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**Negative Health Events and Wealth Trajectories for Working Age Adults and  
Disparities by Race**

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Paper presented at the “SES and Health across Generations Andover the Life Course”  
Conference, Ann Arbor, MI, September 23-24, 2010

## ABSTRACT

Extending prior research on the impact of health on wealth, this paper presents an analysis of the long-term impacts of health declines on financial assets of working age households. It also tests whether there is a differential impact by race. The analysis is based on 23 years of data from the Panel Study of Income Dynamics (PSID). A sample of households composed of self-assessed healthy, employed, and working age adults (age 25-55) at baseline was selected from the 1984 wave, the first time detailed wealth data were collected in the study. In all, eight waves of the panel data on this cohort were analyzed. Using a fixed effects model, pooled time-series regression analysis finds that negative health events did exert a significant, lasting negative impact on household wealth. Households, whose heads experienced declines in self-reported health from healthy to unhealthy, had an estimated \$57,000 fewer assets afterwards, compared with those who did not experience health declines. Notably, when models were run separately by race, significantly different health decline effects were found. For white Americans, the effect of any health decline was a significant \$92,000 decline in assets. For African-Americans, who in general held much less wealth at each wave of the panel data, the analogous effect was insignificant. We interpret these findings to suggest that health declines create notable wealth declines among those who have wealth, but may not create measureable differences among asset-poor households.

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Funding for this research was provided by the PSID small grant competition operated by the Survey Research Center, Institute for Social Research, University of Michigan Ann Arbor. We would also like to acknowledge the generous statistical support and advice by Dr. Grant Ritter and Dr. Dominic Hodgkin, both professors at the Heller School.

## INTRODUCTION

The relationship between health and socioeconomic status (SES) has long been an area of interest for researchers and policymakers. A rich body of research has investigated the ways in which socioeconomic status and poverty affect health. More recently some attention has been directed to the reverse relationship. As more and better data on financial assets have become available in longitudinal national surveys in recent years, a number of studies have begun to explore how declines in health may affect family wealth (Smith 1999). Declining health can affect household economic resources in two ways; first, illness may lower the ability of breadwinners to earn income in the short or long-term, and second, major health care needs may require large new expenses for families (Smith 1999), especially for those with no health insurance coverage or who are underinsured. A small body of research has shown that wealth is negatively affected by health shocks or declining health status among older adults age 50 and older (Lyons and Yilmazer 2005; Kim and Lyons 2008).

Given the continuing attention to challenges of the U.S. health care system after the passage of health reform in 2010 and the likelihood that cost containment will continue to be a concern in the future, the financial consequences of health declines on household wealth is a salient issue for households and policymakers. While much of the extant research has focused largely on the economic consequences of health declines for seniors, much remains unknown about how health shocks may impact broader age cohorts in the United States. Additionally, given the large economic and health disparities by race in this country, investigation into the financial impacts of health events should incorporate examination by race, a focus of very few studies (Kim and Lee 2005). Thus, this study contributes to the growing body of work on relationships between wealth and health by focusing on younger households and adding race to

the analyses, as well as using methods which allow for the incorporation of many years of data to enhance the robustness of the results. The primary research question poses the following: to what extent do health declines of household heads lead to loss of household wealth; and how does this relationship differ by race? Utilizing data from the Panel Study of Income Dynamics, this paper follows a baseline sample of working age households (3464) from 1984 to 2007 to empirically assess the impacts of health declines and better understand differences in impacts by race.

## **LITERATURE REVIEW**

While researchers frequently utilize several different measures of socio-economic status, wealth has a number of characteristics that make it preferable for analysis of relationships to health relative to most commonly used measures of SES, such as income, education, and occupation. Empirical evidence suggests that wealth is better correlated with a number of health conditions when compared to any other measure of SES, although it has not been definitively determined if this is due to higher measurement error in other measures or that wealth is better able to fully capture the construct of SES (Poterba 2003). Additionally, financial assets are important cushions in times of economic need (as often arise during health shocks) and provide resources for security and economic mobility in ways that income alone cannot (Sherraden 1991; Shapiro 2004). Given the importance of net worth in establishing long-term economic stability, this analysis utilizes total wealth (including home equity) as the primary measure of financial standing of households.

Modigliani's life cycle hypothesis of saving (LCH) suggests that in order to maximize lifetime consumption working households will save during their working years to build wealth to

be used for consumption in retirement (Modigliani 1986). This life cycle savings model helps to frame a theoretical understanding of asset accumulation across the life course, but does not provide insights into life course events that may increase or hinder asset accumulation. Kemp, Rosenthal, and Denton (2005) posit that important life events can serve as catalysts and constraints to asset-building providing a framework which incorporates the importance of economic shocks (both positive and negative) in shaping savings trajectories.

