Individual Health Status and Minority Racial Concentration in U.S. States and Counties

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ABSTRACT

Objectives: Ecological studies have documented significant positive associations between mortality rates and minority racial concentration in states, counties, and MAs. We examined whether this association existed for health status after controlling for individual race, socioeconomic status, and region of residence.

Methods: Least squares and probit models were estimated using aggregate and individual data on health status from the 1995, 1997 and 1999 Current Population Surveys merged with Census Bureau estimates of fraction Black by state and county.

Results: Except for older Whites, minority racial concentration was not associated with health status after controlling for individual characteristics and fixed regional factors.

Conclusions: Minority racial concentration may not be a determinant of individual health; differential migration may explain the anomalous result for older Whites.

Persistent racial disadvantages in all-cause mortality have been documented for both Black adult men and women of various age groups,[1-2] and are mirrored in numerous cause-specific mortality rates such as cardiovascular disease and cancer deaths.[2-5] In addition, infant mortality rates for Blacks are substantially greater than those for whites, despite significant reductions in the past decade.[6-7] Consistent with these patterns, several recent ecological analyses have reported that mortality rates are significantly greater in US states,[8-10] metropolitan areas (MAs),[10-12] counties,[13] and zipcodes[14] that have higher proportions of Blacks in the population. However, unlike the unadjusted statistics, these reports of significant associations between fraction Black and mortality rates were based on multivariate analyses that controlled for differences in area-level measures such as socioeconomic status [8-14] (mean income, household size, income inequality, poverty rates, and educational attainment), behavioral risk factors[12] (cigarette consumption and obesity), and characteristics of the environment (urban concentration,[9] environmental pollution,[12] or region of residence within the US[10,12]).

The frequent finding that mortality is significantly associated with fraction Black, or minority racial concentration, is intriguing for several reasons. First, existing studies have not identified the mechanisms through which minority racial concentration affects mortality. Fraction Black in states, counties, or MAs may be a marker for some other explanatory variable that has not been included in multivariate analysis of mortality rates, such as access to or quality of healthcare. Alternatively, fraction Black may represent the degree of racial discrimination in an area; one frequently studied measure of discrimination, residential segregation, has been shown to have adverse consequences for mortality in many studies.[15-23] Interestingly, however, fraction Black is calculated in a different manner than are typical segregation measures like the Dissimilarity Index (DI). Specifically, fraction Black reflects the population composition of the

entire area, whereas the Dissimilarity Index represents the unevenness in the distribution of the races across subunits within the area (for example, across census tracts in a metro area). As a result, correlations between the two measures have been reported in previous studies as 0.062, [23] and 0.28.[11]

Second, further investigation of the association between racial concentration and health outcomes is warranted given the frequent use of ecological analysis in the studies on this topic. It has long been known that relationships shown in ecological studies may not reflect associations at the individual-level.[24] For this reason, multilevel analysis is often the preferred method of assessing the impact of ecological variables on the health of individuals, since it also adjusts for the effect of relevant individual-level traits such as race and socioeconomic status.[25-26] While several existing studies have reported on the associations between area-level racial concentration and individual health status or health risks, their findings have been mixed.[23, 27-32] Further, ecological studies of racial concentration and health status have usually examined large geographic units such as states, MAs or counties; in contrast, most existing multilevel analysis in this area has examined smaller geographic units, such as fraction Black within census tracts (the exception is a study examining percent Black in MAs [23]).

The primary purpose of the current study was to assess whether the associations between health outcomes and racial concentration in states and counties would persist after controlling for both individual-level factors such as race and socioeconomic status, and the contribution of regional effects. We conducted multilevel analysis for separate samples of White and Black individuals using data on overall health status. Since the use of this outcome measure also set our study apart from previous studies, we checked whether our data, when aggregated to the

level of counties and states, would yield significant associations between higher fraction Black and worse health outcomes, as has been found in previous ecological studies on mortality.

