Down, or Down and Out:

Health Shocks, Socioeconomic Status, and Adverse Events in Mid-Life

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As people age, they experience a variety of events, both good and bad. Jobs change, families grow or fall apart, and health improves or deteriorates. While shocks are common, the response to these shocks is quite variable across individuals. In our own work on disability transitions, we have shown that even major health shocks do not lead to universal enrollment in disability insurance; only 10 percent of people with a stroke or chronic lung disease proceed on to disability insurance (Cutler, Meara, and Richards-Shubik, 2012). In response to a bad shock, for example, some people are affected only mildly, whiles others spiral out of control: they may have follow-on health conditions (e.g., depression), become divorced or separate, and initiate or re-initiate use of legal or illegal substances (Moos et al. 2006).

What explains this difference across individuals? To some extent, it is random: the body heals faster in some cases and slower, or not at all, in others. But there is likely more to the story than just physiology (Conti, Berndt and Frank, 2008). Our goal is to see what divides those who are 'down' from those who are 'down and out'.

A surprisingly large number of people go through a downward spiral in their near-retirement years. Out of a sample of roughly 10,000 people in their 50s who we can follow over time (details below), 50 percent will be hit by a series of two or more adverse events over a six year period.

Many events can set off an adverse spiral. In our analysis, we consider how two variables in particular affect subsequent outcomes. The first variable we examine is a new onset of an adverse health event – a new case of cancer, heart disease, stroke, psychiatric illness, or lung disease. We have information on

whether people suffer a new health condition in each two-year period and relate that to subsequent bad events. The second variable we explore is the socioeconomic status (SES) of the individual at baseline (i.e., before their health shock). We examine whether high income or high assets are protective for a constellation of bad outcomes.

Our analysis has three parts. First, we document the extent of down (a single adverse event) versus down-and-out (a constellation of bad events). We show that a surprisingly large share of people suffer an adverse event, and conditional on that, multiple adverse events are very common. Second, we estimate models for the number of adverse events that a person experiences, using as explanatory characteristics baseline variables such as health and labor market status, along with socioeconomic status and new onset of major health conditions, or health shocks. We show that both low socioeconomic status and major health shocks are associated with a large number of subsequent adverse events. Third, we examine whether any familial or policy variables mitigate the impact of health shocks on adverse events. We experiment with whether higher SES, presence of health insurance, and other variables affect the trajectory of experience after health shocks. Our results to date do not suggest that any policies substantially mitigate the role of health shocks in leading to people being down and out. Finally, we demonstrate a strong correlation between adverse events and application or receipt of Social Security Disability Insurance (DI), although application and receipt of DI does not relate to baseline characteristics, suggesting that changes rather than levels of social support, access to health or pensions, for example, may be more important in predicting who experiences multiple adverse events.

I. Data

To study determinants of adverse events, we use data from the 1996 through 2010 Health and Retirement Study (HRS). Since 1992, the HRS has surveyed adults aged 51-61 at baseline and at 2 year intervals. New cohorts have been added to fill in gaps in the existing cohorts and to reflect new people aging. The HRS also surveys the spouses of married respondents, including them in the sample. HRS respondents are asked in detail about health status and functioning, work experience, income, wealth, health insurance, pension coverage, household composition and other characteristics. For our analyses, we observe individuals at a baseline wave, and one wave (two years), two waves (four years) and three waves (six years) from baseline. We restricted our sample to those working full time at baseline, and aged 50 to 60 at the time they report a health shock, to permit us to follow them for four years before reaching age of eligibility for programs like Medicare, with complete information on demographics, work characteristics, and adverse events. This created a sample of 9,566 individuals, of which 5,026 are women.

Health shocks

At baseline for each respondent, the HRS asks: "Has a doctor ever told you that you have/had _____" where the blank ranges from conditions like cancer or chronic lung disease, to a heart attack. In subsequent waves, respondents are asked about new diagnoses since the last interview. In each wave, we create a variable for a new major health shock equal to 1 if a respondent reports having any of the

following: heart disease, lung disease, cancer, stroke, or a psychiatric diagnosis since the last interview, and zero otherwise. We coded new health shocks as those occurring between the baseline wave and the following wave (baseline+2 years). Using this definition, 291 males and 334 females experienced a new major health shock and had information 4 years from baseline (baseline + 4 years). Figure 1 shows the distribution of type of health shocks among those with any health shock.

Adverse events

The HRS permits us to measure changes in household structure, work situations, substance use, depression, and work loss. We used these to construct several alternative measures of "bad events." These bad events are all measured as changes occurring between baseline and four years, or six years later, grouped into several different categories (divorce, social networks, substance use, and other). We define them over this period because the health shock occurs in the first two years. We present information about the variables here, and means separate for men and women in table 2.

Marital shock: For those married or living with a partner, we capture divorce or separation. The variable for this takes on a value of 1 if a respondent was married at baseline but either reports an increase in the number of divorces experienced, or reports being divorced or separated two years later. For those who are unmarried, marital shock is always defined as zero. By two waves after baseline, 3 percent of people have a marital shock, rising to 4 percent by three waves after baseline. This does not differ appreciably for men and women.

Social network deterioration: We measure changes in social networks as a decline in the frequency the individual socializes with neighbors, whether respondents lose either a relative/friend in the neighborhood, or whether they moved. Half of individuals have a social network deterioration in the two waves after baseline. The most common form of social network deterioration is a decline in the frequency with which someone interacts with neighbors.

Adverse substance use: We measure adverse substance use as an increase in the number of drinks per day or a change from former/never smoker to current smoker. Fifteen percent of women and 23 percent of men register positive on this scale.

Lose work: We define a loss of work as the respondent reporting they were unemployed or laid off. Note that this does not include voluntary retirement. On average, 3.4 percent of people lose their job between baseline and two waves hence.

Depression: The HRS administers a CES-D 8 item scale of depression. We code the individual as having increased depression if their CES-D score is higher at wave w+2 (or w+4) than at baseline. Increased depression occurs in 26.6 percent of women and 23.5 percent of men.

In total there are eight possible bad events (seven for those not married at baseline). To summarize the data, we also create summary measures showing

when 2 or more of these 8 events occur, when 3 or more occur, or when at least one event occurs in 3 of the categories (two separate categories if not married at baseline).

Figure 3 shows the number of bad events by two waves after baseline. Only 29 percent of people have no bad events. Thirty-eight percent of people have one bad event, 22 percent of people have two bad events, and 11 percent of people have three or more bad events. Figure 3 also shows the confluence of bad events. Conditional on having one bad event, 46 percent of people have more than two adverse events, and 15 percent have three or more.

II. Explaining Adverse Events

We now turn to models to understand the indicators that lead to adverse outcomes over time. The general form for these models is:

$$\text{Event}_i = X_i\beta + \text{SES}_i*\beta_1 + \text{Health Shock}_i*\beta_2 + \varepsilon_i$$

where Event indicates that one or more of the bad events occurred, SES is an indicator for whether the individual is in the upper half of the household income distribution or not, and Health Shock is an indicator for whether the person suffered a major health shock – or sometimes a series of dummies for the individual shocks. Although our measure of Events is binary, we use linear probability models for convenience.

