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Recent Trends in Disability and the Implications for Use of Disability Insurance

Abstract

Abstract: The health of the working-aged population is a key driver of enrollment in and spending by the two most important federal disability programs, Social Security Disability Insurance (DI) and Supplemental Security Income (SSI). Recent studies have found that some dimensions of the population's health approaching retirement age have worsened relative to earlier cohorts. Other things equal, these unfavorable health trends would be expected to cause both applications and disability awards to increase and portend fiscal challenges for DI and SSI. Using two nationally representative surveys, this study examines the health trends of adults ages 51 to 61 between the mid-1990s and the mid-2010s and finds updated evidence confirming prior conclusions of unfavorable trends. It then summarizes the likely effect of these unfavorable health trends on the demand for DI and SSI benefits by simulating the effect on applications and awards of observed health changes over time while holding constant other factors likely to affect DI/SSI use. These estimated effects suggest an increase in demand for disability benefits due to worsening health of 9 to 16% for men over the 20-year period depending on the age group and survey. Estimated effects of health trends on DI/SSI for women were not significant. If these trends for men continue, they may require adjustments in planning for the future of important social insurance programs.

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Social Security Disability Insurance (DI) is the nation's most important public support for the working-aged population with disabilities: in December 2017 DI made payments totaling $11.5 billion to 10.4 million disabled beneficiaries. In addition, the Supplemental Security Insurance (SSI) program made payments totaling $3.0 billion to 4.8 million disabled adults ages 18 to 64, including 1.4 million who concurrently received DI benefits (Social Security Administration 2019a). The number of disabled workers receiving DI benefits has more than doubled since the mid- to late-1990s, with the disability component of the SSI program growing somewhat less rapidly (Social Security Administration 2018).

The working-aged population's morbidity is a key driver of enrollment in and spending by these two programs. There is broad support for the conclusion that the age-adjusted prevalence of having difficulty with activities of daily living and with instrumental activities of daily living for the roughly 65+ population declined from the 1980s through about 2000. Freedman et al. (2004), written by a 12-person expert panel using estimates from five national data sets, is the most comprehensive assessment of this evidence. That panel was reconvened about 10 years later to reassess evidence through 2008 and consider other age groups. It concluded: "Findings across studies suggest that personal care and domestic activity limitations may have continued to decline for those 85 and older from 2000 to 2008, but generally were flat since 2000 for those ages 65 to 84. Modest increases were observed for the 55- to 64-year-old group approaching late life…" (Freedman et al. 2013). Additional studies focused on the working-aged population roughly 40 to 64, with some extended beyond 2008 (Lakdawalla, Bhattacharya, and Goldman 2004; Weir 2007; Martin et al. 2009, 2010; Case and Deaton 2015; Choi and Schoeni 2017). Estimated trends in these studies differed by the measure of physical functioning and limitation, age and other

demographic factors, and years examined, but they tend to conclude that there were unfavorable trends. Furthermore, for at least some segments of the working-aged population, unfavorable trends have been documented for obesity, diabetes, having multiple chronic conditions, respondent-assessed fair or poor health, and mortality (Bound et al. 2015; Case and Deaton 2017; National Center for Health Statistics 2017; Selvin et al. 2017; Geronimus et al. 2019). In addition, the labor force participation of working-aged men has been falling while the fraction insured for disability has remained constant, and the historic rise in participation among women has leveled off. While multiple factors have undoubtedly contributed to these trends (Binder and Bound 2019; Baicker et al. 2014; Li 2018; Maestas, Mullen, and Strand 2018), there is some evidence that they have been driven, in part, by those in poor health (Bound, Lindner, and Waidmann 2014). Other things equal, these unfavorable health trends would be expected to cause both applications and disability awards to increase and portend fiscal challenges for DI and SSI.

Using two complementary nationally representative surveys, this study examines adults ages 51 to 61, when participation rates in DI and SSI are high and workers are approaching traditional ages of retirement. A wide variety of measures of health and disability are examined, and the updated evidence, 1996 to 2017, confirms findings from prior research showing increasing prevalence of many health problems for middle-aged adults. We then determine the implications of these trends for rates of application for and award of DI and SSI over this 20-year period.

Data and methods

We analyzed data from the Health and Retirement Study (HRS) and the National Health Interview Survey (NHIS). The surveys permit assessment of nine chronic health

conditions, physical functional limitations, depression and psychological distress, limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL), self-rated general health status, and work limitations. Some domains are measured in both surveys but often using questions with somewhat different wording. Other domains are measured in just one survey. Analyzing both surveys allows assessment of the robustness of the findings to a wide array of health and disability measures.

The HRS health measures examined for this study include: eight chronic conditions (whether a doctor has ever told the respondent they had hypertension, cancer, heart disease, diabetes, stroke, chronic lung disease, psychiatric conditions, and arthritis); the Center for Epidemiological Studies-Depression (CES-D) scale, which can be used to construct a measure of depression (score of three or above)[1]; several indicators of reported difficulty with physical functions (lifting and carrying 10 pounds, climbing one flight of stairs, picking up a dime, reaching/extending arms up, sitting for two hours, getting up from chair, stooping/kneeling/crouching, walking several blocks, walking one bock, pushing or pulling large objects); difficulty with ADLs (walking across room, getting in/out of bed, dressing, eating, toileting, bathing); difficulty with IADLs (using telephone, managing money, taking medication, shopping, preparing meals); and a self-rating of general health as fair or poor, as well as good, fair, or poor.