METHODS

The data for our analysis were derived from several years of the March Current Population Survey (CPS), a large nationally representative sample of individuals in the U.S. The primary variable of interest in this study, individual health status, was constructed from a measure of overall health status reported for all individuals in each household by heads of household, as a value ranging from 1 (excellent) to 5 (poor). Using responses to other survey questions we constructed measures of annual household income per capita, and individual age, race (self-reported), education level, marital status, health insurance coverage status, and residence within a metropolitan statistical area or a central city area.

We selected White and Black respondents between the ages of 25 and 74, not living in group quarters, and residing in the 50 U.S. states, following several other studies on social determinants of individual health.[33-35] For our analysis of the effects of racial concentration in state populations, we used a sample of pooled respondents from the 1995, 1997 and 1999 March CPS surveys. Respondents in the intervening years (1996 and 1998) were excluded in order to avoid double-counting (nearly 50% of respondents in each survey year were also surveyed in the previous year). After dropping observations with missing data, our sample consisted of 185,889 individuals. These observations were merged with data on fraction Black by state from the previous year, using the state of residence identifiers in the CPS. Our measure of fraction Black was constructed using state-level data from the Population Estimates Program of the U.S. Census Bureau's Population Division.

To construct the sample used in the analysis of racial concentration in county populations we made two adjustments to the procedures described above. First, because county identifiers were unavailable in the 1995 survey, we included respondents from only the 1997 and 1999 CPS surveys. Second, the survey does not provide county identifiers for most (smaller) US counties, so we excluded respondents residing in those areas. These steps yielded a sample of 58,451 individuals in 217 large U.S. counties that were merged to county measures of fraction Black, constructed from data obtained from the Population Estimates Program of the U.S. Census Bureau's Population Division.

To examine whether our use of overall health status would yield findings similar to those reported in previous ecological studies of fraction black and population mortality, we used the CPS data to calculate aggregate measures of the fraction of the population in poor or fair health for states and counties. We created these measures for 50 U.S. states using 1995-1999 CPS data (n=250), and for 217 U.S. counties using 1996-1999 CPS data (n=868). We then regressed the dependent variable (the fraction of residents in fair or poor health by state or county) on fraction Black in the area and mean area income (calculated from the CPS). The t-statistics for all coefficient estimates were based on White standard errors, in order to adjust for variation in state population size.

To test the association between racial concentration at both state and county levels and individual health, we conducted multivariate analysis of individual health status (H). The dependent variable was an indicator variable assigned a value of one if health status was reported as fair or poor, and zero otherwise. Due to the dichotomous nature of the dependent variable, we used a probit specification for our model. The probit model can be represented as

$Prob(H_{ist}=1) = \Phi\ (X_{ist}\beta_1 + A_{st}\beta_2 + \upsilon_t)$ where i, s and t index individuals, states (or counties), and survey year, and $\Phi(\ )$ is the evaluation of the standard normal cumulative density function. The vector X contains individual characteristics including annual household income per capita, age, and indicator variables for Black race, Hispanic ethnicity, sex, marital status (married, and divorced/separated/widowed, relative to never married), education level (less than high school, some college, and college completion or more, relative to high school), health insurance coverage (either public or private, relative to no coverage). In the state analysis, we also included controls for residence within a metropolitan area or central city. In our base model, the vector A contains area-level measures of fraction Black in the state or county population, and mean household income in the state or county. Finally, υ_t references time effects that are estimated with year dummy variables.

In some specifications, we also added indicators for geographic region in the vector A. This was justified given evidence of significant variation in health and healthcare utilization by region, which is thought to reflect regional differences in behavioral risk factors, the availability of health services, and healthcare quality and price.[36-37] However, since only a subset of previous studies of the health effects of minority racial concentration have incorporated such controls,[10, 12] we reported results with and without the controls for region in order to illustrate the importance of accounting for such variation. Our region controls consisted of indicator variables measuring residence in New England, the Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific regions.

We estimated both models separately for Whites and Blacks; this allowed the effects of all explanatory variables to differ across race. We also compared these results to those obtained

using separate sub-samples of individuals aged 25-64 or aged 65-74.