The primary outcome we examine is whether the individual had three or more bad events, independent of their category. We choose this to highlight the impact of the variables on being down-and-out versus just down. We explore other formulations of the dependent variable afterwards. We also control for baseline

characteristics shown in Table 1 to capture household composition, coverage by insurance and pensions, expectations about the future, other demographics, and baseline measures of social support, depression, and health and functional status. Figure 2 shows the timing of variables used in all regression models.

Table 3 shows the results of our baseline regression, separately for men (table 3a) and women (table 3b). The first column in each panel shows the impact of being in the top half of the income distribution on subsequent bad events and the impact of a major health shock on bad events, with no other controls. Columns 2 and 3 separate out these two measures, and include the other variables measured at baseline. Column four shows the impact of health shocks individually. Column 5 then includes the income distribution and health shock together, along with the other controls. We focus most extensively on this column.

People who experienced a health shock were much more likely to have multiple bad events within 4 years of baseline. The impact is 5 percentage points for men and 4 percentage points for women. Socioeconomic status is a mitigating factor for bad events, though the exact measure of SES that matters varies across specifications. People living in households with income in the top half of the distribution are 2.5 percent less likely to have 3 or more bad events. When we control for baseline characteristics on education, socialization, demographics, assets, and baseline health, the effect of income attenuates, but the impact of health shocks remains robust. Empirically, there is a large effect of being in the top half of the asset distribution, which is more important than the income distribution.

Other baseline characteristics affect the probability of having multiple bad events occur, though not to such a great extent. Living arrangements at baseline are

generally not associated with bad events. People with higher CES-D have fewer bad events; this is generally because it is harder for their CES-D level to increase and so few have positive markers on this case. Education is generally unrelated to the incidence of multiple bad outcomes. Those who socialize more with neighbors have more bad events, but again this likely reflects regression to the mean more than a true causal effect.

Understanding the role of health shocks is vital in this analysis. To the extent that health shocks matter because of inadequate social insurance – for example, they might affect the ability of people without health insurance to pay for needed care – policies that address this could have a systemic impact on welfare.

We examine how various policy and familial characteristics mitigate the impact of health shocks with a series of interaction terms. In one of our major tests, for example, we interact whether the person had a health shock with whether they had employer-sponsored health insurance. A finding that this mitigates the impact of health shocks on multiple bad events would indicate the importance of this type of insurance.

We selected 9 baseline characteristics that we believe could help or hinder individuals experiencing a health shock: depression symptoms at baseline (measured as 3 or more of 8 CES-D items), having employer sponsored health insurance, reporting coverage by a pension, having some college education or more, experiencing Good, Fair or Poor health, having wealth in the top ½ of assets, having 2+ social supports (married or partnered, friend in neighborhood, relative in neighborhood, talk with neighbors weekly or more), having caregiving

responsibilities for a spouse or parent, or parent-in-law, or being in the top half of household income.

We then re-estimated models like those in Table 3, column 4, also controlling for being in the top half of household income. We then interact the major health shock dummy variable with each of these nine indicators. Table 4 presents the coefficients, from nine separate models, of the interaction between a major health shock within 2 years of baseline and having each characteristic above at baseline. Somewhat surprisingly, there is very little interaction between health shocks and baseline characteristics one might expect to ameliorate or exacerbate the onset of a new health shock. Among women, none of the interaction terms suggest any mitigation of the impact of a major health shock on outcomes. Among men, being in good, fair or poor health prior to the health shock mitigates the impact of a health shock (contrary to expectations) and having employer-sponsored insurance mitigates the impact of a health shock on bad events. While this is suggestive, given the number of separate models, we conclude that there is little evidence that specific economic, household structure, or social factors mitigate the negative impact of health shocks for women.

Table 5 shows the impact of income and major health shocks on different types of bad events. We group the events into four categories: changes in marital status; changes in the social network; substance use; and lose work or depression. In general, major health shocks are positively associated with poor outcomes in all of the categories. The magnitude of the coefficients is greatest for losing work and suffering more from depression (driven almost entirely by the impact of health shocks on depression), but social network changes are also large.

Finally, in table 6 we examine the impact of health shocks on other composite measures of bad events, including two of more bad events and bad events in 3 or more different categories. With one exception (bad events in 3 or more categories for men), health shocks are associated with poor outcomes in each of these settings. The effects are larger for 2 or more bad events than for 3 or more bad events, but the implication is generally similar.

One outcome that is not in our set of bad events is applying for disability insurance. We omitted this on purpose, to focus on factors that are less the result of individual decisions. Still, the relationship between bad events, outcomes, and disability is of great importance for the understanding of social insurance programs.

Figure 4 shows why this is the case. Unsurprisingly, people who have a major health shock are more likely to have applied for or be receiving disability insurance two waves after a health shock than people without a major health shock. More surprisingly, the application rate is higher for people with multiple bad events. For example, the rate of DI application or receipt is twice as high for those with a major health shock and three or more bad events compared to those with a major health shock without any bad events.

In table 7, we consider regression models for the DI application decision. The first row of the table confirms that major health shocks increase the probability of applying for DI by nearly 8 percentage points. This is true for both men and women. Interestingly, being in a high-income household is not associated with DI application or receipt, nor are any of the marital characteristics. Given the finding in figure 4 that these variables are correlated with DI application and receipt, it

suggests that the change in these variables matters more than the levels. This is a topic we will explore in some depth in future work.

III. Conclusions

Our analysis of nearly 10,000 older workers documents several findings. First, older workers experience adverse events at a high rate; a new health shock substantially increases the chance of experiencing multiple adverse events. However, we find no evidence that baseline income and assets, employer-sponsored insurance, or pension coverage mitigates the adverse effects of a health shock. This last finding is significant because these are variables amenable to policy changes, offering one potential way to reduce the likelihood of becoming "down and out". We show that DI application and receipt is highly correlated with both adverse events and health shocks, but we find that baseline demographics and policy variables like pensions and insurance are not. Thus, our understanding of DI application and adverse events relies on understanding how these baseline variables change over time leaving some workers to be down and out on multiple dimensions and likely to use disability insurance.

Our results are fairly similar across male versus female samples, and the different measures of adverse events (2 or more versus 3 or more versus events in 3 categories) were also qualitatively similar, with the strongest effects for 2 or more bad events. To understand disability spirals, future work will explore changes over time in predictors of adverse events.

References

Conti, Rena M, Ernst R. Berndt, and Richard G. Frank RG. "Early Retirement and DI/SSI Applications: Exploring the Impact of Depression" in DM Cutler and DA Wise (eds) Health At Older Ages Chicago: University of Chicago Press, 2008.

Cutler, David M., Ellen Meara, and Seth Richards-Shubik, "Unemployment and Disability: Evidence from the Great Recession," mimeo, 2012.

