Race, Hypersegregated Communities and Negative Health Outcomes: Assessing the Risk of Hypertension and Coronary Heart Disease for African Americans in Metropolitan Areas

******EXTENDED ABSTRACT******
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ABSTRACT

Using data from the 2005 Behavioral Risk Factor Surveillance System (BRFSS), I examine the relationship between race, location and health. More specifically, I analyze the effect that hypersegregation has on the likelihood of developing hypertension and coronary heart disease (CHD) for Whites and Blacks. This is important because Blacks are diagnosed with hypertension at a higher rate than Whites, and are also more likely to die from coronary heart disease. I examine individual, community and state-level characteristics to explain these differentials. I find that both race and residing in a hypersegregated area are consistent predictors of developing both hypertension and CHD. Controlling for health status decreased the racial gap in CHD but increased the gap in hypertension. This result provides some evidence that health plays a positive role in narrowing disparities in hypertension, but a negative role in narrowing disparities in CHD. The implications of these results are then considered.

INTRODUCTION

Recent life expectancy estimates show that the mortality gap between Whites and African Americans has narrowed consistently over the past century (National Center for Health Statistics 2005). Coupled with this shrinking of the racial mortality gap is the reduction in the racial gap in cause-specific mortality. However, coronary heart disease (CHD) is the main disease that is an exception to this trend. Racial differences in coronary heart disease have steadily increased over the past decade (National Center for Health Statistics 2005) and simulations suggest that this trend will persist (Lethbridge-Çejku and Vickerie 2005).

Shrinking the increasing racial disparity in acquiring CHD has direct mortality implications. CHD is now the leading cause of death for Americans (Lethbridge-Çejku and Vickerie 2005) and has been since 1910 (National Center for Health Statistics 2006). It is estimated that about every 26 seconds an American will suffer from a coronary event, and about every minute, someone will die from one (Myerburg et al. 2003). Racial differences in acquiring coronary heart disease may be the result of prevention: Blacks are less likely to be diagnosed with CHD and for those who are diagnosed, with Blacks tend to die sooner than Whites with CHD (Mensah et al. 2005). This racial difference is found at among all socioeconomic levels (Ford and Giles 2003).

Given the nature of coronary heart disease in America it is important to understand the role of context in this racial mortality disparity or countertrend. Most research focuses on lifestyle differences between the two races. The risk factors for CHD most associated with African Americans were high levels of sedentary behavior, low vegetable or fruit intake, increases in smoking, high blood pressure and diabetes (Dresser 2003). To date, there have been very few studies that focus on neighborhood context as an explanation of CHD disparities. Those studies have primarily focused on the issue of concentration of African Americans as a unique predictor of CHD. This research adds to the literature by providing evidence illustrating that the persistence and overall negative aspects of complete segregation (termed "hypersegregation" by Massey and Denton (1989)) creates the conditions for acquiring coronary heart disease and ultimately serves as a strong predictor of dying from CHD.

THEORERTICAL ORIENTATION

This research is rooted in the assumption that living in race-based hypersegregated communities is qualitatively different than living in racially diverse communities. What makes them explicitly different is the racial concentration or dispersion that exists. This race-space interaction is most discussed in the literature on health disparities. Health disparities are often discussed in two competing contexts: black-white and urban-rural (Schulz et al. 2002). As such, models that incorporate both race and location to explain health disparities seem the most appropriate. I draw on two complimentary models that help situate the interaction between race and health: the socioeconomic status model and the psychosocial stress model. The socioeconomic status (SES) model sees racial and ethnic health disparities are confounded with preexisting socioeconomic disparities in health. Race and SES are correlated (i.e., African

Americans are overrepresented among lower SES groups – see Balibar and Wallerstein (1992) for a complete discussion regarding the inextricability of race and SES) and some argue that controlling for SES will either reveal the "true" effect of race or ethnicity or, if secondary to SES disparities, cause racial disparities to disappear.