In order to make the estimated probit coefficients comparable to the OLS slope estimates shown in ecological studies, we calculated the "marginal effect" of a 1-unit change in each of the explanatory variables. For example, in the case of fraction Black, the marginal effect reports the change in the probability of reporting fair or poor health for a one unit increase in fraction Black. Mathematically, for a continuous explanatory variable, the marginal effect is expressed as $\delta Prob(H_i=1)/\delta X_i = \beta\phi(\ )$, where β is the probit coefficient for variable X and $\phi(\ )$ is the standard normal probability density function evaluated at the mean for all explanatory variables. For changes in dichotomous explanatory variables we calculated the discrete change in the probability of fair or poor health as the indicator changes from 0 to 1.[38]

Finally, since our model employed variables at both the level of the individual and the area of residence, we conducted a modified contextual analysis that allowed for the possibility that the residuals for individual observations in the same groups (counties, or states) were correlated. That is, t-statistics for the effects of explanatory variables were calculated using standard errors corrected for observation clustering at the state-year (or county-year) level. In doing so, our model is similar to a multilevel analysis employing random slopes coefficients.[26]

RESULTS

Table 1 presents results from least squares models of the fraction of residents in fair or poor health by state or county regressed on fraction Black in the area. Despite our use of a different measure of health, we found results consistent with prior studies: fraction Black at either the state or county level had a significant positive association with the proportion of individuals reporting fair or poor health status. The effect of fraction Black on area health status

was robust to the inclusion of mean area income and year indicator variables. Having established that an ecological analysis of health status could yield results similar to previous ecological studies of mortality, we then explored whether these findings persisted when using individual-level data on health status.

Table 2 lists descriptive statistics for all individual and area variables in our subsequent analysis. There were significant differences in the means of every variable across race. For example, in the state sample, 22.2% of Blacks reported fair or poor health status, compared to only 13% of Whites; this difference was significant at $p<.01$. This difference was slightly smaller in the county sample (19.1% for Blacks and 12% for Whites), but still significant at $p<.01$. Our subsequent analysis examined the extent to which these differences in health status were attributable to individual SES versus area characteristics, such as racial concentration.

Table 3 summarizes the results from probit models that examined the association between state-level racial concentration and individual health status for each sample. Absent controls for regional influences, fraction Black was significantly and positively associated with fair or poor health status for Whites, but not significantly associated with health among Blacks. However, upon the inclusion of regional controls, the association between fraction Black and health status was not significant in either the White or Black sample. For both samples, we tested the hypothesis that the effects of the region controls were jointly equal to zero; this hypothesis was rejected at the 0.01 level.

Table 4 summarizes results from probit models using county-level measures of racial concentration as determinants of individual health status. Once again, absent controls for region, fraction Black was significantly and positively associated with fair or poor health status in the

White sample. However, fraction Black was marginally significant and negatively associated with fair or poor health status in the Black sample. After adding controls for region effects, fraction Black was only marginally significant ($p<.12$) and positively associated with fair or poor health status in the White sample, but not significant in the Black sample. As in the state-level analysis, we found that the effects of the region controls were jointly significant for both Blacks and Whites at the 0.01 level.

We also estimated the full model using separate samples of individuals aged 25-64 and those aged 65-74 (not reported but available upon request). For individuals under age 65, we found no significant association between fraction black at the state- or county-level and the health status of either Whites or Blacks. For individuals over age 65, we found a significant and positive association between fraction Black at the county level and the health status of Whites ($p<.01$). This effect was not observed when racial concentration was measured at the state-level, and was not observed among older Blacks at either the state- or county-level.

