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RESEARCH ARTICLE

Major Illness and Chronic Disease

Does Major Illness Cause Financial Catastrophe?

Keziah Cook, David Dranove, and Andrew Sfekas

Objective. We examine the financial impact of major illnesses on the near-elderly and how this impact is affected by health insurance.
Data Sources. We use RAND Corporation extracts from the Health and Retirement Study from 1992 to 2006.[1]
Study Design. Our dependent variable is the change in household assets, excluding the value of the primary home. We use triple difference median regressions on a sample of newly ill/uninsured near elderly (under age 65) matched to newly ill/insured near elderly. We also include a matched control group of households whose members are not ill.
Results. Controlling for the effects of insurance status and illness, we find that the median household with a newly ill, uninsured individual suffers a statistically significant decline in household assets of between 30 and 50 percent relative to households with matched insured individuals. Newly ill, insured individuals do not experience a decline in wealth.
Conclusions. Newly ill/uninsured households appear to be one illness away from financial catastrophe. Newly ill insured households who are matched to uninsured households appear to be protected against financial loss, at least in the near term.

Key Words. Uninsured, costs of illness, health insurance coverage, median regression, triple difference, medical bankruptcy

Millions of Americans lack health insurance, including 4.2 million people over 55.[2] If illness strikes, many of these individuals may have to tap into accumulated assets that they intended for another purpose, such as retirement. However, there is little hard evidence on just how many are affected and how much they lose. A well-cited study by Himmelstein et al. (2005) suggests that half of all bankruptcies can be described as "medical bankruptcies," and it

[Correction added after online publication October 13, 2009: on page 2, Keziah Cook's e-mail address was incorrectly listed as "kez@northestern.edu," and should have been listed as "kez@northwestern.edu."]

claims that private health insurance does not protect against financial ruin. Many researchers, including an author of this paper, suggested that the research methods in Himmelstein and colleagues were problematic and fundamental questions about the financial impact of illness remain unanswered (Dranove and Millenson 2006).

This study carefully documents how illness affects the financial well-being of the uninsured near-elderly (age 51–64). This age group is likely to have significant assets and fewer opportunities to rebuild if they lose those assets due to illness. A drop in assets for this age group could result in delayed retirement or a lower standard of living following retirement.

We use panel data from the Health and Retirement Study (HRS) to examine what happens to the financial assets of near elderly, uninsured Americans who experience one of six major illnesses including cancer and stroke. We focus on new illnesses, so that we can observe the change in assets immediately following the onset of illness. We compare this group of newly ill/uninsured households with a set of households matched for health status, baseline wealth, and other demographic and health characteristics. We use difference-in–difference (DD) and triple difference (3D) regressions with covariates that control broadly for other determinants of changes in asset accumulation. While matched households with insurance coverage experience no significant loss in assets, uninsured near-elderly Americans who experience a new major illness lose between one-third and one-half of their accumulated assets.

WHAT HAPPENS (FINANCIALLY) WHEN ILLNESS STRIKES?

Insurance covers the bulk of medical expenses for most privately insured individuals. It is up to the provider to collect the balance of the bill, a practice that varies by provider and may be dictated by the insurance contract. In some cases, medical expenses can mount even for insured households (Schoen et al. 2008).

For the uninsured, the financial consequences of illness are potentially far reaching. Some may qualify for Medicaid, but only after spending down their accumulated assets.[3] Some may receive charity care from community health centers and hospitals. Nonprofit hospitals often offer charity care in

Address correspondence to Keziah Cook, Ph.D. Candidate in Economics (expected in June 2010), Department of Economics, Northwestern University, 302 Andersen Hall, 2001 Sheridan Road, Evanston, IL 60208; e-mail: kez@northwestern.edu. David Dranove, Ph.D. Economics, Management, Policy and Andrew Sfekas, Ph.D. Economics, are with the Kellogg School of Management, Northwestern University, Evanston, IL.

exchange for tax benefits, but despite this, many hospitals and other providers, including nonprofits, seek compensation from their uninsured patients. The uninsured are therefore often responsible for large medical bills.

Those uninsured who are unable to qualify for Medicaid or receive charity care must tap their friends and relatives or pay the bills themselves. This can entail a substantial drawdown of assets from bank accounts, investments, and even retirement savings. In some states, provider/creditors can even force the uninsured to sell their houses and businesses to pay off debts. When medical liabilities fully exhaust an individual's assets, the individual may file for bankruptcy. Individuals under bankruptcy protection are liable for no more than their accumulated assets. In some states, certain assets such as housing are protected from seizure. Bankruptcy is therefore the dim light at the end of a dark tunnel; the loss of assets before bankruptcy represents the real financial cost of illness.