The psychosocial model was considered because earlier literature that controlled for SES illustrated that SES failed to totally account for racial and ethnic disparities in health. This led to the consideration of stressors associated with institutional and interpersonal racism as a unique cause of this disparity (Clark et al. 1999, Williams & Collins 1995). The main approach that I will focus on in this orientation is the *John Henryism hypothesis* (James et al. 1984). The John Henryism hypothesis is named for the mythic black steel driver who, in the face of seemingly insurmountable odds, refused to be deterred in his efforts. These researchers adapted general models of the stress process to the specific ethnographic realities of the African American community. For example, Harburg et al. (1973) argued that persons, black or white, living in high "socioecologic stress" areas (characterized by low SES and high rates of social instability as measured by crime) were at a higher risk for stressful experiences on a daily basis, increasing the likelihood of high blood pressure. In a series of studies on John Henryism, James found that persons in the black community who exhibit this tenacious and active coping style have higher blood pressure and a higher prevalence of hypertension if they also have fewer resources, such as higher educational attainment, for achieving their goals.

THE CURRENT STUDY

While there are models explaining how the individual and the society in general perpetuate certain unique dispositions to negative health outcomes, there are still no meso-community level explanations for this association between space, race and health in the demographic literature. A few studies have looked at this in relation to health and have concluded that the mechanism that could be acting in this context is widespread poverty (Hulme 2003).

Poverty, like many other aspects of class inequality, is a direct consequence of differential distribution of economic welfare as well as differential access to culture (Wilson 1991). A general overview of the culture of poverty literature suggests that impoverished neighborhoods are most likely to (1) have a high percentage of minorities in the area (Lewis 1966; Zenk et al. 2005), (2) have inadequate healthcare facilities (Gornick 1999) and (3) have more shopping venues that sell unhealthy consumer goods (Jetter and Cassady 2006). Much of the social psychological literature on the culture of poverty suggests that there is a "learned helplessness" that results from living in an impoverished environment (Rabow et al. 1983). This helplessness can be conceptualized as having little control over community context.

Critics comment on the agency of the individual in this framework (see Leacock (1971) for a review of several critiques of the culture-of-poverty argument). However, one can incorporate control in a general framework of residential mobility and neighborhood change. Hatfield's (1998) study documents the nature of poverty, income and social distress in certain neighborhoods. He argues that concentrated poverty creates distressed environments, not only directly through neighborhood outcomes (e.g., crime) but also indirectly through individual morale and perception of community change. His

analyses find that distressed and "near-distressed" neighborhoods are where people most likely scored low on self-esteem, self-efficacy and self-worth. In addition, respondents felt a community disconnect and an even larger disconnect to the world beyond their neighborhood, suggesting that poverty-stricken neighborhoods invoke a sense of anomie, which is also associated in negative health behaviors (Durkheim 1979).

The main question that I would like to address is whether it is a minority group's presence, a lack of infrastructure within the community, or a broader consumer context that most greatly impacts health. Given the considerations of race, space and consumer context, as well as the findings from prior research, I would expect that all three are important precursors to general health. Specifically, in the current study, I propose to test five main hypotheses. These are:

1. Living in a hypersegregated environment is negatively associated with both having hypertension and suffering from coronary heart disease.
2. Controlling for community context indicators that are associated with neighborhood poverty will decrease this relationship between hypersegregation and negative health.
3. Race will play a substantial role in predicting hypertension/coronary heart disease. Specifically, African Americans will have higher odds of having the disease relative to other racial groups.
4. Controlling for individual variables related to health and diet will further decrease this relationship.
5. The relationship between individual and community context variables will be stronger for hypertension than for coronary heart disease.

The path diagram in Figure A in the Appendix will be operationalized to test these five hypotheses. How they are operationalized will follow shortly in the Measures section. However, it is important to note that the factors, pathways and determinants of mortality will be categorized as individual-level or community-level. The individual-level measures correspond to race, SES, employment, support networks, insurance and health behaviors. The community-level measures correspond to rural/urban place of residence, group behaviors, hypersegregation and healthcare. They are broken into these two groups, in part because of the nature of the data that I use and also in part because of the discussion of the framework above.

DATA AND METHODS

To conduct my analyses, I will examine data from The 2005 Behavioral Risk Factor Surveillance System (BRFSS). BRFSS is a collaborative project of the Centers for Disease Control and Prevention (CDC) and U.S. states and territories. The BRFSS, administered and supported by CDC's Behavioral Surveillance Branch, is an ongoing data collection program designed to measure behavioral risk factors in the adult population (18 years of age or older) living in households. The objective of the BRFSS is to collect uniform, state specific data on preventive health practices and risk behaviors that are linked to chronic diseases, injuries, and preventable infectious diseases in the adult population. Factors assessed by the BRFSS include tobacco use, health care

coverage, HIV/AIDS knowledge and prevention, physical activity, and fruit and vegetable consumption. Data are collected from a random sample of adults (one per household) through a telephone survey.