DISCUSSION

Previous ecological studies have reported significant positive associations between minority racial concentration and mortality rates in states, counties, and MAs. A separate group of multilevel studies has reported on the association between measures of individual health and area-level minority racial concentration; apart from being multilevel by design, these studies differ from the ecological research in that they usually define fraction Black for relatively smaller geographic areas (i.e., census tracts as opposed to states or counties). Furthermore, the multilevel studies have reported mixed findings regarding the association between fraction Black and health status. Significant positive associations have been reported between fraction Black

and adult mortality risk[28] and women's heart disease mortality,[29] although when adjusted for neighborhood household composition, the association with heart disease mortality did not remain significant. One study found a significant positive association between fraction Black and low birthweight incidence,[23] while, in contrast, a study of Chicago neighborhoods reported a significant negative association between fraction Black and infant mortality.[27]

The purpose of this study was to combine the benefits of multilevel analysis with a focus on racial concentration in geographically larger communities such as states and counties. In doing so, this study also provided new evidence on the relationship between minority racial concentration and individual health status (an outcome not examined in previous multilevel studies). In addition, we controlled for the importance of fixed underlying regional differences (such as behavioral risks, availability of health care, cultural norms in diet and exercise) on the determination of individual health. With one exception,[23] previous multilevel studies on minority racial concentration and health have not accounted for these regional influences on health.

We first demonstrated that an ecological analysis of health status yielded results consistent with those observed in ecological studies of mortality. We found that higher levels of minority racial concentration were significantly associated with higher population rates of fair or poor health in states and counties. In our multilevel analysis, we found that absent controls for regional influences, minority racial concentration at the state-level was significantly associated with health status among Whites, but not Blacks. However, once we controlled for regional effects, minority racial concentration was not significantly associated with health status in either sample. We observed a similar pattern for minority racial concentration at the county level,

although the effect on White health status was, at best, marginally significant even after controlling for fixed regional effects.

These results suggest that some prior evidence of strong ecological associations between minority racial concentration and health may be the artifact of ecological bias. The association between fraction black and health status that was observed in our ecological analysis was not present in our analysis of individual health status. The ecological association appears to be driven largely by differences in the socioeconomic status of individuals across states and counties, as well as the differential effects of socioeconomic status on health status across race.

An important exception was found for older Whites, for whom county-level fraction Black had a significant positive association with poor health status. In an effort to explain this association, previous ecological studies suggested that the observed effect of fraction Black may be driven by its correlation with lower levels of publicly provided services, higher levels of stress and crime, increased presence of environmental and behavioral risks, and increased social inequality and economic deprivation. While an attempt to adjust for each of these factors was beyond the focus of the present study, our results were based on models that adjusted for differences in mean area income.

The results from past studies provide some indications as to the likely contribution of other factors. One ecological study is particularly relevant for comparison purposes. Fuchs et al. (2001) focused on whites age 65 to 84, and found a positive association between mortality rates for that group and fraction Black; [12] again, our only finding of a positive association between fraction Black and health was among Whites over age 65. Fuchs et al. controlled for a number of additional factors including the dissimilarity index of racial segregation, area-level education

measures, and measures of obesity, cigarette consumption, and pollution. These findings, and other evidence that income inequality has no significant effect on health status,[9-10] suggest that the effect of racial concentration on the health of older Whites reported in our multilevel analysis is not likely to be driven by the omission of these particular area-level characteristics.

An additional explanation for the observed association between county percent Black and the health status of White individuals is that of selective migration.[12, 28] That is, healthy Whites may migrate from areas with high minority racial concentration. Our results are generally consistent with this explanation since we find a significant positive association between county percent Black and White health, but no association with Black health. However, additional research is required to assess this explanation fully. For example, prior research by Le Clere et al. (1997) was unsupportive of the role of selective migration, in that they found little correlation between mortality risk and the percent of the population that lived elsewhere five years ago. In contrast, Fuchs et al. (2001) found some support for this hypothesis. Future research on the extent of this type of selective migration, perhaps using panel data and multilevel analysis, is warranted.