The extent to which individuals lose assets may depend on their initial asset level in two ways. First, providers may choose not to pursue payments from individuals of limited means, preferring to write the payments off as charity or bad debt. Second, wealthier individuals may demand more costly services, so that medical bills may increase with wealth. These two effects suggest that the poorest uninsured individuals who fall ill are likely to lose a smaller nominal amount of wealth, while wealthier individuals may lose a smaller percentage of their wealth than those of intermediate means. We will take this into account.

Prior Literature

There is an extensive literature on the effects of health on wealth. Wu (2003) uses data from the first two waves of the HRS and finds that serious health shocks for wives affect household wealth, but not for husbands. Hurd and Kapteyn (2003) also use early waves of the HRS to show that wealth increases by smaller amounts for respondents who report declines in health status. Two studies of health and wealth use the HRS to address the role of insurance. Smith (1999) found households experiencing a serious new health condition after the first wave suffer an average decline in wealth of U.S.$17,000. The decline is unrelated to insurance status.

Levy (2003) uses data from the first four waves of the HRS, finding that health shocks cause large depletions of wealth. Levy's estimates of the effects of insurance on wealth are imprecise, however, so economically important effects of insurance on wealth turn out to be statistically insignificant. To

improve precision, we include additional waves of data, match households on key sociodemographic measures, and estimate median regressions to mitigate the impact of outliers in the asset distribution.

Another crucial problem unaddressed by Smith (1999) and Levy (2003) is that uninsured individuals may experience changes in wealth due to unobservable factors correlated with, but not caused by their insurance status. We address this by contrasting changes in wealth among the newly ill/uninsured with changes in wealth for the healthy/uninsured and the newly ill/insured.

Our study is also related to prior research on the effects of health and insurance on bankruptcies. Using data from the 1996 Panel Survey of Income Dynamics, Fay, Hurst, and White (2002) found no statistical link between bankruptcies and health problems. Domowitz and Sartain (1999) found that medical debt was a significant cause of personal bankruptcy but cautioned that high medical debt was rare and might be correlated with unobservable shocks to income. Gross and Souleles (2002) used state-level insurance coverage as a control variable in a model predicting personal bankruptcy, failing to find any relationship between the two.

Himmelstein et al. (2005) conducted an original survey of bankrupt individuals, inquiring about health status, insurance, and health spending. They concluded that over half of all bankruptcies are associated with health events. However, they used a very broad definition of "medical bankruptcy" and did not establish causation. They also failed to acknowledge that the decision to file for bankruptcy is only a proxy indicator for an array of financial difficulties of which medical debt may be just one component.

Data and Methods

We estimate the financial impact of illness on asset accumulation by near elderly Americans, focusing on the mediating role of health insurance. We compare uninsured households facing a new illness (henceforth "newly ill/uninsured") with three matched comparison groups: healthy/uninsured households, newly ill/insured households, and healthy/insured households. To assure that our results are not an artifact of the choice of functional form, we match the newly ill/uninsured to the comparison groups based on preillness wealth, income, and demographic characteristics.

We use DD analysis to compare the wealth trajectories of newly ill/uninsured households to those of newly ill/insured households. We also per-

form 3D regressions on the combination of all four groups. The 3D analyses compare the change in wealth trajectory of uninsured and insured households before and after an illness. This accounts for the possibility that households with insurance would follow a different wealth trajectory from households without insurance, even if no illness had occurred. For example, uninsured people may have less stable employment than insured people, leading to lower asset growth.

Our matching method yields estimates of the effect of being without insurance on those who lack insurance. Thus, one could use these estimates to determine what would happen if the uninsured were given insurance. However, one would need to be more cautious in using these results to determine what happens to insured households, since we use only insured households that resemble uninsured households.

HRS

We use the first eight waves of the HRS, a longitudinal survey of near elderly and elderly administered by the Institute for Social Research at the University of Michigan. It began in 1992 with a cohort of noninstitutionalized Americans born between 1931 and 1941 and their spouses. Additional 6-year cohorts were added in 1998 and 2004. Participating households are interviewed every 2 years from entry until death. The study collects detailed information about each household's finances, health status, labor force participation, and retirement plans. We use the RAND HRS data file, which enables straightforward longitudinal analysis for a subset of variables. We focus on the health, insurance, and financial data for both insured and uninsured households with at least one member under 65. (Nearly all individuals over 65 have Medicare and are therefore not suitable for our study.) We exclude households with no financial respondent, extremely high assets or income, zero or negative net worth, or missing information about insurance, health status, race, and other covariates used in the matching and regressions. To simplify interpretation, we also exclude the small number of households in which both spouses acquire a new illness in the same period (this occurs in 24 uninsured households).

