

# Underlying Socioeconomic Factors Influencing Health Disparities in the Appalachian Region.

Final Report  
March 2008  
Contract No. CO-15198

Mary Babb Randolph Cancer Center/  
Office for Social Environment and Health Research  
Department of Community Medicine  
Robert C. Byrd Health Sciences Center, West Virginia University

**Prepared for the Appalachian Regional Commission by:**

**Joel A. Halverson, PhD  
Director, Office for Social Environment and Health Research  
Department of Community Medicine  
Mary Babb Randolph Cancer Center  
West Virginia University**

**and**

**Greg Bischak, Ph.D.  
Senior Economist  
Appalachian Regional Commission**

**Underlying Socioeconomic Factors Influencing Health Disparities in the Appalachian Region**

## Table of Contents

Executive Summary	.....	iii
Introduction	.....	1
Section I. Data and Methods	.....	4
Section II. Disparities in Premature Mortality in the Appalachian Region	.....	11
II A. All Cause Mortality	.....	11
II.B. Heart Disease Mortality	.....	13
II C. Cancer Mortality	.....	15
II.D. Stroke Mortality	.....	17
Section III. Associations between Socioeconomic Conditions and Disparities in Premature Mortality	.....	19
III.A. National Associations	.....	19
III.A.1 All Cause Mortality	.....	19
III.A.2 Heart Disease Mortality	.....	26
III.A.3 Cancer Mortality	.....	32
III.A.4 Stroke Mortality	.....	38
III.B. Appalachian Associations	.....	44
III.B.1 All Cause Mortality	.....	44
III.B.2 Heart Disease Mortality	.....	50
III.B.3 Cancer Mortality	.....	56
III.B.4 Stroke Mortality	.....	62

Section IV. Conclusions .....69

References .....73

APPENDIX I. Distribution of socioeconomic factors among Appalachian counties and surrounding areas. ....77

APPENDIX II. Premature death rates for Appalachian counties.....85

APPENDIX III. National and Regional tables indicating the associations between premature mortality and socioeconomic factors for Appalachian counties. ....95

## Executive Summary

This study investigates associations between measures of socioeconomic condition and rates of premature mortality for leading causes of death for counties in the U.S., with a focus on the Appalachian region. The overall goal is to elucidate relationships between observed health outcomes in the region and underlying socioeconomic conditions that may be contributing factors in shaping these outcomes. The motivation for this investigation arose from findings in an earlier study conducted for the Appalachian Regional Commission entitled *An Analysis of Disparities in Health Status and Access to Medical Care in the Appalachian Region* (Halverson et al, 2004) which found that the “Appalachia continues to suffer adverse socio-economic conditions (higher unemployment, lower educational achievement, lower per capita income), and there does appear to be some association between areas with more adverse socioeconomic conditions and adverse health outcomes.” Yet, the report noted that “...the direct role of socioeconomic conditions in influencing health disparities is not clear.” The importance of further research on this topic is underscored by the central finding of the study which found that the Appalachian region experiences considerable excesses in mortality from major causes of death and illness when compared to the rest of the nation. In addition, the study demonstrated significant within-region variability in mortality, hospitalization, behavioral risks, and socioeconomic conditions.

A key finding from the 2004 study was a disturbing pattern of extremely high rates of premature mortality from major causes of death which was evident for specific areas in the Appalachian region. In several cases specific areas in the Appalachian region demonstrated the largest clusters of the highest death rates in the U.S. High death rate clusters occurred consistently in the Central Appalachian region for heart disease, all-site cancers, lung cancer, and chronic obstructive pulmonary disease. For a number of specific causes of death, clear geographic gradients exist where the central and southern portion of the region exhibit more adverse outcomes relative to the northern portion of the region.

Observed outcome patterns among U.S. counties provide strong evidence of area-based (or place-based) disparities in health. In addition, strong spatial patterns in health outcomes suggest associations with underlying socioeconomic factors that may ultimately contribute to observed variations in health outcome patterns. It is important to understand local factors that contribute to observed outcomes in order to determine which social, political, economic, public health, and medical care structures need to be engaged to improve health outcomes at the local level and ultimately eliminate health disparities.

This study first updates aspects of the 2004 study by examining geographic disparities in premature mortality for all-causes of death and three major causes of death among counties in the U.S., with particular emphasis on the Appalachian region. Next the study computes associations with underlying socioeconomic factors that may contribute to observed outcome patterns among local populations. The goal of this study is to examine area-based measures of socioeconomic condition as opposed to individual socioeconomic status (SES). There are two basic reasons for this approach. First, most

individual-based public health data includes limited information about individual socioeconomic status (largely because of confidentiality restrictions) and therefore individual analyses cannot be performed. Second, because the focus is on place-based disparities, area-level measures of socioeconomic condition are the appropriate approach to examine these associations.

Five indicators of socioeconomic condition were selected for this analysis: *Percent Urban Population*, *Median Family Income*, *Unemployment Rate*, *Percent of Persons Living in Poverty*, and the *Percent of Persons without Health Insurance*. The specific statistical technique used to derive estimates of association is called *Local Indicators of Spatial Association (LISA)*. Separate analyses were conducted for the U.S. as a whole and for the Appalachian Region as a whole because the results of the LISA technique are highly dependent on the global mean to generate estimates.

There are two major findings from the results of this study. First, there are clear geographic disparities in premature mortality from leading causes of death at both the national and regional level which update and confirm the earlier analyses of health disparities for all-cause, heart disease, all-site cancer, and stroke mortality measures. Second, the results from the local indicators of spatial association exhibit two distinct types of statistically significant association between measures of socioeconomic conditions and health outcomes among neighboring counties: *adverse outcomes* as measured by associations of neighboring counties with relatively high mortality rates and poor socioeconomic conditions, and; *favorable outcomes* for associations of neighboring counties with low mortality rates and good socioeconomic conditions.

Two slightly different portraits of Appalachia emerge from the national and regional levels of analysis. At the national level the clearest spatial patterns of association are found when using the *poverty rate* and the *percentage of persons without health insurance* as the socioeconomic measures, with adverse health outcomes for heart disease and all-site cancer deaths spatially concentrated in the lower Mississippi Delta, parts the Southeastern U.S. and parts of Central and Southwestern portions of the Appalachian Region, as well as a few variable small clusters in the West. At the regional level well defined clusters with higher rates of mortality for heart disease and all-site cancer are found in parts of Central and Southwestern Appalachian compared to other parts of the region that are comparably disadvantaged on several socioeconomic measures.

Of five measures of socioeconomic condition evaluated in this study, poverty and the percentage of persons without health insurance consistently define localized areas that suffer the highest rates of premature mortality. There are a number of related factors, in addition to these direct measures of socioeconomic condition that may contribute to observed variations in the rates of premature mortality. Local differences in availability to local medical care resources, local health behaviors, industrial and occupational structure represent additional avenues for further research. Finally, the areas identified in this report with adverse health outcomes and poor socioeconomic conditions represent clear candidates for community level research to address these issues.