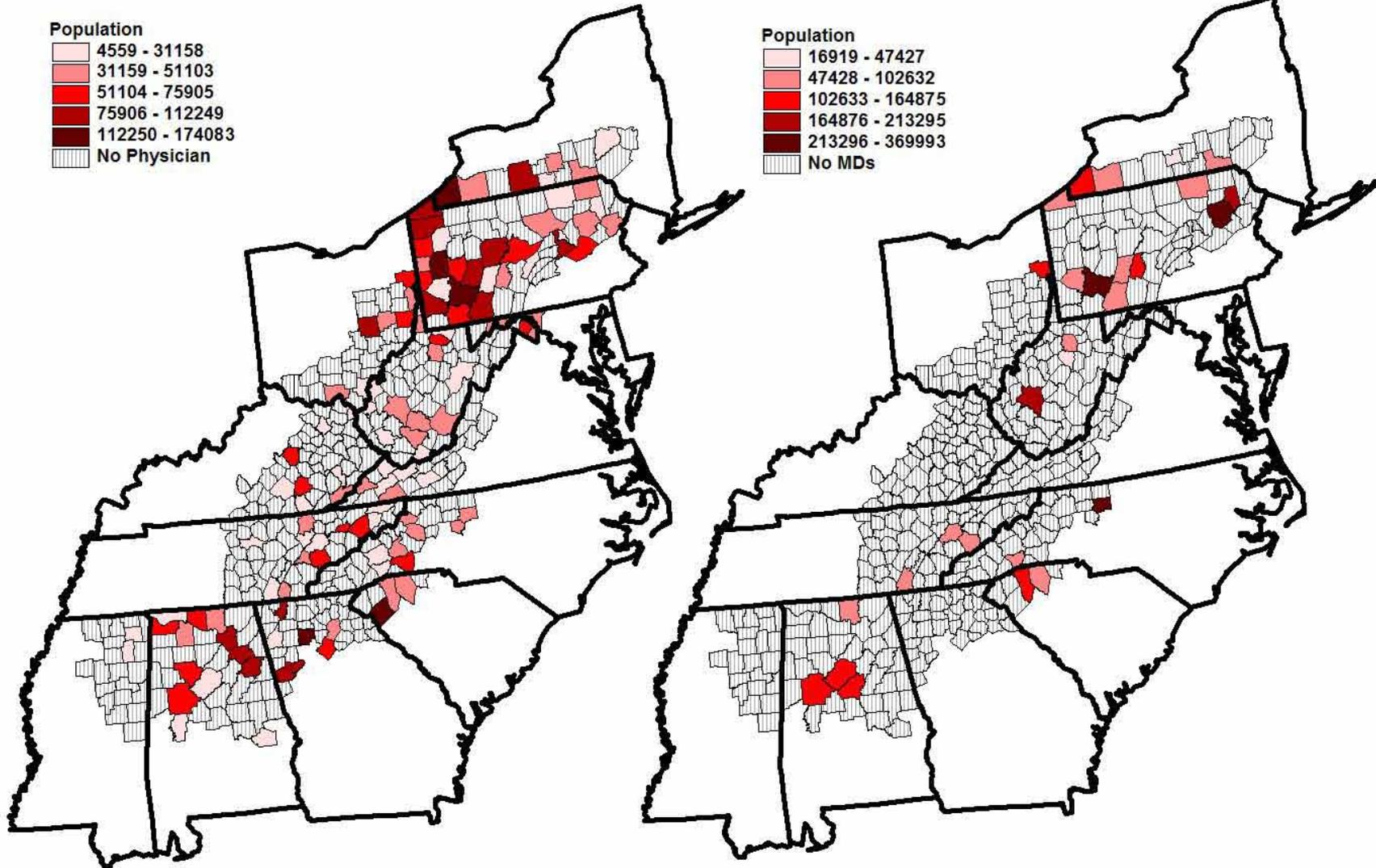
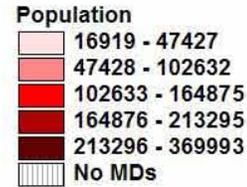
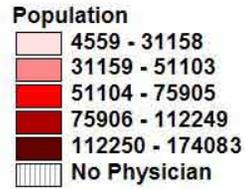
Total Population per Cardiovascular Disease Specialty Physician, 1999



