Short-Run Effects of Job Loss on Health Conditions, Health Insurance, and Health Care Utilization

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Job loss in the United States is associated with long-term reductions in income and long-term increases in mortality rates. This paper examines the short- to medium-term changes in health, health care access, and health care utilization after job loss that lead to these long-term effects. Using a sample with more than 9800 individual job losses and longitudinal data on a wide variety of health-related measures and outcomes, we show that job loss results in worse self-reported health, including mental health, but is not associated with statistically significant increases in a variety of specific chronic conditions. Among the full sample of workers, we see reductions in insurance coverage, but little evidence of reductions in health care utilization after job loss. Among the subset of displaced workers for whom the lost job was their primary source of insurance we do see reductions in doctor's visits and prescription drug usage. These results suggest that access to health insurance and care may be an important part of the health effects of job loss for some workers. The pattern of results is also consistent with a significant role for stress in generating long-term health consequences after job loss.

Over the course of the Great Recession more than 8 million Americans lost their jobs. A growing body of research in economics points to adverse and long-lasting consequences of worker displacement. These include significant decreases in lifetime earnings, reduced job stability, increased likelihood of divorce, lower fertility, and negative impacts on health, education, and labor market outcomes for the children of the displaced.[1] A particularly grim addition to this literature is the finding that job loss results in sharply increased mortality for US workers. Sullivan and von Wachter (2009) estimate that displacement is associated with a 10-15% increase in a worker's annual death hazard – an implied loss in life expectancy of 1-1.5 years for an individual displaced at age 40.

Despite the dramatic magnitude of the mortality effects of job loss, little is known about why job loss leads to increased mortality. Many potential pathways exist, including reduced income and access to health insurance, reductions in continuity of care due to changes in insurance coverage or geographic mobility, increased prices of health care as a result of insurance loss or changes, and the substantial stress associated with reduced and variable earnings following job displacement. Persuasively identifying how job loss leads to reduced health is made difficult by the fact that poor health may lead to selection for displacement, or to difficulty becoming re-employed, both of which can raise doubts about causality in cross-sectional comparisons, even with large sample sizes and many controls. These factors make it critical to utilize methods—often based on longitudinal data—that can more clearly establish the direction of causality between job loss and health outcomes. The multiple potential pathways by which job loss may affect health also make it important to consider a variety of outcomes,

[1] See, among others, Ruhm (1991), Jacobson, Lalonde and Sullivan (1993), Stevens (1997), Charles and Stephens (2004), Lindo (2009), Lindo (2011), Stevens and Schaller (2011), Oreopoulos, Page, and Stevens (2008).

including health conditions, utilization of medical care, and insurance coverage, in the same study and estimation framework.

This paper combines short panels from the Medical Expenditure Panel Survey (MEPS) covering the years 1996 through 2011 to study the effects of job loss on health conditions, health insurance coverage, and health care utilization and expenditures. The MEPS is uniquely suited for analysis of the health effects of displacement and allows us to improve on existing research in two ways. First, by combining many panels of the MEPS data we generate larger sample sizes of displaced workers than are typically available from non-administrative data, with almost 10,000 involuntary job losses. At the same time, the MEPS contains detailed longitudinal information on a wide set of health outcomes, health insurance coverage and its source, and detailed (self-) reports of expenditures on and utilization of health care. This allows us to push the literature on job loss and health forward by presenting estimates that more convincingly isolate the causal impact of job loss on health outcomes, comparing how these estimates are affected by specification and treatment of the control group, and comparing effects on conditions, insurance, and utilization for a common sample.

Using models that include both individual fixed effects and baseline health measures interacted with trends, we find that involuntary job loss is associated with increased likelihood of self-reported fair or poor health in the short-run, as well as significant declines in self-reported mental health, depression, and anxiety. We see no robust, significant effects on the incidence of specific chronic physical conditions (diabetes, arthritis, hypertension or high cholesterol) within the first two years following job loss.

Turning to estimates of the effects of displacement on insurance status and health care utilization, we find that job loss is associated with a 9.9 percentage point decrease in the probability of being covered by any health insurance and a 12.8 percentage point increase in the probability of experiencing a spell of non-insurance in the current interview round. While we find that job loss has no

statistically significant effect on health care utilization and expenditures for the sample as a whole, we do find that job loss negatively impacts utilization among the sample of workers who held insurance through their employer prior to the job loss. Among this sample with larger insurance and utilization effects, as in the full sample, we again find significant negative effects of job loss on self-reported health status and mental health outcomes, but no significant effects on the likelihood of reporting any specific chronic conditions. There is no evidence that greater incidence of uninsurance in this subsample leads to larger effects on health outcomes.

Taken as a whole, our results suggest that job loss has significant negative effects on the health of displaced workers in the short run, with the largest effects on mental health and self-reported health status, and no measurable effects on the incidence of specific chronic conditions like arthritis, diabetes, cholesterol, and hypertension. Loss of insurance seems to drive reductions in health care utilization, but does not seem to result in more pronounced negative effects on self-reported health or mental health problems.

I. Related Literature

The background for this study and many other recent studies comes from early work that establishes the large and permanent effects of job loss on earnings (Jacobson, Lalonde, and Sullivan (1993), Couch and Placzek (2010)) and, more recently, the large effects of job loss on mortality. Specifically, Sullivan and von Wachter (2009) show that displaced workers are 10-15% more likely to die in the two decades following job loss.[2] These results are concentrated among workers losing jobs before age 50, with older displaced workers facing much smaller mortality effects in the aftermath of job loss.

[2]Smaller mortality effects have been found using European administrative data (Rege, Telle, and Votruba (2009), Eliason and Storrie (2009), Browning and Heinesen (2012)).

Sullivan and von Wachter also show that the extent of the mortality effects seem to be correlated with the size of earnings losses and the volatility of earnings after job loss. Unfortunately, the administrative data utilized by Sullivan and von Wachter do not contain any information on the cause of death, or the types of underlying health changes that could lead to increased mortality.

