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Economic Mobility and the Mortality Crisis Among U.S. Middle-Aged Whites

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To the Editor

Recent studies demonstrate an alarming rise in mortality rates among middle-aged white Americans in recent decades [1–4]. These studies hypothesize that an underlying cause of this phenomenon is the growing realization among some members of this age group that they will not achieve a better standard of living than their parents, leading to destructive health behaviors. Put differently, this hypothesis ties the prospects of upward mobility to health outcomes in white middle-aged Americans. While conceptually attractive, this link has not been explicitly studied. Our study addressed this gap by examining whether county-level economic opportunity was associated with changes in mortality rates for middle-aged non-Hispanic whites in recent decades.

We calculated mortality rates for non-Hispanic whites aged 45–54 over the 3-year period between 1999 and 2001 and for the 3-year period between 2011 and 2013 [4]. Economic mobility was defined as the county-level correlation of the percentile ranks in the national income distribution for children (based on average incomes between 2010–2012 for the 1980–1982 birth cohort) and their parents (whose income was measured over 1996–2000) [5]. Higher values reflect less economic mobility. We obtained county-level estimates of poverty, college completion, marriage, unemployment and per capita personal income for non-Hispanic whites. We also obtained county-level estimates of the total population, population density and the Gini index of inequality.

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We estimated least squares regression models specifying logged mortality rate as the dependent variable. In this model we included the above covariates, a binary indicator for year (=1 for observations for 2012 and 0 for 2000), and county fixed effects. The year indicator and county fixed effects account for all national trends and time-invariant county attributes, respectively, that may jointly influence the economic measures and outcomes. To model whether mortality increased more in areas characterized by low economic mobility net of other covariates, we included economic mobility in the model interacted with the year indicator. We weighted models by the average number of non-Hispanic whites aged 45–54 at risk for death in the two periods. Standard errors were corrected for clustering at the county level [6].

Our final sample included N=2,659 counties for T=2 time periods, with coverage of more than 98% of the US population in 2000. As shown in Table 1, the positive interaction between economic mobility and the year indicator implies that mortality for middle aged non-Hispanic whites increased more in areas characterized by low economic mobility. Our findings suggest that mortality increased 5.0% more [95% CI 2.4%, 7.6%] in counties in the bottom quartile of mobility (25^{th} percentile of intergenerational income rank correlation=. 379) compared to those in the top quartile (75^{th} percentile of intergenerational income rank correlation =.287).

The proportion of non-Hispanic whites with a college degree was negatively associated with within-county change in mortality across the two time periods; no other covariates were associated with change in mortality. Models examining sex-specific mortality rates revealed substantively similar patterns for both men and women in this age group.

This study provides the first explicit evidence that lack of economic mobility may help explain the recent and striking rise in mortality among middle-aged non-Hispanic white Americans. Our findings are consistent with recent work showing an inverse relationship between lack of economic opportunity and a range of negative health behaviors and health outcomes [7]. While the aggregate, observational study design precludes causal inference, our findings motivate further inquiry into whether and how future expectations and changes in living standards may create despair and compromise health. Studies using individual level data may help provide higher resolution, causal evidence on the factors and mechanisms underlying this growing mortality crisis.

Methodological Appendix

We obtained county-level mortality data from the Centers for Disease Control Wide-Ranging Online Data for Epidemiologic Research (WONDER) Compressed Mortality files. Mortality rates per 100,000 include all deaths for non-Hispanic whites aged 45–54 over the 3-year period between 1999 and 2001 and over the 3-year period between 2011 and 2013 [1].

Data on economic mobility were taken from the Equality of Opportunity Project [2–3]. Economic mobility was defined as the county-level correlation of the percentile ranks in the national income distribution for children (based on average incomes between 2010–2012 for the 1980–1982 birth cohort) and their parents (whose income was measured over 1996–

2000). Higher values reflect less economic mobility; the higher the value, the greater the degree to which an individual's economic position in adult life is determined by economic the circumstances of their birth. These data include both whites and nonwhites but are only available at a single point in time. These estimates are based on linked IRS administrative tax records for virtually every individual born between 1980 and 1982 and their parents; these are the first—and only—local area estimates of intergenerational economic mobility derived from population-level administrative data.