In this study, racial concentration had a significant association with health status for Whites age 65-74 only when measured at the county-level. This suggests that area characteristics are more powerful determinants of health when defined for smaller geographic units, which is consistent with existing studies conducted with neighborhood-level measures. However, since our county-level sample was composed of individuals residing in larger counties, this result could also reflect important sample differences. An inspection of Table 2 suggests that the individuals omitted from the county-level analysis are likely to have lower incomes, less

education, and to be in worse health. Observable factors aside, differences in unobserved traits that are correlated with fraction Black would produce biased estimates of the association between racial concentration and health. For example, if a factor that we were unable to control for in our model was positively correlated with fraction Black in the individual's area of residence, and reduced the probability of poor health, then our estimated association between fraction Black and health status would be understated. One such possibility is the quality of healthcare, which may be higher in urban areas. On the other hand, omitted factors such as crime and pollution may be positively correlated with fraction black; to the extent that these are determinants of health, this would cause our estimates of the effect of fraction black on individual health status to be overstated. We suggest these possibilities here, and leave additional exploration for subsequent research.

Several other methodological points are illustrated by this study. First, we provide additional evidence regarding the importance of multilevel analysis. In addition, we show that the ecological association between health status and percent Black is not observed in an analysis of individual-level health status that controls for relevant individual covariates. Finally, our findings underscore the importance of controlling for the health effects of regional factors and the need to model the determinants of health status separately for individuals of different race and age groups.

References

1. Keppel KG, Pearcy JN, Wagnener DK. Trends in racial and ethnic-specific rates for the health status indicators: United States, 1990-98. *Healthy people 2000 statistical notes*, no 23. Hyattsville, Maryland: National Center for Health Statistics, January 2002.

2. Kochanek KD, Smith BL, Anderson RN. Deaths: Preliminary data for 1999. *National vital statistics reports*; 49 (3):1-49. Hyattsville, Maryland: National Center for Health Statistics. 2001.

3. Centers for Disease Control and Prevention. Recent trends in mortality rates for four major cancers, by sex and race/ethnicity – United States, 1990-1998. *MMWR.* 2002; 51 (3): 49-53.

4. Marbella AM, Layde PM. Racial trends in age-specific breast cancer mortality rates in US women. *Am J Public Health*. 2001; 91 (1): 118-21.

5. Ayala C, Greenlund KJ, Croft KB, Keenan NL, Donehoo RS, Giles WH Kittner SJ, Marks MS. Racial/ethnic disparities in mortality by stroke subtype in the United States, 1995-1998. *Am J Epidemiol.* 2001; 154(11): 1057-63.

6. Mathews TJ, MacDorman MF, Menacker F. Infant mortality statistics from the 1999 period linked birth/infant death data set. *National vital statistics reports*; 50 (4): 1-28. Hyattsville, Maryland: National Center for Health Statistics. 2002.

7. Centers for Disease Control and Prevention. Racial and ethnic disparities in infant mortality rates — 60 largest U.S. cities, 1995–1998. *MMWR*. 2002; 51 (15): 329-332, 343.

8. Bird ST. Separate black and white infant mortality models: differences in the importance of structural variables. *Soc Sci Med.* 1995; 41 (11):1507-1512.

9. Mellor, JM, Milyo JD. Re-examining the evidence of an ecological association between income inequality and health. *J Health Polit Policy Law*. 2001; 26: 487-522.

10. Deaton A, Lubotsky D. Mortality, inequality and race in American cities and states. *Soc Sci Med*. 2002; in press.

11. Cooper RS, Fennelly JF, Durazo-Arvizo R, Oh H, Kaplan G, Lynch J. Relationship between premature mortality and socioeconomic factors in black and white populations of US metropolitan areas. *Public Health Rep.* 2001; 116 (September/October): 464-473.

12. Fuchs VR, McClellan M, Skinner J. Area differences in utilization of medical care and mortality among U.S. elderly. *National Bureau of Economic Research Working Paper Number 8628.* Cambridge, Mass: NBER; December 2001.

13. McLaughlin DK, Stokes CS. Income inequality and mortality in US counties: does minority racial concentration matter? *Am J Public Health.* 2002; 92: 99-104.