Moos, Rudolf H. et al. 2006, Older Adults' Coping with Negative Life Events, *International Journal of Aging and Development*, 62:39-59.

Figure 1 – Distribution of health shocks among those with any major shock

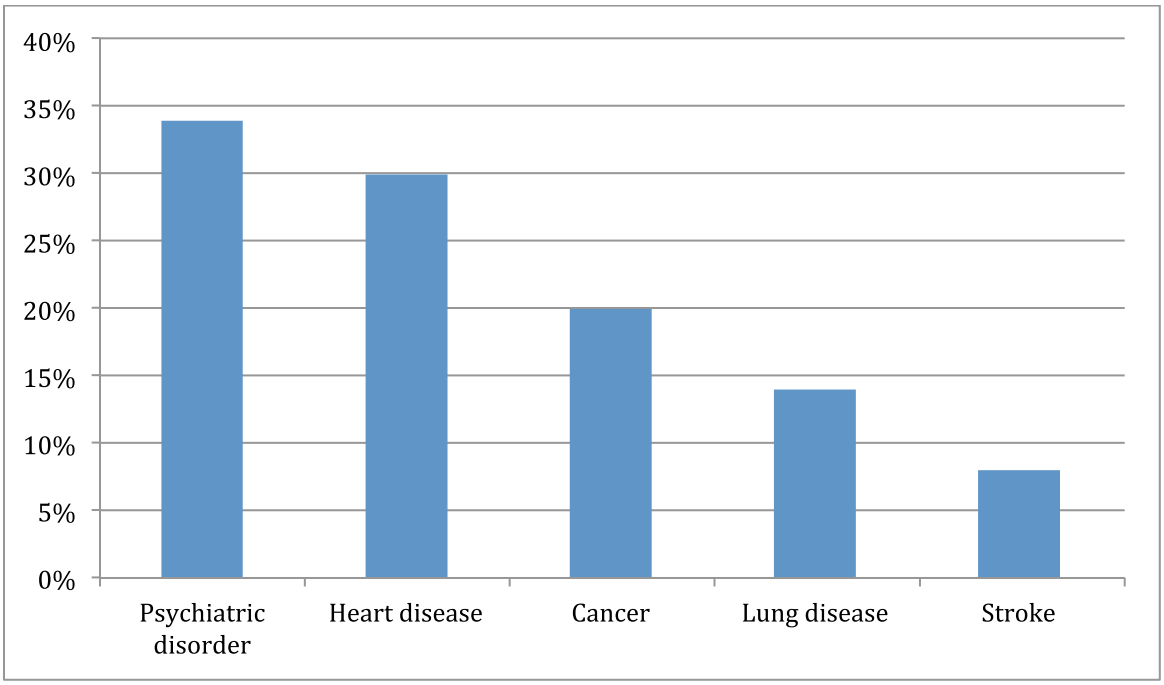

Figure 2 – Timing of major variables

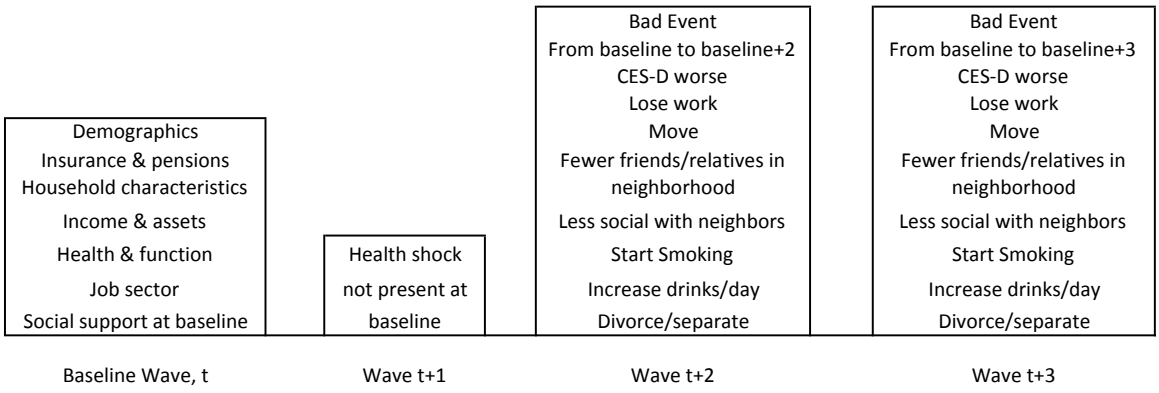

Figure 3 – Number of bad events, wave t+2

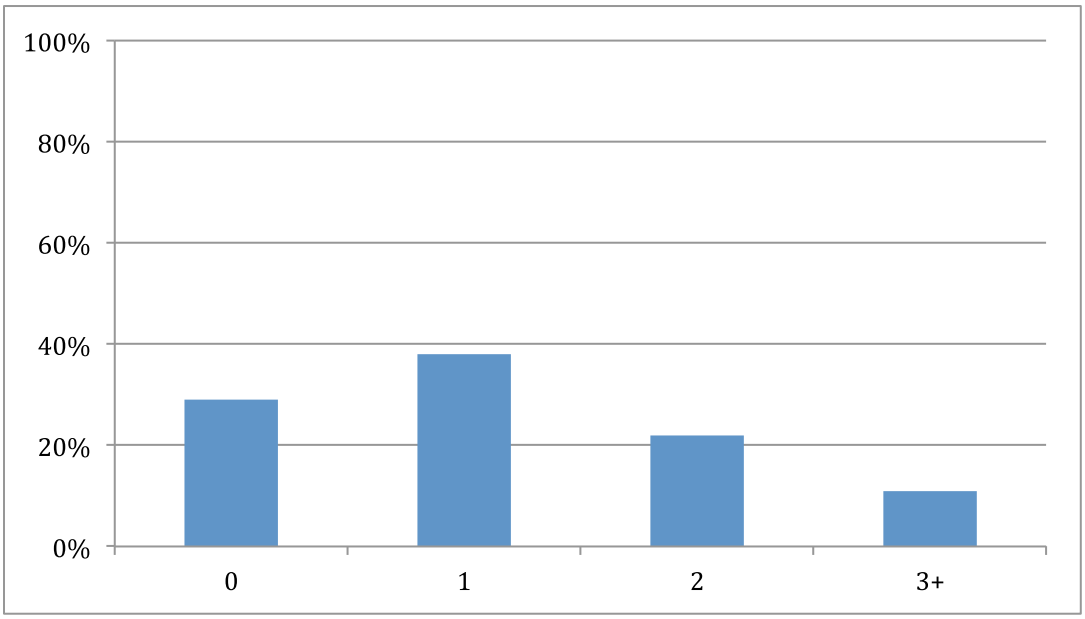

Figure 4 –

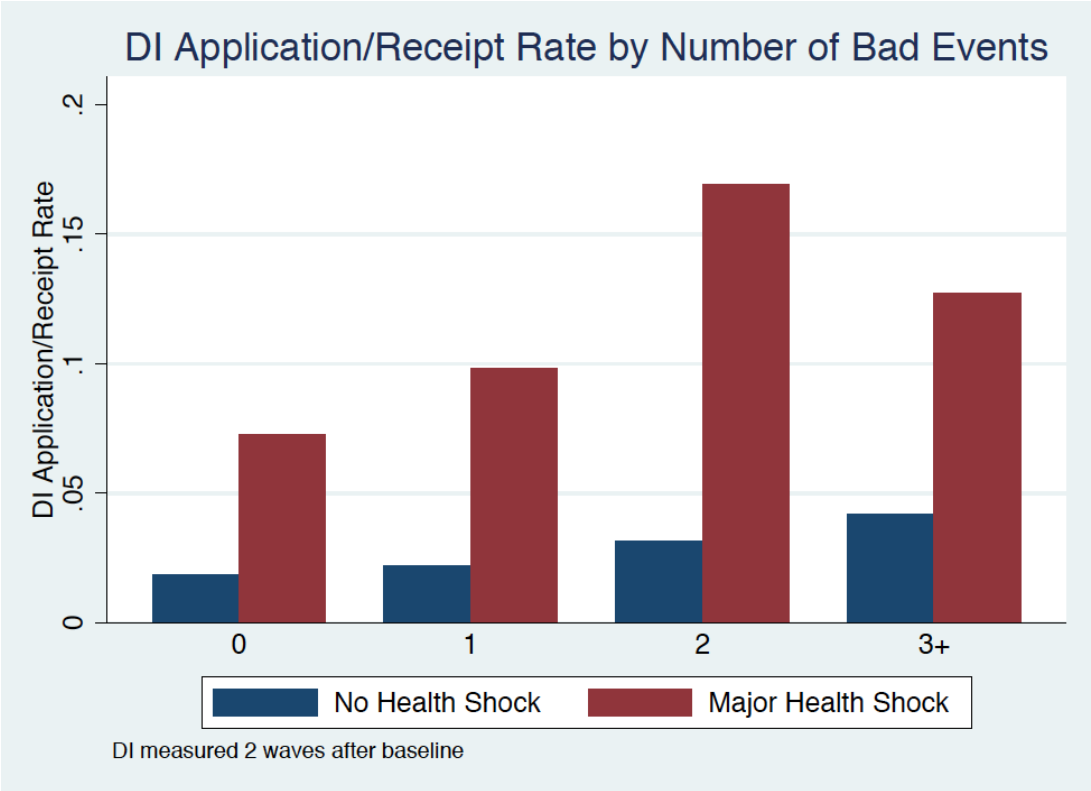

Table 1 – Sample Characteristics

Baseline + 1 Wave		**Measured at Baseline**	
Major health shock	7.0%	Overweight	41.4%
Individual Shocks		Obese	29.0%
Cancer	1.4%	Former Smoker	37.5%
Heart Disease	2.1%	Current smoker	19.7%
Stroke	0.6%	Married	71.0%
Psychiatric Illness	2.4%	Partnered	4.3%
Lung Disease	1.0%	Divorced	16.7%
Back Pain*	4.8%	Never Married	4.4%
Measured at Baseline		Live Alone	14.6%
Male	52.9%	Blue Collar	24.0%
Hispanic	5.5%	Services	8.3%
Black	7.8%	Covered by own employer-sponsored health insurance	74.5%
Other non-Hispanic race	4.3%	Covered by spouse's employer-sponsored health insurance	17.5%
Age at interview	54.51	Covered under pension plan	71.5%
	(2.300)	Frequency Socialize with neighbors	
<12 Years Education	8.2%	Daily	7.0%
13-15 Years Education	26.9%	Weekly	39.0%
16+ Years Education	35.1%	Biweekly	10.0%
Top half of assets	50.6%	Monthly	11.5%
Top half of income	59.9%	Relative lives in neighborhood	22.8%
# drinks/day when drinks	1.04	Good friend lives in neighborhood	58.4%
	(1.614)	Assist Spouse with ADLs/IADLs	3.5%
CES-D Depression Scale (3+ of 8 items)	15.4%	Respondent or spouse assist parent with personal activities	9.1%
Self-reported health		Respondent or spouse assist parent with errands/chores	29.4%
Very Good	38.4%	P(Live to age 75)	
Good	27.7%	Quartile 1	14.4%
Fair	9.4%	Quartile 2	31.3%
Poor	1.5%	Quartile 3	28.2%
One functional limitation	18.2%	P(Work FT after age 62)	
Multiple functional limitations	23.5%	Quartile 1	18.1%
Any ADL	4.1%	Quartile 2	19.4%
Any IADL	1.6%	Quartile 3	35.8%
Underweight	0.4%		
Observations	9,566		9,566

Weighted using HRS person-level weight. Standard deviation in parentheses for continuous variables.