The NHIS asks similar questions about difficulty with physical functions and self-rated general health, but its questions about mental health, ADLs, IADLs, and chronic conditions differ from those asked in the HRS. For mental health, the NHIS includes the six-item version of the Kessler scale for psychological distress (Kessler et al. 2003;

[1] The CESD scale is derived from a short battery of questions designed to measure depressive symptomatology (Radloff 1977).

score of>12). For ADLs, the survey asks whether the respondent needs help with each of the activities, but for IADLs the survey combines the activities into a single question and asks whether the respondent needs help handling “routine needs, such as everyday household chores, doing necessary business, shopping or getting around for other purposes.” For chronic conditions, the NHIS also asks whether a doctor or other health professional has told the respondent they had hypertension, asthma, cancer, heart disease, diabetes, stroke, and chronic lung disease. NHIS includes whether the respondents are limited in the amount or kind of work or unable to work at all because of their health. Both surveys also collect self-reports of having ever applied for disability benefits from DI and SSI and of currently receiving such benefits.

We analyzed men and women separately, since rates of use and trends in use of the DI and SSI programs have differed, and differences in the types of jobs held by men and women mean that the types of health problems that limit work may also differ. Our analysis focuses on the older working-aged population not yet eligible to collect Social Security retirement benefits. Since the NHIS draws a new nationally representative sample each year, we can include in the analysis persons ages 51 to 61 in each year. While the HRS interviews individuals 51 and older when it refreshes the sample, it only does so every six years. To use as many waves as possible and maintain representation of the population, we limit the HRS analysis to those ages 55 to 61. For comparability between the HRS and NHIS, we also conduct one set of analyses with the NHIS including only those ages 55 to 61.

The analyses cover the period from the mid-1990s to the mid-2010s. While the HRS began in 1992, we restrict our analyses to the period beginning in 1996 because some measures of physical functioning, IADLs, ADLs, and mental health were not collected or were asked only of a sub population (e.g., those older than 70) prior to

1996. For the NHIS, we begin our analysis in 1998. The NHIS was redesigned in 1997 and has had a mostly consistent questionnaire since then. Importantly, however, while the survey began asking respondents about their application and receipt of disability benefits in 1997, the skip pattern in this section of the questionnaire changed in 1998, making comparisons of application responses between 1997 and the rest of the period impossible (Centers for Disease Control and Prevention 2019). For these reasons, analyses are restricted to 1998-2017 for the NHIS and 1996-2016 for the HRS.

The HRS data has a higher rate of missing data on individual items, ranging from 0.2% (difficulty with bathing) to 4.9% (CES-D). To address this difference, we imputed missing values in the HRS health measures by using iterative multivariable regression technique (Royston 2007).

All analyses were conducted using NHIS and HRS separately. Using logistic regression, we first calculated the adjusted prevalence of each health problem in each year controlling for changes in age composition (indicator/dummy variables for each single year of age) and race/ethnicity (Hispanic, non-Hispanic white, non-Hispanic black, other). We then estimated linear time trends in the natural log of these adjusted prevalence estimates using ordinary least squares, with the coefficient on the time trend representing the annual percent change when it is multiplied by 100. These analyses determine whether evidence from the most recently available data from these surveys support previous findings of worsening health. We experimented with adjusting for education as well as age and race/ethnicity. Since educational attainment was increasing over time in these populations, and education is positively associated with good health, adjusting for education tends to strengthen the observed negative trends somewhat.

We then summarized these multiple health indicators by constructing indices of health-related demand for disability benefits. To calculate the indices, we first estimated logistic regression models of each of our two DI/SSI outcomes: ever applied for and currently receiving benefits. In addition to a vector of health variables (H_i), each model also included a set of controls (X_i) for the individual's age and race/ethnicity (as defined above) and a set of dummy variables for year (τ_t). H_i included all health measures except self-reported, doctor-diagnosed conditions, self-rated general health and self-reported work limitations. We exclude these types of self-reports out of concerns that the eligibility requirements for DI and SSI make them endogenous to benefit application and receipt and that doctor-diagnosed condition measures, in particular, are sensitive to trends in diagnostic practice (Waidmann, Bound, and Schoenbaum 1995). The self-assessments of psychological symptoms and limitations with specific physical tasks and personal care activities are not so directly tied to program requirements. Thus, each model is of the form

$$P(DI/SSI_{it} = 1) = \lambda\left(\beta H_{i,t} + \gamma X_{i,t} + \tau_t\right). \quad (1)$$

The demographic variables control for any nonhealth compositional changes in the population that might affect the overall propensity to apply for or be awarded benefits. The year dummies control for any period-specific effects that might explain changes in claiming behavior, including business cycles or administrative program changes.

Using the coefficient estimates from these models, the index was then calculated by holding constant the non-health variables at their value in the base year, $t = 0$ (1996 for HRS and 1998 for NHIS), and calculating the average predicted value of the outcome in each year, based on the observed individual health values in the year, or

$$\eta_t^* = \overline{\lambda\left(\hat{\beta} H_{\iota,t|X_0} + \hat{c}_0 + \hat{\tau}_0\right)} \quad (2)$$

where the scaling constant $\hat{c}_0$ is estimated such that the predicted value of the index in the base year (η_0^*) equals the actual value of the outcome variable $P(DI/SSI_0)$. The term $H_{i,t|X_0}$ is individual *i*'s vector of health items in year *t* reweighted so that the demographic composition (age, race) in year *t* matches that in year 0. This reweighting controls for changes in the prevalence of health problems related solely to demographic changes, most notably, population aging.