We obtained county-level estimates specific to non-Hispanic whites for population proportion below the poverty line (scaled 0–1), proportion of college graduates (scaled 0–1), proportion married (scaled 0–1), proportion unemployed in the civilian labor force (scaled 0–1), and per capita personal income (log). We also obtained county-level estimates of the total population (log), population density (log) and the Gini index of inequality (scaled 0–1). Covariates for the mortality period 1999–2001 (hereafter "2000") were taken from the 2000 Decennial Census [4]; covariates for the mortality period 2011–2013 (hereafter "2012") were taken from the American Community Survey 5–Year estimates, pooling survey years 2010–2014 (midpoint 2012) [5].

We estimated least squares models specifying logged mortality rate as the dependent variable. These models included the above covariates, a binary indicator for year (=1 for observations for 2012 and 0 for 2000), and county fixed effects. The year indicator and county fixed effects account for all national trends and time-invariant county attributes, respectively, that may jointly influence the economic measures and outcomes. To model whether mortality increased more in areas characterized by low economic mobility net of other covariates, we included our measure of economic mobility in the model interacted with the year indicator.

We estimated the following model:

$$ln\,(Y_{ct}) = \beta 1(Mobility_c * Year_t) + \beta X_{ct} + Year_t + \boldsymbol{\alpha_c} + \varepsilon_{ct}$$

where $ln(Y_{ct})$ is the logarithm-transformed mortality rate for non-Hispanic whites aged 45–54 in year t and county c; $Mobility_c$ is our economic mobility measure; $Year_t$ is a dummy indicator for year (2000=0; 2012=1); X_{ct} is a vector of covariates in time t for each county c; $\boldsymbol{\alpha_c}$ is the county fixed effect; and ε_{ct} is the error term. The coefficient on the interaction term, $\beta 1$, is the key parameter of interest. This coefficient (multiplied by 100) can be interpreted as the marginal percent change in mortality owing to a one-unit increase in absolute upward mobility. Again, the main effect for *Mobility* is subsumed by the county fixed effect.

We weighted models by the average number of non-Hispanic whites aged 45–54 at risk for death in each of the two time periods. All standard errors were corrected for clustering at the county level, so as to account for serial correlation in mortality rates within counties. All analyses were conducted using Stata version 14.0.

Economic Mobility and Mortality by Sex

Models estimating the association between economic mobility and change in mortality separately for non-Hispanic men and non-Hispanic women aged 45–54 are presented in eTable1 and eTable 2, respectively. The interaction between economic mobility and the year indicator is positive and of roughly similar magnitude in both models, suggesting that mortality increased more in areas characterized by low-economic mobility over this time period for both men and women. The analytic sample is smaller for these sex-specific models due to missing mortality data from counties where the population of men or women aged 45–54 is too small to generate reliable estimates.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Non-Hispanic White Middle-Age Mortality and Economic Mobility, Fixed Effects

Economic Mobility X Year	0.54 [0.26, 0.83]
Gini Index	−0.01 [−0.04, 0.01]
Income Per Capita (log)	−0.00 [−0.06, 0.06]
College Graduates	−0.32 [−0.39, −0.25]
Population Density (log)	−1.20 [−3.75, 1.34]
Proportion Married	−0.02 [−0.05, 0.01]
Unemployment Rate	−0.02 [−0.05, 0.01]
Poverty Rate	0.02 [−0.01 −0.06]
Population (log)	0.97 [−1.24, 3.19]
Year	0.10 [−0.04, 0.24]
Constant	6.08 [5.70, 6.47]
Observations	5,171
R-squared	0.93

Notes: 95% confidence intervals computed with standard errors corrected for clustering at the county level in brackets.