Respondents are identified through telephone based methods. Although overall, approximately 95 percent of U.S. households have telephones, coverage ranges from 87 to 98 percent across states and varies for subgroups as well (Mokdad et al. 2003). For example, people living in the South, minorities, and those in lower socioeconomic groups typically have lower telephone coverage. No direct method of compensating for non telephone coverage is employed by the BRFSS; however, post stratification weights are used, which may partially correct for any bias caused by non telephone coverage (Mokdad et al. 2003). These weights adjust for differences in probability of selection and nonresponse, as well as noncoverage, and must be used for deriving representative population based estimates of risk behavior prevalence.

The BRFSS is arguably the richest data set with which to test the proposed hypotheses. It has geopolitical indicators at both the micro and meso level of analysis. On average, missing data accounted for about 3% of each measure. Unless otherwise specified, modal replacement is used to handle missing data.

PRELIMINARY RESULTS

Preliminary results suggest that there are true racial differences in having hypertension and coronary heart disease. In addition, the context of hypersegregation is highly significant in all models (see Table 2). Living in a hypersegregated environment is negatively associated with both having hypertension and suffering from coronary heart disease. Health measures tended to decrease the effect that race had on coronary heart disease but increased its effect on hypertension. This provides some evidence that health behaviors are playing a more substantial role in the racial disparity in hypertension than in coronary heart disease. Overall, the models provide some support for my analytical framework.

The next step in this research is to add community-level covariates as a separate set of control variables. These will be measured at the county level through 2005 Census estimates, based on the American Community Survey. Merging these measures onto the BRFSS in will allow me to address the remainder of my hypotheses and will allow for a more complete discussion of how community and spatial context operate in the mortality and health outcomes of African Americans.