The interpretation of this index is that it estimates what the DI/SSI outcomes would have been in each year, if only health variables had changed over time. An alternative interpretation is that it is a unidimensional index of the vector of health items (H_{it}) where each item is weighted by the strength of its association $(\hat{\beta})$ with the DI/SSI outcome.

In addition to examining plots of the series of average annual predicted outcomes, i.e., ever applied and currently receiving (η_t^*), we also estimate the time trend in the predictions as a useful summary measure of the change in disability-benefit demands due to changes in the population's health. Because each disability outcome has a different level, we estimate trends relative to the base value using a log-linear specification:

$$\ln(\eta_t^*) = \alpha + \delta t + u_t. \quad (3)$$

Results

Each health measure's average prevalence rates over the study period are presented in Table 1. Estimated annual percent change in each health measure adjusted for age and race/ethnicity are presented in Table 2. For self-reported doctor diagnosed conditions, three conditions (hypertension, cancer, diabetes) measured in both NHIS and HRS, one condition (psychiatric conditions) measured in only HRS, and

one condition measured in only NHIS (asthma) experienced statistically significant increases for both men and women. Heart disease decreased for men in both data sources, with smaller or insignificant changes for women depending on the survey. For stroke and lung disease, there were no significant changes among men or women 55 to 61, but among women 51 to 61 in the NHIS there were significant increases and decreases in these two conditions, respectively. Arthritis, measured only in HRS, declined for women but not men. Rates of self-reported, doctor-diagnosed conditions are potentially influenced by factors other than the prevalence of the health conditions, including disease awareness. For example, in the case of diabetes, where the National Health and Nutrition Examination Survey tracks both self-reported diagnoses and clinical disease markers, a recent analysis found both increased prevalence of diabetes based on clinical markers and an increased diagnosis rate among those with clinical markers (Selvin et al. 2017). Most notably we suspect that the dramatic rise in reported psychiatric conditions reflects, at least in part, reporting behavior (e.g., less stigmatized in recent years), and not the population's underlying mental health.

Among the 62 estimates of trends in functional limitations, 24 indicate statistically significant increases and five indicate statistically significant decreases. The CES-D indicator in the HRS shows no change in depression, while the K-6 indicator from the NHIS shows statistically significant increases in psychological distress. With few exceptions, the prevalence of difficulty with ADLs and IADLs increased for men and women in both data sources. The proportion reporting their general health as good, fair, or poor increased among men; the evidence is mixed among women. For both men and women, the share unable to work because of their health rose significantly.

In sum, the prevalence of most health problems increased. For some measures, while levels differ, both the directions and relative magnitudes of the trends from the two

surveys and between men and women are remarkably similar. In some cases, this difference in levels is to be expected because the surveys ask somewhat different questions. For example, for measures of ADL limitations, the HRS survey asks respondents if they have any difficulty performing the task, while the NHIS asks if the respondent needs the help of another person to perform the task. Arguably, needing help indicates a more severe level of impairment than having any difficulty, and accordingly, prevalence rates in the NHIS are lower than those in the HRS.

Table 3a presents the estimated coefficients for men (presented as odds ratios) on each health measure in several specifications of equation (1) where the outcome variable is ever having applied for benefits from either DI or SSI. Table 3b presents the analogous coefficients for women. When the four blocks of measures (functional limitation, ADLs, IADLs, depression / psychological distress) are entered separately, they each demonstrate significant positive effects on DI/SSI applications. When all measures are entered simultaneously, effect of each item tends to be muted, which is what we could expect given the typically strong correlation across these measures. Given our concerns about self-rated general health, work limitations, and self-reported diagnosed chronic conditions described earlier, we have not included these as explanatory variables in the models. We do note that to be awarded DI or SSI benefits a person has to experience a health condition that significantly limits their ability to do basic work activities. For this reason, the measures we include should do a reasonable job picking up relevant health trends. Results for models using currently receiving DI or SSI benefits as the dependent variable or using the wider age range are quite similar.

Combining the findings of worsening health as measured by trends in individual indicators and the largely positive and significant effects of those indicators on the demand for DI/SSI benefits, we expect the indices of demand for disability benefits

calculated using equation (2) to rise as well. Table 4 summarizes the estimated time trends in those indices from regressions of the form of equation (3). For ages 55 to 61, our models predict a growth in the demand for disability benefits of between 0.42 and 0.55% per year for men and changes of between -0.06% and 0.42% per year for women, though none of the estimates is significant for women. Estimates for the 51- to 61-year-old population tend to be larger than for the 55- to 61-year-old population, although they are still not significant for women. These estimates imply that holding everything else constant, over a 20-year period declining health would have increased disability-benefit demand by roughly 10% among men ages 55 to 61 and by more than 15% among men 51 to 61. In Figures 1a to 1d, we plot annual average values of the indices, predicting application and receipt as well as the linear trends implied by the estimates in Table 4. The figures show considerable year to year variation in average predicted probabilities, reflecting year-to-year variation in reported limitations, but the overall trends are also evident.