* Back pain is not included in "major health shock" because it was measured less frequently than other health shocks. Results are similar, but less precise if it is included in major health shock.

Table 2A– Different Measures of Down and Out – Males

		Fixed Sample	
	By 2 waves after baseline	By 2 waves after baseline	By 3 waves after baseline
Categories			
Divorce/Separation/End Partnership	2.7%	2.8%	3.8%
Social Network	51.1%	52.9%	66.4%
Substance Abuse	22.5%	21.7%	30.8%
Lose work	3.4%	2.7%	5.2%
Depression	24.3%	24.6%	36.5%
Composite Measures			
2 or more bad events	34.3%	35.0%	53.9%
3 or more bad events	11.0%	11.7%	23.8%
Bad event in 3 or more categories*	7.9%	8.4%	15.1%
Observations	4,540	3,639	3,639

*Two or more categories if not married/partnered at baseline. Social network events include: no longer having a good friend or relative living in neighborhood, less frequent socialization with neighbors, or moving. Substance abuse events: an increase in the number of alcoholic drinks consumed per day when drinking and currently smoking (if not smoking at baseline). Lose work includes becoming laid off or unemployed and Depression is an increase in the 8-item CES-D Depression Score. Means are weighted using the HRS person-level weight.

Table 2B– Different Measures of Down and Out – Females

		Fixed Sample	
	By 2 waves after baseline	By 2 waves after baseline	By 3 waves after baseline
Categories			
Divorce/Separation/End Partnership	2.8%	2.7%	3.5%
Social Network	51.9%	52.5%	64.7%
Substance Abuse	15.1%	14.4%	22.5%
Lose work	3.5%	2.9%	5.9%
Depression	26.8%	27.2%	41.3%
Composite Measures			
2 or more bad events	32.0%	32.1%	50.7%
3 or more bad events	10.1%	10.6%	22.9%
Bad event in 3 or more categories*	10.0%	10.1%	19.5%
Observations	5,026	4,152	4,152

*Two or more categories if not married/partnered at baseline. Social network events include: no longer having a good friend or relative living in neighborhood, less frequent socialization with neighbors, or moving. Substance abuse events: an increase in the number of alcoholic drinks consumed per day when drinking and currently smoking (if not smoking at baseline). Lose work includes becoming laid off or unemployed and Depression is an increase in the 8-item CES-D Depression Score. Means are weighted using the HRS person-level weight.