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APPENDIX

Figure A: Analytical Framework

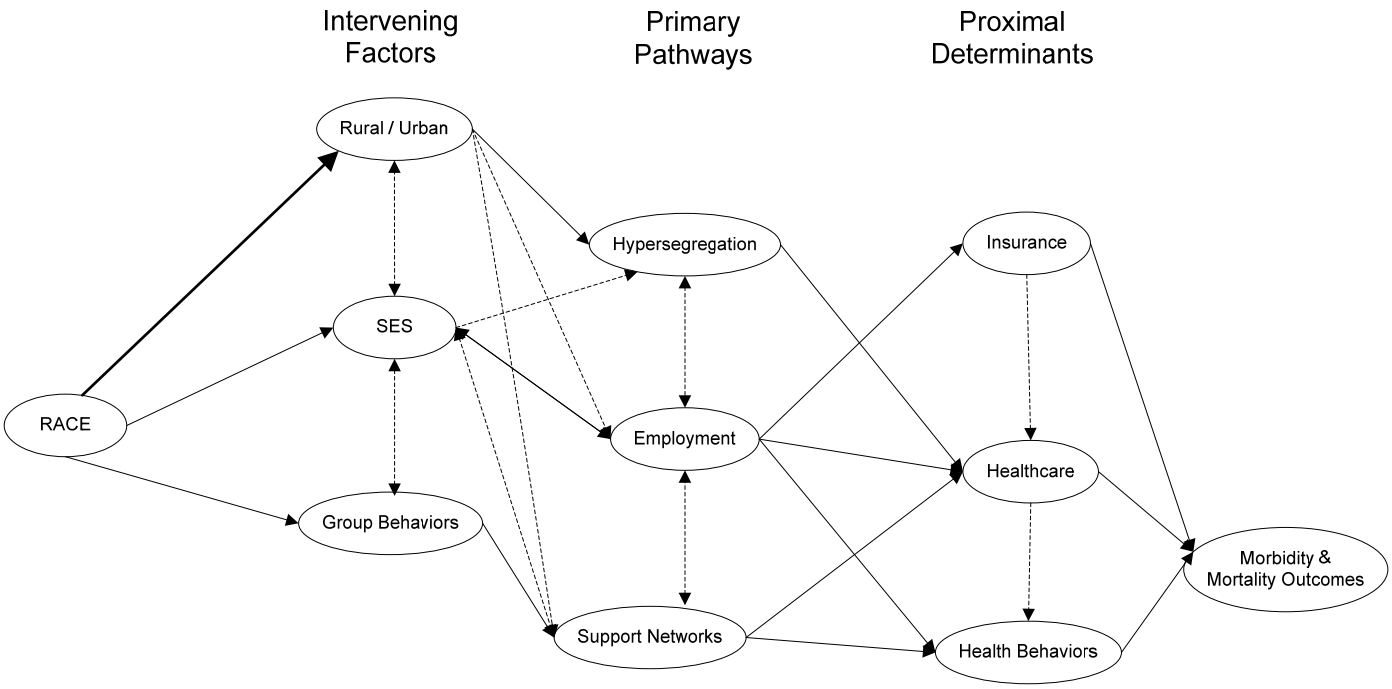

Table 1: Descriptive Statistics of Variables By Race

	White	Black†	Other
Dependent Variables			
Has Hypertension	27.91%	36.20%	22.78%
Has CHD	5.06%	2.71%	2.87%
Intervening Factors			
Place of Residence			
Rural	31.31%	13.78%	30.32%
Suburban	36.68%	27.82%	29.73%
Urban†	32.01%	58.40%	39.94%
Socioeconomic Status			
Educational Level			
Less than High School	4.31%	10.09%	12.52%
High School Graduate†	25.01%	31.69%	25.60%
Some College	27.23%	30.13%	26.59%
Graduated College	43.45%	28.09%	35.28%
Household Income			
Less than $15,000	5.58%	15.29%	10.92%
$15,000 to $20,000	4.70%	11.03%	8.71%
$20,000 to $25,000	7.45%	11.66%	11.62%
$25,000 to $35,000	11.81%	15.12%	14.28%
$35,000 to $50,000	17.71%	17.36%	16.22%
$50,000 to $75,000	20.79%	14.55%	16.00%
More than $75,000†	31.95%	14.99%	22.24%
Primary Pathways			
Segregation Measures			
Extremely Hypersegregated	0.93%	2.80%	0.94%
Hypersegregated†	3.37%	10.38%	2.46%
Not Hypersegregated	95.71%	86.83%	96.60%
Employed	68.52%	69.59%	73.97%
Support Networks			
Marital Status			
Single, Never Married†	14.43%	33.76%	19.97%
Cohabiting	7.40%	3.30%	5.60%
Married	60.71%	31.84%	53.94%
Separated	1.81%	31.00%	20.49%
Children Under 18 in Household	0.65	0.88	0.98
Emotional Support Scale	4.20	3.95	3.97

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Proximal Determinants			
Insured	90.23%	81.50%	79.63%
Access to Health Care	85.07%	80.80%	73.97%
Health Behaviors			
Self-Reported Health Scale	3.77	3.44	3.53
Body Mass Index	26.61	28.77	26.84
Smoker Status			
Current Smoker†	20.56%	31.20%	25.60%
Former Smoker	31.72%	17.07%	23.36%
Never Smoked	47.72%	51.73%	51.04%
Days Per Month of Alcohol Consumption	20.64	17.75	22.02
Days Per Week of Exercise	4.71	4.13	4.43
Daily Servings of Fruits & Vegetables	0.64	0.60	0.62
Demographic Controls			
Age	49.33	43.36	42.09
Male	46.91%	41.17%	52.59%
Region			
New England	12.61%	4.81%	7.84%
Middle Atlantic	10.49%	14.24%	10.13%
East North Central	11.04%	15.99%	5.85%
West North Central	12.93%	3.74%	6.86%
South Atlantic†	16.00%	39.60%	12.24%
East South Central	2.92%	8.01%	0.97%
West South Central	5.59%	6.89%	11.36%
Mountain	11.85%	2.17%	15.59%
Pacific	16.58%	4.56%	29.16%
N	128,884	8,693	9,679

Source: 2005 BRFSS.

Note: Categories may not sum to 100 due to rounding.

† used in the analyses as contrast variable.