14. Fang J, Madhavan S, Bosworth W, Alderman MH. Residential segregation and mortality in New York City. *Soc Sci Med.* 1998; 47 (4): 469-476.

15. LaVeist TA. Linking residential segregation to the infant-mortality race disparity in US cities. *Sociol Soc Research.* 1989; 73 (2): 90-94.

16. Polednak AP. Black-white differences in infant mortality in 38 standard MSAs. *Am J Public Health*. 1991; 81 (11):1480-2.

17. Polednak AP. Poverty, residential segregation, and black/white mortality ratios in urban areas. *J Healthcare Poor Underserved.* 1993; 4 (4):363-373.

18. LaVeist TA. Segregation, poverty and empowerment: health consequences for African Americans. *Milbank Q.* 1993; 71: 41-64.

19. Polednak AP. Trends in US urban black infant mortality, by degree of residential segregation. *Am J Public Health.* 1996; 86 (5):723-726.

20. Polednak AP. Segregation, discrimination and mortality in U.S. Blacks. *Ethn Dis.* 1996; 6:99-108.

21. Hart KD, Kunitz SJ, Sell RR, Mukamel DB. Metropolitan governance, residential segregation, and mortality among African Americans. *Am J Public Health.* 1998; 88 (3):434-438.

22. Collins CA, Williams DR. Segregation and mortality: the deadly effects of racism? *Sociological Forum*. 1999; 14 (3): 495-523.

23. Ellen, IG. Is segregation bad for your health? The case of low birth weight. *Brookings-Wharton Papers on Urban Affairs*, 2000. William G. Gale and Janet Rothenberg Pack, eds. Washington DC: The Brookings Institution Press.

24. Robinson. Ecological correlations and the behavior of individuals. *Am Sociol Rev.* 1950; 15: 351-357.

25. Pickett KE, Pearl M. Multilevel analyses of neighborhood socioeconomic context and health outcomes: a critical review. *J Epidemiol Community Health.* 2001; 55(2):111-122.

26. Diez Roux AV. A glossary for multilevel analysis. *J Epidemiol Community Health.* 2002; 56: 588-594.

27. Roberts EM. Neighborhood social environment and the distribution of low birthweight in Chicago. *Am J Public Health*. 1997; 87 (4):597-603.

28. LeClere FB, Rogers RG, Peters KD. Ethnicity and mortality in the United States: individual and community correlates. *Soc Forces*. 1997; 76 (1):169-198.

29. Le Clere FB, Rogers RG, Peters KD. Neighborhood social context and racial differences in women's heart disease mortality. *J Health Soc Behav*. 1998; 39 (June):91-107.

30. Cubbin C, LeClere FB, Smith GS. Socioeconomic status and injury mortality: individual and neighborhood determinants. *J Epidemiol Community Health*. 2000; 54:517-524.

31. Lee RE, Cubbin C. Neighborhood context and youth cardiovascular behaviors. *Am J Public Health*. 2002; 92 (3):428-436.

32. Jackson SA, Anderson RT, Johnson NJ, Sorlie PD. The relation of residential segregation to all-cause mortality: A study in Black and White. *Am J Public Health*. 2000; 90 (4): 615-617.

33. Fiscella, K, Franks, P. Poverty or income inequality as predictor of mortality: longitudinal cohort study. *BMJ*. 1997; 314 (7096): 1724-28.

34. Mellor, JM, Milyo, JD. Income inequality and health status in the United States. *Journal of Human Resources*. 2002; 37(3): 510-539.

35. Mellor, JM, Milyo JD. Is exposure to income inequality a public health concern: lagged effects of inequality on health. *Health Serv Res*. 2002; forthcoming.

36. Wennberg JE, Cooper MC. *The Dartmouth atlas of health care in the United States*, 1996. Chicago, IL: American Health Association Press.

37. Pickle LW, Gillum RF. Geographic variation in cardiovascular disease mortality in US blacks and whites. *J Natl Med Assoc*. 1999; 91 (10): 545-56..

