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**The Influence of Asset Ownership on the Risk of Adult Mortality in the United States**

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## **ABSTRACT**

An inverse association between socioeconomic status (SES) and mortality risk dates back to early US records and exists in all countries where it has been examined. However, few studies have included detailed measures of SES that move beyond the typical income, education, and occupational status variables. Indeed, recent sociological work suggests that asset and wealth variables may have strong influences on the general well being of individuals in the US. Here, we examine the relationship between the ownership of assets and adult mortality risks in the US using the 1994 Family Resources Supplement of the National Health Interview Survey linked to deaths from the National Death Index through the end of 1997. The data show that, net of basic SES characteristics, people who report receiving interest and dividends—indicating ownership of savings accounts and investments—as well as people who own vehicles are characterized by somewhat lower mortality risks than people who do not own these types of assets. These effects do not differ greatly by gender, although our analysis does reveal stronger income effects on mortality risk for women. Further, the black-white difference in mortality is reduced by the inclusion of asset variables, even beyond the reduction produced by the basic SES variables. These results suggest the need to further consider how a range of SES characteristics beyond individual-level education and income can work to influence the health and survival of U.S. adults.

## INTRODUCTION

Williams and Collins (1995: 380-381) have described racial and socioeconomic differences in health and mortality as “arguably the single most important public health issue in the United States.” Indeed, an inverse association between different measures of socioeconomic status (SES) and mortality risk dates back to early US records and exists in all countries where it has been examined (Adler et al. 1994; Kitagawa and Hauser 1973; Rogers et al. 2000). However, very few of the studies in this area have included detailed measures of SES that move beyond the typical income, education, and occupational status variables (Hummer et al. 1998; Kaufman et al. 1997). Thus, additional research into the linkages between SES and mortality that are able to more carefully examine the bundle of characteristics that comprise the multi-faceted concept of socioeconomic status are clearly warranted. Here, we examine the relationship between the ownership of several different kinds of assets and adult mortality risks in the United States using the 1994 Family Resources Supplement of the National Health Interview Survey linked to deaths from the National Death Index through the end of 1997.

We further examine the extent to which these additional measures of SES can account for black-white differences in adult mortality. Indeed, most (but not all) studies in this area have failed to fully explain the black-white gap in adult mortality, even with the inclusion of income, education, and/or occupational status variables (e.g., Hummer et al. 1999; Rogers et al. 2000; Sorlie et al. 1992; Sorlie et al. 1995). Importantly, we also perform this analysis separately by sex. This is because, first, a number of studies have pointed to differing effects of SES variables between men and women (Pappas et al. 1993; but also see McDonough et al. 1999). Second, the most detailed study to date in this area (Menchik 1993) was limited because of data restrictions to the analysis of men.

## PREVIOUS STUDIES

Some of the best work on the relationship between income and mortality suggests that multi-year income measures are powerful predictors of mortality risk, above and beyond single-year measures (McDonough et al. 1997). However, few national-level studies have been able to examine the relationship between the ownership of assets or wealth (e.g., assets minus liabilities) and mortality risk in the United States. One notable exception is Menchik (1993), who used the 1966-1983 National Longitudinal Survey of Older Men to model the relationship between two different “permanent income” variables—wealth and permanent earnings—and the risk of mortality over the 17-year period. Menchik found wide disparities in follow-up death rates across men with different levels of wealth, which was measured as a sum of the value of home(s), stocks, bonds, and other assets minus the debts on these items. For example, the 17-year mortality rate of those men who were in the poorest quintile of the wealth distribution exceeded that of men in the richest quintile by nearly three to one. In a multivariate analysis of survivorship over the period, a higher level of wealth continued to be associated with lower mortality, even with baseline health accounted for. Further, a higher level of permanent earnings was also associated lower mortality, net of the complete set of demographic, social, and health controls. Thus, this analysis provides strong evidence that the cumulative nature of wealth is associated with protection from premature death among U.S. men; moreover, the permanent income variables substantially reduced, but did not eliminate, the black-white difference in mortality over the period. However, a major limitation of the study was that the sample was limited only to men. Further, the data are now quite dated—going back into the mid-1960s—and the accumulation of wealth and assets across the U.S. population has changed considerably since that time.

A number of other recent studies have focused on the relationship between measures of wealth and health status among U.S. adults. Burr and Mutchler (1991) analyzed race differences in health status using the Survey of Income and Program Participation, and included measures of both current income and net worth as explanatory variables. They found that, even net of current income, higher levels of net worth were associated with worse health among all four outcome measures utilized, although the relationships were much stronger for whites than for blacks.

In a series of studies, Kington and Smith (1997; Smith and Kington 1997a and 1997b) have also analyzed black-white differences in health status, with a special focus on the role of income and wealth. Together, these studies suggest that long-term wealth affects the health trajectories of adult men and women. Perhaps even more importantly, this set of studies also highlights the complexity in understanding the causal relationships between health, income flows, and wealth. Indeed, not only do SES variables influence health, but the reverse is also the case. Smith and Kington (1997b: 151-156), for example, state that in lieu of cross-sectional studies of health or mortality, “a more promising avenue to pursue is to model short-run health dynamics as a function of long-term household economic status that predates current health transitions.” Fortunately, our data set allows for a fairly rigid control for the health status of individuals at the time of the baseline survey, allowing for a very conservative estimate of the relationships between income, assets, and mortality risk. Further, our asset measures, although far from perfect, tap long-term well-being far more comprehensively than current income measures, which we also control in our analyses.

### **THE POTENTIAL IMPORTANCE OF ASSETS FOR SURVIVAL**

Why should the ownership of assets matter for mortality risk, beyond the effects of current family income and other SES variables (e.g., education)? Three clear reasons stand out. First, the ownership of assets is qualitatively different from other measures of current socioeconomic standing.