Table 2: Logistic Regression Estimates and Odds Ratios for Hypertension Propensity

	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	Odds	β	Odds	β	Odds	β	Odds	β	Odds
Race (Black)										
White	-0.382 ***	0.682	-0.266 ***	0.767	-0.591 ***	0.554	-0.413 ***	0.661	-0.496 ***	0.609
Other	-0.654 ***	0.520	-0.628 ***	0.534	-0.703 ***	0.495	-0.537 ***	0.585	-0.489 ***	0.613
Intervening Factors										
Place of Residence (Urban)										
Rural			0.082 ***	1.086	0.046 ***	1.047	0.046 **	1.047	0.030	1.030
Suburban			0.048 ***	1.049	0.077 ***	1.080	0.009	1.009	0.030	1.030
Educational Level (Diploma)										
Less than High School			0.070 **	1.072	0.082 ***	1.086	0.003	1.003	-0.076 *	0.927
Some College			-0.082 ***	0.922	-0.065 ***	0.937	-0.038 *	0.963	0.011	1.011
Graduated College			-0.216 ***	0.806	-0.214 ***	0.807	-0.068 ***	0.934	-0.078 ***	0.925
Household Income ($75,000+)										
Less than $15,000			0.563 ***	1.756	0.164 ***	1.178	0.005	1.005	0.054	1.056
$15,000 to $20,000			0.483 ***	1.621	0.195 ***	1.216	0.104 ***	1.110	0.048	1.049
$20,000 to $25,000			0.400 ***	1.492	0.145 ***	1.156	0.060 **	1.062	-0.002	0.998
$25,000 to $35,000			0.303 ***	1.354	0.102 ***	1.107	0.016	1.016	-0.042	0.959
$35,000 to $50,000			0.238 ***	1.269	0.101 ***	1.107	0.012	1.012	0.002	1.002
$50,000 to $75,000			0.121 ***	1.129	0.060 ***	1.062	-0.016	0.984	0.005	1.005
Primary Pathways										
Segregation Measures (Hyper)										
Extremely Hypersegregated					0.588 **	1.800	0.563 **	1.756	0.562 **	1.754
Not Hypersegregated					-0.235 **	0.095	-0.292 **	0.747	-0.280 **	0.756
Employed					-0.685 ***	0.504	-0.580	0.560	-0.094 ***	0.910
Marital Status (Never Married)										
Cohabiting					0.132 ***	1.141	0.139 ***	1.149	0.037	1.037
Married					0.782 ***	2.186	0.613 ***	1.845	0.054 *	1.055
Separated					0.880 ***	2.411	0.781 ***	2.184	0.093 ***	1.098
Children Under 18 in Household					-0.394 ***	0.675	-0.351 ***	0.704	-0.072 ***	0.931
Emotional Support Scale					-0.059 ***	0.942	0.000	1.000	0.008	1.008

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Proximal Determinants												
Insured							0.239	***	1.269	0.018		1.018
Access to Health Care							0.747	***	2.111	0.629	***	1.876
Self-Reported Health Scale							-0.427	***	0.653	-0.395	***	0.674
Body Mass Index							0.084	***	1.088	0.089	***	1.093
Smoker Status (Current)												
Former Smoker							0.301	***	1.351	0.005		1.005
Never Smoked							0.075	***	1.078	-0.041	*	0.960
Days Per Month of Alcohol Consumption							0.002	***	1.002	0.001	***	1.001
Days Per Week of Exercise							-0.010	***	0.991	0.001		1.001
Daily Servings of Fruits & Vegetables							0.116	***	1.123	0.011		1.011
Demographic Controls												
Age										0.047	***	1.048
Male										0.185	***	1.203
Region (South Atlantic)												
New England										-0.133	***	0.875
Middle Atlantic										-0.178	***	0.837
East North Central										-0.098	***	0.906
West North Central										-0.128	***	0.879
East South Central										-0.004		0.996
West South Central										-0.004		0.996
Mountain										-0.100	***	0.905
Pacific										-0.074	***	0.929
Constant	0.567	***	-	0.812	***	-	0.165	***	-	2.342	**	-	4.502	**	-
Model χ^2	412.011	***		2,103.851	***		11,983.210	***		25,477.737	***		31,892.436	***	
Nested χ^2	-			1,691.839	***		9,879.359	***		13,494.528	***		6,414.699	***	
Max Rescaled R^2	0.004			0.020			0.113			0.229			0.280		

Source: 2005 BRFSS.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3: Logistic Regression Estimates and Odds Ratios for Propensity of Acquiring Coronary Heart Disease