Conclusions and policy implications

This analysis is consistent with findings in prior studies showing evidence of worsening health among older working-age adults (Lakdawalla, Bhattacharya, and Goldman 2004; Weir 2007; Martin et al. 2009, 2010; Bound et al. 2015; Geronimus et al. 2019; Case and Deaton 2015, 2017; Choi and Schoeni 2017; National Center for Health Statistics 2017; Selvin et al. 2017), measured in the current study by chronic disease prevalence, symptoms of mental illness, self-rated health, as well as the prevalence of limitations in physical function, ADLs, and IADLs. We then estimated the expected effect of this worsening health on the demand for public disability benefits from the DI and SSI programs, as measured by rates of application for and receipt of

those benefits, holding constant other factors that might influence demand (e.g., changes in labor market conditions and program policies). Among men 55 to 61 over the 20-year period studied, we find an increase in the health-based demand for benefits of between 9 and 12%. For the broader age group, ages 51 to 61, we find an increase of between 15 and 16%. Among women, we do not find a significant increase in health-based demand in either group. The divergent conclusions likely arise from gender differences in health trends and/or health effects on DI/SSI.

These implied changes in demand for DI and SSI are by no means small, and if these trends continue as younger cohorts age, they may require adjustments in planning for the future of important social insurance programs. However, as other studies have demonstrated, there are many factors beyond health that influence the demand for disability benefits. Economic factors that drive short-term fluctuations and long-term trends in the demand for labor can have a large influence on the demand for disability benefits (Maestas, Mullen, and Strand 2018; Binder and Bound 2019; Li 2018; Social Security Administration 2019b). In fact, the swings in demand for benefits associated with business-cycle fluctuations are often much greater in magnitude than the estimates here imply about the effect of health. Nonetheless, for the most part the demand changes driven by these cyclical conditions are by their nature temporary. For example, from the start of the great recession in 2007, the number of DI applications grew by more than 30% by 2010, and then, as the economy recovered, the number fell back to 2007 levels by 2016 (Li 2018), and continued to fall through 2018. Addressing worsening health and the structural changes in the economy affecting low-skill workers, on the other hand, likely requires the development of more significant long-term solutions.

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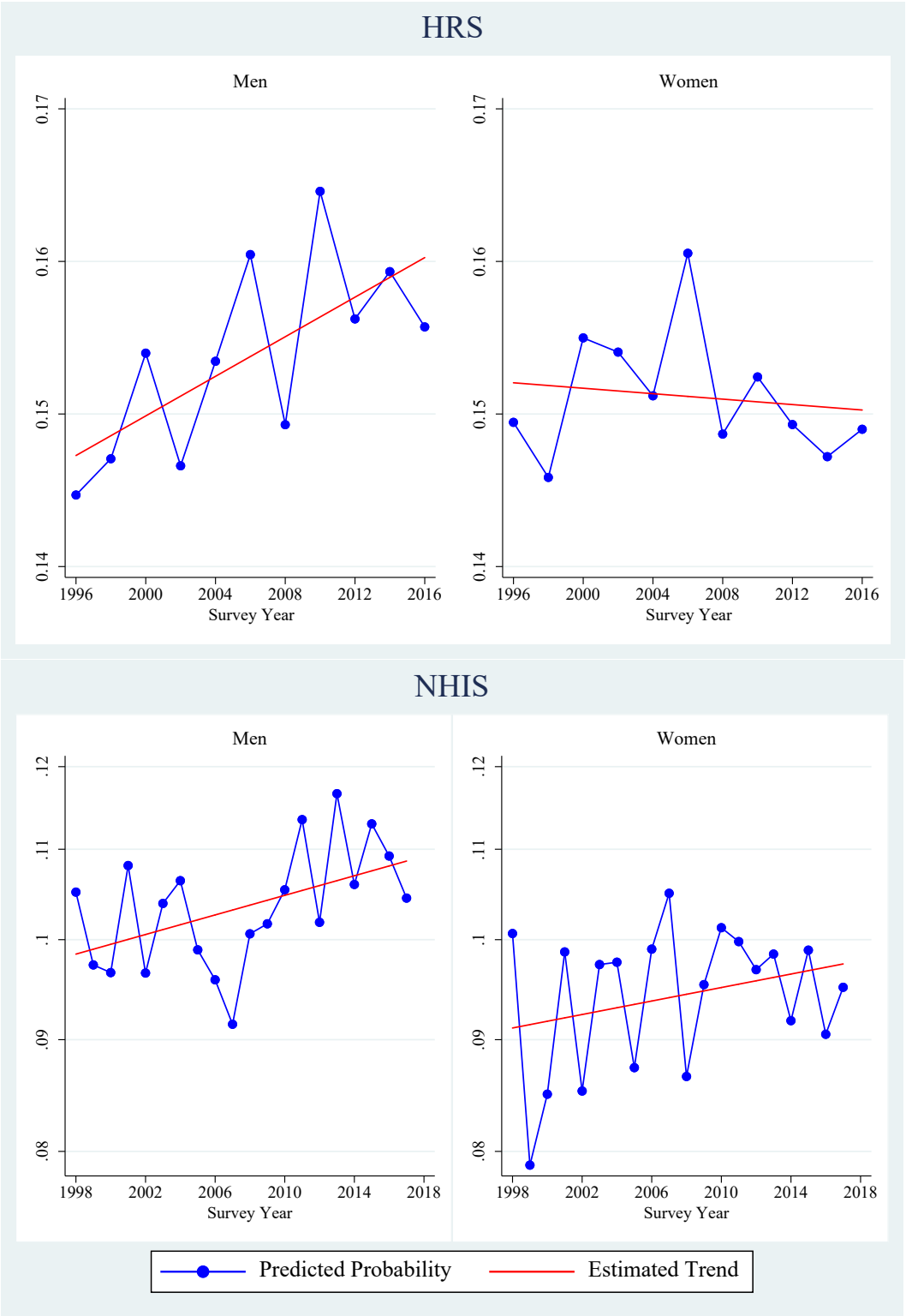
Figure 1a: Trend in health index of DI/SSI application, ages 55 to 61