Families with the same current incomes but different levels of wealth may still experience substantial differences in economic well-being and stability. In a recent analysis of the generation of inequality in wealth between blacks and whites, Oliver and Shapiro (1995: p.2) state:

Wealth is a special form of money not used to purchase milk and shoes and other life necessities. More often it is used to create opportunities, secure a desired stature and standard of living, or pass class status along to one's children. In this sense the command over resources that wealth entails is more encompassing than is income or education, and closer in meaning and theoretical significance to our traditional notions of economic well-being and access to life chances.

This perspective emphasizes that income is temporary—current inflow that can be used at the present time to purchase food, make rent or housing payments, pay insurance premiums or health care bills, pay for a health club membership, and alleviate day-to-day stresses. All of these factors are clearly important in the maintenance of health and in lowering mortality risks. Wealth, on the other hand, is a stock—a much more permanent set of assets (minus liabilities)—that gives individuals and families substantial control over their lives, and possibly even their health (Conley 1999; Oliver and Shapiro 1995). Wealth is accumulated over time—in part through earned income, savings, and investments, but often times is passed on within families from generation to generation. Wealth can be a supplement or a substitute for income, when necessary, such as in the temporary loss of income associated with unemployment, illnesses, business losses, or high inflationary periods. Perhaps more important, the possession of wealth can help individuals to be relatively unconcerned about life's necessities such as food and housing, assures individuals access to consistently high quality medical care, and empowers individuals within their communities. Even wealth that provides little or no immediate family income, such as the ownership of a main home and basic transportation, can help to assure health and well-being by consuming minimal current income expenditures on these items, by providing loan collateral in times of need, and by helping to ensure safety.

Second, because of the intergenerational and cumulative nature of wealth, its overall and race/ethnic distributions are much more uneven in the U.S. compared to that of income (Conley 1999; Oliver and Shapiro 1995). For example, while median black family incomes are roughly 60 percent of those of whites, median wealth among black families is less than 10 percent of those of whites. Without regard to race and ethnicity, the top 10 percent of U.S. families receives 26 percent of all income, but holds over 47 percent of all wealth. On the flip side, the bottom 40 percent of all families earns about 14 percent of all income, but only owns about one percent of all wealth. Thus, nearly one-half of all U.S. families have almost no assets on which to draw. Further, if home ownership is factored out of the calculation of wealth, close to 60 percent of all families have little or no assets on which to draw on in times of need (Oliver and Shapiro 1995, p.86).

These severe differences in the distribution of assets and wealth thus help maintain inequality over time and across generations, and create a bi-polar distribution of overall well-being across groups in comparison to measures of current income. Further, the overall median level of assets among blacks in a recent analysis (\$2000) would do relatively little to help with medical crises, unemployment, or other times of need. Meanwhile, the median level for whites (\$28,000) may offer more protection and leeway in times of crisis, as well as more peace of mind on a day-to-day basis (Conley 1999: 28-29). Unfortunately, little empirical work at the national level has focused on the accumulation and control of assets and wealth by sex. However, a number of studies have shown that gender is an influential determinant of both power over household finances as well as the use of these resources (Volger and Pahl 1993, 1994).

Last, a recent analysis of the impact of wealth on the life chances of young adult whites and blacks demonstrated some important effects that may also be apparent when examining adult health and survival. For example, parental wealth was found to be one of the key variables in erasing the

black-white gap in several measures of educational attainment (Conley 1999: 68-79). This may be due to the use of wealth, and especially housing and liquid assets, in ensuring high-quality schooling, a safe and healthy home learning environment, top quality learning tools, and the financing of college. This finding is important to the present analysis for two reasons. First, this analysis adds to the growing literature that assets can make an important difference in the well-being of individuals, as well as help to account for race differences in outcomes. Second, this analysis again reminds us that part of what is measured by “current SES”—such as education and income—may be attributable to the overall wealth that was inherited from parents in the form of greater educational, occupational, and income opportunities. Thus, even though much of the literature in this area (including this article) considers variables like education and income to be individual attributes, recent (e.g., Conley 1999) and classic sociological literature (e.g., Blau and Duncan 1967) reminds us that even these “individual” attributes of SES are strongly influenced by parental well-being.

## **DATA AND METHODS**

Data. The data for this study come from the 1994 Family Resource Supplement (FRS) of the National Health Interview Survey (NHIS). This is the only recent supplement of the NHIS that has a large number of questions devoted to the ownership of assets and that has been linked to follow-up mortality data. NHIS data are cross-sectional and derived from a household multistage sampling of the civilian non-institutional population of the U.S. (NCHS 1980). The NHIS includes two types of questionnaires: the Basic Health and Demographic Questionnaire, composed of "core" questions that are asked annually, and the Current Health Topic Questionnaires, called supplements (such as the FRS), which focus on sets of health issues that may vary from year to year (see Chyba and Washington 1993). In all, approximately 73,000 adults aged 25 to 99 are included in the FRS used here, the purpose of which was to collect in-depth information on the sources and amounts of

income people receive, and the sources and values of their assets (NCHS 1996). Also included in the FRS are the conventional socioeconomic indicators, demographic items, and health questions that are available on the core NHIS questionnaire for that year. Unfortunately, we are restricted to non-Hispanic white and non-Hispanic black individuals in this analysis because there were too few deaths among members of other race/ethnic groups for a stable analysis.