Health Measures

HRS participants are asked about their current health and previously diagnosed conditions. We focus on households who report a new illness. These households are most likely to experience large medical expenditures

and least likely to have adjusted their spending patterns to cope with their health shock. We indicate that a household has a *new-illness* if a respondent in that household reports one of the following six major illness categories in a given survey wave, but did not report that condition in the previous survey wave:

1. Diabetes/elevated blood sugar
2. Cancer/malignant tumor (excluding skin cancer)
3. Lung diseases such as chronic bronchitis or emphysema (excluding asthma)
4. Heart problems including heart attack, coronary heart disease, angina, and congestive heart failure
5. Stroke or transient ischemic attack
6. Emotional, nervous, or psychiatric problems

All of the above conditions result in more than U.S.$5,000[4] in medical expenditures for the majority of uninsured sufferers; thus, a newly ill, uninsured household could be exposed to substantial loss of assets. We also consider a stricter definition of *new illness,* limited to the three most costly illnesses: cancer, heart problems, and stroke. Our full sample includes 454 newly ill, uninsured households and 3,175 newly ill, insured households.

Financial Measures

The RAND HRS consolidates the financial data solicited from HRS respondents into several simple measures of total assets. We consider total nonhousing assets, which includes checking and savings accounts, CDs, stocks and bonds, IRAs, vehicles, real estate, and businesses.[5] This definition is appropriate both because houses are less liquid than other assets and because in many states home equity is protected from bankruptcy proceedings. We also use total household income as a matching and control variable. All financial variables are scaled to constant year 2006 dollars using the Consumer Price Index. We include those households with some imputed financial data, but exclude households with no financial respondent, those with more than U.S.$3 million in nonhousing assets or more than U.S.$400,000 in income, and those with zero or negative nonhousing assets.[6] We make this latter exclusion because we are interested in how well insurance protects financial assets; thus, those households with no financial assets are not suitable for our study.

Insurance Variables

The HRS asks about several types of health insurance and health care coverage, including group and nongroup private insurance, Medicare, Medicaid, and CHAMPUS. An individual is considered insured if he or she holds any of these types of coverage at the time of the survey. A household is considered insured if both spouses are insured. We define a household as *newly ill/uninsured* if the newly ill individual in the household did not have insurance coverage in the prior survey wave.[7] We also consider the household's insurance status in the period in which the illness is first reported, with similar results to those reported herein. Unfortunately, the HRS does not allow us to determine if a newly ill individual was covered for the medical services associated with their new illness or the nature of any copayments, so we cannot predict out of pocket medical expenses. Before matching, our sample contains 454 newly ill, uninsured households and 3,810 healthy uninsured households.

Matching

As Table 1 shows, a major problem with comparing uninsured and insured households, or, potentially, healthy uninsured and newly ill, uninsured households, is that the distributions of wealth, income, and other factors are different across the groups. For example, the households that lack insurance have lower median preillness assets and income than the households with insurance. If there is uncertainty about the real-world process affecting asset growth and the corresponding regression specification, then these differences could profoundly affect the empirical estimates. To see why, consider two households. The first has baseline assets of U.S.$1,000 and experiences asset growth of U.S.$100. The second has baseline assets of U.S.$10,000 and experiences asset growth of U.S.$300. If the underlying real-world process is linear, then it would appear that the second household experienced more rapid asset growth. If the underlying process is semilog, it would appear that the first household experienced more rapid asset growth.[8] Thus, the results obtained from regressions that use the entire sample will depend on the choice of functional form.

Rather than allow the choice of functional form to dictate our findings, we limit the samples from all groups to a region of common support.[9] We take subsamples from the newly ill/insured, healthy/insured, and healthy/uninsured groups that match the distribution of assets, income, health, and demographic variables of the newly ill/uninsured group. This is a common technique in the program evaluation literature (Heckman, Ichimura, and Todd