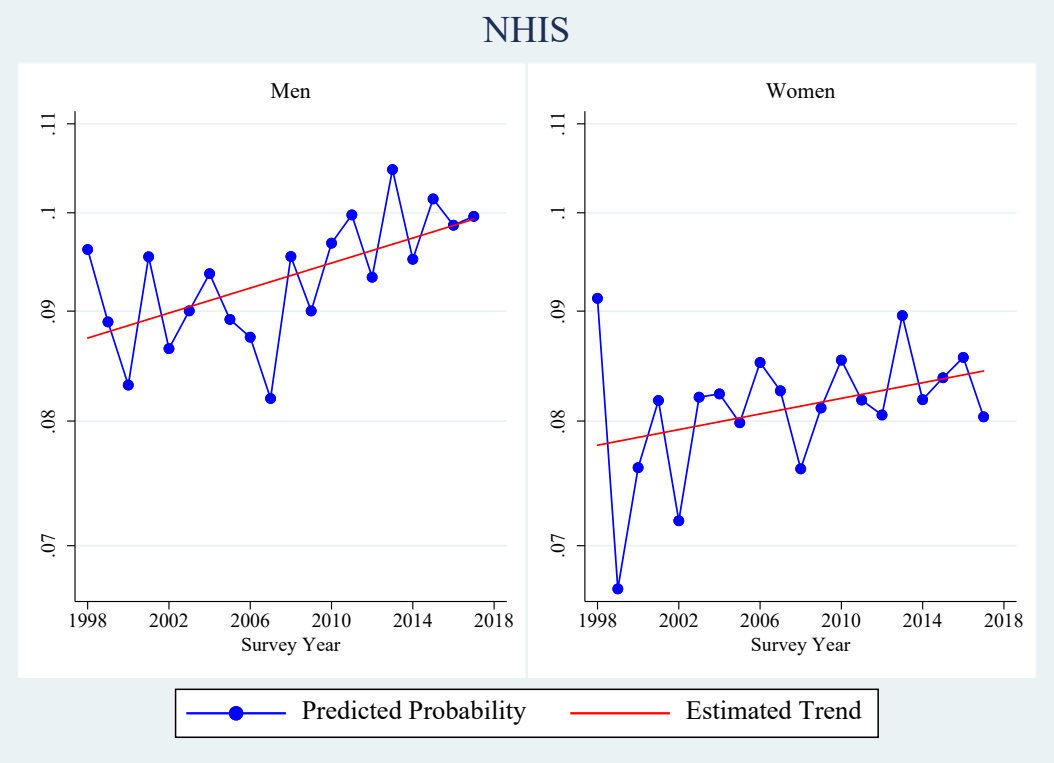


Note: Trends adjusted for changes in race/ethnic and age composition

Figure 1b: Trend in health index of DI/SSI receipt, ages 55 to 61

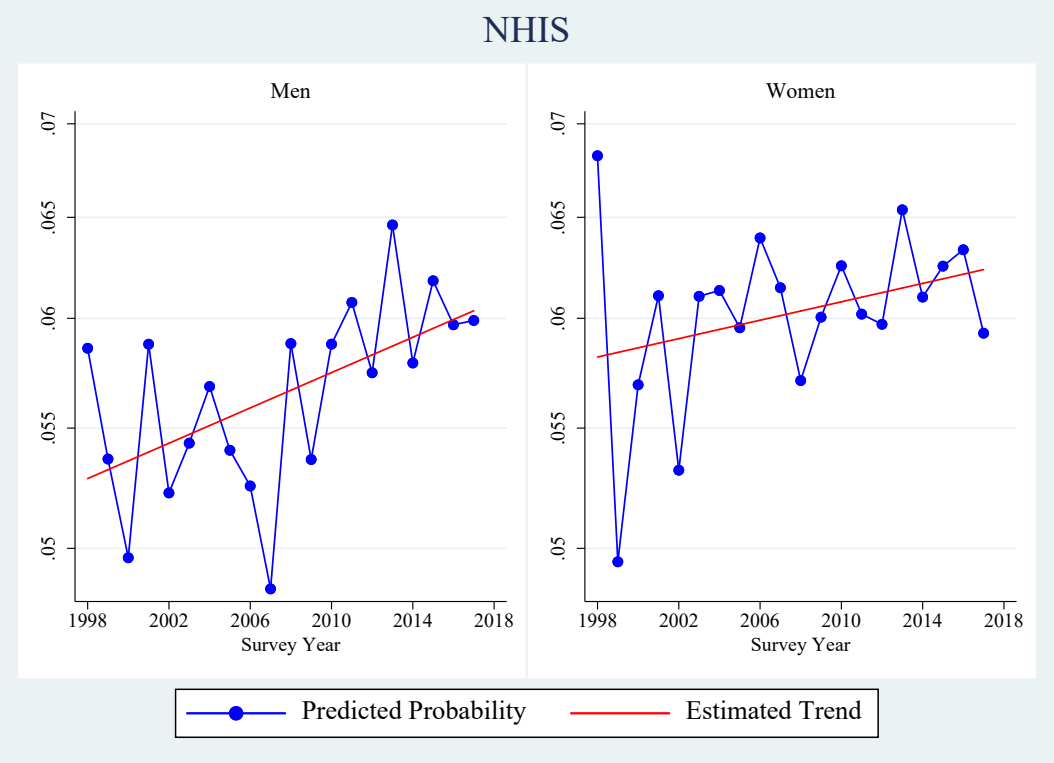
Note: Trends adjusted for changes in race/ethnic and age composition