Very recently, NCHS matched the NHIS from 1986 through 1994 to the National Death Index (NDI) for the years 1986 through 1997 to create an updated version of the NHIS Multiple Cause of Death file (NHIS-MCD), a unique and powerful data base for mortality research (NCHS 2000). Note that earlier versions of the NHIS-MCD matched only to deaths through 1991 (e.g., LeClere et al. 1997; Rogers et al. 1996) and then through 1995 (e.g., Rogers et al. 2000). Fewer than five percent of adult individuals in every NHIS contain insufficient identifying information to be linked to any death certificate; consequently, these “ineligible” individuals are excluded from the analysis because they would appear to live forever (NCHS 2000). Preston and Taubman (1994, p. 291) called the NHIS the “most authoritative source of national data on socioeconomic differences in health status.” With the death matches to the NDI, we extend this high praise to vital status as well. Indeed, the updated NHIS-MCD is a major resource for mortality researchers in the United States.

NCHS devised a probabilistic matching scheme that assigns weights to twelve items (e.g., social security number, name, race, sex, and others) to determine the quality of matches between the NHIS surveys and the NDI (NCHS 2000). Patterson and Bilgrad (1986) demonstrated that this matching methodology is highly accurate. Of the 61,417 eligible non-Hispanic black and non-Hispanic white adults aged 25-99 included in the 1994 FRS, 2,346 were identified as dying between the date of the survey in 1994 and the end of 1997. Their dates of death have been added to the questionnaire information to create a longitudinal database for mortality analysis. Thus, the data set

contains a wealth of information for a large sample of adults aged 25 to 99—some who died and most who survived over the follow-up period. The matched data set also alleviates the problem of race/ethnic inconsistency that arises when two disparate data sources are used for mortality analyses. In sum, the NHIS-MCD matched data set used here is nationally representative of the non-institutionalized U.S. civilian population at the time of their interview; provides prospective mortality data; contains a large number of cases and a substantial number of deaths; includes a number of important covariates of mortality, including information on family income and ownership of assets; and allows for an examination of those who are exposed to the risk of death over a four year period.

Measures and Methods. A number of the variables in this analysis are straightforward and measured in a consistent fashion with other recent research on U.S. adult mortality. Our demographic variables include age, sex, and race. We include a continuous measure of age in years as an important control variable in every model. Note that our attempts to run separate models by age resulted in quite unstable coefficients, most notably because of the relatively small number of deaths to individuals under the age of 65. Thus, all of our models in this paper include the full age range of adults. Recall as well that our race/ethnic measure only compares non-Hispanic blacks with non-Hispanic whites because of the limited number of deaths to persons of other race and ethnic groups in this data set.

Our conventional measures of socioeconomic status include education and family income. Education is measured as <12 years, 12 years, and 13+ years. Family income is divided into five categories: <10,000, 10,000-14,999, 15,000-29,999, 30,000-49,999, and 50,000+. We further add a missing category for family income, because about 16% of the sample did not answer the specific question regarding family income.

We group our asset measures into two categories: liquid assets and non-cash assets. This distinction has been made in recent literature because liquid assets (e.g., stocks, bonds, and savings accounts) can more easily be cashed in for current income during times of need than non-cash assets (e.g., homes, cars, businesses), which are both goods and investments, and are less easily transferred into cash (Conley 1999). Our measures of liquid assets include interest and dividends (NCHS 1998). Technically, each refers to an amount of family income received during the past year, but perhaps more importantly, each of these measures also signifies the holding of assets from which the interest or dividend income is received. Specifically, the NHIS-FRS asked if anyone in the family earned interest money in the past month, which we categorized into a simple yes/no dichotomy. Similarly, the NHIS-FRS asked if anyone in the family received dividend income in the past month, which we also dichotomize.

Our four measures of non-cash assets include car ownership, home ownership, business ownership, and a residual measure of other non-cash assets (NCHS 1998). As with interest and dividends, the NHIS-FRS ascertained whether anyone in the family owned a car, truck, or other vehicle, and, if so, asked for an estimated worth of the vehicle(s). We divide this variable into three categories: no vehicles, vehicle(s) worth less than \$20,000, and vehicle(s) worth \$20,000 or more. In a similar way, home ownership is divided into four categories: non-owners, buyers, owned home(s) worth less than \$50,000, and owned home(s) worth \$50,000 or more. The buyer category is designated here because of the long-term nature in which many home purchases are made. Additionally, we dichotomize business ownership into persons who report that they own a business, farm, or professional practice versus those persons who do not. The percentage of business owners (approximately seven percent) was too small to distinguish between different levels of business ownership. Finally, we designated a residual asset ownership dummy variable for persons who

reported owning other assets, property, or savings in comparison to persons who do not.

The dependent variable for this analysis contrasts persons who died during follow-up with those who survived the follow-up period. Because the deaths for individuals surveyed between January and December of 1994 could have taken place in as many as 48 months following the time of the survey, we use a Cox proportional hazards model to estimate associations between the independent variables and mortality risk (Allison 1984). The models are specified in a sequence that allows for an understanding of the gross and net relationships between asset ownership and mortality risk. We report all coefficients in the form of hazard ratios. All models were run first with the sample as a whole; subsequently, we model these relationships separately by sex. All analyses are weighted to approximate the U.S. non-institutionalized population of adults. Because the NHIS includes a multi-stage stratified sampling design, we use SUDAAN 7.5 software (Shah et al. 1997) to correctly estimate the coefficients and standard errors for all models.