These findings have sparked several recent investigations into short- and medium-run health changes that result from displacement. Findings using data from the United States (where evidence on negative earnings and mortality effects from job loss is strongest) produce mixed results. Salm (2009) uses the Health and Retirement Study (HRS) and a sample of workers ages 50 and over and finds little evidence of negative effects of job loss on mental or physical health outcomes. This lack of effect for older workers (average age in Salm's sample is 55 years) is consistent with earlier work by Sullivan and von Wachter (2009) who argue that older workers may be close enough to eligibility for retirement benefits that the earnings losses and uncertainty that follow displacement are mitigated and with them, many of the negative health effects. Salm also has a relatively small sample (around 370) of displaced workers (defined as those losing jobs due to firm closings) and includes only two observations per worker—one pre- and one post-displacement. Other work using the HRS (Gallo, et al. (2000), for example) faces similar sample size and age limitations.

Using data from the Panel Study of Income Dynamics, Strully (2009) finds that job loss is associated with a higher likelihood of self-reported fair or poor health and increased onset of new health conditions. Her sample includes a broader set of ages, but includes only 200 workers losing jobs due to a firm closing. She finds some evidence of negative effects on self-reported health and increases in the onset of new conditions after job loss. These results include controls for baseline health reports, but look only at a single point in time after the job loss.

Several studies have utilized large administrative data sets from European countries that contain large numbers of displaced workers, but typically lack repeated, longitudinal measures of health outcomes or other health measures. Black, Devereux, and Salvanes (2012), for example, have longitudinal data on earnings and employment for all of Norway, but observe health outcomes for individuals only at a single point in time. They use a rich set of individual characteristics to control for differences between displaced and not-displaced individuals, but are unable to control for individual fixed-effects in health measures or use longitudinal data on health. Black, Devereux, and Salvanes find that job loss results in small increases in smoking and reductions in an index of cardiac health. They also show, consistent with previous work on job loss in Norway, that the earnings effects of job loss are much smaller in Norway and that Norwegian workers have access to generous, long-term unemployment insurance. Thus it is unclear whether we would expect very large associated health effects in this setting. They do not have information on health insurance coverage or healthcare utilization. Other papers have also pointed to relatively modest health effects after job loss using European data (see Browning et al. (2006), Browning and Heinesen (2012)).[3]

The findings of relatively small health effects in Europe could reflect that job loss may be less of an economic shock in Europe than in the United States, given more generous social insurance and employment stability policies. It could also reflect broader availability of health insurance not tied to employment. Overall, the limitations of existing studies leave open the question of how, in the United States at least, the economic shock associated with job loss is translated into increased mortality over several decades.

[3] An exception to the pattern of limited health effects using European data comes from Bergemann, Gronqvist, and Gudbjornsdottir (2011) who use data from Sweden and find increased rates of diabetes after job loss among certain groups.

Another limitation of the existing literature is that alternative health-related outcomes have been analyzed in isolation. The above studies focus on health conditions or self-reported health, while separate studies have looked at effects on insurance coverage (Gruber and Madrian (1997), Lin (2005)). Job loss generates reductions in insurance coverage, and may change access and costs of care for many, and these could be related to short- and long-term changes in health. Only by analyzing health conditions, insurance, and health care utilization in a unified study are we likely to make progress on understanding the full health effects of job loss.

Given this backdrop, our paper makes an important contribution by combining U.S. data on job losses, which we know are associated with both large earnings losses and large mortality effects, with a variety of health-related outcome measures. In addition, because we have longitudinal data and repeated observations (up to five observations per worker) of our health measures, we can use more robust models to control for unobserved characteristics that may be correlated with job loss. Specifically we include individual fixed-effects and baseline health measures interacted with trends to isolate the effects of job loss on several key health outcomes. We can also compare results across displaced workers with different baseline insurance sources and status, to gain clues about the likely drivers of the health effects of job loss.

II. Statistical models of the health effects of job loss

Our approach to understanding the health effects of job loss is motivated by the well-established empirical models of job loss and earnings, but also informed by a standard health production function. Specifically, many previous authors (Jacobson, Lalonde, Sullivan 2003, Stevens 1997, Schmieder, von Wachter and Bender, 2012) model earnings effects of job loss using specifications such as:

(1a) $$lnE_{it} = \alpha_i + \gamma^k \sum_{k=-2}^{K} D_{it}^k + \beta X_{it} + Y_t + \varepsilon_{it}$$

(1b) $$lnE_{it} = \alpha_i + \delta_i t + \gamma^k \sum_{k=-2}^{K} D_{it}^k + \beta X_{it} + Y_t + \varepsilon_{it}$$

The log of earnings (E_{it}) for person i in year t is modeled as a function of individual fixed-effects (α_i) and a vector of dummy variables indicating years before and after the job loss (D^k_{it}). In some specifications, an individual-specific trend is also included, as shown in equation (1b). Additional control variables (X_{it}) may be included, such as higher order terms in age or experience, along with a set of calendar year dummies (Y_t). The individual fixed effects and trends are necessary to isolate the effects of displacement from pre-existing levels or trends in earnings that may be correlated with job loss. Such specifications use observed earnings prior to job loss to establish the counterfactual pattern of earnings if the job loss had not occurred. A control group of never-displaced workers helps to estimate the common (to displaced and non-displaced workers) age and calendar year terms and identify the counterfactual pattern of earnings.

Using this framework to estimate the effects of job loss on health requires consideration of a simple health production function, as originally suggested by Grossman (1972). Specifically, let an individual's health stock in some period be expressed as a function of their lagged health, investment in health this period (I), and depreciation (at rate θ) of health this period.

(2) $$H_{it} = (1 - \theta_{it}) H_{i,t-1} + I_{it}$$

(3) $$I = F(M, T, \mathrm{E})$$

Investment in health is in itself a function of market-based health care inputs (M), an individual's time devoted to improving health (T), and an individual's human capital (E), which may affect the efficiency with which purchases of medical care or time investments produce next period's stock of good health.

Considering these inputs into health production jointly with the direct effects of job loss on employment, earnings, and health insurance coverage, it is easy to see how job loss can alter health. Earnings losses and employment changes may reduce spending on health care inputs (M). Loss of insurance may increase the price of health care inputs and so further reduce the quantity of health inputs. Time allocation towards health (T) may change after displacement, although the direction of this change is not clear. Less time may be spent in market work initially, but job changes, stress and uncertainty may result in less time being allocated toward health after displacement. Combining these factors and replacing earnings with health on the left-hand-side of equation (1a) or (1b), a dummy variable indicating displacement is likely be associated with reduced health as the result of displacement's effects on health expenditures and (possibly) time investments.