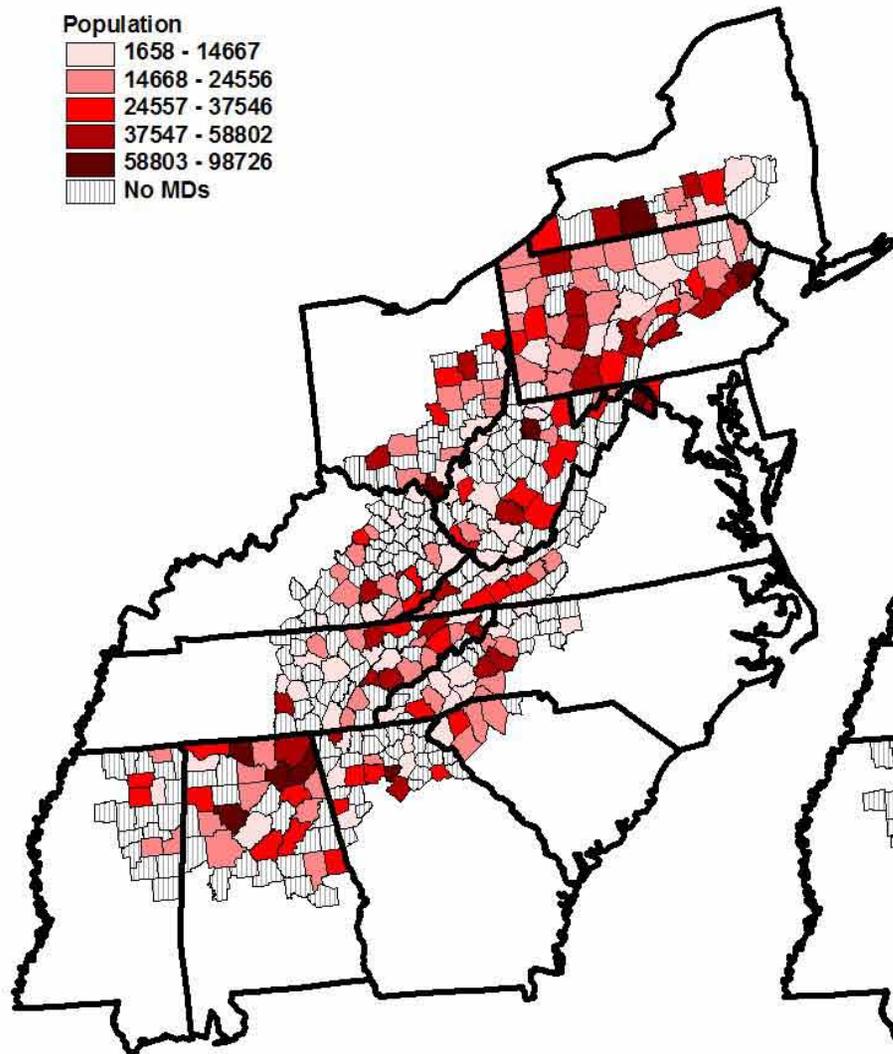
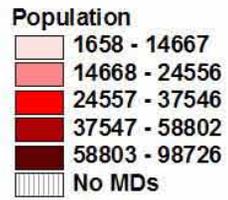
Physicians, 1999