As discussed in the literature review above, health selectivity remains a major issue for all analyses that attempt to model the association between socioeconomic status and mortality risk. Without health and SES data across the life course, this is a very, very difficult issue of causality to untangle. We attempt to reduce the impact of health selectivity in two ways in the present analysis. First, recall that a positive feature of the NHIS is that it samples only the non-institutionalized population of the US, thus excluding some of the most unhealthy people (who would also tend to possess few if any assets) from the analysis. Second, we include some models in our analysis that control for two strong indicators of health at the time of the survey: self reported health status and an indicator of activity limitations. Each has been shown to be highly predictive of subsequent mortality risk in the NHIS-MCD data set, even net of one another (Rogers et al. 2000). Note, though, that controlling for these strong indicators of health at the time of the survey most likely

results in overly conservative estimates of the association between asset ownership and mortality risk, because some of the effects of socioeconomic variables throughout the life course undoubtedly work to influence the health of adults at the time of the survey (House et al. 1988; Smith and Kington 1997). Thus, we consider our models of assets and mortality that do not include health status measures to be fairly liberal measures of association between assets and mortality. On the other hand, we consider that the inclusion of the health measures probably results in very conservative measures of association between SES variables and mortality risk.

## **RESULTS**

### **Descriptive Results**

Table 1 provides descriptive statistics for adult mortality risk factors by survival status. Of greatest interest for the present analysis is the distribution of the asset variables. Among the liquid assets, the percentage of individuals who report earning interest (55.2%) is much greater than the percentage of people who report earning dividends (14.9%). A consistent pattern is also evident in that persons who report receiving interest or dividends are less likely to die in the follow-up period compared to persons who do not report savings or dividends. In terms of non-cash assets, a large majority of individuals report that they own vehicles of some value (91.1%), while about 29% of people report that they own their homes. Nearly 45% of the individuals in the data set also report that they are currently buying their homes; that is, they are making loan payments. With the exception of home ownership, persons who have non-cash assets are less likely to die during follow-up in comparison to persons who do not hold these assets. Recall, though, that age and other important differences are not controlled in these descriptive data. Thus, in general, these initial results suggest somewhat higher mortality risks among people who do not own the various kinds of assets.

Table 1 about here

The distributions of the descriptive data from Table 1 also show differences in survival across the various demographic, SES, and health characteristics. For example, it is clear that persons in poor or fair health have higher mortality risks than persons in excellent or very good health; a similar high risk of mortality is evident for the 19.7% of persons who report having activity limitations. Similarly, low education is associated with higher percentages of mortality than higher levels of education. Of clear importance to this paper as well, at least at this bivariate level, a higher level of income is associated with lower mortality percentages than low levels of income—as is expected.

Because this paper is concerned with whether or not the asset variables help to explain the overall black-white gap in adult mortality, Table 2 presents a similar descriptive analysis by race. Again, turning first to the asset variables, the distribution of each of the six variables highly favors non-Hispanic whites. Indeed, white adults (60.5%) are nearly three times as likely as black adults (22.5%) to report earning interest and nearly five times as likely as blacks to report dividends. The disparities in vehicle and home ownership are among the smallest of the race differences, but in each case, white adults are about 2.5 times as likely as black adults to report the highest level of ownership of these assets. Further, the race disparity in both business and other asset ownership are very large, also favoring whites. Notably, some of these disparities (e.g., interest, dividends, businesses, other assets) are much greater in magnitude in comparison to that of the highest level of family income (\$50,000 or greater), a category in which 27.0% of white adults fall in comparison to 11.4% of black adults. Thus, these data are consistent with other national-level reports (e.g., Conley 1999; Oliver and Shapiro 1995) that show very wide racial disparities in not only family income, but also in the ownership of various kinds of assets.

Table 2 about here

Few studies consider the notion that income levels and the ownership of assets may vary by gender, in large part because these items are often shared within families. However, even without considering gender differences in the control and use of such assets within families, different family configurations and age distributions by gender make such family income and asset disparities possible. Indeed, our data (Table 3) show that, with the exception of a very slight female advantage in terms of home ownership, the distributions of the remainder of the income and asset variables are reported to favor men. Indeed, women are much more likely than men to live in families with very low income, and also tend to report slight disadvantages in terms of the ownership of assets. Again, these disparities may arise because women and men tend to live in somewhat different family configurations across the life course, most notably at the older ages when women greatly outnumber men. Because no study that we are aware of separately considers the mortality consequences of asset ownership separately by gender, we do so later in this paper. For now, we turn to the multivariate analysis of asset ownership and mortality, first considering the entire sample of adults.

Table 3 about here

### **Multivariate Results of Asset Ownership and Mortality**

Table 4, like the rest of the multivariate analysis, presents a series of models relating different demographic, health, SES, and asset variables to the risk of mortality—in this case for U.S. adults aged 25-99 in 1994. Model 1, as expected, shows that the hazard of mortality for blacks over the follow-up period is 1.45 as high as whites, net of controls for both age and sex. Model 2 shows that the basic SES variables—education and family income—are also related to mortality risk in largely an expected fashion, although the difference in mortality risk between the two lower levels of education is negligible. Nevertheless, individuals living in families with the highest incomes have

the lowest mortality, as expected. Further, the racial mortality gap is substantially reduced, but not eliminated, with the inclusion of these basic SES variables. Moreover, as shown in a recent related analysis (Rogers et al. 2000), the sex difference in mortality widens when controlling for these basic SES factors, because women are more likely to fall in disadvantaged, high-mortality categories than men.

Table 4 about here

Model 3 adds dummy variables for interest and dividends, and shows that receipt of both of these types of income is associated with lower risks of mortality, net of the basic SES variables. Likewise, Model 4 adds non-cash assets. Net of basic SES characteristics, people who own vehicles, and particularly those whose vehicles are worth \$20,000 or more, are characterized by lower mortality risks than people who do not own vehicles. However, the other non-cash asset variables display no significant associations with the risk of mortality. Model 5, in turn, includes the whole set of asset variables along with the basic SES characteristics, and shows that while some of these relationships diminish with the inclusion of the range of covariates, the basic patterns remain the same. That is, net of basic SES variables, persons who receive interest income (e.g., they have savings accounts), persons who receive dividends (e.g., they have dividend bearing investments), and persons who own vehicles have lower risks of mortality in the follow-up period than persons who do not own such items. Note as well that the black-white difference in mortality is reduced—but again not fully eliminated—by the inclusion of asset variables, beyond the reduction produced by the basic SES variables. That is, these data suggest that the black disadvantage in asset holdings is at least partially responsible for their higher mortality risk compared to whites, even net of basic SES variables (e.g., Menchik 1993).