Racial and ethnic minorities experience poorer health and dramatically lower wealth than their white counterparts in the United States. Health outcomes differ substantially by race and the higher prevalence of several chronic diseases among minorities is inadequately explained by SES alone (Kington and Smith 1997) suggesting increased risk for health events among people of color in the United States. Also, research on differences in asset holdings by race reveals that controlling for income, substantial differences in wealth by race exist in the United States (Oliver and Shapiro 2006). Using the PSID, Shapiro found that for each dollar held by a white household, African American households own just 10 cents (Shapiro 2004). More recent analyses show that the racial wealth gap has been increasing over the past quarter century among households in the same age cohort who were in their prime working years in the 1980s (25-55 in 1984) (Shapiro, Meschede, and Sullivan 2010). To date, the extent of variation by race in the financial impacts of disease and declining health is poorly understood. Limiting their study population to adults age 70 and older, Kim and Lee (2005) found that health events affect wealth changes over a five year period differently across African American, Latino, and white older adults during retirement.

While it has been demonstrated that negative health events can be the source of wealth declines in older households, the comparative magnitude of impacts on working-age households

of different racial and ethnic groups remained largely unexplored before this study. Still, existing literature provides some guidance regarding possible differential effects of health declines on wealth. Due to their lower levels of wealth, African Americans and Latinos could see smaller absolute changes in assets due to health problems since they have fewer assets to expend on health care; on the other hand, their asset losses due to health problems could represent higher percentage changes. Higher levels of uninsurance for health conditions among Latinos and African Americans (James, Thomas et al. 2007) suggest that health conditions and events may cause more dramatic economic burdens on minority households. Research indicates that differences by race exist regarding the effects of health conditions and events on assets among seniors but the relationships are still relatively unclear, pointing to the need for further study to better understand these relationships (Kim and Lee 2005). Though interest and research in the field has been growing in recent years, the extant literature leaves much unknown about the long-term relationships between health and wealth and influences of race and ethnicity.

## **RESEARCH AIMS**

The purpose of this research is to fill this gap by analyzing the economic consequences of negative health events on individuals who are of initially working age, and by examining whether these consequences differ by racial groups.<sup>1</sup> More specifically, the research aims of the project include the following:

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<sup>1</sup> While our initial research aims included an exploration of impacts of health events on wealth by both race and Latino ethnicity, we found that the data available in the PSID regarding Latino ethnicity was insufficient for a long term analysis starting in 1984. The PSID was not representative of Latinos at the start of our study because new immigration in the country had changed the composition of the U.S. Latino population since the initial sampling of the PSID in 1968. New Latino immigrant survey participants were added in the 1990s to the PSID to make the sample more nationally representative but information about Latino ethnicity was not collected between 1996 and 2005 limiting the possibilities for a longitudinal analysis after the addition of the immigrant sample.

*Aim 1)* Measure the impact of negative health events on household wealth among the adult population over two decades of the life cycle (heads initially ages 25-55 to final ages of 48-78);

*Aim 2)* Among the same group of adults test whether the impact of negative health events differs for different measures of health events and wealth, and explore the moderating effect of health insurance coverage; and

*Aim 3)* Test whether the impact of negative health events on wealth differs by race among the same age group of adults.

Such information is relevant for policymakers as we seek to look for ways to make the U.S. health care system more equitable and affordable and to address weaknesses in our health care system through implementation of the new health care law and the possibly of further legislation. Recent evidence suggests that one of the primary cause of U.S. bankruptcies is medical costs (Himmelstein, Thorne et al. 2009). While the financial burdens of health care on families has been a central concern in health care policy discussions for years, little information exists that provides a long-term assessment of the impacts of negative health events on the financial well-being of families.

### **Major Hypotheses**

Prior research indicates that health problems negatively affect wealth for older adults and the same relationship is expected to hold for younger adults. Given the rising expenses related to health care in the United States and the increasing numbers of uninsured and underinsured households, it seems likely that the adverse impacts would be have grown in recent decades. Racial minorities are more likely than the general population to experience poor health status and

low wealth accumulation, and it is likely that a negative relationship will affect them most.

Based on these conjectures, the following hypotheses were developed to guide the analysis:

H<sub>1</sub>: The onset of new negative health events will have a significant and negative impact on household wealth accumulation.

H<sub>2</sub>: The negative financial impact of health events will be moderated by health insurance coverage.

H<sub>3</sub>: New negative health events will have larger negative impacts on wealth (by percent) among African-American households than on white households due to greater numbers of uninsured and lower wealth levels.

## **METHODS**

As this study aims to capture the impacts of new health declines on wealth, the selection of healthy and working households at baseline (in 1984) limits the possible impacts of earlier health problems that may have affected wealth before the start of the study. By limiting the initial sample to healthy adults (head age 25-55 in 1984), this investigation allows us to better understand how new health problems alter wealth trajectories of families relative to similar families who do not face significant health problems during the same time period. While complexities in the estimation strategy arise due to the fact that decreases in health and wealth may concurrently affect each other, the design has incorporated a strategy to best address this possible endogeneity concern. The study sample selects only households that are healthy (both head and spouse, if present) and have employment income in the initial period, and only new health events are used as the intervention variable, rather than indication of existing chronic conditions. Starting with such a sample, a new health event should have a larger and more

immediate impact on wealth accumulation, compared with the effect of a new employment or financial event (e.g., the loss of a job or health insurance) will have on health. Given that impacts are likely to be so disproportionate in terms of magnitude, an observed association in the sample will, for the most part, represent a health event leading to a loss of wealth instead of the other way around. Of course, health events as a result of financial setbacks may not be entirely unexpected, but the timing of such events is difficult to predict (Smith 1999).