Total Population per Pulmonary Disease Physician, 1999

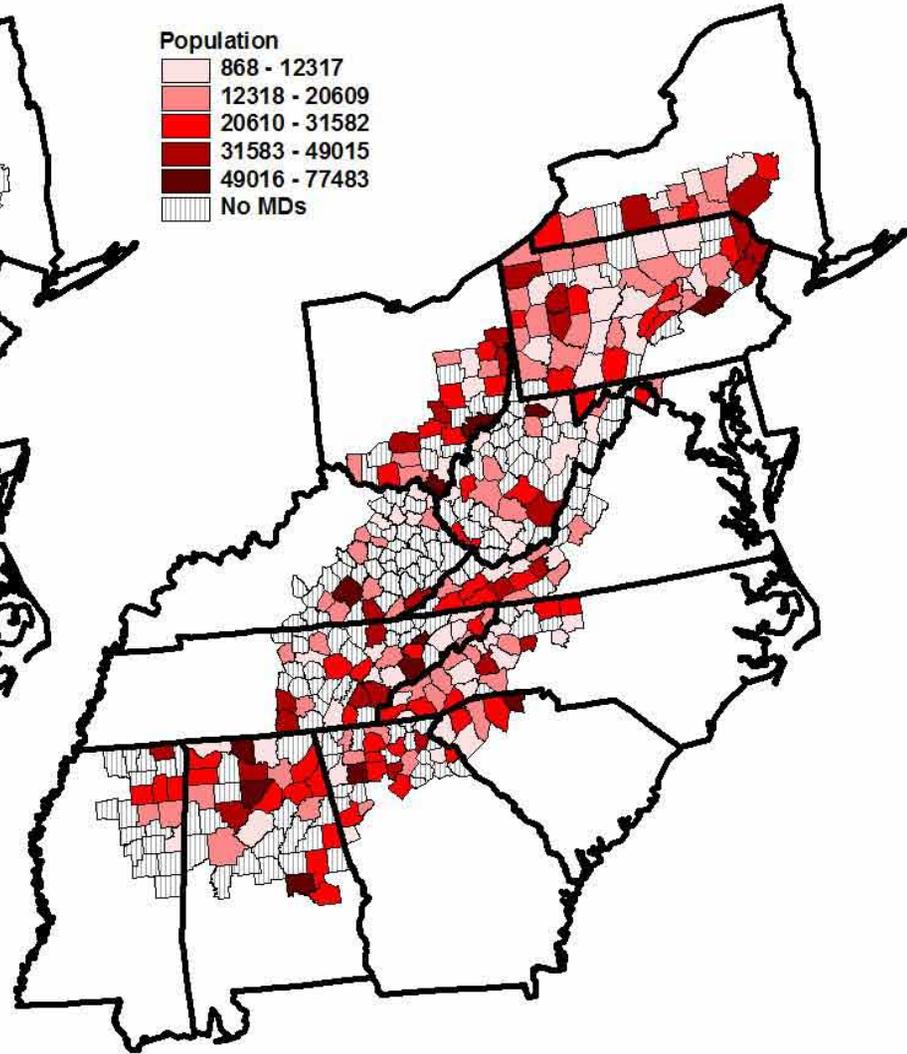
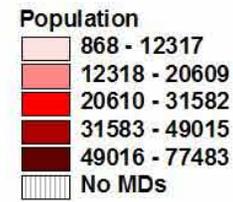
Total Population per Colon/Rectal Surgery MD, 1999



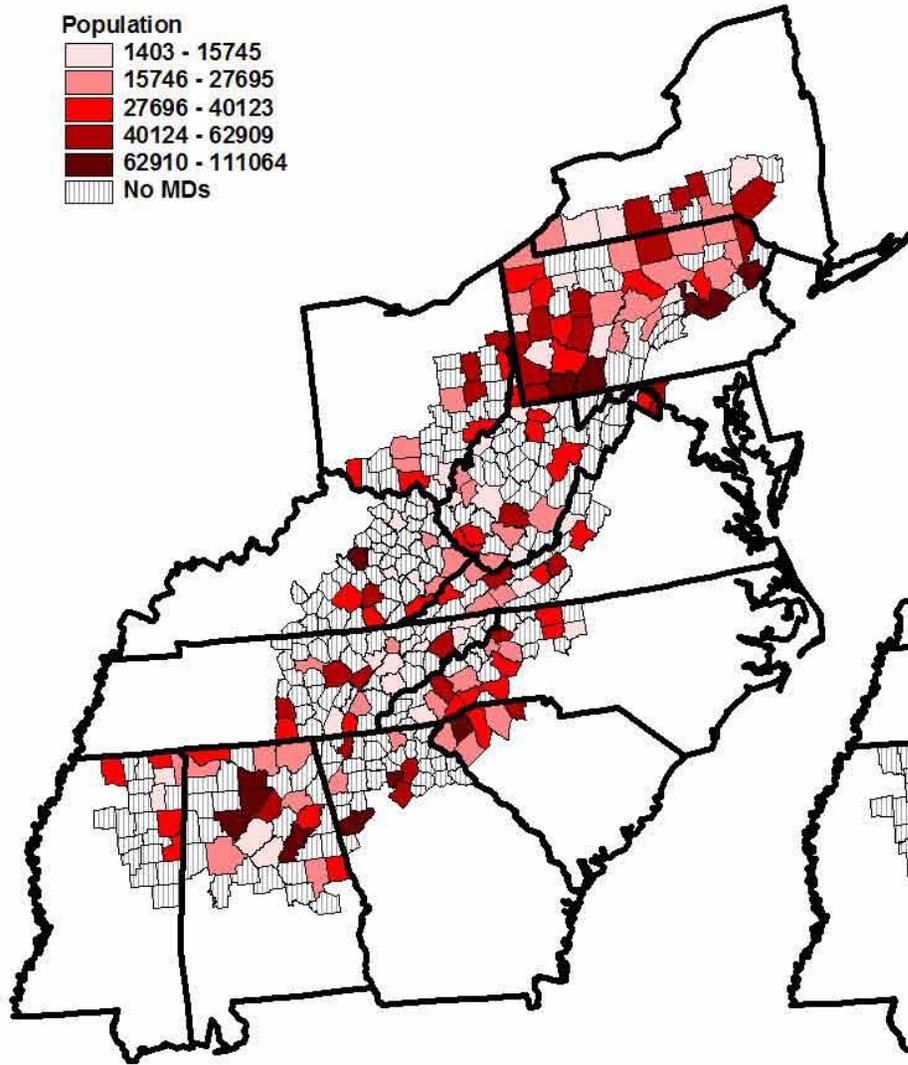
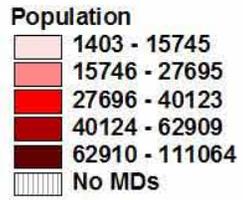
Total Population per Diagnostic Radiology MD, 1999