Model 6 adds the two health variables: self-reported overall health and the indicator of activity limitations. Note first that each is very strongly related to the risk of mortality during the follow-up period, even net of one another and the range of SES and asset variables. Notably, health controls eliminate the significant associations between liquid assets (e.g., interest and dividends) and mortality risk over the follow-up period, and substantially reduce the influences of income and education. The implications of these findings are twofold. One, this implies that persons who reported earning interest and dividends at baseline were not protected from the risk of mortality over the course of the 4-year follow-up period, once their baseline levels of health were taken into consideration. A similar implication applies to persons who report low levels of education and income, although even net of the health variables, there are still significant influences of income on mortality risk for persons who report incomes of less than \$30,000 in comparison to the \$50,000+ comparison group. Second, it must also be kept in mind that we have no way of determining, using this data set, what variables influenced the baseline levels of health that are reported here. Indeed, a large amount of scientific literature finds that education and income have important influences on health across the lifecourse (e.g., Adler et al. 1994; Preston and Taubman 1994; Williams and Collins 1995), and savings and investments could very well influence health as well. Thus, it is far too premature at this point to conclude that there no effects of interests and dividends on mortality risk simply because health controls eliminated the association. Nevertheless, it is important to again point out that our results did not find an effect for interest and dividends once baseline health controls were instituted. On the other hand, the ownership of a vehicle(s), particularly at the highest level, continues to be associated with lower mortality, even net of the complete set of demographic, SES, and health variables.

Tables 5 and 6 repeat the analysis for women and men, respectively. The results are largely consistent with those produced for the entire adult population, although the influence of vehicle ownership seems to be a bit more pronounced for men than for women. However, the general conclusions regarding the influence of asset ownership on mortality do not differ by sex. On the contrary, it is evident that the effects of family income on mortality are stronger among women after the health controls are included in Model 6 (e.g., compare Model 6 in Table 5 to Model 6 in Table 6). This is contrary to some studies of SES, gender, and mortality that suggest a stronger SES-mortality gradient among men (Elo and Preston 1996; Feldman et al., 1989; Pappas et al. 1993). However, some of these studies (e.g., Elo and Preston 1996; Feldman et al. 1989) base their conclusions on educational, and not income, effects, while others (e.g., Pappas et al. 1993) have used income measures that are imprecisely merged from two different data sets. Importantly, McDonough et al. (1999), using longitudinal data from the Panel Study of Income Dynamics, recently showed that the effects of personal earnings on mortality risk did not differ across the sexes. Coupled with our results shown in Tables 5 and 6, evidence is mounting that the SES gradient in mortality—at least as expressed in the form of income—is as strong, if not stronger, among women than men.

Tables 5 and 6 about here

## **DISCUSSION**

Using the most recent data available from the mid-1990s, this paper shows that ownership of some types of assets are associated with lower mortality risks in the United States, even controlling for education and income. In particular, the recent receipt of interest (indicating savings) and dividends (indicating investments) were each associated with lower mortality risks, as was the ownership of vehicles. These findings differed very little for women and men. Importantly,

controlling for the asset variables resulted in a smaller black-white gap in mortality compared to models that controlled for just income and education. This suggests that the very wide gap in asset holdings between blacks and whites has an impact on the health and well-being of these respective populations beyond current measures of SES. Thus, studies that do not take these important aspects of SES into account miss an important portion of the resource differentials that help to create racial health disparities in the United States.

At this point, the pathways by which the ownership of assets influences health and mortality outcomes is an open question. There are a number of possibilities. These range from the notion that assets can be financially important and buy better nutrition and health care, to the idea that assets can help to improve the health behavior (such as exercise patterns) of individuals, to the sense that assets can provide individuals with a greater sense of control over their lives and lower stress levels. Further, some types of assets, such as homes and vehicles, can help ensure the safety of those who own them. Thus, future work in this area will not only need to carefully specify the relationship between specific types of assets as they relate to health and mortality risks (e.g., over a long period of time, within race/ethnic groups, within age and income categories, etc...), but also uncover the pathways by which the ownership of assets can help protect individuals from illness, injury, and death.

The data used for this investigation, while containing many strengths (such as its large size, many deaths, and racial diversity), also contains a number of weaknesses. First, it is a cross-sectional survey and, thus, changes in the socioeconomic status and health of individuals across time cannot be included in the models. This is not a unique weakness in the mortality literature; indeed, the type of data used here—that considers individuals who were surveyed at baseline with a mortality follow-up over time—is relatively new in this area of research. Fortunately, the AHEAD

and HRS data sets, which began in 1992-93, are following individuals over time in a panel design, which will allow for the modeling of how income, assets, and health work together to influence the mortality of individuals. At present, however, each of these data sets contain too few deaths for a thorough analysis of these effects.

In an important recent paper, Kaufman et al. (1997) discussed the problems in accurately measuring socioeconomic status for blacks and whites, and how such mis-measurement can have important impacts on how mortality models are interpreted. Indeed, at one level, the unadjusted, baseline differences in mortality across race, ethnic, and SES groups are at issue—and it is no secret that blacks continue to suffer from much higher mortality risks than whites over most of the life course and particularly during young and middle-aged adulthood. But because historical and continued discrimination has worked to create unequal socioeconomic outcomes for blacks and whites, it is important for researchers to try to model the current socioeconomic conditions that help lead to disparate outcomes—and then for policymakers to address the resource-outcome relationship. The intent of this paper is to move the literature toward the more complete inclusion of the multiple factors that help to comprise SES in the United States that, at the very least, include some forms of assets.