An important element of previous studies of displacement that we extend to our estimates of the health production function is the use of a fixed-effects specification, or similar methods, to control for unobservable individual characteristics. A primary concern in this case is that human capital (E), which is a key determinant of health in our production function, is likely to have both observed and unobserved components that are correlated with job loss probabilities. Thus, in order to control for individual characteristics that might be correlated with earnings, human capital and ability, it is important to include individual fixed effects, or otherwise utilize pre-displacement values of health outcomes. Given this, our main specifications used in the analysis are given by:

(4a) $$H_{it} = \alpha_i + \gamma PD_{it} + \beta X_{it} + Y_t + \varepsilon_{it}$$

(4b) $$H_{it} = \alpha_i + \delta_i t + \gamma PD_{it} + \beta X_{it} + Y_t + \varepsilon_{it}$$

(4c) $$H_{it} = \alpha_i + \theta H_{i0} t + \gamma PD_{it} + \beta X_{it} + Y_t + \varepsilon_{it}$$

Equation (4a) is a standard fixed-effects specification. Note that, because we have only five observations per person, we collapse all post-displacement indicators into a single indicator for the post-displacement periods (PD_{it}). In addition, in most specifications we do not include a dummy for the period prior to displacement. In specification testing we show that including the pre-displacement controls in this case do not substantially change our results. Equation (4b) adds the individual-specific trend, allowing for the possibility that underlying health may have a trend that is correlated with displacement. In practice, with a relatively small number of time periods per person, we may not have sufficient power in the longitudinal data to identify the person-specific trend. As an alternative, we estimate models in which we specify the individual effect, δ_i, as a linear function of baseline (round 1) self-reported health (H_{i0}), so that the individual-specific trend in (4b) is replaced with a summary measure of an individual's health status (baseline health) prior to any displacements. This specification, summarized by (4c) suggests that health outcomes should have an individual-specific average and trend, and that the effects of job displacement will be measured as deviations from that trend.

III. Data

The data for this analysis are from the Household Component of the Medical Expenditure Panel Survey (MEPS), maintained by the Agency for Healthcare Research and Quality. The MEPS collects data from a nationally representative subsample of households that participated in the prior year's National Health Interview Survey (conducted by the National Center for Health Statistics). The MEPS interviews respondents five times over a period covering two calendar years, collecting data on demographic characteristics, health status, health care utilization and expenditures, health insurance coverage, income, and employment status. Our data include fifteen waves of the MEPS, covering the period 1996-

2011. We limit our analysis to individuals between the ages of 21 and 65 that are employed in the first round of the survey.[4]

The MEPS is ideally suited to this analysis for a few reasons. First, the set of medical conditions identified in the MEPS is far broader than those used in previous studies, allowing us to study not only general self-reported health and mental health, but also a variety of specific conditions including depression and anxiety, diabetes, arthritis, hypertension, high cholesterol, and cancer, among others. Second, the MEPS allows us to go beyond the health consequences of displacement and study the mechanisms behind this relationship – changes in insurance coverage, the frequency of medical care, and total expenditures on care. Finally, we are not limited by small sample sizes, as previous panel data studies have been. By combining MEPS data from 1996 through 2011 we have over 460,000 person-round observations and observe over 9800 job losses.

Our indicator for job displacement is constructed from a survey question asking the respondent to identify the main reason why he or she changed jobs since the last round of interviews. We define involuntary job loss to include three responses: (1) job ended; (2) business dissolved or sold; and (3) laid off. By this definition, we identify 9,892 individuals that experience involuntary job displacement after round 1 of the survey, and 91,459 individuals that are never displaced.

Our outcome variables fall into three categories: (1) health outcomes; (2) health insurance status; and (3) health care utilization. Data on health outcomes are compiled from the main MEPS household survey file and the Medical Conditions file. In the household survey, the respondent was asked to rate the health and mental health status of each person in the family according to the following categories: excellent, very good, good, fair, and poor. From these variables, we create indicators equal

[4] Additional analysis, available upon request, shows that our results are very similar if we instead restrict the sample to include only individuals that worked full time in the first round of the survey, or to individuals with one or more years of job tenure in round 1.

to one if health and mental health were recorded to be fair or poor. The Medical Conditions file includes specific medical conditions that were reported directly from the respondent, recorded verbatim by the interviewer, and then coded by professional coders to fully-specified ICD-9-CM codes. Medical conditions can appear in a given round in one of several ways. First, conditions categorized as "priority conditions" are asked about in a condition enumeration section of the main survey and coded as present for a specific round if they are described as "current" in the survey for that round. Second, health conditions associated with specific events occurring in each round, such as hospital stays, doctor visits, disability days, and prescription drug purchases, are added to the file. Finally, respondents may report that a specific condition is "bothering them during a survey round. To preserve confidentiality, condition codes are collapsed to 3-digit code categories. We use these 3-digit codes to identify a set of six specific conditions: arthritis, diabetes, high cholesterol, hypertension, cancer (potentially a placebo test for direct health effects of displacement), and anxiety or depression.[5]

Health insurance indicators are constructed from variables identifying whether a survey respondent was covered by a particular type of insurance at any time during each month of the panel. The variables are equal to one if the respondent was insured at any point during the month of the interview. In order to capture spells of uninsurance, we also generate a variable equal to one if the respondent was without insurance for any month of the round.

Finally, data on health expenditures and health care utilization come from three separate event file components of the MEPS – the Prescribed Medicines file, the Emergency Room Visits file, and the Office-Based Medical Providers file. These files contain data on the number of office-based visits to a

[5] As each of the conditions that we consider is considered a priority condition, the reporting of the conditions should not be mechanically dependent on the utilization of care (i.e. the number of health "events" in a specific round). However, to the extent that individuals are more likely to describe as "current" a condition for which they have recently seen the doctor or filled a prescription, utilization of medical care and likelihood of reporting medical conditions may be correlated. It is also possible that frequent care makes it more likely that individuals will be diagnosed and thus become aware that they have a specific medical condition.

doctor and number of visits to the emergency room, as well as the amount paid by family, insurance, and other sources for each medical event that occurred in the round, including the purchase of prescription drugs. We collapse the data to the person-round level to generate total number of visits and expenditures by category for each individual.