38. Greene, William H. *Econometric analysis, 4th edition*, 2000. Upper Saddle River, NJ.: Prentice Hall.

Table 1. Descriptive Statistics and Results from Least Squares Models of Fraction of Population Reporting Fair or Poor Health Status in 50 U.S. States, 1995-99, and 217 U.S. Counties, 1996-99

Panel A: State-Level Ecological Analysis (n=250)		
Explanatory Variable	Mean (X) (std dev)	β-hat (abs val of t-statistic)
Fraction Black in State Population	0.101 (0.094)	0.202** (12.40)
Mean Annual Household Income in State (in thousands of $)	43.26 (6.34)	-0.003** (10.14)
		R^2=0.545; Mean(Y)=0.138
Panel B: County-Level Ecological Analysis (n=868)		
Explanatory Variable	Mean (X) (std dev)	β-hat (abs val of t-statistic)
Fraction Black in County Population	0.116 (0.118)	0.093** (5.19)
Mean Annual Household Income in County (in thousands of $)	47.99 (14.05)	-0.002** (10.90)
		R^2=0.202; Mean(Y)=0.132

Notes: Models also include indicator variables for year of survey. Unstandardized regression coefficients are reported; t-statistics based on White standard errors are reported in parentheses.
** $p < 0.01$, * $p<0.05$, † $p<0.10$

Table 2. Individual and Area-Level Characteristics of CPS Respondents aged 25-74, By Race and Area of Aggregation

	State-level Samples		County-level Samples	
	Whites (n=167,853)	**Blacks (n=18,028)**	**Whites (n=51,327)**	**Blacks (n=7,120)**
Fraction with Poor or Fair Health Status, mean (std dev)	0.130 (0.34)	0.222** (0.42)	0.120 (0.33)	0.191** (0.39)
Age, mean (std dev)	45.52 (13.37)	43.4** (12.81)	45.43 (13.30)	43.25** (12.64)
Annual Household Income per capita (in thousands of $), mean (std dev)	21.40 (21.05)	14.24** (14.79)	23.90 (25.18)	15.80** (16.16)
Hispanic ethnicity, %	11.1	2.2**	17.5	4.2**
Female, %	50.8	55.3**	50.9	54.9**
Married, %	68.3	41.6**	65.3	41.2**
Divorced, Separated or Widowed, %	17.9	27.7**	18.7	27.0**
Any health insurance coverage, %	85.6	77.8**	84.3	77.3**
Less than high school education, %	14.8	22.6**	14.4	19.4**
Some college education, %	25.4	26.1†	25.9	27.6*
College degree or higher, %	26.1	14.5**	29.5	18.0**
Residence in MSA, %	74.9	84.6**	—	—
Residence within in central city, %	23.2	54.1**	—	—
Fraction Black in Area, mean (std dev)	0.120 (0.07)	0.172** (0.08)	0.117 (0.10)	0.260** (0.16)
Mean Area Income (in thousands of $), mean (std dev)	44.493 (5.40)	44.157** (5.72)	50.288 (12.94)	46.831** (11.61)

Notes: Descriptive statistics are calculated by applying the March Supplemental Weight provided in the CPS to individual observations.

** Differences in means by race significant at the 0.01 level
* Differences in means by race significant at the 0.05 level
† Differences in means by race significant at the 0.10 level

Table 3. Estimated Effects of Individual and State-Level Characteristics on the Probability of Fair or Poor Health Status for CPS Respondents aged 25-74, By Race