Much more work in this area is needed. For example, the present work does not include socioeconomic factors that operate at the neighborhood and higher levels of analysis. Recent theoretical and empirical work (e.g., LeClere et al. 1997; Robert 1999) has pointed toward the ways in which neighborhood poverty and residential segregation can impact the health and mortality of individuals beyond their own characteristics. Further, the present work includes no direct measures of racism—either at the individual or contextual levels—that may also work independently of SES factors to influence health and mortality (Hummer 1996; Williams et al. 1994). Thus, it is clear that

the impacts of race, ethnicity, and SES on health and mortality outcomes are far from being completely understood. As fundamental causes of health and mortality (e.g., Link and Phelan 1995), race/ethnicity and SES deserve our continued attention.

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Table 1: Descriptive Statistics for Adult Mortality Risk Factors, 1994-1997

	Alive	Dead
<b>Demographic</b>		
<b>Race</b>		
- black	16.0	14.0
- white	84.0	86.0
<b>Sex</b>		
- male	45.7	53.1
- female	54.3	46.9
<b>Health Status</b>		
<b>Self Reported Health</b>		
- excellent	32.0	9.0
- very good	29.1	14.0
- good	25.7	28.0
- fair	9.6	24.0
- poor	3.6	25.0
<b>Activity Limitation</b>		
- limited	19.7	59.8
- not limited	80.3	40.2
Socioeconomic Status		
<b>Family Income</b>		
- < \$9,999	7.2	18.0
- \$10,000 - \$14,999	6.3	13.1
- \$15,000 - \$29,999	21.6	24.6
- \$30,000 - \$49,000	24.6	13.6
- > \$50,000	24.5	8.3
- missing income	15.8	22.4
<b>Education</b>		
- ≤ 11 years	18.0	40.0
- 12 years	38.0	35.0
- ≥ 13 years	44.0	25.0

Table 1: Descriptive Statistics for Adult Mortality Risk Factors, 1994-1997

	Alive	Dead
<u>Liquid Assets</u>		
<u>Savings</u>		
- interest	55.2	51.4
- no interest	44.8	48.6
<b>Investments</b>		
- dividends	14.9	14.0
- no dividends	85.1	86.0
<u>Non-Cash Assets</u>		
<u>Car</u>		
- no car	8.9	22.0
- $\leq$ \$19,999	67.6	67.0
- $\geq$ \$20,000	23.5	11.0
<u>Home Ownership Status</u>		
- non-owner	26.2	24.0
- buyer	44.8	22.0
- own home $\leq$ \$49,999	9.0	20.0
- own home $\geq$ \$50,000	20.0	34.0
<u>Other non-cash assets</u>		
- no other non-cash assets	77.7	83.2
- own other non-cash assets	22.3	16.8
<b>Business</b>		
- do not own business	92.2	95.5
- own business	7.8	4.5
N	59,071	2,346

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000)

Table 2: Descriptive Statistics for Adult Mortality Risk Factors by Race, 1994-1997

Demographic	White		Black	
	Alive	Dead	Alive	Dead
<b>Race</b>	96.3	3.7	96.0	4.0
<b>Sex</b>				
- male	46.0	54.0	39.7	49.6
- female	54.0	46.0	60.3	50.4
<b>Health Status</b>				
<b>Self Reported Health</b>				
- excellent	33.0	9.8	22.0	6.1
- very good	30.0	15.0	24.0	11.2
- good	25.0	28.2	30.0	25.0
- fair	9.0	23.0	17.0	26.7
- poor	3.0	24.0	7.0	31.0
<b>Activity Limitation</b>				
- limited	20.0	60.0	23.7	60.0
- not limited	80.0	40.0	76.3	40.0
<b>Socioeconomic Status</b>				
<b>Family Income</b>				
- < \$9,999	5.5	15.7	17.2	29.6
- \$10,000 - \$14,999	5.7	13.6	9.3	10.7
- \$15,000 - \$29,999	21.4	25.7	23.0	19.0
- \$30,000 - \$49,000	26.0	14.5	15.1	9.3
- > \$50,000	27.0	8.8	11.4	5.6
- missing income	14.4	21.7	24.0	25.8
<b>Education</b>				
- ≤ 11 years	16.0	38.0	30.0	52.0
- 12 years	38.0	36.0	38.0	30.0
- ≥ 13 years	46.0	26.0	32.0	18.0

Table 2: Descriptive Statistics for Adult Mortality Risk Factors by Race, 1994-1997

	White		Black	
	Alive	Dead	Alive	Dead
<b>Liquid Assets</b>				
<u>Savings</u>				
- interest	60.5	58.0	22.5	18.9
- no interest	39.5	42.0	77.5	81.1
<b>Investments</b>				
- dividends	17.0	16.0	3.6	3.5
- no dividends	83.0	84.0	96.4	96.5
<u>Non-Cash Assets</u>				
<u>Car</u>				
- no car	5.9	19.2	27.0	37.6
- $\leq$ \$19,999	68.4	68.6	62.7	57.3
- $\geq$ \$20,000	25.7	12.2	10.3	5.1
<u>Home Ownership Status</u>				
- non-owner	22.9	21.6	47.0	40.5
- buyer	46.9	19.3	32.0	24.0
- own home $\leq$ \$49,999	8.6	20.1	13.0	25.1
- own home $\geq$ \$50,000	21.6	39.0	8.0	10.4
<u>Other non-cash assets</u>				
- no other non-cash assets	75.0	81.0	92.7	94.1
- own other non-cash assets	25.0	19.0	7.3	5.9
<b>Business</b>				
- do not own business	91.0	95.0	98.3	98.4
- own business	9.0	5.0	1.7	1.6
N	50,811	1,971	8,260	375