Figure 1c: Trend in health index of DI/SSI application, ages 51 to 61



Note: Trends adjusted for changes in race/ethnic and age composition

Figure 1d: Trend in health index of DI/SSI receipt, ages 51 to 61



Note: Trends adjusted for changes in race/ethnic and age composition

Table 2: Estimated annual <u>percent</u> change in prevalence of health problems

	HRS, Age 55-61		NHIS, Age 55-61		NHIS, Age 51-61	
	Men	Women	Men	Women	Men	Women
Chronic Conditions						
Hypertension	2.16% *	1.09% *	1.13% *	0.40% *	1.08% *	0.43% *
Asthma	-	-	1.69% *	2.15% *	2.19% *	2.28% *
Cancer	4.12% *	1.69% *	1.43% *	1.81% *	1.19% *	1.58% *
Heart Disease	-0.79% *	0.20%	-1.03% *	-0.53%	-1.08% *	-0.60% *
Diabetes	4.75% *	5.62% *	2.02% *	1.62% *	1.72% *	1.45% *
Stroke	0.16%	-0.54%	0.71%	1.01%	1.17%	1.08% *
Lung Disease	-1.28%	0.32%	-0.42%	-0.74%	-0.06%	-0.86% *
Psychiatric Condition	5.71% *	4.44% *	-	-	-	-
Arthritis	-0.17%	-1.11% *	-	-	-	-
Functional Limitations						
Lift/Carry 10 lbs	0.51%	-0.71% *	0.28%	0.06%	0.26%	0.06%
Climb stairs	-0.90% *	-0.86% *	0.41%	0.35%	0.56% *	0.26%
Climb one stair	0.64%	-0.79%	-	-	-	-
Grasp/pick up object	1.93% *	0.47%	0.80% *	0.17%	0.90% *	0.11%
Reach over head	1.24% *	-0.64%	0.85% *	0.08%	0.70% *	0.15%
Sit 2 hours	0.78%	-1.35% *	1.29% *	0.86% *	1.31% *	0.77% *
Stand 2 hours	-	-	0.83% *	0.58% *	0.85% *	0.66% *
Getting up from chair	1.20%	-1.18%	-	-	-	-
Stoop/Kneel	1.15% *	0.22%	1.52% *	1.14% *	1.42% *	1.14% *
Walk several/3 blocks	1.25% *	-0.41%	0.63% *	0.36%	0.99% *	0.40%
Walk one block	3.05% *	0.10%	-	-	-	-
Push/Pull large object	0.78%	-1.25% *	0.33%	0.15%	0.44%	0.13%
Depression/Distress						
CES-D>=3	0.58%	-0.48%	-	-	-	-
Kessler-6>12	-	-	3.34% *	2.89% *	2.16% *	1.95% *
ADL Difficulty/Help						
Getting around inside	2.54% *	0.51%	4.69% *	3.78% *	4.85% *	6.15% *
Getting in/out of bed	-0.04%	-1.45% *	1.80%	4.65% *	2.32% *	5.63% *
Dressing	1.96%	-0.58%	2.77% *	4.03% *	2.39% *	4.62% *
Eating	6.87% *	3.76% *	11.46% *	3.19%	3.14%	2.97%
Toileting	5.19% *	0.16%	2.13%	2.44%	2.61% *	6.29% *
Bathing	4.91% *	1.93% *	1.58%	4.06% *	1.71% *	4.16% *
IADL Difficulty/Help						
Any Routine Activity	2.48% *	2.15% *	1.29% *	1.24% *	1.45% *	1.60% *
Use telephone	-1.02%	7.37% *	-	-	-	-
Manage Money	5.98% *	6.57% *	-	-	-	-
Medications	5.35% *	6.97% *	-	-	-	-
Shopping	0.69%	0.41%	-	-	-	-
Preparing Meals	0.21%	0.14%	-	-	-	-
Self-rated Health						
Fair or Poor	1.16%	-0.72%	0.40%	-0.16%	0.55% *	-0.01%
Good or Fair or Poor	0.75% *	0.24%	0.35% *	-0.01%	0.38% *	0.04%
Work Limitation						
Limited in kind/amount	-	-	0.56% *	0.12%	0.59% *	0.23%
Unable to work	-	-	0.78% *	0.80% *	0.79% *	1.05% *

* p<0.05

Note: Trends adjusted for changes in race and age composition.

Table 3a: Estimated effects of health problems on probability of ever having applied for DI or SSI, men 55 to 61 (odds ratios)

	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS
Functional Limitations										
Lift/Carry 10 lbs	2.07 *	1.44 *	2.34 *	1.64 *						
Climb stairs	2.12 *	1.30 *	2.19 *	1.47 *						
Climb one stair	1.16	- *	1.23	- *						
Grasp/pick up object	2.24 *	1.27 *	2.52 *	1.36 *						
Reach over head	1.50 *	1.12	1.67 *	1.13						
Sit 2 hours	1.35 *	1.33 *	1.44 *	1.30 *						
Stand 2 hours	-	2.06 *	-	2.12 *						
Getting up from chair	1.10	- *	1.15	- *						
Stoop/Kneel	1.26 *	1.58 *	1.25 *	1.59 *						
Walk several/3 blocks	2.74 *	2.22 *	2.82 *	2.34 *						
Walk one blocks	1.17	- *	1.36 *	- *						
Push/Pull large object	1.82 *	2.42 *	1.90 *	2.48 *						
ADL Difficulty/Help										
Getting around inside	0.78	0.52			3.80 *	1.42				
Getting in/out of bed	0.90	1.20			3.74 *	3.81 *				
Dressing	1.10	1.77			4.61 *	3.38 *				
Eating	0.57	0.55			1.84	0.55				
Toileting	0.87	0.86			1.51	0.54				
Bathing	1.18	0.86			3.60 *	8.72 *				
IADL Difficulty/Help										
Any Routine Activity	-	4.50 *					-	26.30 *		
Use telephone	1.40	-					2.47 *	-		
Manage Money	2.02 *	-					3.23 *	-		
Medications	1.32	-					2.62 *	-		
Shopping	2.48 *	-					15.35 *	-		
Preparing Meals	1.48	-					3.27 *	-		
Depression/Distress										
CES-D>=3; Kessler-6>12	1.56 *	2.52 *							5.59 *	11.61 *