IV. RESULTS

Sample means, presented in Table 1, make clear the importance of controlling for observable and unobservable characteristics that may be correlated both with the likelihood of involuntary job displacement and with health-related outcomes. We compare characteristics for two groups: workers that experience an involuntary displacement sometime after the first round of data collection and workers that are never displaced.[6] Displaced workers are more likely to be male, more likely to be black or Hispanic, and slightly younger than their continually-employed counterparts. They are also less-educated: 16% of the displaced sample has less than a high school degree, compared with 10% of the non-displaced group, and only half have attended any college, compared with 59% of the non-displaced group.

Differences between the displaced and non-displaced groups are also apparent when considering health-related outcomes. Notably, while displaced workers are more likely to have their general health categorized as "Fair" or "Poor" and are more likely to experience poor mental health, they are less likely to report several of the specific health conditions, including diabetes, high cholesterol and hypertension. While this discrepancy may be due to differences in the prevalence of these conditions between these two groups, it also may be due to the reduced rate of health insurance coverage among workers that will eventually be displaced: only 68.9 percent of the displaced sample is

[6] Observation numbers in Table 1 show that there is sample attrition between Rounds 1 and 5. We have also conducted analysis on a balanced panel – a sample in which every observation has complete data in each round of the panel – and find that our results are robust to this sample change.

covered by any insurance in the initial round of the sample, while 84.2 percent of the never-displaced sample is covered. The gap in health insurance coverage may also explain differences in health care utilization between the two groups even prior to any displacements: displaced workers are less likely to visit the doctor's office and less likely to use prescription drugs, and more likely to visit the emergency room, where treatment can often be obtained without health insurance.

These large pre-existing differences in insurance status suggest that it may be critical to check sensitivity of these results to controlling for pre-existing differences in insurance coverage between displaced and not displaced workers. If less financially stable firms, for example, are less likely to offer health insurance policies for their workers, there could be substantial selection of workers into firms that are most likely to close or lay off their workers, leading to bias in estimates of the effects of job loss that cannot control for insurance status. This could mean that those who are displaced would have been less healthy even in the absence of the job loss, given their lower levels of access to health coverage. In contrast, if healthier workers disproportionately select into firms that do not offer health insurance as part of their compensation package, the resulting bias could go in the other direction. Our inclusion of both fixed-effects and trends interacted with baseline health, which has not often been done in previous work, reduces the likelihood that results are driven by pre-displacement differences across workers. We also conduct some of our analysis on the subset of workers who have insurance through their employers as of round 1, and prior to any of the displacements. This results in a better balance of displaced and non-displaced workers and allows us to draw some suggestive conclusions about the role of insurance in driving effects on health outcomes and utilization for this subset of workers.

Table 2 shows results from our baseline set of health regressions. We begin by looking at the effects of job displacement on health outcomes, defining displacement broadly to include those who

report that they were laid off, their job ended, or their business was dissolved or closed. To account for both observable and unobservable differences between displaced and non-displaced workers, our starting point is a standard specification, described in equation (4a) above that includes individual fixed effects; these results are summarized in column (3) of Table 2. For comparison, column (1) of that Table shows mean levels of each health outcome as of round 1 and column (2) shows a specification without individual fixed-effects that instead includes controls for baseline self-reported health and mental health and dummies for gender, race, and educational attainment categories in addition to age and calendar year fixed effects – an approach that has been common in the previous literature. Finally, in column (4) we show our preferred specification (based on equation (4c)) that includes both individual fixed-effects and an interaction between round 1 self-reported health and a trend term, meant to proxy for individual-specific trends that are correlated with underlying health status.[7] The results in column 4 of Table 2 show that displacement increases the probability of having a self-reported physical health status of fair or poor by approximately 1.5 percentage points, or roughly 18 percent of the baseline probability, with the effect statistically different than zero at the 1 percent level. The effect is slightly larger than effects shown in column 2, without fixed effects, and significantly larger than effects shown in column 3 that do not control for a time trend. For virtually all outcomes examined (see later rows of Table 2) we find somewhat smaller effects of displacement in the specifications that use fixed-effects specifications. Thus, to be conservative in quantifying the causal portion of negative health outcomes following job loss, we rely on the specification from column 4 for the remaining results.

The next rows of Table 2 show the effects of displacement on a variety of other health conditions. We include a number of specific chronic conditions that may be plausibly linked to job loss via direct or indirect mechanisms. First, we consider the incidence of arthritis and diabetes, as much

[7] We have also estimated a slightly less restricted model in which trends are interacted with five dummies for the value of self-reported health (rather than just the continuous measure of self-reported health) and obtained very similar results.

evidence suggests that episodes of acute stress (and more chronic stress) can be associated with onset and increased symptoms of both diseases (Hasset and Clauw (2010), deBrouwer et al. (2010), Surweit, Schneider and Feinglos (1991)). We also include cholesterol and hypertension – two conditions that have not been linked directly to stress, but may reflect changes in health behaviors after displacement. Specifically, if job loss and the associated stress leads to changes in smoking, drinking, nutrition, or exercise, conditions likely to be affected by such behaviors may be affected as well, and we include cholesterol and hypertension to check for this mechanism. Finally, as a placebo test for direct health effects of displacement, we include cancer since it seems unlikely that any behavioral change (or changes to health care) from job loss would be associated with cancer in the short (approximately two years on average) time frame after job loss considered here.

As shown in the next two rows of Table 2, we find positive and significant increases of approximately 7 to 8 percent in the incidence of both arthritis and diabetes following displacement but these effects are not robust to inclusion of baseline health interacted with a trend. We find no evidence of increases in either high cholesterol or hypertension. Finally, as expected, we find no significant increase in the onset of cancer, which suggests that we are not picking up spurious negative changes in health that are simply correlated with the likelihood of job loss. We do, however, find a marginally significant reduction in reported cancer following job loss. While this is only suggestive, one possibility is that reductions in health care utilization delay diagnosis of some conditions, like cancer, leading to the appearance of reduced incidence when we rely on self-reports of conditions.

We also study the effects of displacement on two mental health outcomes: a self-reported measure of mental health that is fair or poor, and a report of experiencing depression or anxiety. Mental health effects of displacement may play an important role in mediating the effects of job loss not only on physical health, but also on a number of other outcomes that have been examined in the literature

including marital dissolution and children's wellbeing. These results are presented in the lower panel of Table 2. Not surprisingly, we find that job loss leads to substantial increases in both of these measures of mental health. The probability of self-reporting fair or poor mental health rises by 38 percent after job loss, and reports of depression or anxiety rise by about 22 percent.

