

Disability has high societal and personal costs. Various disparate federal and state programs attempt to address the economic and social needs of people with disabilities. Presumably workplace injuries and accidents are an important source of disability. Yet separate public policies and research literatures have evolved for these two social problems—disability and workplace injuries—despite their relatedness. This article seeks to document the overlap between these two phenomena in estimating the proportion of the disabled population whose disability was caused by workplace injury, accident, or illness using the Health and Retirement Study of 1992. The results point toward the need for initiatives to reduce disability that focus on work-related causes, which are a common pathway to disability, and that may result in substantial savings in federal programs.

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The Fraction of Disability Caused at Work

by Robert T. Reville and Robert F. Schoeni

Summary

Studies of the economic and social consequences of disability among adults have documented the disadvantages that confront individuals with disabilities. A separate literature has focused on the economic and social consequences of workplace injuries and illnesses, which have been shown to lead to lower employment rates for years after the injury and significant losses in income. The public policies for these two social problems—disability and workplace injuries—are distinct, as are the associated research literatures, and yet the phenomena are related. In this article, we seek to document the overlap between these phenomena to improve public policy for both. Specifically, our goal is to estimate the proportion of the disabled population whose disability was caused by work.

Using the 1992 Health and Retirement Study, a nationally representative study of the U.S. population of people aged 51 to 61, we find that among those whose health limits the amount or kind of work they can do 36 percent became disabled because of an accident, injury, or illness at work. Among people of this age group who are receiving Social Security Disability Insurance, 37 percent are disabled because of an accident, injury, or illness at work. The workplace is a more common source of disability for

men than it is for women: among Disability Insurance recipients, 45 percent of men and 26 percent of women are disabled because of workplace accidents, injuries, or illnesses. The annual cost of workplace injuries to Medicare and Social Security Disability Insurance is roughly \$33 billion.

The results imply that one focus of initiatives to reduce disability should be work-related causes, because occupational injuries and illnesses are a common pathway to disability. Workplace injury prevention and rehabilitation may have far greater social benefits than previously realized, because of the substantial savings to Social Security Disability Insurance and Medicare.

Introduction

Studies of the economic and social consequences of disability among adults have documented the disadvantages that confront individuals with disabilities. Among these consequences are lower employment and earnings (Burkhauser, Daly, and Houtenville 2001) and higher medical expenditures (Trupin, Rice, and Max 1995). Noneconomic consequences include increased social isolation and higher rates of entry into nursing homes (Freedman and others 1994). Much of this literature is cited as motivation for antidiscrimination policies and income-support programs for the disabled, such

as the Americans with Disabilities Act of 1990, which provided disabled individuals with the right to sue for discrimination and for accommodations in public places, and the Social Security Disability Insurance program, which provided \$55 billion of income support for the disabled in 2000 (Thompson Williams, Reno, and Burton 2003).

A separate literature has focused on the economic and social consequences of workplace injuries and illnesses, which have been shown to lead to lower employment rates for years after the injury and significant losses in income (Berkowitz and Burton 1987; Biddle, Boden, and Reville 2001; Reville and Schoeni 2001). Much of this literature is cited to motivate an entirely different set of public policies, such as adequate and equitable workers' compensation benefits and workplace injury and illness prevention programs. Workers' compensation provides indemnity benefits and medical care to injured workers and cost employers \$63.9 billion in 2001 (Thompson Williams, Reno, and Burton 2003).

The public policies for these two social problems—disability and workplace injuries—are distinct, as are the associated research literatures, and yet the phenomena are intimately related. Workplace injuries and illnesses sometime lead to disabilities. Disabled individuals may draw income support at different times in their lives from both workers' compensation and Social Security Disability Insurance. A significant fraction of workers' compensation benefits is compensation for "permanent partial disability," which is caused by chronic, disabling conditions. Despite this similarity, even the philosophy of the two sets of public policies are distinct: disability policy emphasizes income support and nondiscrimination; occupational injury and illness policy emphasizes compensation and prevention.

This article investigates the fraction of the disabled population that is disabled because of work, using a nationally representative database of adults aged 51 to 61 in 1992. Disability is defined using two methods: individuals reporting a work-limiting impairment or health condition and individuals receiving Social Security Disability Insurance. The former group is considerably larger and is commonly used in the literature to measure the prevalence of disability (Burkhauser and Daly 2002). This research permits fuller estimates of the cost of occupational injuries and provides insights into the extent to which disability and associated public expenditures may be prevented through improved workplace safety.