Table 3a, continued

	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS
Age Dummies (61 omitted)										
55	0.73 *	0.82	0.75 *	0.84	0.73 *	0.73 *	0.70 *	0.73 *	0.73 *	0.66 *
56	0.8 *	0.83	0.82	0.86	0.76 *	0.82 *	0.70 *	0.80 *	0.74 *	0.77 *
57	0.72 *	0.93	0.73 *	0.96	0.76 *	0.87	0.74 *	0.88	0.73 *	0.81 *
58	0.88	0.80 *	0.91	0.81 *	0.94	0.79 *	0.83	0.77 *	0.87	0.73 *
59	0.84	0.83	0.86	0.86	0.87	0.85	0.83 *	0.82 *	0.87	0.79 *
60	0.93	1.02	0.94	1.03	0.93	1.02	0.86	1.01	0.92	0.98
Race/Ethnicity (NHW omitted)										
NH Black	2.94 *	1.99 *	2.95 *	1.97 *	3.15 *	2.05 *	3.20	1.98 *	3.16 *	2.20 *
Hispanic	1.51	1.22 *	1.58	1.20	1.36	1.22 *	1.31 *	1.25 *	1.40	1.24 *
Other	1.11	0.76	1.20	0.73 *	1.27	0.64 *	1.40	0.67 *	1.37 *	0.69 *
Year (1998 omitted)							*			
1996	1.03		1.01		1.00		1.03		1.07	
1999		0.97		0.96		0.91		0.89		0.93
2000	0.85	1.18	0.86	1.15	0.87 *	1.01	0.90	1.05	0.95	1.04
2001		0.79		0.81		0.88		0.84		0.91
2002	0.84	1.01	0.85	1.01	0.86	0.92	0.85	0.89	0.90	0.92
2003		1.16		1.15		1.07		1.06		1.08
2004	0.93	0.90	0.94	0.92	0.94	0.95	0.98	0.92	0.98	0.95
2005		1.14		1.11		1.01		1.02		1.04
2006	0.83	1.17	0.85	1.21	0.93	1.03	0.96	1.01	0.93	0.99
2007		1.40		1.38		1.13		1.12		1.13
2008	0.97	1.06	0.98	1.08	0.98	0.98	1.02	1.00	1.00	0.99
2009		1.37		1.35		1.21		1.21		1.24
2010	0.77	1.39	0.78	1.42 *	0.83	1.16	0.89	1.18	1.03	1.15
2011		1.33		1.36		1.27		1.31		1.25
2012	1.02	1.53 *	1.01	1.56 *	1.03	1.28	1.1	1.29	1.11	1.25
2013		1.54 *		1.57 *		1.47 *		1.42 *		1.40 *
2014	0.91	1.27	0.92	1.28	1.01	1.15	0.97	1.17	1.09	1.11
2015		1.77 *		1.78 *		1.52 *		1.55 *		1.46 *
2016	1.08	1.69 *	1.07	1.72 *	1.04	1.51 *	1.14	1.53 *	1.16	1.46 *
2017		1.91 *		1.85 *		1.55 *		1.62 *		1.54 *
Chi-2 (All Health Coeffs=0)	2341.3	3506.6	2793.0	3813.1	747.0	230.9	656.2	1031.2	1079.1	741.6
DF	23	17	11	9	6	6	5	1	1	1

* p<0.05

Note: Race/ethnicity, age and year dummies are included in controls

Table 3b: Estimated effect of health problems on probability of ever having applied for DI or SSI,

<u>women</u> 55 to 61 (odds ratios)

	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS
Functional Limitations										
Lift/Carry 10 lbs	2.23 *	2.08 *	2.42 *	2.33 *						
Climb stairs	1.89 *	1.49 *	1.94 *	1.65 *						
Climb one stair	1.30 *		1.36 *							
Grasp/pick up object	1.12	1.23 *	1.40 *	1.30 *						
Reach over head	1.36 *	1.26 *	1.53 *	1.39 *						
Sit 2 hours	1.45 *	1.30 *	1.46 *	1.34 *						
Stand 2 hours		1.91 *		1.97 *						
Getting up from chair	0.99		1.00							
Stoop/Kneel	1.33 *	1.00	1.35 *	0.97						
Walk several/3 blocks	2.32 *	2.09 *	2.48 *	2.31 *						
Walk one blocks	1.23 *		1.49 *							
Push/Pull large object	1.94 *	1.93 *	2.11 *	1.99 *						
ADL Difficulty/Help										
Getting around inside	1.03	1.19			3.67 *	2.52 *				
Getting in/out of bed	0.75 *	1.34			2.48 *	3.90 *				
Dressing	0.88	0.84			2.75 *	2.83 *				
Eating	2.16 *	0.53			5.26 *	0.55				
Toileting	0.94	1.40			2.05 *	0.70				
Bathing	1.03	0.92			3.32 *	5.13 *				
IADL Difficulty/Help										
Any Routine Activity	-	3.37 *					-	22.58 *		
Use telephone	1.05	-					1.53	-		
Manage Money	1.86 *	-					3.01 *	-		
Medications	1.29	-					2.74 *	-		
Shopping	1.89 *	-					9.91 *	-		
Preparing Meals	1.92 *	-					4.00 *	-		
Depression/Distress										
CES-D>=3; Kessler-6>12	1.48 *	2.20 *							5.07 *	9.26 *