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000)

Table 3: Descriptive Statistics for Adult Mortality Risk Factors by Gender, 1994-1997

Demographic	Male		Female	
	Alive	Dead	Alive	Dead
<b>Race</b>				
- white	87.8	85.1	84.5	82.8
- black	12.2	14.9	15.5	17.2
<b>Sex</b>	95.6	4.4	96.7	3.3
<b>Health Status</b>				
<b>Self Reported Health</b>				
- excellent	35.0	10.0	28.0	9.0
- very good	29.2	14.0	30.0	15.0
- good	24.0	27.2	27.0	28.0
- fair	8.4	23.6	11.0	23.0
- poor	3.4	25.2	4.0	25.0
<b>Activity Limitation</b>				
- limited	18.3	58.3	20.9	61.5
- not limited	81.7	41.7	79.1	38.5
<b>Socioeconomic Status</b>				
<b>Family Income</b>				
- < <b>\$9,999</b>	4.7	12.8	9.2	23.2
- <b>\$10,000 - \$14,999</b>	5.0	14.1	7.2	12.0
- <b>\$15,000 - \$29,999</b>	21.5	27.1	21.7	22.0
- <b>\$30,000 - \$49,000</b>	27.0	15.0	23.0	12.2
- > <b>\$50,000</b>	27.0	11.0	22.4	6.0
- <b>missing income</b>	15.0	20.0	16.5	24.6
<b>Education</b>				
- ≤ 11 years	17.0	41.0	18.0	40.0
- 12 years	36.0	31.0	40.0	38.0
- ≥ 13 years	47.0	28.0	42.0	22.0

Table 3: Descriptive Statistics for Adult Mortality Risk Factors by Gender, 1994-1997

	Male		Female	
	Alive	Dead	Alive	Dead
<b>Liquid Assets</b>				
<u>Savings</u>				
- interest	56.9	53.5	53.8	49.1
- no interest	43.1	46.5	46.2	50.9
<b>Investments</b>				
- dividends	16.2	15.3	13.8	12.3
- no dividends	83.8	84.7	86.2	87.7
<u>Non-Cash Assets</u>				
<u>Car</u>				
- no car	6.0	14.0	11.3	31.3
- $\leq$ \$19,999	68.2	73.0	67.1	60.3
- $\geq$ \$20,000	25.8	13.0	21.6	8.4
<u>Home Ownership Status</u>				
- non-owner	24.6	21.5	28.0	28.0
- buyer	47.5	22.2	42.0	17.7
- own home $\leq$ \$49,999	8.6	20.3	10.0	21.3
- own home $\geq$ \$50,000	19.0	36.0	20.0	33.0
<u>Other non-cash assets</u>				
- no other non-cash assets	76.6	82.1	78.7	84.4
- own other non-cash assets	23.4	17.9	21.3	15.6
<b>Business</b>				
- do not own business	91.3	94.9	93.0	96.0
- own business	8.7	5.1	7.0	4.0
N	26,973	1,246	32,098	1,100

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000)

Table 4: Hazards Ratios for U.S. Adult Mortality - Focus on Effects of Assets, 1994-1997

	Model 1	Model 2	Model 3	Model4	Model5	Model 6
<b>Demographic</b>						
<b>Race</b> [white]	----	----	----	----	----	----
- black	1.45**	1.28**	1.20**	1.23**	1.16*	1.08
<b>Sex</b> [female]	----	----	----	----	----	----
- male	1.76**	1.88**	1.88**	1.93**	1.93**	1.89**
<b>Age</b> (Continuous)	1.09**	1.08**	1.08**	1.08**	1.08**	1.07**
<b>Health Status</b>						
<b>Self Reported Health</b> [excellent]						----
- very good						1.12
- good						1.61**
- fair						2.14**
- poor						4.33**
<b>Activity Limitation</b> [not limited]						----
- limited						1.81**
<b>Socioeconomic Status</b>						
<b>Family Income</b> [ $\geq$ \$50,000]		----	----	----	----	----
- < \$9,999		2.28**	2.02**	1.94**	1.80**	1.37**
- \$10,000 - \$14,999		1.90**	1.73**	1.71**	1.61**	1.30*
- \$15,000 - \$29,999		1.57**	1.48**	1.45**	1.40**	1.20+
- \$30,000 - \$49,000		1.34**	1.30**	1.29*	1.26*	1.18
- missing income		1.60**	1.44**	1.46**	1.35*	1.17
<b>Education</b> [ $>$ 13 years]		----	----	----	----	----
- $\leq$ 11 years		1.18*	1.12+	1.16*	1.12	.98
- 12 years		1.19**	1.16*	1.19*	1.16*	1.12+
<b>Liquid Assets</b>						
<b>Savings</b> [no interest]			----		----	----
- interest			.83**		.84**	.96
<b>Investments</b> [no dividends]			----		----	----
- dividends			.87*		.88*	.93
<b>Non-Cash Assets</b>						
<b>Car</b> [no car]				----	----	----
- $\leq$ \$19,999				.82**	.82**	.88*
- $\geq$ \$20,000				.69**	.70**	.79**
<b>Home Ownership</b> [non-owner]				----	----	----
- buyer				1.03	1.03	1.02
- own home $\leq$ \$49,999				1.06	1.07	1.10
- own home $\geq$ \$50,000				1.02	1.06	1.03
<b>Other non-cash assets</b> [no other]				----	----	----
- yes other non-cash assets				.92	.98	1.01
<b>Business</b> [do not own business]				----	----	----
- own business				1.02	1.01	1.04
-2*LL	80,002.8	79,874.6	79,850.5	79,853.3	79,834.3	78,949.7
N	61,417					