The fact that we find significant increases in the number of workers reporting poor or fair health, but no increase in specific physical conditions is somewhat surprising. Of course, the increase in anxiety and depression could lead workers to report worse health. It may also be that other conditions and minor illnesses are occurring that lead to these reports. Finally, reporting a specific condition requires that individual have been diagnosed (or at least that they have self-diagnosed) and this may depend on access to and utilization of health care, which we explore below. Previous work shows that specific conditions are frequently misreported by individuals (see Baker et al. (2002)), and so self-reported summaries of health may be more reliable. It is also true that summary measures of self-reported health have been linked to mortality (Idler and Benyamini (1997)), and so may be particularly important here, given our interest in understanding the connections between short-term health effects of displacement and mortality.

We next consider the extent to which displacement alters access to health insurance and health care utilization, again using specification (4c). In Panel A of Table 3 we show the effects of displacement on several measures of insurance, including the probability of having any insurance coverage at the round-specific survey date, the probability of having private or public insurance coverage, and the probability of having any period (between interviews) uninsured. The first column shows that individuals who are displaced are approximately 10 percentage points less likely to have any source of health insurance following job loss. Recall that the "post-displacement" period here ranges from a few months (for those displaced between rounds 4 and 5) to just under 2 years for those displaced soon

after the round 1 interview. This effect consists of a slightly larger reduction in access to private insurance (which shows a reduction of approximately 11 percentage points) and a statistically significant increase of 1.3 percentage points in access to public insurance. Finally, roughly 13 percent of those displaced experience some period without insurance in the period after displacement. These effects are consistent with, though somewhat smaller than, previous estimates by Gruber and Madrian (1997) on the effects of job loss on insurance status. Gruber and Madrian report a reduction in the likelihood of having insurance after a job separation of approximately 20 percentage points. The fact that they include only men and consider both voluntary and involuntary changes job changes in their study may explain much of this difference.

The lower panel of Table 3 shows results summarizing the response of health care utilization and total expenditures. Specifically, the outcomes we consider having any office-based medical visits since the last survey round, any ER visits, or receiving any prescription medications, along with total expenditures on office visits, ER visits and prescription drugs. This shows no evidence of changes in either utilization or expenditures. Given that only 1 in 10 displaced workers face lasting changes in insurance status following their job losses, it is perhaps not surprising that we see little evidence of changes in utilization.

We next consider a subset of workers who are likely to face larger changes in insurance coverage, and examine whether this group also has larger effects on health outcomes or utilization. Specifically, we limit our analysis sample to the group of individuals who, as of round 1, are holding health insurance through their own employer ("round 1 insurance holders"). If the loss of insurance coverage drives other outcomes, such as health conditions or utilization, we would expect results for this subsample to differ from those in Tables 2 and 3. This restriction eliminates from both our treatment and control groups those who are uninsured at round 1, as well as those who are insured, but

whose coverage is through either a spouse's employer or an individual policy. A potential advantage of this approach is that it forces both treatment and control groups to be more similar in terms of observables (such as insurance status) at round 1. While fixed-effects and baseline health trends are meant to correct for potential baseline differences between treatments and controls, this sample restriction may make the sample more similar in unobservable ways as well. Of course, the disadvantage is that the effects of displacement here apply to only a subset of job losers, and that subset, given their access to employer-based insurance in round 1, may be relatively advantaged.[8]

Table 4 shows the effects of displacement in the sample that conditions on having own-employer-based insurance in round 1. As expected, there are much larger effects on access to health insurance, with a 26 percentage point reduction in the likelihood of having any insurance following job loss. Echoing results in Table 2, the reduction in private insurance coverage from job loss is offset only very slightly by increased access to public insurance. There is a 1.8 percentage point increase in the probability of having public insurance as the result of displacement. This likely reflects limited eligibility for public insurance (Medicaid) for most able-bodied adults under current law, something that could change substantially as the Affordable Care Act is implemented in the coming years.

Consistent with the much larger reductions in insurance coverage for this subset of our sample, we find evidence of larger changes in utilization for this group. Panel B of Table 4 shows a reduction of 3.6 percentage points (relative to a baseline mean of 48.6 percent) in the likelihood of having an office visit since the last round. The probability of visiting the ER is reduced by approximately 1 percentage point, relative to a mean of 4.0 percent, and the likelihood of using prescription medications during the round is similarly reduced by 3.3 percentage points, relative to a mean of 49.2 percent. Meanwhile,

[8] Summary statistics by displacement status for the set of Round 1 insurance holders, presented in Appendix Table A2, show that the restricted sample is less likely to be Hispanic and more likely to be college-educated than that sample as a whole.

there is evidence that job displacement also results in decreased expenditures on ER visits and prescription drugs, though some of these effects are only marginally significant.

Taken together, the larger effects on insurance coverage for this sub-sample, and the emergence of statistically significant reductions in health care utilization provide a rough guide to how disruptions in insurance status from displacement might affect the probability of receiving medical care. Suppose that all of the effect of displacement on health care utilization in this sample comes as the result of reductions in insurance coverage. In particular, this assumes (contrary to the findings in Table 2) that there is no direct effect of job loss on health. Then, the results in Panels A & B of Table 4 suggest that loss of insurance coverage reduces office visits and use of prescription medications by approximately 15 percentage points per round. This magnitude is similar to the estimates in Currie and Gruber (1996), for children, that suggest becoming Medicaid eligible increased the probability of an office visit by approximately 9 percentage points per year. Of course, if displacement also produces independent, negative effects on health (perhaps due to stress or lifestyle changes), that would tend to increase the likelihood of medical visits and so this estimate may be a lower bound of the direct reduction in utilization from loss of insurance.

In the final panel of Table 4 we show the effects of displacement on health conditions for the sub-sample of round 1 employer-based insurance holders. For the self-reported health measure, this sample shows slightly smaller increases in the probability of reporting fair or poor health, and similar effects (as in the full sample) on fair or poor mental health, anxiety and depression. Also similar to the full sample, there is no evidence of significant changes in the incidence of the specific chronic physical conditions. This suggests that, at least in the short-run, it is not access to insurance and health care utilization that drives observed changes in health conditions immediately after job loss. It may be that reduced utilization, or reductions in continuity of care over a longer period, contribute to long-term

effects on mortality, but we do not see evidence of specific physical conditions emerging in the years immediately after job loss.