Table 1: Sample Statistics before and after Matching

	Before Matching				*After Matching*			
	Un, Sick	*Un, H*	*Ins, S*	*Ins, H*	*Un, S*	*Un, H*	*Ins, S*	*Ins, H*
# of households	454	3,810	3,175	22,197	304	304	304	304
% with diabetes	28	*	24	0	25	*	23	0
% with cancer	14	*	17	0	16	*	16	0
% with heart disease	20	*	26	0	22	*	21	0
% with lung disease	13	*	13	0	12	*	13	0
% with psychiatric	26	*	22	0	21	*	22	0
% with stroke	10	*	8	0	8	*	8	0
Preillness assets								
Mean	U.S.$101,188	U.S.$144,388	U.S.$198,261	U.S.$228,789	U.S.$107,904	U.S.$109,551	U.S.$103,545	U.S.$108,302
Median	U.S.$11,078	U.S.$20,144	U.S.$65,672	U.S.$83,111	U.S.$14,267	U.S.$14,635	U.S.$13,730	U.S.$14,230
% with								
<U.S.$1,000	10.5	8.1	4.2	2.9	8.4	8.1	9.0	9.4
U.S.$1,000–U.S.$5,000	24.9	19.1	8.6	6.7	22.8	23.8	21.3	20.1
U.S.$5,000–U.S.$20,000	28.0	23.6	16.1	14.8	26.5	26.9	25.3	27.9
U.S.$20,000–U.S.$35,000	8.1	8.9	9.8	9.0	10.4	8.7	10.3	9.7
U.S.$35,000–U.S.$50,000	4.0	5.1	6.7	6.7	5.0	5.0	7.0	5.0
U.S.$50,000–U.S.$100,000	7.6	9.3	15.2	14.9	9.1	7.7	7.3	9.1
U.S.$100,000–U.S.$200,000	7.0	9.2	14.5	15.8	7.4	9.7	10.0	8.4
>U.S.$200,000	9.9	16.9	24.9	29.1	10.4	10.1	9.7	10.4
Preillness income								
Mean	U.S.$35,523	U.S.$45,988	U.S.$72,678	U.S.$75,489	U.S.$42,433	U.S.$41,837	U.S.$42,905	U.S.$42,493
Median	U.S.$23,552	U.S.$30,239	U.S.$58,748	U.S.$60,167	U.S.$31,185	U.S.$31,084	U.S.$31,104	U.S.$31,487
% with								
<U.S.$15,000	32.5	26.6	9.7	8.5	18.8	17.8	18.4	17.5
U.S.$15,000–U.S.$30,000	26.9	23.3	12.3	12.5	29.7	30.7	29.9	30.4

continued

Table 1. *Continued*

	Before Matching				*After Matching*			
	Un, Sick	*Un, H*	*Ins, S*	*Ins, H*	*Un, S*	*Un, H*	*Ins, S*	*Ins, H*
U.S.$30,000–U.S.$45,000	15.5	16.8	14.4	15.2	18.5	18.8	17.8	19.1
U.S.$45,000–U.S.$60,000	9.3	9.6	14.7	14.3	12.9	12.9	12.2	12.9
U.S.$60,000—75,000	4.4	6.5	12.3	12.2	6.6	7.3	6.6	6.3
>U.S.$75,000	11.5	17.3	36.5	37.3	13.5	12.5	15.1	13.9
% non-White	26	27	18	19	27	27	27	24
% with some college	31	36	54	57	33	35	39	35
% unmarried	38	36	25	32	37	37	37	38
% preexisting condition	52	45	56	47	50	50	50	51
% who own home	71	73	86	87	78	78	78	78
% change in assets								
Mean	1486	1327	74	123	2263	291	788	146
25th percentile	−96%	−76%	−57%	−48%	−92%	−76%	−71%	−67%
50th percentile	−41%	−19%	−6%	1%	−37%	−8%	−6%	−17%
75th percentile	35%	83%	73%	81%	57%	110%	105%	98%
90th percentile	410%	406%	281%	297%	436%	432%	487%	402%
99th percentile	6449%	6661%	3668%	2593%	6449%	7231%	20000%	6594%

Notes. *Less than 4% of healthy, uninsured households have a insured member with a new diagnosis of one of the six conditions.
All income and asset values are in 2006 dollars.

1998). The resulting samples from each group can then be compared with create valid estimates of the effect of a new illness on uninsured households.[10]

We match households on assets, income, pre-illness home ownership, presence of an existing medical condition, and (for the newly ill) the type of new illness, number of other new diagnoses, and existence of prior conditions for the newly ill individual. Matching on initial assets and income avoids bias that might arise if the uninsured have systematically different baseline wealth or income and illness therefore causes systematically different shocks to wealth in each group. Matching on marital status and household ownership addresses potential differences in financial stability and wealth accumulation resulting from household structure. The remaining matched characteristics (existing medical condition and type of new condition) account for potential differences in households' information about their health status. Thus, the matched households in our sample begin at a similar point financially (similar initial assets and income), have similar household structures, and have similar information on health status.

For each newly ill, uninsured household, we find all of the households in the relevant group that match exactly on marital status,[11] home ownership, and the presence of existing medical condition(s) for either household member. We also require that the newly ill/insured households match the newly ill/uninsured group on the type of new illness,[12] the number of other simultaneous new diagnoses, and the existence of prior conditions for the newly ill person.