### **Data**

Using the Panel Study of Income Dynamics (PSID) this study utilizes pooled time-series analysis to investigate the impacts of new negative health events on wealth in households headed by healthy, working age adults. The analysis begins with surveys from 1984, the first year wealth data is available in the PSID, and follows a cohort of households through to the most current survey year available, 2007. The level of analysis is the household, or family in PSID parlance, as wealth is a household level variable. The eight PSID waves in which wealth data are available and that are utilized for the analysis include: 1984, 1989, 1994, 1999, 2001, 2003, 2005, and 2007, with data from 1984 providing the baseline information for health and wealth status.

### **Wealth Measures**

The two wealth variables from the PSID to be used as the dependent variables in these analyses are 1) a summary of household wealth including home equity, the largest asset for most households available,<sup>2</sup> and 2) a summary of household wealth not including home equity. The

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<sup>2</sup> Wealth includes business assets, savings in financial accounts, real estate, stocks, bonds, other investment assets, and vehicle equity minus debts.

latter dependent variable allows us to explore if dramatic health declines lead to changes in liquid forms of assets. We will run regressions on both the original wealth measures for which estimated coefficients of independent variables represents absolute effects on wealth, and on the log transformed values of wealth, for which model coefficients can usually be interpreted as relative (percentage) effects on wealth. Both types of effects are of interest, as percent changes in wealth among the time periods provide assessment of wealth depletion proportional to overall household wealth, while absolute wealth changes will estimate the mean effect of some characteristic across households of different initial wealth holdings.

### **Health Measures**

Several measures of health conditions and health events are available in the PSID. This analysis uses responses of three different survey questions. The first survey question in the PSID concerning health asks household heads, “Would you say your [wife's/friend's] health in general is excellent, very good, good, fair, or poor?” This is one of the most commonly used measures of health status in the research literature (Smith and Kington 1997) and should provide a good foundation for the association of health to wealth. Following past studies (Meer, Miller et al. 2003; Kim and Lyons 2008), those who answer “excellent,” “very good,” or “good” are categorized as healthy, while those who respond “fair” or “poor” are categorized as unhealthy to create a dichotomous variable. A negative health event is identified when a household head/spouse has a change in self-reported health from healthy to unhealthy.

The second health question in the PSID focuses on new functional limitations, such as disability and work limitations due to disability. The survey question asks household heads, “Do you [your wife/friend] have any physical or nervous condition that limits the type of work or the

amount of work you can do?” Similar to previously, the indicator of a change from no disabling condition to having a disabling condition creates a dichotomous variable which signifies a health event. A third question on the PSID concerning health asks the number of days the head of household spent at a hospital in the past year.

Access to health insurance may function as a moderator to the association between negative health events and household wealth. Having health insurance reduces the burden of health event-related medical expenses but it probably can not compensate for the effect of negative health events on a worker’s livelihood, loss of wages and possibly even one’s job. Thus, in our models we include indicators for household health insurance coverage and their interactions with our health variables for each of the years in the study (1999-2007).

### **Analyses**

The analyses begin with a set of descriptive analyses examining measures of health status and wealth for each of the years of the survey (1984 through 2007) and their bivariate relationships. These descriptive analyses document gradual changes in wealth over the study period and show how they relate (at least in an unadjusted manner) with health status. These presentations are broken down by race to highlight disparities by race.

The multivariate analyses utilize a pooled cross-sectional time-series design to investigate the impacts of new negative health events on household wealth among initially healthy. To account for the panel nature of the PSID data, we must utilize a model which accounts for repeated observations from households over an extended time period. Pooled cross-sectional time-series analyses using either fixed effects or random effects is an appropriate method in our case to explore the effects of time-varying predictors on continuous dependent variables.

Importantly, the time intervals between waves in the data collection do not have to be equal, as is the case of the waves that include wealth data in the PSID.

One of the first issues in our modeling is whether to use fixed or random effects to specify the impacts of individual subjects in the sample. When random effects are consistent, the corresponding model provides more efficient estimation. The Hausman specification test can be used to determine whether a random effects specification for the model was valid, and found that it was not ( $p < 0.001$ ). Therefore, we employed a fixed effects model for our analyses.

Time invariant covariates can not be included in a fixed effects model (e.g. race and education).<sup>3</sup> Time variant variables such as household income, marital status, and access to health insurance<sup>4</sup> are included in the model to control for their impact on wealth changes over time. Among the various model specifications examined, underinsurance was included to study whether this variable added explanatory power to the model. Interactions between race and health changes were also investigated to gauge the differential impact of health events by race.

The model can be summarized as follows:

$$W_{it} = f(H_{it}, X_{1it}, X_{2it}, I_{it}, a_i)$$

Where  $W_{it}$  = wealth (total assets including home equity; total assets excluding home equity)

$H_{it}$  = self-reported health status; disability; days hospitalized (head and spouse<sup>5</sup>)

$X_{1it}$  = Moderating variable (health insurance)

$X_{2it}$  = Control variables (age, marital status, race/ethnicity, and income<sup>6</sup>)

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<sup>3</sup> For further discussion of fixed effects estimation, see Wooldridge, J. M. (2009). Introductory Econometrics: A Modern Approach. Mason, OH, South-Western.