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000). + All Variables are categorical with reference categories in brackets [ ] unless specified as continuous. \* $p \leq .05$ , \*\* $p \leq .01$ , + $p < .10$

Table 5: Hazards Ratios for U.S. Adult Female Mortality - Focus on Effects of Assets, 1994-1997

	Model 1	Model 2	Model 3	Model4	Model5	Model 6
<b>Demographic</b>						
<b>Race</b> [white]	----	----	----	----	----	----
- black	1.43**	1.31**	1.22*	1.25+	1.18+	1.09
<b>Age</b> (Continuous)	1.09**	1.08**	1.08**	1.08**	1.08**	1.07**
<b>Health Status</b>						
<b>Self Reported Health</b> [excellent]						----
- very good						1.11
- good						1.53**
- fair						1.89**
- poor						4.07**
<b>Activity Limitation</b> [not limited]						----
- limited						1.79**
<b>Socioeconomic Status</b>						
<b>Family Income</b> [≥ \$50,000]		----	----	----	----	----
- < <b>\$9,999</b>		2.42**	2.18**	2.23**	2.08**	1.80**
- <b>\$10,000 - \$14,999</b>		1.72**	1.59**	1.67**	1.58*	1.41+
- <b>\$15,000 - \$29,999</b>		1.75**	1.67**	1.73**	1.68**	1.56**
- <b>\$30,000 - \$49,000</b>		1.61**	1.57**	1.60**	1.57**	1.52**
- <b>missing income</b>		1.80**	1.64**	1.74**	1.62**	1.51*
<b>Education</b> [ <b>&gt; 13 years</b> ]		----	----	----	----	----
- ≤ 11 years		1.12	1.06	1.10+	1.06	.93
- 12 years		1.21*	1.19+	1.22**	1.20+	1.16
<b>Liquid Assets</b>						
<b>Savings</b> [ <b>no interest</b> ]			----		----	----
- interest			.82**		.83**	.95
<b>Investments</b> [no dividends]			----		----	----
- dividends			.88		.87	.94
<b>Non-Cash Assets</b>						
<b>Car</b> [ <b>no car</b> ]				----	----	----
- ≤ \$19,999				.80*	.81*	.86
- ≥ \$20,000				.71	.71*	.82
<b>Home Ownership</b> [ <b>non-owner</b> ]				----	----	----
- buyer				1.08	1.08	1.08
- own home ≤ \$49,999				1.03	1.05	.98
- own home ≥ \$50,000				1.04	1.07	1.13
<b>Other non-cash assets</b> [ <b>no other</b> ]				----	----	----
- yes other non-cash assets				.98	1.05	1.05
<b>Business</b> [do not own business]				----	----	----
- own business				1.07	1.05	1.05
-2*LL	36,287.6	36,233.7	36,221.9	36,223.1	36,212.2	35,837.4
N	32,098					

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000). + All Variables are categorical with reference categories in brackets [ ] unless specified as continuous. \*p≤.05, \*\*p≤.01, +p<.10

Table 6: Hazards Ratios for U.S. Adult Male Mortality - Focus on Effects of Assets, 1994-1997

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Demographic						
<b>Race</b> [white]	----	----	----	----	----	----
- black	1.47**	1.26*	1.18+	1.19+	1.15	1.08
<b>Age</b> (Continuous)	1.09**	1.08**	1.08**	1.08**	1.08**	1.07**
Health Status						
<b>Self Reported Health</b> [excellent]						----
- very good						1.12
- good						1.67**
- fair						2.35**
- poor						4.56**
<b>Activity Limitation</b> [not limited]						----
- limited						1.83**
Socioeconomic Status						
<b>Family Income</b> [ $\geq$ \$50,000]		----	----	----	----	----
- < \$9,999		2.28**	2.00**	1.83**	1.71**	1.13
- \$10,000 - \$14,999		2.09**	1.89**	1.79**	1.68**	1.25
- \$15,000 - \$29,999		1.47**	1.38*	1.31*	1.26+	1.01
- \$30,000 - \$49,000		1.20	1.17	1.13	1.11	1.01
- missing income		1.48**	1.33*	1.30+	1.21	.99
<b>Education</b> [ $>$ 13 years]						
- $\leq$ 11 years		1.22*	1.17+	1.20*	1.16+	1.02
- 12 years		1.15+	1.13	1.15+	1.13	1.09
Liquid Assets						
<b>Savings</b> [no interest]			----		----	----
- interest			.84**		.86*	.98
<b>Investments</b> [no dividends]			----		----	----
- dividends			.87		.90	.92
Non-Cash Assets						
<b>Car</b> [no car]				----	----	----
- $\leq$ \$19,999				.79*	.80*	.86
- $\geq$ \$20,000				.66**	.67**	.76*
<b>Home Ownership</b> [non-owner]				----	----	----
- buyer				.99	1.00	1.00
- own home $\leq$ \$49,999				1.07	1.08	1.05
- own home $\geq$ \$50,000				1.01	1.05	1.09
<b>Other non-cash assets</b> [no other]				----	----	----
- yes other non-cash assets				.87+	.92	.98
<b>Business</b> [do not own business]				----	----	----
- own business				1.00	.99	1.04
-2*LL	40,298.1	40,210.8	40,199.7	40,194.8	40,187.46	39,681.6
N	28,219					

Sources: National Health Interview Survey, 1994: Family Resources Income and Assets Supplement and National Health Interview Survey, 1994-1997: Multiple Cause of Death linked file (1998, 2000). + All Variables are categorical with reference categories in brackets [ ] unless specified as continuous. \* $p \leq .05$ , \*\* $p \leq .01$ , + $p < .10$