To match on assets and income, we use a two-step procedure. First, we require that the potential matches are within 50 percent or U.S.$1,500 of the value of the newly ill/uninsured household's assets and income. We then calculate the Mahalanobis distance of income and assets between the newly ill/uninsured household and each matched household. We keep the household in each group that is closest to the newly ill, uninsured household. Mahalanobis matching has the advantage of being equal percent bias reducing (Rubin 1980), which means that the percent reduction in bias from matching on assets is the same as the percent reduction in bias from matching on income. Following Rubin (1980), we match without replacement on each of several random orderings of the newly ill/uninsured households and then select the matched set with the smallest Mahalanobis distance.

A common alternative approach to exact matching would be propensity-score matching, that is, matching only on the probability of being sick and uninsured. We chose exact and Mahalanobis distance matching over propensity score matching for several reasons. First, in order to get accurate

results, we needed to match as closely as possible on initial wealth and income. Propensity score matching would not have guaranteed the closest possible match on these two variables. Second, Heckman, Ichimura, and Todd (1998) show that when the propensity score must be estimated (as is usually the case), the coefficient estimates become less precise, requiring adjustment of the standard errors in our regression results. This is due to the inclusion of the propensity score on the right hand side of the estimation equation. Exact matching does not require adjustment of the standard errors because the procedure relies only on independent variables and not dependent variables (Ho et al. 2007). Finally, exact matching combined with Mahalanobis distance matching allows us to avoid making functional form assumptions on how the matching variables predict the probability of being uninsured.

We include one match in each category for each newly ill/uninsured household. Including further matches would diminish the number of newly ill/uninsured households with complete matches, particularly at the lower end of the asset distribution. Two-match results were similar. We exclude households that do not have matches in all three comparison groups. In our final matched sample, we have 304 newly ill/uninsured households, matched with 304 healthy/uninsured, 304 newly ill/insured, and 304 healthy/insured households.

Table 1 reports sample characteristics for four groups of households, classified by health status (newly ill/healthy) and insurance status (uninsured/insured). The right-hand columns report the characteristics before matching and the left hand show the characteristics of the matched subsample. Uninsured households in the full sample are more likely to have extremely low assets or income, more likely to be non-White, less likely to have attended college, and less likely to be homeowners than insured households. These differences disappear in the matched sample.

The bottom of Table 1 shows percent changes in assets for each of the four groups. While there is substantial variation within each group, the newly ill/uninsured tend to show the smallest percentage increase in assets and the largest losses.

Regression Specifications

We estimate both DD and 3D median regression equations. The DD regressions compare the change in assets of the newly ill/uninsured group with the change in assets of the newly ill/insured group. It is possible, however, that uninsured households and insured households accumulate wealth at different

rates. Our matching procedure eliminates differences in initial wealth between groups, but not differences in wealth trajectory. We therefore estimate 3D regressions to control for this potential difference in wealth trajectory. If insured households tend to accumulate assets faster than uninsured households, this difference will be controlled for by the 3D method. We present both sets of results, but base our conclusions on the 3D results, since these results account for the most differences across groups.

Median Regression

For all of our analyses we use median regressions rather than OLS. Median regression is more robust to extreme outliers than OLS, which is especially important considering the range of assets and asset changes in the HRS data displayed in Table 1.

Dependent and Control Variables

Our dependent variables are *asset_change*, which is the nominal difference between current assets and the assets in the previous survey (lagged assets), and *percent_asset_change*, which is the difference between current and lagged assets, divided by lagged assets.[13]

We include several controls defined at the household level: race, education, time dummies to control for economic conditions, household income before illness, marital status, existence of prior health conditions, and homeownership.[14]

The DD models contain only the newly ill/insured and newly ill/uninsured groups. The independent variable of interest is *uninsured*, an indicator for those households in which the newly ill individual was not covered by insurance.

The 3D model contains all four groups. The independent variables of interest are the indicator for insurance status in the wave before the reporting of the new disease (*uninsured*) and its interaction with *new illness* (*new-illness-uninsured*). (Thus, the newly ill/uninsured score a "1" for *uninsured, new illness*, and *new-illness-uninsured*.) The omitted group is healthy/insured households. Pursuant to our discussion of the impact of baseline wealth on change in wealth, in some regressions we exclude households with more than U.S.$200,000 in assets (roughly the upper 11 percent of the wealth distribution) and < U.S.$1,000 in assets (roughly the lower 8 percent). We expect the magnitude of the coefficient on *new-illness-uninsured* to increase when we make these exclusions.

RESULTS

Table 2 presents our results for the full-matched sample, and Table 3 presents results restricted to the three major diseases of heart disease, stroke, and cancer. We will focus our discussion on results with the broad definition of *new illness* and in which we restrict the sample to households with between U.S.$1,000 and U.S.$200,000 in baseline assets (Table 2, columns 1 and 3).