<sup>4</sup> Health insurance information for the household is available in the PSID beginning in 1999.

<sup>5</sup> Health status of spouse only tested using the self-reported health status measure.

<sup>6</sup> Though gender of the household head is well-documented to be an important factor in measuring wealth and SES status of a household, there was not sufficient independent variation in this variable, which was collinear with married, in the sample to be included in the model. Since males are defined as heads in couple households in the PSID, gender of household head is closely related with marital status.

$I_{it}$  = Interaction terms race\*health event;

The coefficient on  $H_{it}$  provides a measure of how health events affect wealth after controlling for covariates; this coefficient is expected to be negative.

## RESULTS

### Descriptive Statistics

Baseline characteristics of the sample and comparison households can be found in Table 1. Households included in this study are more likely to be white and married and tend to be wealthier and have higher incomes than all PSID households in the same age cohort. This is not surprising due to the exclusion of less healthy households without labor income. Comparison of households lost during the 23 year period of study to those who remained in the study reveals that households no longer present in 2007 are younger, more likely to be headed by a woman,<sup>7</sup> less likely to be white and tend to have lower incomes and assets. Thus, the study sample is relatively better-off than the general population and those who are lost to attrition over the course of the study tend to be more economically vulnerable.

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<sup>7</sup> Since the PSID usually assigns identifies males in a married or partnered household as the head of household, being a female headed household in the survey is also a likely indication of that the head is single.

Table 1. Characteristics of the sample in 1984 by study sample and present or not present in 2007 (Attrition Analysis)

	Comparison age group <sup>a</sup>	Study sample	Study sample present in 2007 (Attrition)	Study sample not present in 2007 (Attrition)	
<b>Age of head</b>					
Mean	37.6	37.0	37.26	36.27	*
Median	36	35	36	34	
<b>Female head (percent)</b>	24.73	21.94	20.27	25.70	*
<b>Education of head (percent)</b>					
Less than high school	19.18	13.92	11.57	19.22	*
High school	20.14	19.9	18.49	23.08	
Some post-high school training (vocational or academic)	36.94	39.14	42.62	36.48	
College graduate	16.46	18.63	20.89	13.53	
Graduate degree	6.9	8.01	8.52	6.85	
Missing	0.39	0.41	0.22	0.85	
<b>Race (percent)</b>					
White	82.61	85.74	87.71	81.29	*
African-American	13.82	10.91	10.01	12.95	
Latino	2.96	2.80	1.86	4.91	
Other	0.61	0.55	0.42	0.85	
<b>Married (percent)</b>	59.27	61.09	65.72	50.66	*
<b>Healthy head (self-assessed) (percent)</b>	89.04	100	100	100	
<b>Disabled head (percent)</b>	11.91	6.41	6.38	6.5	
<b>Wealth (excluding home equity)</b>					
Mean	122456	136001	149161	106300	
Median	17400	20400	25500	13600	
<b>Wealth (including home equity)</b>					
Mean	175703	192561	210990	150968	*
Median	54000	60600	71600	37000	
<b>Household Income</b>					
Mean	62258	67129	70776	58899	*
Median	53000	57441	62000	49400	
<i>N</i>	4524	3464	2081	1383	

The information in the table is based on the 1984 interview. All dollar figures are converted to 2007 dollars.

All data is weighted using the 1984 family weights available in the PSID.

<sup>a</sup> The comparison age group consists of all households in the PSID whose heads were between ages 25-55 in 1984.

\*Indicates significant difference between households present and not present in 2007 due to attrition (at  $p = 0.05$  level).

T-tests performed on continuous variables and chi-square tests performed on categorical variables.

Table 2 reports the demographic characteristics of the study sample by race in the baseline year of 1984. In comparing African-Americans with the study sample overall, the data

reveal that African-Americans have substantially less wealth, lower incomes, and are much less likely to be married. Whites, who represent a majority of the sample (86 percent), are more similar to the study sample overall, but have slightly more education and slightly higher income levels.

	Study sample	Sample whites	Sample African-Americans
<b>Age of head</b>			
Mean	37.0	37.21	35.23
Median	35	36	33
<b>Female head (percent)</b>	21.94	19.14	46.34
<b>Education of head (percent)</b>			
Less than high school	13.92	11.70	27.10
High school	19.9	18.92	26.59
Some post-high school training (vocational or academic)	39.14	40	35.09
College graduate	18.63	20.44	8.79
Graduate degree	8.01	8.56	1.83
Missing	0.41	0.38	0.6
<b>Race (percent)</b>			
White	85.74	100	0
African-American	10.91	0	100
Latino	2.80	0	0
Other	0.55	0	0
<b>Married (percent)</b>	61.09	64.45	33.20
<b>Healthy head (self-assessed) (percent)</b>	100	100	100
<b>Disabled head (percent)</b>	6.41	6.73	4.44
<b>Wealth (excluding home equity)</b>			
Mean	136001	136374	17448
Median	20400	25100	3600
<b>Wealth (including home equity)</b>			
Mean	192561	197243	32444
Median	60600	70300	8000
<b>Household Income</b>			
Mean	67129	70491	40917
Median	57441	60956	34648
<i>N</i>	3464	2256	1097

The information in the table is based on the 1984 interview.