While the relatively short panels we have available in this data limit the extent to which we can examine the timing of health changes around displacement, we can distinguish the immediate effects of displacement from those that occur in the next few months. In addition, we can look at health, insurance, and utilization effects in the period just prior to job loss, to examine whether there is evidence of effects that begin before the actual displacement. Much of the literature on earnings losses from displacement, for example, show that some of the effects appear prior to the displacement event, as firms begin to struggle and may reduce pay and hours. There may be similar clues to the process that appear from looking at the timing of these health-related effects.

In Table 5 we repeat our basic analyses, but instead of a single, post-displacement indicator, we include three variables: one for the round immediately prior to job loss, one for the round of job loss, and one for the rounds after job loss. In Panel A, we see small reductions (of around 2 percentage points) in insurance coverage in the round just prior to job loss, but much larger effects at the time of job loss and after. Focusing on the availability of private insurance, for example, coverage falls by 14 percentage points in the round of the job loss, but recovers slightly to an 11 percentage-point reduction in later rounds. Importantly, the much larger effects at and following job loss provide additional evidence that these are direct effects of job loss, and not pre-existing characteristics of those workers who are most likely to lose jobs.

Panel B of Table 5 examines the timing of changes in health care utilization. Once again, it is reassuring to see no evidence of effects emerging in the period prior to the displacement. Interestingly, for these measures, there are some small but statistically significant increases in utilization (measured by having any office visit or any prescription drug coverage) in the round of the job loss. This may reflect

increased utilization among those who anticipate losing coverage upon displacement. These effects turn negative, as expected, in the period after displacement.

Finally, when we look at health reports and conditions, we again see little evidence of changes in health that begin prior to displacement. Effects on being in poor health and on reported anxiety or depression grow very slightly from the period of displacement to later rounds, but are generally fairly similar across the two "post-displacement" periods.

We have also estimated models that add an interaction between the displacement variable and the reason for displacement (firm closing versus layoffs or job endings). This could be important in light of concerns that layoffs may disproportionately affect workers with low productivity, possibly linked to poor health. Thus, firm closings may provide a more exogenous employment shock than the full set of displacements. If this concern is important, we might expect to see smaller effects of displacement on health-related outcomes among those losing jobs in business closings. As summarized in Appendix Table 1, we see little evidence that this is the case. In short, we see evidence of slightly larger effects on self-reported and mental health indicators, and smaller effects on insurance coverage. The effects on insurance coverage, however, seem mainly to reflect differences in the source of insurance coverage by those whose firms close relative to those who are laid off. Displacements due to business closings may also capture workers who lose jobs in particularly difficult local economic environments so are not perfectly comparable to the broader set of displacements. Our findings, however, do not suggest that laid off workers (for whom there is a greater possibility of negative, health related selection for layoff) drive the significant negative effects we report here.

V. CONCLUSION

In this paper, we use data from the Medical Expenditure Panel Survey to examine the short-term effects of job displacement on health outcomes, and to examine the role of health insurance shocks and changes medical care utilization in mediating these effects. By combining 16 panels of MEPS data, we generate a sample that includes almost 10,000 individuals that were involuntarily displaced from their main jobs between 1996 and 2011 – a much larger sample than other non-administrative datasets that have been used previously in the literature.

Using an empirical specification that includes both individual fixed effects and baseline health interacted with a linear time trend to account for unobservable individual characteristics that may be correlated with both health and the probability of job loss, we find that job displacement is associated with significant declines in self-rated physical and mental health and increased reports of anxiety or depression. There is no evidence of increases in specific chronic physical conditions including diabetes, arthritis, high cholesterol or hypertension. Focusing on a restricted sample that includes only individuals that held insurance through their employer in Round 1, we find that these individuals are more likely to lose their insurance as a result of job loss (30.5 percent of the restricted sample experience a spell without insurance after job loss compared with 12.8 percent of the full sample), and to reduce their health care utilization (round-1 insurance holders experience a 7.4-percent decrease in the probability of a doctor's visit after displacement). However, we do not find larger health effects for the restricted sample of Round 1 holders, which suggests that the negative health effects for the full sample are not driven by reductions in medical care in the short-term.

The lack of immediate increases in physical health problems among those likely to lose insurance after job loss does not rule out the possibility that these reductions in insurance and utilization of health care over a longer time frame could have negative consequences for the longer-term health of affected workers. Previous work, for example, has shown that access to Medicaid and

Medicare lowers health care utilization and mortality among children and the elderly (Currie and Gruber (1996), Card, Dobkin and Maestas (2008, 2009)). For displaced workers, however, only a minority faces a prolonged period without access to healthcare. The fact that we do see substantial reductions in health care utilization among the subset of displaced workers most likely to lose health insurance suggests that access to insurance, or perhaps continuity of care, could play an important role in generating long-term effects on mortality. Given the changes in coverage in the U.S. likely to come about as the Affordable Care Act is implemented, this suggests that an important area for study is the relationship between insurance status and utilization in the aftermath of job loss.

This brings us to our second main finding. Perhaps the most robust effects of job loss found here involve effects on mental health. A large literature establishes a strong association between stress and mortality, though a causal link from stress to long-term mortality has not been established (See, for example, Russ, et al. (2012) and citations therein). This is also consistent with arguments made by Sullivan and von Wachter (2009) who document a relationship between the extent of post-displacement income volatility (which may indicate prolonged uncertainty and stress) and mortality effects. While we do not see short-term increases in physical conditions that may be influenced by stress (such as diabetes or arthritis), prolonged mental health effects could lead to longer-term deterioration in physical health.

Job loss in the U.S. brings with it long-lasting reductions in earnings power, highly variable earnings, and a host of related effects on the health and well-being of individuals and their families. While the causal nature of this association has been well-established in the literature focusing on earnings effects of job loss, prior work on job loss and health outcomes has often lacked the longitudinal data and methods to establish causality. By controlling for individual fixed effects and health related trends, we show that job loss also results in decreased self-reported health, small increases in some chronic physical conditions, and marked declines in mental health. Future work should further explore

the long-term effects of the stress of job loss on mental and physical health of workers, following up on the short-term indications found here that this could be an important link in the relationship between job loss and long-term health.