The top half of Table 2 presents results of our DD regressions. We find that the median nominal loss in assets for newly ill/uninsured households is U.S.$4,176 relative to the median loss in assets for newly ill insured households. We also find that the median percentage loss in assets for newly ill/uninsured households is 46.0 percent, again compared with the change for newly ill/insured households.[15] Both findings are significant at $p < .01$ or better. As seen in Table 3, the results are slightly bigger when we focus on the major illnesses of cancer, heart disease, and stroke. Income, race, education and marital status are significantly associated with asset growth in some specifications and have the expected signs for the most part.

These DD findings indicate that the uninsured experience substantial declines in assets when illness strikes, but they do not allow us to determine whether this is due to the illness per se or unobservable factors correlated with insurance status. The 3D results in the bottom halves of Tables 2 and 3 sort out these competing explanations. The coefficients on *uninsured* are close to zero and insignificant, providing weak evidence of bias due to unobservables. The coefficients on *newly ill, uninsured* are negative, large, and statistically significant. Controlling for trends in wealth in healthy/uninsured households and newly ill/insured households, the median additional nominal loss in assets for newly ill/uninsured households is U.S.$4,240. The median additional percentage loss in assets for newly ill/uninsured households is 53.8 percent. The demographic controls are significant in some but not all specifications. The coefficient on *new illness* is consistently positive but only marginally statistically significant ($p = .09$).

To illustrate the impact of a new illness, consider four households, one from each group, each having baseline assets of U.S.$20,000 (this is the 57th percentile of the distribution in the newly ill, uninsured group). Now suppose that 2 years later, the healthy/insured household still has U.S.$20,000 in assets.[16] Based on the 3D percentage change estimates using all new diseases, the healthy/uninsured and newly ill/insured households would have asset levels that were slightly larger but statistically indistinguishable from U.S.$20,000.

Table 2: DD and 3D Results: All New Diagnoses

	Asset Change (in U.S.$1000s)		*% Asset Change*	
Initial assets above *Initial assets below*	*U.S.$1k* *U.S.$200k*	*U.S.$0* *U.S.$3000k*	*U.S.$1k* *U.S.$200k*	*U.S.$0* *U.S.$3000k*
DD results				
Uninsured	**−4.176****	**−2.964***	**−0.460****	**−0.336****
	(1.486)	**(1.238)**	**(0.160)**	**(0.124)**
Initial income (in U.S.$1,000s)	0.030	−0.043*	0.001	0.000
	(0.031)	(0.019)	(0.003)	(0.002)
hh_nonwhite	−1.233	−0.659	−0.293	−0.145
	(1.661)	(1.410)	(0.178)	(0.142)
hh_college	1.336	1.718	0.187	0.175
	(1.706)	(1.417)	(0.183)	(0.141)
Unmarried	−2.756	−2.943*	−0.443*	−0.479**
	(1.762)	(1.465)	(0.189)	(0.145)
Preexisting condition	0.612	0.954	−0.085	−0.142
	(1.550)	(1.282)	(0.167)	(0.128)
Nonhomeowner	−0.003	1.193	−0.034	−0.058
	(1.840)	(1.568)	(0.199)	(0.158)
Constant	1.031	1.329	0.157	0.163
	(2.541)	(2.081)	(0.274)	(0.205)
N	484	608	484	608
3D results				
Uninsured	−0.218	−0.165	0.078	0.023
	(1.304)	(1.205)	(0.137)	(0.107)
New-illness-uninsured	**−4.240***	**−3.006**$^{+}$	**−0.538****	**−0.333***
	(1.830)	**(1.692)**	**(0.192)**	**(0.150)**
New illness	1.660	0.940	0.240^{+}	0.117
	(1.289)	(1.196)	(0.136)	(0.107)
Initial income (in U.S.$1,000s)	0.059**	0.022^{+}	0.005*	0.001
	(0.019)	(0.013)	(0.002)	(0.001)
hh_nonwhite	−1.679	−0.872	−0.272*	−0.217*
	(1.066)	(0.998)	(0.112)	(0.089)
hh_college	2.534*	1.206	0.195^{+}	0.212*
	(1.064)	(0.973)	(0.111)	(0.086)
Unmarried	−0.631	−1.011	−0.202^{+}	−0.292**
	(1.112)	(1.023)	(0.116)	(0.091)
Preexisting condition	0.018	−0.032	−0.143	−0.147^{+}
	(0.982)	(0.896)	(0.103)	(0.080)
Nonhomeowner	−0.165	0.179	−0.159	−0.147
	(1.173)	(1.099)	(0.123)	(0.099)
Constant	−1.990	−0.494	−0.153	−0.011
	(1.748)	(1.545)	(0.183)	(0.137)
N	968	1216	968	1216

Notes. All regressions also include year dummies to control for time varying macroeconomic conditions.