All data is weighted using the 1984 family weights available in the PSID.

All dollar figures are converted to 2007 dollars.

Descriptive analyses of health and wealth confirm many of the expected patterns regarding disparities in health and wealth by race that have been established in past research. Table 3 reveals the overall patterns of health for the study sample as well as disparities in health of heads of household by race. As would be expected, the health of all groups decline with age; however, the health of African-Americans is much lower throughout the study period than that of whites, except in the initial year in which all sample members are, by definition, healthy. While the sample includes only healthy households at the start of the study among both whites and African-Americans and thus, will be healthier than the full PSID cohort overall, African-Americans in the study sample experience greater declines than whites do during the 23 years under investigation. For the study sample, over 85 percent (86.1) of the white households have self-assessed healthy heads at the end of the study while just over two-thirds (76.1 percent) of African-American households do. Among the entire PSID cohort which has heads born in the same years as our study sample, the disparities are even more pronounced; over 80 percent (82.7) of the white households have self-assessed healthy heads at the end of the study, while less than two-thirds (64.5 percent) of African-American households do.<sup>8</sup>

	<b>1984</b>	<b>1989</b>	<b>1994</b>	<b>1999</b>	<b>2001</b>	<b>2003</b>	<b>2005</b>	<b>2007</b>
Full study sample	100	92.2	89.2	89.2	87.5	86.7	85.9	84.7
Whites	100	93.6	90.1	90.4	89.1	88.2	87.4	86.1
African-Americans	100	83.2	80.9	78.2	75	75	75.0	76.1

While health disparities by race are revealed clearly in Table 3, Table 4 demonstrates disparities in wealth by health status among the study sample as some households experience

<sup>8</sup> Since our study sample is the focus of this study, the data on the full PSID age cohort is not presented in the table.

health declines and others do not. The median wealth of healthy households<sup>9</sup> is significantly greater than that of households with unhealthy heads and this disparity grows over the life course. Healthy households continue to grow their assets over time while those who experience set-backs in their health status see much more modest growth in assets, in terms of raw numbers and percentage growth. By 2007 the gap in median assets between households with healthy heads and those without is over \$200,000. There is an even larger and statistically significant ( $p < 0.001$ ) difference in means between healthy and unhealthy households of approximately \$400,000 in 2007.

	1984	1989	1994	1999	2001	2003	2005	2007
Healthy heads of household								
Median	\$60,600	\$90,013	\$123,536	\$166,160	\$193,050	\$207,920	\$233,200	\$281,000
Mean	\$192,561	\$281,206*	\$309,526*	\$479,962*	\$502,918*	\$515,375*	\$580,971*	\$691,830*
N	3464	2841	2637	1899	1864	1840	1794	1756
Unhealthy heads of household								
Median	n/a	\$37,842	\$46,200	\$83,576	\$73,710	\$78,535	\$95,400	\$79,930
Mean	n/a	\$122,623*	\$135,989*	\$159,728*	\$218,365*	\$232,618*	\$286,938*	\$282,714*
N	0	267	333	240	278	276	311	320

All data is weighted using the 1984 family weights available in the PSID.

All dollar figures are converted to 2007 dollars.

\* indicates significant ( $p < 0.001$ ) difference in wealth by health status of head.

Combining the analysis seen in Table 3 and Table 4, Table 5 reveals the impacts of health declines on whites and African-Americans separately. Initially, though all households are healthy and working in the sample, evidence from this cohort confirms the substantial the racial wealth gap that has been well-documented in the literature (Shapiro 2004; Shapiro, Meschede et al. 2010). In 1984, the median wealth gap<sup>10</sup> between white and African American households in

<sup>9</sup> All dollar figures are reported in 2007 dollars.

<sup>10</sup> Regarding the racial wealth gap, the median wealth gap is the primary focus of the discussion because the median reflects the middle of the distribution, as opposed to the mean which is affected by the skewness of the wealth distribution.

the sample was \$62,300, with white households holding almost nine times the wealth of their African-American peers. Over the course of the study, significant gains in wealth are experienced among white households; however, a large portion of the gains are concentrated among the healthy, white households, who end the period with approximately \$310,000 in median assets, or almost three times the wealth of white households with heads in poor health. Still, all white households fair better than both healthy and unhealthy heads of African-American households who have much lower levels of wealth and experience much more modest gains in assets over the period; healthy African-American heads end the period with \$37,000 in assets, while unhealthy, African-American heads hold just \$6,700 in assets. In terms of percentage gains, healthy white and African-American households are able to grow their wealth at much higher rates than their unhealthy peers. From 1989 to 2007<sup>11</sup>, white households with unhealthy heads saw their wealth increase by 1.7 times and African-American households headed by unhealthy persons saw their wealth cut in half. Over the same time period, the wealth of white households with healthy heads increased 2.8 times and healthy African-American households increased their wealth by 2.1 times.