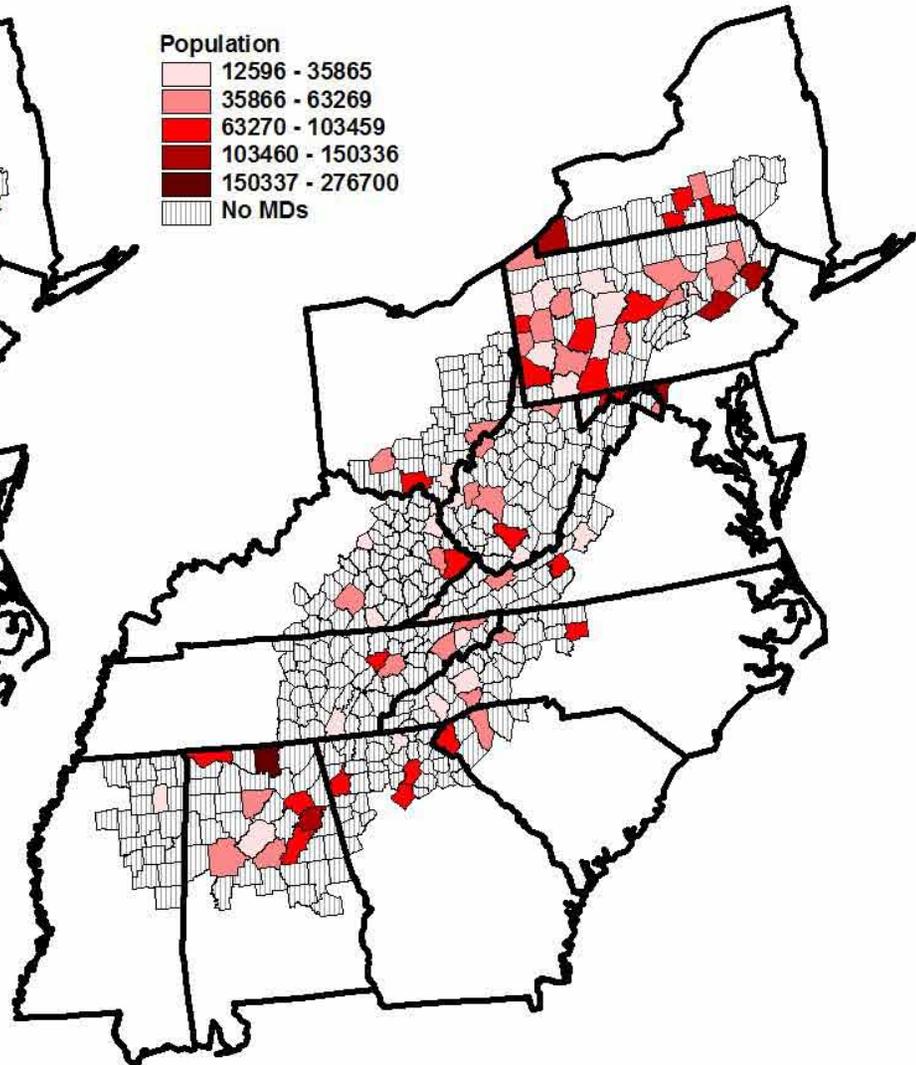
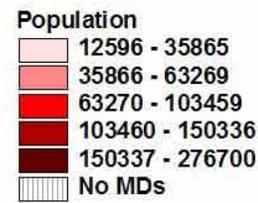
Total Population per Emergency Medicine MD, 1999



**Total Population per Pathology
MD, 1999**



**Total Population per Physical Medicine/
Rehabilitation MD, 1999**



Total Population per General Preventive Medicine MD, 1999

Total Population per Public Health MD, 1999