	White Sample (n=167,853)		Black Sample (n=18,028)	
Explanatory Variable	Base Model	Plus region fixed effects	Base Model	Plus region fixed effects
Age	0.005**	0.005**	0.009**	0.009**
	(63.08)	(63.43)	(31.12)	(31.24)
Household Income per capita	-0.002 **	-0.002**	-0.006**	-0.006**
	(18.75)	(18.65)	(11.82)	(11.82)
Hispanic ethnicity	0.003	0.002	-0.020	-0.011
	(1.02)	(0.60)	(0.91)	(0.54)
Female	0.003†	0.003†	0.011	-0.010
	(1.92)	(1.91)	(1.59)	(1.48)
Married	-0.055**	-0.056**	-0.080**	-0.078**
	(17.68)	(17.80)	(7.69)	(7.55)
Divorced, Separated or Widowed	-0.011**	-0.012**	-0.012	-0.012
	(3.71)	(4.06)	(1.19)	(1.22)
Any health insurance coverage	0.002	0.003	0.037**	0.038**
	(0.78)	(1.06)	(3.97)	(4.09)
Less than high school education	0.080**	0.078**	0.102**	0.104**
	(22.32)	(22.57)	(11.95)	(12.13)
Some college education	-0.019**	-0.019**	-0.030**	-0.033**
	(9.86)	(9.96)	(3.55)	(4.11)
College degree or higher	-0.048**	-0.048**	-0.052**	-0.055**
	(21.01)	(20.88)	(4.52)	(4.87)
Residence in MSA	-0.014**	-0.015**	-0.067**	-0.065**
	(4.24)	(4.55)	(4.94)	(5.10)
Residence within in central city	0.013**	0.014**	0.034**	0.033**
	(4.43)	(4.29)	(2.81)	(3.03)
Fraction Black in State	0.111**	-0.016	-0.058	-0.022
	(6.30)	(0.62)	(0.97)	(0.35)
Mean State Income	-0.001**	-0.0004	-0.002*	-0.001
	(3.07)	(1.14)	(2.43)	(0.35)
Joint significance of region effects (χ^2)		75.94 (p<0.00001)		48.55 (p<0.00001)

Notes: Each cell reports dProb(Y)/dX from a multivariate probit model and the absolute value of the t-statistic in parentheses. Both model specifications also include indicator variables for year of interview.
** p < 0.01, * p<0.05, † p<0.10

Table 4. Estimated Effects of Individual and County-Level Characteristics on the Probability of Fair or Poor Health Status for CPS Respondents aged 25-74, By Race

	White Sample (n=51,331)		Black Sample (n=7,120)	
Explanatory Variable	Base Model	Plus region fixed effects	Base Model	Plus region fixed effects
Age	0.005** (38.15)	0.005** (38.44)	0.008** (18.68)	0.007** (18.61)
Household Income per capita	-0.002 ** (10.17)	-0.002** (10.17)	-0.005** (7.99)	-0.005** (7.90)
Hispanic ethnicity	0.011* (2.18)	0.011* (2.23)	0.010 (0.41)	-0.0004 (0.02)
Female	0.003 (1.21)	0.003 (1.14)	-0.014 (1.41)	-0.013 (1.44)
Married	-0.054** (11.56)	-0.054** (11.67)	-0.082** (5.79)	-0.077** (5.65)
Divorced, Separated or Widowed	-0.012* (2.43)	-0.012* (2.42)	-0.010 (0.80)	-0.005 (0.41)
Any health insurance coverage	0.007 (1.56)	0.007 (1.55)	0.042** (3.91)	0.041** (3.93)
Less than high school education	0.062** (13.14)	0.062** (13.40)	0.071** (5.34)	0.072** (5.48)
Some college education	-0.016** (4.19)	-0.015** (3.98)	-0.035** (3.25)	-0.039** (3.58)
College degree or higher	-0.042** (12.33)	-0.042** (12.32)	-0.074** (5.04)	-0.078** (5.45)
Fraction Black in County	0.047* (2.24)	0.034 (1.58)	-0.049† (1.91)	0.029 (0.96)
Mean County Income	-0.0004** (2.45)	-0.0004* (2.50)	0.0008 (1.62)	0.001** (2.81)
Joint significance of region effects (χ^2)		10.05 (p=0.26)		35.86 (p<0.00001)

Notes: Each cell reports dProb(Y)/dX from a multivariate probit model and the absolute value of the t-statistic in parentheses. Both model specifications also include indicator variables for year of interview.
** $p < 0.01$, * $p<0.05$, † $p<0.10$