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<sup>11</sup> Since our baseline study sample does not include any unhealthy heads of household or spouses, we must start analysis of unhealthy heads in 1989 after the health of some of our sample has started to decline.

Table 5. Wealth including home equity at each wave by health status and race

	1984	1989	1994	1999	2001	2003	2005	2007
Healthy, white heads of household								
Median	\$70,300	\$108,550	\$143,080	\$196,540	\$215,280	\$235,605	\$273,480	\$309,200
Mean	\$197,243	\$301,272	\$337,040	\$529,278	\$546,542	\$557,737	\$630,992	\$748,649
<i>N</i>	2256	1947	1827	1396	1369	1341	1316	1280
Healthy, African-American heads of household								
Median	\$8,000	\$17,869	\$23,100	\$23,810	\$36,270	\$44,183	\$39,220	\$36,924
Mean	\$32,444	\$73,441	\$65,683	\$72,983	\$91,835	\$98,996	\$113,166	\$147,002
<i>N</i>	1097	812	731	469	465	469	451	450
Unhealthy, white heads of household								
Median	n/a	\$66,466	\$59,920	\$113,088	\$113,303	\$110,740	\$140,980	\$111,000
Mean	n/a	\$160,515	\$161,845	\$189,016	\$273,684	\$278,087	\$348,539	\$338,086
<i>N</i>	0	127	182	138	156	161	176	192
Unhealthy, African-American heads of household								
Median	n/a	\$3,090	\$14,000	\$32,240	\$35,100	\$15,836	\$14,310	\$6,700
Mean	n/a	\$29,541	\$39,199	\$55,000	\$56,513	\$71,051	\$76,715	\$83,053
<i>N</i>	0	129	144	101	117	111	128	120

All data is weighted using the 1984 family weights available in the PSID.

All dollar figures are converted to 2007 dollars.

### Pooled Time-Series Regression Analyses

A number of variations on the basic fixed effects model are used to test the relationship between health and wealth. Table 6 presents results from a primary fixed effects regression analysis on the impact of self-assessed health declines on wealth of households controlling for income, marital status, and year effects for the entire sample and separately for white and African American households.<sup>12</sup> As predicted, health status of the head has a independent significant ( $p < 0.033$ ) and negative impact on wealth (including home equity) indicating that poor health status has lasting and damaging effects on financial security. However, it is notable that health declines have a larger negative impact among whites than among the sample overall

<sup>12</sup> Tests of tolerance (Variance Inflation Factor) on a pooled Ordinary Least Squares model revealed that there were no significant concerns regarding multicollinearity in the model.

(\$92,104 versus \$56,823) and that health declines do not have a significant influence on wealth for African-Americans. Given the low levels of wealth among African-Americans, there may not be significant enough variation in wealth among healthy and unhealthy households to detect any impact on wealth. Thus, for those households with wealth, who have something to lose if they experience a health shock, health declines do appear to negatively affect wealth. These results indicate that among more financially vulnerable populations, particularly African-Americans, health declines may not make a substantial difference on asset-building given already low levels of wealth. Testing interaction terms comparing differential impacts of health declines by race within a single model did not produce significant results.

Variable	All Households (N=3464)		Whites (N=2256)		African Americans (N=1097)	
	Beta	Std error	Beta	Std error	Beta	Std error
Unhealthy head	-56823*	(26653)	-92104*	(41140)	-9508	(11572)
Total family income	2.88***	(0.0975)	2.88***	(0.117)	0.949***	(0.133)
Married head	50373*	(22459)	91265**	(32701)	7880	(11067)
Year 1989	22688	(21843)	40277	(31182)	11068	(10978)
Year 1994	46136*	(22363)	69440*	(31758)	20651	(11354)
Year 1999	121339***	(25172)	177880***	(35020)	18821	(13249)
Year 2001	158826***	(25266)	223878***	(35186)	37445**	(13298)
Year 2003	187046***	(25330)	256468***	(35334)	48739***	(13255)
Year 2005	243151***	(25450)	326701***	(35475)	74001***	(13342)
Year 2007	320873***	(25600)	422691***	(35728)	98914***	(13372)
Constant term	-62833**	(21894)	-83554*	(33216)	-4852	(10087)
R-square						
within		0.0704		0.0757		0.0321
between		0.326		0.319		0.126
overall		0.195		0.189		0.0747

Note: Study sample includes only households with healthy, working-aged (25-55) heads and labor income in 1984.

Dollar values converted to 2007 dollars.

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

Like total wealth, financial assets excluding home equity are likely to decline if the head of household becomes unhealthy. Secondary analyses focusing on wealth excluding home

equity reveal that financial assets other than the home decline by \$48,844 on average due to a decline in the health status of the head of household. This relationship approaches significance at the  $p=0.057$  level.