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Table 1
Summary Statistics By Displacement Status

	Never Displaced		Displaced	
Demographic Characteristics				
Male	0.53		0.58	
Age	41.0		38.3	
Black, Non-Hispanic	0.11		0.13	
Other Race, Non-Hispanic	0.06		0.05	
Hispanic	0.12		0.17	
High School Dropout	0.10		0.16	
High School Graduate	0.30		0.33	
Any College	0.59		0.50	
	Round	**Round 5**	**Round 1**	**Round 5**
Physical Health				
Health Fair/Poor	8.2	7.0	10.7	9.9
Arthritis	8.3	14.8	8.2	15.4
Diabetes	3.6	4.7	3.7	5.1
High Cholesterol	7.3	10.6	5.9	9.0
Hypertension	11.3	15.2	9.9	13.6
Cancer	1.7	4.1	1.2	2.9
Mental Health				
Mental Health Fair/Poor	3.2	3.7	5.1	6.4
Depression/Anxiety	7.1	15.1	8.5	19.1
Insurance Coverage				
Any Insurance	84.2	83.8	68.9	59.8
Private Insurance	80.7	80.3	62.4	52.0
Public Insurance	5.6	5.2	8.0	9.2
Ever Uninsured	18.5	16.9	34.8	42.5
Health Care Utilization				
Any Office-Based Visit	45.3	37.2	40.5	32.5
Expenditures on Office-Based Visits	189.6	200.8	158.6	170.9
Any ER Visit	3.9	3.0	5.1	4.2
Expenditures on ER Visits	31.2	29.1	32.9	44.6
Any Prescription Drug	46.1	40.9	40.6	34.8
Expenditures on Prescription Drugs	142.1	167.9	120.0	157.2
Observations	91459	78184	9892	8927

Notes: The data are from the 1996 through 2011 waves of the Household Component of the Medical Expenditure Panel Survey. The sample includes individuals aged 21 to 65 that are employed in the first round of the survey. Observations are weighted using MEPS person-level sampling weights.

Table 2
Effects of Job Displacement on Physical and Mental Health Outcomes

		Regression Specification		
	Round 1 Mean	OLS with Baseline Controls	Fixed Effects	Fixed Effects With Baseline Health*Trend
Physical Health				
Health Fair/Poor	0.084	0.011***	0.004	0.015***
		(0.003)	(0.003)	(0.003)
Arthritis	0.083	0.020***	0.006**	0.002
		(0.004)	(0.002)	(0.002)
Diabetes	0.036	0.005	0.003**	0.002
		(0.003)	(0.001)	(0.001)
High Cholesterol	0.071	0.001	0.001	-0.001
		(0.004)	(0.002)	(0.002)
Hypertension	0.112	0.003	0.001	-0.002
		(0.004)	(0.002)	(0.002)
Cancer	0.016	0.000	-0.002	-0.003*
		(0.002)	(0.001)	(0.001)
Mental Health				
Mental Health Fair/Poor	0.034	0.018***	0.008**	0.013***
		(0.002)	(0.003)	(0.003)
Depression or Anxiety	0.073	0.053***	0.024***	0.016***
		(0.005)	(0.003)	(0.003)

Notes: N=463,243. Standard errors (in parentheses) are clustered at the individual level. * p<.1 ** p<.05 *** p<.01. Estimates are weighted using MEPS person-level sampling weight. OLS regressions (column (2)) include dummies for Round 1 health and mental health (1 = excellent, 2=very good, 3 = good, 4 = fair, 5 = poor), race/ethnicity (non-Hispanic black, non-Hispanic other race, Hispanic), and educational attainment (high school graduate, college graduate). All regressions include age and calendar year fixed effects.

Table 3
Job Displacement, Insurance Status, and Health Care Utilization

Panel A: Insurance Status

	(1) Any Insurance	(2) Private Insurance	(3) Public Insurance	(4) Ever Uninsured
Displaced	-0.099***	-0.113***	0.013***	0.128***
	(0.005)	(0.005)	(0.002)	(0.005)

Panel B: Health Care Utilization

	(1) Any Office Visit	(2) Office Expenditures	(3) Any ER Visit	(4) ER Expenditures	(5) Any Rx	(6) Rx Expenditures
Displaced	-0.005	13.780	0.000	1.506	-0.008	-9.899
	(0.006)	(19.296)	(0.003)	(5.153)	(0.005)	(6.797)

Notes: N=463,243. Standard errors (in parentheses) are clustered at the individual level. * p<.1 ** p<.05 *** p<.01. Estimates are weighted using MEPS person-level sampling weight. All regressions include age and calendar year fixed effects and baseline health and mental health interacted with trends. The dependent variables in columns (1) –(3) of Panel A are equal to 1 if an individual is insured in the month of the current interview. The dependent variable in column (4) of Panel A is equal to 1 if an individual experienced a spell with no insurance coverage between the last interview and the current interview.

Table 4
Job Displacement, Insurance Status, Utilization, and Health: Round 1 Insurance Holders Only

Panel A: Insurance

	(1) Any	(2) Private	(3) Public	(4) Ever
Displaced	-0.260***	-0.283***	0.018***	0.305***
	(0.008)	(0.009)	(0.003)	(0.009)

Panel B: Health Care

	(1) Any	(2) Office	(3) Any ER	(4) ER	(5) Any Rx	(6) Rx
Displaced	-0.036***	-1.044	-0.010*	-17.785*	-0.033***	-23.510*
	(0.009)	(42.441)	(0.005)	(7.536)	(0.008)	(10.011)

Panel C: Health

	(1) Health	(2) Arthritis	(3) Diabetes	(4) Cholester	(5) Hyperten	(6) Cancer	(7) Mental	(8) Depr/Anx
Displaced	0.011*	-0.001	0.001	-0.001	-0.003	-0.002	0.016***	0.017***
	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.004)	(0.005)

Notes: N=242,814. The sample includes only individuals that were covered by health insurance through their current main job in Round 1 of the panel. Standard errors (in parentheses) are clustered at the individual level. * p<.1 ** p<.05 *** p<.01. Estimates are weighted using MEPS person-level sampling weight. All regressions include age and calendar year fixed effects and baseline health and mental health interacted with trends.