Table 3A – Main Regression Results on Probability of Adverse Events 4 Years from Baseline - Males

Outcome: 3 or more bad events	(1)	(2)	(3)	(4)	(5)
Baseline + 1 Wave					
Major Health Shock	0.0501**		0.0468*		0.0468*
	(0.0253)		(0.0248)		(0.0248)
Health shock (w-1 to w)					
Cancer				0.0941*	
				(0.0567)	
Heart Disease				0.0326	
				(0.0418)	
Stroke				0.142	
				(0.0923)	
Psychiatric Illness				-0.0175	
				(0.0367)	
Lung Disease				0.102	
				(0.0880)	
Measured at Baseline					
Top half of HH income	-0.0241**	0.00337			0.00345
	(0.0121)	(0.0138)			(0.0138)
Top half of assets		-0.0212*	-0.0204*	-0.0207*	-0.0211*
		(0.0123)	(0.0120)	(0.0120)	(0.0123)
Married		0.0392	0.0437	0.0382	0.0436
		(0.0701)	(0.0705)	(0.0690)	(0.0708)
Partnered		0.0813	0.0862	0.0805	0.0862
		(0.0773)	(0.0777)	(0.0761)	(0.0779)
Divorced		0.0156	0.0191	0.0165	0.0200
		(0.0698)	(0.0700)	(0.0690)	(0.0705)
Never Married		-0.0125	-0.00819	-0.0118	-0.00721
		(0.0721)	(0.0724)	(0.0714)	(0.0728)
Live Alone		0.0397	0.0407	0.0375	0.0409
		(0.0326)	(0.0325)	(0.0323)	(0.0325)
CES-D Depression Scale (3+ of 8 items)		0.00264	0.00165	0.00415	0.00187
		(0.0191)	(0.0190)	(0.0190)	(0.0191)
Covered by own employer-sponsored health insurance		-0.0240	-0.0238	-0.0243	-0.0241
		(0.0165)	(0.0164)	(0.0163)	(0.0164)
Covered by spouse's employer-sponsored health insurance		-0.0377**	-0.0368**	-0.0381**	-0.0375**
		(0.0176)	(0.0174)	(0.0174)	(0.0175)
Covered under pension plan		-0.0112	-0.0117	-0.0111	-0.0120
		(0.0133)	(0.0133)	(0.0133)	(0.0133)
# drinks/day when drinks		-0.00738***	-0.00738***	-0.00754***	-0.00740***
		(0.00267)	(0.00268)	(0.00270)	(0.00268)
Hispanic		0.0719**	0.0723**	0.0730**	0.0726**
		(0.0291)	(0.0289)	(0.0289)	(0.0289)
Black		-0.0465***	-0.0460***	-0.0481***	-0.0458***
		(0.0168)	(0.0167)	(0.0169)	(0.0168)

Other non-Hispanic race		-0.00836	-0.00878	-0.0102	-0.00869
		(0.0286)	(0.0285)	(0.0285)	(0.0285)
<12 Years Education		0.00238	0.00123	0.000501	0.00129
		(0.0223)	(0.0221)	(0.0218)	(0.0221)
13-15 Years Education		0.0349**	0.0352**	0.0348**	0.0348**
		(0.0176)	(0.0174)	(0.0173)	(0.0176)
16+ Years Education		0.00407	0.00450	0.00543	0.00386
		(0.0170)	(0.0167)	(0.0167)	(0.0170)
Assist Spouse with ADLs/IADLs		-0.0213	-0.0230	-0.0232	-0.0226
		(0.0270)	(0.0269)	(0.0268)	(0.0269)
Respondent or spouse assist parent with personal activities		0.0153	0.0138	0.0155	0.0139
		(0.0226)	(0.0224)	(0.0220)	(0.0224)
Respondent or spouse assist parent with errands/chores		-0.00755	-0.00712	-0.00796	-0.00708
		(0.0125)	(0.0125)	(0.0123)	(0.0125)
Relative in neighborhood		0.0162	0.0154	0.0161	0.0156
		(0.0141)	(0.0140)	(0.0140)	(0.0141)
Good Friend in neighborhood		0.0450***	0.0461***	0.0459***	0.0460***
		(0.0118)	(0.0118)	(0.0117)	(0.0118)
Frequency Socialize with neighbor					
Daily		0.0917***	0.0905***	0.0912***	0.0904***
		(0.0272)	(0.0271)	(0.0270)	(0.0271)
Weekly		0.0433***	0.0429***	0.0419***	0.0430***
		(0.0138)	(0.0138)	(0.0137)	(0.0137)
Biweekly		0.0376*	0.0382**	0.0368*	0.0382**
		(0.0194)	(0.0194)	(0.0195)	(0.0194)
Monthly		0.0436**	0.0436**	0.0420**	0.0438**
		(0.0188)	(0.0188)	(0.0189)	(0.0188)
Self-reported health					
Very Good		0.00475	0.00390	0.00398	0.00395
		(0.0140)	(0.0140)	(0.0139)	(0.0140)
Good		0.0229	0.0217	0.0224	0.0218
		(0.0161)	(0.0161)	(0.0161)	(0.0161)
Fair		0.0427*	0.0388	0.0383	0.0391
		(0.0259)	(0.0258)	(0.0257)	(0.0259)
Poor		0.0103	0.00834	0.0137	0.00869
		(0.0518)	(0.0521)	(0.0520)	(0.0522)
Constant	0.122***	0.0741	0.0728	0.0795	0.0722
	(0.0102)	(0.149)	(0.148)	(0.148)	(0.149)
R-squared	0.003	0.049	0.051	0.053	0.051

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 4,540 observations. Columns 2-5 include age and wave fixed effects. Models 2-5 includes baseline characteristics included in Table 1 but not shown and dummy for any missing bad event. Regressions weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents. Outcome is 3 or more bad events (out of 8 if married/partnered at baseline, 7 if not).