To test whether changes in wealth by percent tell a different story than analysis of the level form of wealth, fixed effects models using the log of wealth are conducted (see Table 7). The results are similar to the analysis presented in Table 6. Though percent changes in wealth due to health declines was expected to be greater for African-Americans, who have lower levels of wealth, relative to whites, again no significant differences are detected by health status of household head among African-Americans in the log model. Among the study sample overall and whites, declines in health among the household head remains significantly and negatively

Variable	All Households (N=3423)		Whites (N=2238)		African Americans (N=1074)	
	Beta	Std error	Beta	Std error	Beta	Std error
Unhealthy head	-0.275***	(0.0710)	-0.285***	(0.0571)	-0.109	(0.183)
Total family income (1000s)	0.00242***	(0.000249)	0.00173***	(0.000158)	0.0211***	(0.00201)
Married head	1.47***	(0.0597)	1.03***	(0.0457)	1.90***	(0.173)
Year 1989	0.426***	(0.0577)	0.379***	(0.0429)	0.434*	(0.175)
Year 1994	0.519***	(0.0589)	0.512***	(0.0436)	0.424*	(0.180)
Year 1999	0.807***	(0.0657)	0.795***	(0.0478)	0.707**	(0.206)
Year 2001	0.979***	(0.0660)	0.880***	(0.0480)	1.07***	(0.208)
Year 2003	1.12***	(0.0662)	0.989***	(0.0483)	1.27***	(0.208)
Year 2005	1.20***	(0.0664)	1.06***	(0.0483)	1.39***	(0.210)
Year 2007	1.27***	(0.0669)	1.22***	(0.0487)	1.25***	(0.210)
Constant term	8.90***	(0.0588)	10.12***	(0.0464)	5.75***	(0.163)
R-square						
within		0.0810		0.132		0.0916
between		0.272		0.234		0.287
overall		0.194		0.181		0.210

Note: Study sample includes only households with healthy, working-aged (25-55) heads and labor income in 1984.

Dollar values converted to 2007 dollars.

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

related to household wealth. One contrast between the two models is the finding that marriage is significantly and positive related to increased wealth among African-Americans in the log model. While this pattern is true for the whole sample and whites in both models, marriage is insignificant in the level model for African-Americans.

Several alternative models were tested to add to the robustness of the analysis. A time-dependent variable indicating the head of the household had a work-limiting disability was tested on both the primary study sample and on a study sample of initially non-disabled households. However, in neither case was this disability status variable significant in the model. In addition, we attempted to incorporate the self-reported health status for a partner<sup>13</sup> (non-head of household) as another possible measure of health shock among couple households, but again the model did not reveal a significant impact from this characteristic.

The variable for days spent in the hospital as an alternative measure of health status is also not significantly related to a reduction in wealth holdings. The PSID variable which captures numbers of days a household head spent in the hospital in a given year is available for a limited number of years during our study (1984, 2003, 2005, 2007) limiting the data available to capture a significant effect. Additionally, changes in hospital policies have made inpatient hospital stays less frequent and shorter than two decades ago, and this is likely to limit the reliability of this variable as an measure of health status.

In addition to testing the effects of self-reported health declines, disability status and days spent in the hospital, the analysis aims to reveal the impacts of health insurance and its relationship to wealth declines due to major out-of-pocket medical expenses. Since direct health expenses among households vary significantly by insurance status, the influence of health

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<sup>13</sup> In the PSID, household heads are generally males in couple households and generally not female unless a female is single and not partnered.

insurance and out-of-pocket expenses were tested together (and separately) in this analysis for the years available.<sup>14</sup> However, the analysis did not find significant effects of either out-of-pocket medical expenses or health insurance. In addition to testing health insurance itself, underinsurance (medical expenses at least 10 percent of income) was tested as an influence on assets and significant effects were not identified. Data limitations rather than a lack of relationship may have led to these results given that only eight calendar years (1999-2007) of survey data are available on these factors; additionally, the health insurance information employed in the analysis is household-level and does not provide specific information for each individual in the household. While our analysis of wealth is at the household level, individual data-level data on health insurance may be more successful in testing the relationship between health and wealth and will be explored further in future analyses. Thus, there may have not been sufficient data to capture the true relationships between wealth and insurance and out-of-pocket medical expenses. Additionally, about 95 percent of the study sample had some health insurance coverage in the household during the years of data collection indicating that the sample may not have had enough variation in this variable to detect significant relationships,

As expected, among the control variables, income is positively and significantly ( $p < 0.001$ ) related to wealth for the study sample; however, gains in wealth from each dollar earned by whites are three times the gains experienced by African Americans (\$2.88 v. \$0.95). Inter vivo transfers from family that are much more commonly received by white households (Shapiro 2004) or predatory lending and unequal access to banking services in the African-American community are possible explanations for these discrepancies. Still, this finding lends itself to further exploration regarding the reasons that African-Americans cannot achieve equal gains in wealth from equal earnings. Additionally, the average gains over time (as represented by the

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<sup>14</sup> Information on health insurance and out-of-pocket medical expenses is limited to 1999 and later.

time dummy variables) show that life course gains for whites are substantially larger than those for African-Americans. The binary variables for each year beyond the base year capture both time trends and expected gains over the life course as households age and are able to accumulate assets.<sup>15</sup> The analysis reveals significant discrepancies in gains across the life course by race and suggests important disparities in households in achieving long-term security.