Table 5
Job Displacement, Insurance Status, Utilization, and Health - Lags and Leads

Panel A: Insurance Status

	(1) Any Insurance	(2) Private Insurance	(3) Public Insurance	(4) Ever Unins
Displaced:				
	-0.022***	-0.022***	0.000	0.023***
Next round	(0.005)	(0.005)	(0.003)	(0.005)
	-0.129***	-0.143***	0.013***	0.167***
This round	(0.007)	(0.007)	(0.003)	(0.007)
	-0.095***	-0.111***	0.014***	0.117***
Prior round	(0.008)	(0.007)	(0.004)	(0.008)

Panel B: Health Care Utilization

	(1) Any Office	(2) Office Expend.	(3) Any ER Visit	(4) ER Expend.	(5) Any Rx	(6) Rx Expend.
Displaced:	0.011	7.489	0.006	0.547	0.012	1.756
Next round	(0.008)	(16.768)	(0.004)	(6.534)	(0.007)	(9.388)
	0.028***	17.102	0.007	1.085	0.019**	14.855
This round	(0.008)	(18.562)	(0.004)	(6.698)	(0.007)	(10.698)
	-0.023**	-33.527	0.001	2.503	-0.020**	-30.496**
Prior round	(0.008)	(34.564)	(0.004)	(8.520)	(0.007)	(9.311)

Panel C: Health Outcomes

	(1) Health Fair/Poor	(2) Arthritis	(3) Diabetes	(4) Cholesterol	(5) Hypertension	(6) Cancer	(7) Mental Fair/Poor	(8) Depr/Anx
Displaced:	-0.000	0.005	0.000	0.001	-0.001	-0.002	0.000	0.006
Next round	(0.004)	(0.003)	(0.001)	(0.002)	(0.002)	(0.001)	(0.003)	(0.003)
	0.012**	0.005	0.001	0.001	-0.002	-0.003*	0.014***	0.016***
This round	(0.004)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)
	0.016***	0.006	0.002	-0.002	-0.003	-0.005*	0.012***	0.022***
Prior round	(0.004)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.004)	(0.005)

Notes: N = 463,243**.** DispN1 is an indicator for one period prior to displacement, Disp0 is an indicator for the period of displacement, and Disp1M is an indicator for 1 or more periods after displacement. Standard errors (in parentheses) are clustered at the individual level. * p<.1 ** p<.05 *** p<.01. Estimates are weighted using MEPS person-level sampling weight. All regressions include age and calendar year fixed effects and baseline health and mental health interacted with trends.

APPENDIX

Table A1
Job Displacement, Insurance Status, Utilization, and Health by Type of Displacement

Panel A: Insurance Status

	(1) Any Insurance	(2) Private Insurance	(3) Public Insurance	(4) Ever Uninsured
Laid off or	-0.113***	-0.128***	0.013***	0.145***
Job Ended	(0.007)	(0.006)	(0.003)	(0.006)
Business	-0.055***	-0.068***	0.013**	0.078***
Closed	(0.009)	(0.009)	(0.004)	(0.009)

Panel B: Health Care Utilization

	(1) Any Office Visit	(2) Office Expend.	(3) Any ER Visit	(4) ER Expend.	(5) Any Rx	(6) Rx Expend.
Laid off or	-0.007	0.234	0.001	0.626	-0.01	1.831
Job Ended	-0.006	-23.691	-0.003	-5.206	-0.006	-8.038
Business	0.015	-7.927	0.002	11.11	0.004	3.693
Closed	-0.012	-22.813	-0.005	-13.314	-0.01	-9.223

Panel C: Health Outcomes

	(1) Health Fair/Poor	(2) Arthritis	(3) Diabetes	(4) Cholesterol	(5) Hypertension	(6) Cancer	(7) Mental Fair/Poor	(8) Depr/Anx
Laid off or	0.007	0.004	0.002	0.002	0.001	-0.003	0.010***	0.021***
Job Ended	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.003)	(0.003)
Business	0.008	0.009	0.003	-0.003	-0.002	-0.000	0.007	0.023***
Closed	(0.006)	(0.005)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)

Notes: N=463,243. Standard errors (in parentheses) are clustered at the individual level. * p<.1 ** p<.05 *** p<.01. Estimates are weighted using MEPS person-level sampling weight. All regressions include age and calendar year fixed effects and baseline health and mental health interacted with trends.

Table A2
Summary Statistics By Displacement Status: Round 1 Holders

	Never Displaced		Displaced	
Demographic Characteristics				
Male	0.56		0.60	
Age	41.5		39.5	
Black, Non-Hispanic	0.11		0.13	
Other Race, Non-Hispanic	0.06		0.06	
Hispanic	0.09		0.11	
High School Dropout	0.07		0.09	
High School Graduate	0.29		0.32	
Any College	0.64		0.58	
	Round	**Round**	**Round**	**Round**
Physical Health				
Health Fair/Poor	7.4	6.4	9.1	8.9
Arthritis	8.3	15.2	8.0	15.2
Diabetes	3.9	5.0	3.3	4.7
High Cholesterol	8.0	11.8	6.7	10.4
Hypertension	12.4	16.5	11.6	15.6
Cancer	1.7	4.3	1.3	3.4
Mental Health				
Mental Health Fair/Poor	2.7	3.3	4.0	5.5
Depression/Anxiety	7.3	15.1	9.4	20.4
Insurance Coverage				
Any Insurance	100.0	95.1	100.0	68.7
Private Insurance	100.0	94.3	100.0	65.1
Public Insurance	2.0	2.4	1.9	4.8
Ever Uninsured	1.7	5.3	3.5	34.1
Health Care Utilization				
Any Office-Based Visit	48.7	39.4	48.1	37.0
Expenditures on Office-Based Visits	214.3	217.4	206.2	222.7
Any ER Visit	3.9	2.8	5.5	3.4
Expenditures on ER Visits	34.0	29.1	44.2	46.6
Any Prescription Drug	49.3	43.7	47.3	39.1
Expenditures on Prescription Drugs	141.0	183.7	140.2	161.9
Observations	49150	42576	3589	3314

Notes: The data are from the 1996 through 2010 waves of the Household Component of the Medical Expenditure Panel Survey. The sample includes individuals aged 21 to 65 that are employed and are covered by health insurance through their employer in the first round of the survey. Observations are weighted using MEPS person-level sampling weights.