$N = 608$ includes 304 newly ill/uninsured households and 304 newly ill/insured households. $N = 1216$ includes 304 newly ill/uninsured households and 304 households from each comparison group.

62 newly ill/uninsured households have assets over U.S.$200,000 or under U.S.$1,000; these households and their matches are excluded from the regressions in columns 1 and 3.

All new diagnoses (diabetes, cancer, heart conditions, lung conditions, stroke, and psych.) are included in new illness and new-illness-uninsured.

Koenker–Bassett (1978) standard errors for median regression are reported in parentheses.

Bold text indicates the variable of primary interest.

$^{+}p < 0.1$; $*p < .05$; $**p < .01$.

DD, difference-in-difference; 3D, triple difference.

(Assets increase to U.S.$21,560 for the healthy/uninsured and U.S.$24,800 for the newly ill/insured household.) The newly ill/uninsured household, however, would have U.S.$15,600. If we limit attention to the three major illnesses, the newly ill/uninsured household would have U.S.$9,740.[17]

DISCUSSION

We provide compelling evidence of the financial damage illness causes in uninsured families. We show that the median near-elderly household with a newly ill, uninsured member substantially depletes its accumulated assets while controlling for financial changes that occur among the healthy uninsured and the newly ill insured.

Compared with the uninsured, matched insured households suffer no measurable loss of assets upon falling ill. We caution that our analysis does not include a representative sample of insured households—these households have finances similar to uninsured households. They have relatively low assets and income and are more likely than others in their age cohort to have group health insurance rather than individually purchased coverage. Group health insurance is often more generous than individual insurance and might provide better financial protection. Our results suggest that when these households have a severe illness they do not deplete their savings. Extending the time horizon might show that they eventually spend down their assets, however.

We have only examined part of how illness affects uninsured households. They may also experience dramatic changes in consumption, labor force participation, and home equity. Additionally, the financial burden may persist for many years—we measure the impact at most 2 years after onset of a new illness. Thus, our estimate is a lower bound on the full financial impact of illness for the uninsured.

Some, but not all, of our findings are similar in spirit to those in Himmelstein et al. (2005), who report a strong connection between illness and bankruptcy and tie this link to inadequacies in health insurance coverage. Our findings suggest that the existing health insurance system does offer financial protection, at least among insured households that are sociodemographically similar to uninsured households. Thus, it may be possible to afford financial protection to all Americans through expansion of the current system. Whether such an expansion is achievable and affordable with current markets for insurance and medical care remains to be seen. Until such reforms are implemented, millions of Americans are potentially one illness away from financial catastrophe.

Table 3: DD and 3D Results: Major New Diagnoses Only

	Asset Change (in U.S.$1000s)		*% Asset Change*	
Initial assets above *Initial assets below*	*U.S.$1k* *U.S.$200k*	*U.S.$0* *U.S.$3000k*	*U.S.$1k* *U.S.$200k*	*U.S.$0* *U.S.$3000k*
DD results				
Uninsured	**−5.385****	**−4.511***	**−0.465**$^{+}$**	**−0.440****
	(1.726)	**(2.046)**	**(0.251)**	**(0.153)**
Initial income (in U.S.$1,000s)	0.069*	0.069*	0.001	0.000
	(0.033)	(0.027)	(0.005)	(0.002)
hh_nonwhite	0.529	−1.269	−0.095	−0.151
	(1.956)	(2.324)	(0.291)	(0.175)
hh_college	3.785^{+}	0.689	0.311	0.265
	(1.962)	(2.307)	(0.286)	(0.171)
Unmarried	−0.601	−2.292	−0.509^{+}	−0.651**
	(2.123)	(2.472)	(0.307)	(0.183)
Preexisting condition	2.103	1.433	−0.048	−0.116
	(1.869)	(2.208)	(0.269)	(0.165)
Nonhomeowner	2.658	2.378	0.010	−0.063
	(2.297)	(2.707)	(0.328)	(0.203)
Constant	−3.214	−3.319	−0.152	−0.070
	(2.915)	(3.408)	(0.416)	(0.253)
N	248	310	248	310
3D results				
Uninsured	−3.218^{+}	−0.801	−0.265	−0.156
	(1.725)	(1.336)	(0.201)	(0.155)
New-illness-uninsured	**−2.669**	**−4.202***	**−0.328**	**−0.154**
	(2.437)	**(1.895)**	**(0.286)**	**(0.220)**
New illness	0.457	2.395^{+}	0.086	0.013
	(1.720)	(1.338)	(0.203)	(0.156)
Initial income (in U.S.$1,000s)	0.094**	0.036**	0.005	0.001
	(0.023)	(0.012)	(0.003)	(0.001)
hh_nonwhite	0.034	0.326	−0.161	−0.066
	(1.384)	(1.085)	(0.162)	(0.125)
hh_college	2.505^{+}	2.649*	0.102	0.254*
	(1.413)	(1.064)	(0.165)	(0.123)
Unmarried	1.142	−0.326	0.060	−0.140
	(1.517)	(1.162)	(0.179)	(0.134)
Preexisting condition	1.579	0.830	0.035	−0.052
	(1.336)	(1.050)	(0.157)	(0.120)
Nonhomeowner	1.675	1.891	−0.258	−0.276^{+}
	(1.666)	(1.327)	(0.195)	(0.150)
Constant	−3.509	−3.354^{+}	−0.127	−0.045
	(2.288)	(1.743)	(0.270)	(0.199)
N	496	620	496	620