Table 3B – Main Regression Results on Probability of Adverse Events 4 Years from Baseline - Females

Outcome: 3 or more bad events	(1)	(2)	(3)	(4)	(5)
Baseline + 1 Wave					
Major Health Shock	0.0432*		0.0371*		0.0373*
	(0.0230)		(0.0217)		(0.0217)
Health shock (w-1 to w)					
Cancer				-0.0424	
				(0.0358)	
Heart Disease				0.0149	
				(0.0420)	
Stroke				0.0739	
				(0.0919)	
Psychiatric Illness				0.0694*	
				(0.0376)	
Lung Disease				0.0720	
				(0.0507)	
Measured at Baseline					
Top half of HH income	-0.0251**	-0.00807			-0.00851
	(0.0106)	(0.0134)			(0.0134)
Top half of assets		-0.0381***	-0.0402***	-0.0402***	-0.0383***
		(0.0119)	(0.0119)	(0.0118)	(0.0118)
Married		0.0123	0.00921	0.00894	0.0123
		(0.0230)	(0.0225)	(0.0225)	(0.0230)
Partnered		0.0411	0.0381	0.0376	0.0405
		(0.0345)	(0.0340)	(0.0340)	(0.0342)
Divorced		0.0247	0.0248	0.0243	0.0243
		(0.0229)	(0.0228)	(0.0228)	(0.0228)
Never Married		0.00958	0.00842	0.0103	0.00826
		(0.0334)	(0.0334)	(0.0335)	(0.0333)
Live Alone		0.0203	0.0195	0.0196	0.0198
		(0.0203)	(0.0202)	(0.0201)	(0.0203)
CES-D Depression Scale (3+ of 8 items)		-0.0359***	-0.0365***	-0.0374***	-0.0369***
		(0.0126)	(0.0125)	(0.0126)	(0.0126)
Covered by own employer-sponsored health insurance		-0.00225	-0.00297	-0.00262	-0.00253
		(0.0156)	(0.0156)	(0.0155)	(0.0156)
Covered by spouse's employer-sponsored health insurance		0.000171	-0.00111	-0.00156	2.74e-05
		(0.0160)	(0.0160)	(0.0160)	(0.0160)
Covered under pension plan		-0.0178	-0.0183	-0.0186	-0.0176
		(0.0129)	(0.0128)	(0.0129)	(0.0129)
# drinks/day when drinks		0.00132	0.00111	0.00129	0.00128
		(0.00663)	(0.00648)	(0.00633)	(0.00649)
Hispanic		0.00439	0.00546	0.00589	0.00511
		(0.0237)	(0.0238)	(0.0238)	(0.0238)
Black		-0.0315*	-0.0305*	-0.0300*	-0.0309*
		(0.0166)	(0.0166)	(0.0166)	(0.0166)

Other non-Hispanic race		0.0155	0.0150	0.0134	0.0143
		(0.0276)	(0.0274)	(0.0272)	(0.0274)
<12 Years Education		0.0355	0.0349	0.0339	0.0345
		(0.0240)	(0.0238)	(0.0238)	(0.0239)
13-15 Years Education		0.00200	0.00140	0.00115	0.00204
		(0.0138)	(0.0136)	(0.0137)	(0.0138)
16+ Years Education		0.0124	0.0112	0.0114	0.0125
		(0.0156)	(0.0152)	(0.0152)	(0.0156)
Assist Spouse with ADLs/IADLs		0.0461	0.0431	0.0415	0.0418
		(0.0281)	(0.0282)	(0.0273)	(0.0280)
Respondent or spouse assist parent with personal activities		-0.0231	-0.0234	-0.0235	-0.0237
		(0.0176)	(0.0175)	(0.0174)	(0.0175)
Respondent or spouse assist parent with errands/chores		0.0336**	0.0340**	0.0339**	0.0339**
		(0.0137)	(0.0138)	(0.0138)	(0.0138)
Relative in neighborhood		0.0293**	0.0298**	0.0293**	0.0294**
		(0.0138)	(0.0138)	(0.0138)	(0.0138)
Good Friend in neighborhood		0.0357***	0.0359***	0.0357***	0.0358***
		(0.0115)	(0.0114)	(0.0114)	(0.0115)
Frequency Socialize with neighbor					
Daily		0.119***	0.120***	0.121***	0.119***
		(0.0275)	(0.0276)	(0.0276)	(0.0275)
Weekly		0.0674***	0.0679***	0.0679***	0.0679***
		(0.0123)	(0.0122)	(0.0122)	(0.0122)
Biweekly		0.0632***	0.0635***	0.0634***	0.0632***
		(0.0183)	(0.0184)	(0.0184)	(0.0184)
Monthly		0.0489***	0.0494***	0.0492***	0.0493***
		(0.0153)	(0.0153)	(0.0154)	(0.0154)
Self-reported health					
Very Good		0.0146	0.0137	0.0129	0.0136
		(0.0144)	(0.0144)	(0.0143)	(0.0143)
Good		0.0323**	0.0302*	0.0297*	0.0301*
		(0.0162)	(0.0163)	(0.0163)	(0.0163)
Fair		0.0322	0.0310	0.0298	0.0307
		(0.0242)	(0.0243)	(0.0242)	(0.0242)
Poor		0.0144	0.0127	0.0124	0.0126
		(0.0427)	(0.0423)	(0.0420)	(0.0424)
Constant	0.111***	0.0647	0.0656	0.0685	0.0663
	(0.00828)	(0.0692)	(0.0690)	(0.0690)	(0.0690)
R-squared	0.003	0.055	0.056	0.058	0.056

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 5,026 observations. Columns 2-5 include age and wave fixed effects. Models 2-5 includes baseline characteristics included in Table 1 but not shown and dummy for any missing bad event. Regressions weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents. Outcome is 3 or more bad events (out of 8 if married/partnered at baseline, 7 if not).

Table 4 – Interaction Effects of Baseline Characteristics with Major Health Shock

	(1) Females	(2) Males
Major Shock (w-1 to w)* … (at w-1)		
…CESD	0.0236	-0.0724
	(0.0464)	(0.0571)
…Employer Sponsored Ins (R or S)	-7.57e-05	-0.155**
	(0.0541)	(0.0761)
…Covered by Pension	-0.000251	-0.0782
	(0.0445)	(0.0585)
…>12 years of education	0.00975	-0.00370
	(0.0441)	(0.0497)
…Good/Fair/Poor Health	0.000636	-0.0892*
	(0.0462)	(0.0484)
…top 1/2 of assets	-0.0234	-0.0118
	(0.0404)	(0.0467)
…2+ social supports	0.0348	-0.0256
	(0.0400)	(0.0497)
…Caregiving	-0.0207	0.0713
	(0.0452)	(0.0522)
…top 1/2 of HH income	-0.0105	-0.0578
	(0.0423)	(0.0522)
Observations	5,026	4,540

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Outcome is 3 or more bad events. Each row represents a separate model. All models include the relevant interaction term in addition to age and wave fixed effects, all controls included in Table 3 Column 4, and a dummy variable for being in the top half of income at baseline. Caregiving is parent or spouse care, where parent care is measured at the household-level, spouse care is measured at the person-level. Social supports include: being married or partnered at baseline, socializing with neighbors weekly or more frequently at baseline, having a good friend in neighborhood at baseline, and having a relative in neighborhood at baseline. Regressions were weighted using the HRS person-level weight and standard errors were adjusted for autocorrelation within respondents.

Table 5A – Effect of Health Shocks and Income on Different Types of Bad Events – Males

Outcome	(1) Divorce/Separation	(2) Social Network	(3) Substance Use	(4) Lose work/Depression
Baseline + 1 Wave				
Major Health Shock	-0.0101	0.0512	0.00241	0.0799**
	(0.00976)	(0.0323)	(0.0300)	(0.0327)
Measured at Baseline				
Top half of HH income	-0.000723	-0.00906	0.00584	-0.0264
	(0.00946)	(0.0215)	(0.0183)	(0.0194)
Observations	3,901	4,540	4,540	4,540
R-squared	0.030	0.108	0.035	0.058

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include age and wave fixed effects, baseline characteristics included in Table 1 but not shown, and a dummy for any missing bad event, as in Table 3, Column 5. Regressions are weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents.