Table 3b, continued

	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS	HRS	NHIS
Age Dummies (61 omitted)										
55	0.83 *	0.89	0.87	0.92	0.74 *	0.78 *	0.75 *	0.81 *	0.72 *	0.74 *
56	0.80 *	0.98	0.81 *	1.03	0.76 *	0.87	0.77 *	0.87	0.72 *	0.82 *
57	0.91	0.94	0.94	0.96	0.83 *	0.84 *	0.84 *	0.87	0.79 *	0.77 *
58	0.96	0.94	0.95	0.98	0.93	0.94	0.95	0.92	0.89	0.87
59	0.88	0.81 *	0.91	0.84	0.83 *	0.85 *	0.84 *	0.82 *	0.83 *	0.81 *
60	0.85	0.81 *	0.85	0.83	0.86	0.85 *	0.9	0.83 *	0.89	0.81 *
Race/Ethnicity (NHW omitted)										
NH Black	2.04 *	1.88 *	2.03 *	1.81 *	2.34 *	2.25 *	2.58 *	2.25 *	2.67 *	2.44 *
Hispanic	0.97	0.96	1.01	0.96	1.42	1.25 *	1.38	1.22 *	1.5	1.17 *
Other	1.16	0.91	1.23	0.90	1.43 *	0.80 *	1.56 *	0.83	1.41 *	0.79 *
Year (1998 omitted)										
1996			0.94		1.03		0.94		1.08	
1999		1.35		1.28		0.97		1.09		1.00
2000	0.93	1.20	0.95	1.14	1.02	0.97	0.99	1.05	1.04	0.95
2001		1.14		1.10		1.06		1.12		1.04
2002	0.89	1.15	0.93	1.11	0.99	0.95	0.94	1.02	1.00	0.96
2003		1.20		1.19		1.11		1.18		1.05
2004	0.82	1.21	0.84	1.21	0.92	1.07	0.9	1.12	0.97	1.10
2005		1.21		1.17		0.99		1.08		0.98
2006	0.84	1.36	0.86	1.32	0.99	1.19	0.91	1.34 *	1.03	1.15
2007		1.20		1.32		1.14		1.12		1.13
2008	0.9	1.86 *	0.94	1.79 *	0.99	1.26	0.89	1.49 *	0.98	1.28
2009		1.66 *		1.65 *		1.28		1.39 *		1.31 *
2010	0.94	1.85 *	0.98	1.88 *	1.03	1.44 *	0.93	1.56 *	1.09	1.44 *
2011		1.43 *		1.55 *		1.17		1.21		1.13
2012	1.12	1.78 *	1.18	1.78 *	1.13	1.37 *	1.05	1.45 *	1.18	1.35 *
2013		1.73 *		1.70 *		1.38 *		1.60 *		1.33 *
2014	1.25	2.38 *	1.35	2.31 *	1.23	1.58 *	1.09	1.84 *	1.24	1.60 *
2015		2.19 *	*	2.14 *		1.59 *		1.89 *		1.58 *
2016	1.36 *	1.81 *	1.40	1.80 *	1.29	1.33 *	1.21	1.47 *	1.35 *	1.32 *
2017		1.75 *	*	1.76 *		1.36 *		1.52 *		1.33 *
Chi-2 (All Health Coeffs=0)	3468.9	3795.7	3550.6	4001.3	710.5	302.2	1080.5	1598.6	1360.9	945.9
DF	23	17	11	9	6	6	5	1	1	1

* $p<0.05$

Note: Race/ethnicity, age and year dummies are included in controls.

Table 4: Estimated annual and 20-year <u>percent</u> change in disability application and receipt, as predicted by changes in health

	Men		Women	
	HRS	**NHIS**	**HRS**	**NHIS**
	Change/(s.e.)	**Change/(s.e.)**	**Change/(s.e.)**	**Change/(s.e.)**
Probability of Application				
Ages 55-61	0.42% *	0.55% *	-0.06%	0.42%
	0.15%	*0.20%*	*0.14%*	*0.29%*
20-year equivalent	8.9%	11.6%	-1.2%	8.7%
	3.3%	*4.5%*	*2.7%*	*6.2%*
Ages 51-61		0.71% *		0.49%
		0.20%		*0.26%*
20-year equivalent		15.2%		10.3%
		4.6%		*5.8%*
Probability of Receipt				
Ages 55-61	0.41% *	0.53% *	-0.03%	0.35%
	0.19%	*0.24%*	*0.14%*	*0.30%*
20-year equivalent	8.5%	11.1%	-0.5%	7.3%
	4.2%	*5.2%*	*2.8%*	*6.4%*
Ages 51-61		0.75% *		0.35%
		0.23%		*0.30%*
20-year equivalent		16.2%		7.3%
		5.4%		*6.4%*

*p<0.05