Notes. All regressions also include year dummies to control for time-varying macroeconomic conditions.

$N = 310$ includes 155 newly ill/uninsured households and 155 newly ill/insured households. $N = 620$ includes 155 newly ill/uninsured households and 155 households from each comparison group.

31 newly ill/uninsured households have assets over U.S.$200,000 or under U.S.$1,000; these households and their matches are excluded from the regressions in columns 1 and 3.

Only new diagnoses of heart conditions, stroke, and cancer are included in new illness and new-illness-uninsured.

Koenker–Bassett standard errors for median regression are reported in parentheses.

Bold text indicates the variable of interest.

$^{+}p < 0.1$; $*p < .05$; $**p < .01$.

DD, difference-in-difference; 3D, triple difference.

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Disclosures: None.

Disclaimers: None.

NOTES

1. This analysis uses Early Release data from the Health and Retirement Study (Core Early V2.0, Sep 2007), sponsored by the National Institute of Aging (grant number NIA U01AG009740) and conducted by the University of Michigan. These data may contain errors that will be corrected in the Final Public Release version of the dataset.
2. Kaiser Family Foundation, http://www.kff.org/uninsured/7451.cfm
3. Some individuals may qualify for disability. However, there is a 2-year waiting period to receive medical benefits.
4. By contrast, the median total annual medical expenses of an uninsured household with no new illnesses are U.S.$1,500.
5. The RAND HRS asset measures do not include the value of defined benefit pension plans, retirement annuities, or 401k plans.
6. These cutoffs correspond to the 99th percentile of the pooled income and asset distributions. Please see the RAND HRS version H documentation for imputation details.
7. In unreported specifications, we include an indicator for one insured and one uninsured household member. The coefficient is small and other results are unchanged.
8. Similar problems can arise due to differences in other right-hand-side predictors, provided that there is uncertainty about the proper specification of the right-hand side.
9. Because we are using median regression, we cannot readily use a Box Cox transformation to ascertain the best way to specify the dependent variable. Even then, we would be relying on fit rather than the underlying economics.
10. Exact matching also yields a gain in efficiency over comparing unmatched samples (Cochran 1953).
11. We include unmarried couples with shared finances in the "married" category.
12. For people with more than one new diagnosis, we match on the first disease in the following order: stroke, cancer, heart, lung, psychiatric, and diabetes. Thus, an uninsured person newly diagnosed with both cancer and diabetes would be matched to an insured person with cancer and one other condition.
13. We also estimated the percent asset change based on the average of lagged and current assets and the log of the ratio of current and lagged assets, with similar results to those reported herein.
14. A household is considered non-White if either spouse is nonwhite and college educated if either spouse attended some college. A household has a preexisting condition if either spouse reported one of our six conditions in an earlier survey wave.

15. The consistency of the linear and log specifications confirms the effectiveness of the matching algorithm; our results are not contingent on functional form.
16. Assuming that this household has median initial income (U.S.$30,000) and is in the omitted categories for all other characteristics, we can calculate their expected percentage asset change by adding the constant term (− 0.153) to the coefficient on income (0.005) times their income in thousands (30). The resulting predicated percentage asset change is − 0.3 percent, and it is both statistically and economically insignificant.
17. We obtain this by adding the coefficients on *uninsured*, *newly ill*, and *newly ill/uninsured*. The newly ill/uninsured figure is marginally insignificantly different from the assets of the healthy/insured ($p = .11$). The figure of U.S. $9,740 for the major diseases is significantly different from U.S.$20,000 at $p < .05$.

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SUPPORTING INFORMATION

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Appendix SA1: Author Matrix.

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