Table 5B – Effect of Health Shocks and Income on Different Types of Bad Events – Females

Outcome	(1) Divorce/Separation	(2) Social Network	(3) Substance Use	(4) Lose work/Depression
Baseline + 1 Wave				
Major Health Shock	0.0228	0.0717**	-0.0176	0.0933***
	(0.0180)	(0.0304)	(0.0222)	(0.0309)
Measured at Baseline				
Top half of HH income	-0.000240	-0.00392	0.0207	-0.0475**
	(0.00834)	(0.0221)	(0.0171)	(0.0186)
Observations	3,516	5,026	5,026	5,026
R-squared	0.038	0.122	0.039	0.068

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include age and wave fixed effects, baseline characteristics included in Table 1 but not shown, and a dummy for any missing bad event, as in Table 3, Column 5. Regressions are weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents.

Table 6A – Alternative Composite Measures of Bad Events – Males

Outcome	(1) 3+ bad events	(2) 2+ bad events	(3) Bad event in 3+ categories
Baseline + 1 Wave			
Major Health Shock	0.0468*	0.0956***	0.0120
	(0.0248)	(0.0320)	(0.0198)
Measured at Baseline			
Top half of HH income	0.00345	-0.0143	0.00920
	(0.0138)	(0.0210)	(0.0122)
Top half of assets	-0.0211*	-0.0445**	-0.0154
	(0.0123)	(0.0191)	(0.0108)
Married	0.0436	-0.0846	-0.261***
	(0.0708)	(0.0820)	(0.0828)
Partnered	0.0862	-0.0209	-0.242***
	(0.0779)	(0.0911)	(0.0858)
Divorced	0.0200	-0.0476	0.000216
	(0.0705)	(0.0864)	(0.0851)
Never Married	-0.00721	-0.146	-0.101
	(0.0728)	(0.0950)	(0.0898)
Live Alone	0.0409	0.0367	-0.00925
	(0.0325)	(0.0534)	(0.0455)
CES-D Depression Scale (3+ of 8 items)	0.00187	-0.00900	0.0104
	(0.0191)	(0.0271)	(0.0176)
Covered by own employer-sponsored health insurance	-0.0241	-0.0464*	-0.0410***
	(0.0164)	(0.0246)	(0.0152)
Covered by spouse's employer-sponsored health insurance	-0.0375**	-0.0617**	-0.0403***
	(0.0175)	(0.0267)	(0.0130)
Covered under pension plan	-0.0120	-0.0243	-0.00502
	(0.0133)	(0.0215)	(0.0111)
# drinks/day when drinks	-0.00740***	-0.0112***	-0.00274
	(0.00268)	(0.00431)	(0.00238)
Hispanic	0.0726**	0.0762**	0.0340
	(0.0289)	(0.0359)	(0.0285)
Black	-0.0458***	-0.0461	-0.0380*
	(0.0168)	(0.0322)	(0.0203)
Other non-Hispanic race	-0.00869	-0.0364	-0.0102
	(0.0285)	(0.0415)	(0.0227)
<12 Years Education	0.00129	0.0455	0.0160
	(0.0221)	(0.0317)	(0.0207)
13-15 Years Education	0.0348**	0.0303	0.0106
	(0.0176)	(0.0248)	(0.0149)
16+ Years Education	0.00386	0.000929	-0.0112
	(0.0170)	(0.0266)	(0.0145)
Assist Spouse with ADLs/IADLs	-0.0226	-0.0257	-0.0356***
	(0.0269)	(0.0467)	(0.0135)

Respondent or spouse assist parent with personal activities	0.0139	0.0376	-0.00403
	(0.0224)	(0.0304)	(0.0132)
Respondent or spouse assist parent with errands/chores	-0.00708	0.00502	-0.00213
	(0.0125)	(0.0189)	(0.00957)
Relative in neighborhood	0.0156	0.0496**	-0.000121
	(0.0141)	(0.0203)	(0.0109)
Good Friend in neighborhood	0.0460***	0.0566***	-0.00376
	(0.0118)	(0.0190)	(0.0102)
Frequency Socialize with neighbor			
Daily	0.0904***	0.286***	0.0337
	(0.0271)	(0.0354)	(0.0218)
Weekly	0.0430***	0.0996***	0.00874
	(0.0137)	(0.0214)	(0.0122)
Biweekly	0.0382**	0.123***	0.0119
	(0.0194)	(0.0303)	(0.0180)
Monthly	0.0438**	0.0966***	-0.00401
	(0.0188)	(0.0285)	(0.0141)
Self-reported health			
Very Good	0.00395	0.0145	0.00993
	(0.0140)	(0.0210)	(0.0120)
Good	0.0218	0.0512**	0.0116
	(0.0161)	(0.0240)	(0.0143)
Fair	0.0391	0.0548	0.0435*
	(0.0259)	(0.0359)	(0.0229)
Poor	0.00869	0.0484	-0.0308
	(0.0522)	(0.0750)	(0.0421)
Constant	0.0722	0.279*	0.405**
	(0.149)	(0.165)	(0.168)
R-squared	0.051	0.073	0.144

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 4,540 observations. All models include age and wave fixed effects, baseline characteristics included in Table 1 but not shown, and dummy for any missing bad event. Regressions are weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents. Column 1 is repeated from Table 3A Column 5. The outcome in column 2 is for two or more bad events. The outcome in column 3 is having a bad event in 3+ categories (2+ if not married/partnered at baseline). Categories include: divorce/separation, social network, substance abuse, and lose work/depression.