	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	Odds	β	Odds	β	Odds	β	Odds	β	Odds
Race (Black)										
White	0.416 ***	1.517	0.655 ***	1.925	0.257 ***	1.292	0.358 ***	1.430	0.365 ***	1.440
Other	0.058	1.060	0.112	1.119	0.119	1.126	0.183 *	1.201	0.326 ***	1.385
Intervening Factors										
Place of Residence (Urban)										
Rural			0.060	1.062	0.042	1.043	0.006	1.006	0.001	1.001
Suburban			0.044	1.045	0.028	1.028	-0.007	0.993	-0.032	0.968
Educational Level (Diploma)										
Less than High School			0.362 ***	1.436	0.351 ***	1.420	0.188 ***	1.207	0.053	1.055
Some College			-0.047	0.954	0.004	1.004	0.073 *	1.076	0.139 ***	1.149
Graduated College			-0.096 **	0.908	-0.059	0.942	0.156 ***	1.169	0.108 **	1.114
Household Income ($75,000+)										
Less than $15,000			1.050 ***	2.856	0.446 ***	1.561	-0.055	0.947	0.016	1.016
$15,000 to $20,000			0.945 ***	2.572	0.459 ***	1.583	0.118	1.125	0.029	1.029
$20,000 to $25,000			0.760 ***	2.138	0.325 ***	1.384	0.044	1.044	-0.056	0.946
$25,000 to $35,000			0.665 ***	1.945	0.316 ***	1.372	0.096	1.100	-0.021	0.979
$35,000 to $50,000			0.436 ***	1.546	0.190 ***	1.209	0.013	1.013	-0.051	0.950
$50,000 to $75,000			0.189 ***	1.208	0.079	1.082	-0.045	0.957	-0.028	0.972
Primary Pathways										
Segregation Measures (Hyper)										
Extremely Hypersegregated					0.260 ***	1.297	0.192 ***	1.212	0.158 ***	1.171
Not Hypersegregated					-0.152 ***	0.859	-0.174 ***	0.840	-0.162 ***	0.850
Employed					-1.147 ***	0.318	-0.779 ***	0.459	-0.203 ***	0.816
Marital Status (Never Married)										
Cohabiting					0.363 ***	1.437	0.300 *	1.349	0.321 *	1.379
Married					1.282 ***	3.604	0.958 ***	2.605	0.406 ***	1.501
Separated					1.218 ***	3.380	0.923 ***	2.517	0.348 ***	1.417
Children Under 18 in Household					-0.681 ***	0.506	-0.547 ***	0.579	-0.124 ***	0.883
Emotional Support Scale					-0.079 ***	0.924	0.006	1.006	0.020	1.020

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Proximal Determinants												
Insured							0.255	***	1.291	-0.065		0.937
Access to Health Care							0.707	***	2.027	0.515	***	1.674
Self-Reported Health Scale							-0.789	***	0.454	-0.712	***	0.491
Body Mass Index							0.016	***	1.017	0.015	***	1.015
Smoker Status (Current)												
Former Smoker							0.527	***	1.694	0.095	*	1.100
Never Smoked							-0.145	***	0.865	-0.347	***	0.707
Days Per Month of Alcohol Consumption							0.000		1.000	-0.001	***	0.999
Days Per Week of Exercise							0.018	**	1.018	0.027	***	1.028
Daily Servings of Fruits & Vegetables							0.106	**	1.112	0.070		1.072
Demographic Controls												
Age										0.046	***	1.047
Male										0.745	***	2.107
Region (South Atlantic)												
New England										0.000		1.000
Middle Atlantic										0.032		1.032
East North Central										-0.061		0.940
West North Central										-0.030		0.970
East South Central										-0.081		0.922
West South Central										0.094		1.098
Mountain										-0.146	*	0.865
Pacific										-0.147	**	0.863
Diagnosed with Hypertension										0.744	***	2.105
Constant	3.578	***	-	4.239	***	-	3.530	***	-	2.844	***	-	5.706	***	-
Model χ^2	74.994	***		993.183	***		5,071.399	***		9,266.777	***		11,878.353	***	
Nested χ^2	-			918.189	***		4,078.217	***		4,195.378	***		2,611.576	***	
Max Rescaled R^2	0.002			0.024			0.121			0.217			0.276		

Source: 2005 BRFSS.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.