## DISCUSSION

The research confirms the first and primary hypothesis that health declines do lead to significant declines in wealth, most notably among households with higher wealth. The second hypothesis on the moderating role of health insurance coverage could not be confirmed. Even though over 90 percent of sample households had some health insurance in years in which the information is available, personal assets still appear to be an important buffer against financial decline when health declines lead to high medical expenses or reduced work capacity. Given this reality, policymakers should contemplate what level of self-insurance is appropriate to expect households to bear and how to protect vulnerable families that do not have tens of thousands of dollars in savings to weather a health crisis. Many individual families are likely unaware of the severe financial burden of health declines and today would be economically vulnerable if faced with a major health decline of the head of household. The analysis results suggesting that a health decline leads to a \$56,823 drop in assets among all households represents about 50 percent (47.8) of median financial assets (excluding home equity) of healthy

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<sup>15</sup> Age, which increases exactly in step with time, was not included in the final model because time and age variables which are in sync, capture the same trends. Though we considered inclusion of a variable to capture age cohort within our sample, cohort, a time invariant variable, can not be included in a fixed effects regression model.

households in 2007.<sup>16</sup> Thus, such health events represent a major threat to security for a significant proportion of the population. Though there is not evidence to support the hypothesis that health insurance moderates the negative impact of health declines on family wealth, this line of inquiry is worth further investigation using individual-level data or in other datasets that may offer more years of data.

The analysis provides new insights that were not anticipated regarding the role of negative health effects by race. Though the percentage difference in wealth due to health declines was expected to be higher for African-Americans, who are more likely to be uninsured and have less wealth, the regression analysis did not find significant differences in wealth by health status for African-Americans in either dollar or percentage terms. The results do corroborate Kim and Lee's (2005) finding that health shocks affect the wealth of households of different racial and ethnic groups in differing ways, though their focus is on elders. This finding reveals that among those with few assets, wealth changes may not be significant in times of economic shock, even in percentage terms. While it appears that white households utilize their assets in times of health shocks providing them with a financial buffer, African-Americans do not see significant declines in their already low levels of wealth after a household head experiences health declines.

By revealing that white and African-American experience the financial fallout from health declines differently, this study suggests that families of color with few assets may have to adopt approaches other than tapping very limited assets to address financial needs when the head of household experiences declining health. Further qualitative and quantitative research to explore alternative methods of managing shocks would help to elucidate other strategies that

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<sup>16</sup> Median financial assets not including home equity in 2007 were \$119,000 for households with healthy heads and \$16,000 for households with unhealthy heads (2007 dollars).

African-Americans and other asset-poor households use to cope with unexpected economic challenges and ways assets could help buffer the shocks. By utilizing a quarter century of data, the findings provide new evidence that declining health has long term implications for asset-building, but more research needs to uncover and more clearly understand differential experiences of health shocks by race and ethnicity.

## **CONCLUSIONS AND IMPLICATIONS**

This study uses the PSID to analyze the impacts of health declines on wealth using panel data for 23 years, representing the longest-study in this area of which we are aware. The results reveal a negative long-term impact of health declines on household wealth. The research builds on prior research on the impact of health events on wealth, while expanding the knowledge base in a number of critical areas. Prior research on this subject mostly focused on older populations, often using the Health and Retirement Study (HRS) and the Asset and Health Dynamics of the Older Old (AHEAD) data (before it was merged with the HRS), while this study begins with prime working age adults. Also, previous studies have been more limited in their health measures (self-assessed health status) and generally do not analyze the relationship between health and wealth by race. This research adds to the existing literature by studying the impacts of health events on wealth building for younger adult populations over longer periods of time than applied in previous research, by expanding the measures of health events, and by a specific focus on race. While results find a significant relationship between health and wealth only when health is measured by self-assessed health status (as opposed to disability or days of hospitalization), these findings present an opportunity for further research to explore the relationships between alternative health measures and wealth. Alternative data sources may

provide insight into these relationships as well as a better understanding of the role of insurance which is inconclusive from the findings presented in this study.

Further, most prior research has focused on the economic consequences of changes in health status between just two survey periods (such as two or five years). This research uses techniques which incorporate several years of data and therefore, develop more robust findings. These results serve to help the research and policy communities better understand the lasting effects of health problems on economic security and on the ability of families to build assets. The new evidence this analysis provides on the long-term implications of negative health events on family wealth suggests that health declines dramatically alter long-term financial security.

This study brings to light further opportunities for investigating the role of health declines on asset-holdings and financial security of families. First, further analyses focusing on the median wealth of households using median regression techniques would be a significant contribution given the distribution of wealth data, which skews means substantially to the right. Additionally, further investigation of the role of other economic shocks, both positive and negative, in the long-term development of households' assets would be valuable in understanding the complexities of life-course asset-building trajectories. Given the unequal return that whites and African-Americans get in terms of wealth from equal earnings seen in this analysis, exploration into family transfers, access to banking services, and financial literacy seem like promising avenues for further study to further identify the reasons for these disparities. In addition to contributing new information about the long-term effects of health declines, the findings of the study lay the groundwork for further investigations into the long-term impacts of health declines and other household level economic shocks.

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