Table 6B – Alternative Composite Measures of Bad Events – Females

Outcome	(1) 3+ bad events	(2) 2+ bad events	(3) Bad event in 3+ categories
Baseline + 1 Wave			
Major Health Shock	0.0373*	0.106***	0.0436**
	(0.0217)	(0.0316)	(0.0211)
Measured at Baseline			
Top half of HH income	-0.00851	-0.00238	-0.00295
	(0.0134)	(0.0209)	(0.0127)
Top half of assets	-0.0383***	-0.0534***	-0.0196*
	(0.0118)	(0.0185)	(0.0107)
Married	0.0123	-0.00955	-0.185***
	(0.0230)	(0.0362)	(0.0293)
Partnered	0.0405	0.0522	-0.153***
	(0.0342)	(0.0495)	(0.0354)
Divorced	0.0243	0.0445	0.0453
	(0.0228)	(0.0344)	(0.0302)
Never Married	0.00826	-0.0394	0.0175
	(0.0333)	(0.0438)	(0.0411)
Live Alone	0.0198	-0.0399	-0.0159
	(0.0203)	(0.0292)	(0.0258)
CES-D Depression Scale (3+ of 8 items)	-0.0369***	-0.0622***	-0.0459***
	(0.0126)	(0.0209)	(0.0137)
Covered by own employer-sponsored health insurance	-0.00253	-0.00720	0.0127
	(0.0156)	(0.0224)	(0.0140)
Covered by spouse's employer-sponsored health insurance	2.74e-05	-0.0151	-0.0127
	(0.0160)	(0.0239)	(0.0111)
Covered under pension plan	-0.0176	-0.0312	-0.0163
	(0.0129)	(0.0197)	(0.0124)
# drinks/day when drinks	0.00128	-0.0118	-0.00785*
	(0.00649)	(0.00754)	(0.00425)
Hispanic	0.00511	-0.00545	0.00722
	(0.0238)	(0.0360)	(0.0228)
Black	-0.0309*	-0.0248	-0.0181
	(0.0166)	(0.0243)	(0.0169)
Other non-Hispanic race	0.0143	0.0562	-0.000830
	(0.0274)	(0.0425)	(0.0271)
<12 Years Education	0.0345	0.00710	0.0256
	(0.0239)	(0.0335)	(0.0208)
13-15 Years Education	0.00204	-0.0146	-0.00128
	(0.0138)	(0.0212)	(0.0131)
16+ Years Education	0.0125	-0.0220	-0.0172
	(0.0156)	(0.0225)	(0.0135)
Assist Spouse with ADLs/IADLs	0.0418	0.0411	-0.0153
	(0.0280)	(0.0448)	(0.0145)

Respondent or spouse assist parent with personal activities	-0.0237	0.0338	0.00382
	(0.0175)	(0.0277)	(0.0174)
Respondent or spouse assist parent with errands/chores	0.0339**	0.00350	0.0218*
	(0.0138)	(0.0188)	(0.0122)
Relative in neighborhood	0.0294**	0.109***	0.0276**
	(0.0138)	(0.0198)	(0.0130)
Good Friend in neighborhood	0.0358***	0.0493***	-0.00444
	(0.0115)	(0.0180)	(0.0110)
Frequency Socialize with neighbor			
Daily	0.119***	0.251***	0.0786***
	(0.0275)	(0.0344)	(0.0231)
Weekly	0.0679***	0.145***	0.0358***
	(0.0122)	(0.0202)	(0.0121)
Biweekly	0.0632***	0.156***	0.0398**
	(0.0184)	(0.0284)	(0.0187)
Monthly	0.0493***	0.126***	0.0374**
	(0.0154)	(0.0263)	(0.0160)
Self-reported health			
Very Good	0.0136	-0.00749	0.0104
	(0.0143)	(0.0220)	(0.0131)
Good	0.0301*	0.00424	0.0178
	(0.0163)	(0.0253)	(0.0151)
Fair	0.0307	0.0215	0.0287
	(0.0242)	(0.0350)	(0.0221)
Poor	0.0126	-0.141**	-0.0468
	(0.0424)	(0.0610)	(0.0459)
Constant	0.0663	0.290***	0.255***
	(0.0690)	(0.104)	(0.0426)
R-squared	0.056	0.083	0.149

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 5,026 observations. All models include age and wave fixed effects, baseline characteristics included in Table 1 but not shown, and dummy for any missing bad event. Regressions are weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents. Column 1 is repeated from Table 3B Column 5. The outcome in column 2 is for two or more bad events. The outcome in column 3 is having a bad event in 3+ categories (2+ if not married/partnered at baseline). Categories include: divorce/separation, social network, substance abuse, and lose work/depression.

Table 7 – DI Application/Receipt Regressions

Outcome: Apply for or Receive DI 2 waves after baseline	(1) Males	(2) Females
Baseline + 1 Wave		
Major Health Shock	0.0770***	0.0770***
	(0.0180)	(0.0195)
Measured at Baseline		
Top half of HH income	0.00321	-0.00766
	(0.00846)	(0.00727)
Top half of assets	-0.0112*	0.000802
	(0.00676)	(0.00670)
Married	0.0266	-0.0109
	(0.0208)	(0.0148)
Partnered	0.0113	0.00266
	(0.0319)	(0.0235)
Divorced	0.0247	0.00284
	(0.0199)	(0.0140)
Never Married	0.0311	-0.00691
	(0.0225)	(0.0208)
Live Alone	-0.0127	-0.0116
	(0.0182)	(0.0122)
CES-D Depression Scale (3+ of 8 items)	0.00251	-0.0123
	(0.0115)	(0.00900)
Covered by own employer-sponsored health insurance	-0.00533	0.00783
	(0.00894)	(0.00882)
Covered by spouse's employer-sponsored health insurance	0.00403	0.0166*
	(0.00973)	(0.00942)
Covered under pension plan	-0.00342	0.00282
	(0.00685)	(0.00775)
# drinks/day when drinks	0.00179	-0.00331
	(0.00193)	(0.00205)
Hispanic	-0.0324***	-0.00331
	(0.0120)	(0.0148)
Black	0.0253*	0.0170
	(0.0153)	(0.0140)
Other non-Hispanic race	0.00132	-0.0478***
	(0.0204)	(0.0111)
<12 Years Education	0.0316	0.0301
	(0.0203)	(0.0187)
13-15 Years Education	-0.00216	0.00226
	(0.00935)	(0.00842)
16+ Years Education	-0.00716	-0.0129*
	(0.00869)	(0.00660)
Assist Spouse with ADLs/IADLs	0.000908	0.0542**
	(0.0193)	(0.0249)
Respondent or spouse assist parent with personal activities	0.00218	0.0156

	(0.00874)	(0.0113)
Respondent or spouse assist parent with errands/chores	-0.00103	0.00526
	(0.00644)	(0.00660)
Relative in neighborhood	-0.00693	-0.00522
	(0.00705)	(0.00708)
Good Friend in neighborhood	0.0103*	0.00409
	(0.00622)	(0.00642)
Frequency Socialize with neighbor		
Daily	0.0270	-0.0265***
	(0.0189)	(0.00998)
Weekly	-0.00739	-0.00229
	(0.00693)	(0.00726)
Biweekly	-0.0101	0.00672
	(0.00850)	(0.0114)
Monthly	0.000358	0.00253
	(0.00953)	(0.00926)
Self-reported health		
Very Good	-0.00487	0.00688
	(0.00501)	(0.00422)
Good	-0.00124	0.00837
	(0.00741)	(0.00598)
Fair	0.0384**	0.0721***
	(0.0191)	(0.0180)
Poor	0.115**	0.197***
	(0.0571)	(0.0600)
Constant	-0.0343	-0.0318
	(0.0322)	(0.0289)
Observations	4,540	5,026
R-squared	0.084	0.110

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 5,026 observations. All models include age and wave fixed effects, baseline characteristics included in Table 1 but not shown, and dummy for any missing bad event. Regressions are weighted using HRS person-level weight. Standard errors adjusted for autocorrelation within respondents. Outcome is DI application or receipt two waves after baseline.