Methods

After a search of all nationally representative databases that may be used to examine this question, two surveys were identified: the Health and Retirement Study (HRS)

and the Survey of Income and Program Participation (SIPP) (Reville, Bhattacharya, and Sager Weinstein 2001). The HRS, which is a face-to-face interview, surveys individuals in the noninstitutionalized population in 1992 who were born between 1931 and 1941 (Juster and Suzman 1995). The HRS, which is conducted by the Institute for Social Research at the University of Michigan, includes an oversample of blacks and Hispanics (at a rate of 2 to 1 for each group, relative to whites) and of residents of Florida. The response rate is 82 percent. When weights are used to account for differential selection into the study and nonresponse, the sample is representative of the national population aged 51 to 61 in 1992. We do not use later waves of the HRS, which is a longitudinal survey that interviews respondents every other year, because the information on workplace hazards was collected only in 1992.

We use the SIPP to confirm the estimates of workplace attribution that were measured using the HRS. The SIPP, which is also a face-to-face interview and is conducted by the U.S. Census Bureau, is representative of the noninstitutionalized population of all ages. Wave 2 of the 1992 SIPP panel is used because it contains most of the survey information needed to determine the attribution of disability.

Both surveys collect extensive information on income, employment, demographics, and health. Our study examined two measures of disability. The first is a widely used indicator of work limitation: "Do you have any impairment or health problem that limits the kind or amount of paid work that you can do?" The question is slightly different in the SIPP: "Do you have a physical, mental, or other health condition which limits the kind or amount of work that you can do?" The second measure, which is examined using the HRS, is participation in the Social Security Disability Insurance program in 1991 (the calendar year before the survey year). Social Security Disability Insurance recipients are at least as disabled as are individuals with work limitations. Specifically, Disability Insurance recipients have been found by the Social Security Administration to be "unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment expected to result in death or that has lasted or can be expected to last for a continuous period of at least 12 months." Disability Insurance recipients are of interest as a measure of disability and, in their own right, as recipients of a federal income-support program that is not necessarily targeted toward occupational injuries.

Using each of the two measures of disability above, we then estimate the proportion of the disabled populations whose disability can be attributed to work. Five different definitions of workplace attribution are examined.

- Definition 1 is the most direct; it includes accidents and injuries. After being asked to report the main condition that caused their disability, respondents were asked: “Was the impairment or health problem you just mentioned the result of an accident or injury?” If they answered “yes,” they were then asked if the injury took place at work, home, or someplace else.
- Definition 2 includes disabilities that are caused by the nature of the work, as indicated with an affirmative response to the following question: “Was this impairment or health problem in any way caused by the nature of your work?”
- Definition 3 includes nonpermanent impairments from workplace hazards. Disabled individuals are assumed to be in this category if they reported that they have ever had to breathe any kinds of dusts, fumes, or vapors or have ever been exposed to organic solvents or pesticides at work; that they feel they have been harmed by this exposure; and that they do not believe the harm to be permanent.
- Definition 4 includes permanent impairments from workplace hazards and is identical to definition 3 but only includes disabled individuals who think the harm was permanent. To satisfy definitions 3 and 4, the impairment had to occur after the person started working regularly.
- Definition 5 is the broadest; it includes all four of these possibilities.

The SIPP contains data that allow for estimation of the first definition using the same wording of the question as in the HRS. However, SIPP data are not collected to allow for estimation of definitions 2, 3, 4, or 5. Therefore, estimates of definition 1 are calculated using the SIPP to confirm the HRS estimates and also to provide estimates for a broader range of ages.

We expect disabled people whose impairments are due to accidents and injuries to have different conditions than disabled people whose impairments arise from the nature of their work or workplace hazards. Accidents and injuries should lead to more problems of the musculoskeletal system, while exposures to workplace hazards should be more likely to lead to problems with the heart, circulatory, and respiratory systems. We use reports of the type of condition of disability to determine whether this pattern is observed in the data.

Estimates of the attribution of disability are presented separately for Hispanics, non-Hispanic whites, non-Hispanic blacks, and also for men and women within each of these racial and ethnic groups. Sample weights are used for all calculations, and hence the estimates are

nationally representative for the given age group. Standard errors of the estimates are reported in each table.

One limitation of the study is that estimates of workplace attribution of disability are based on self-reports. For instance, workers’ compensation may provide an incentive to attribute the condition to work, perhaps inflating the estimates of work-relatedness. It is also likely that some disabilities are caused by a mixture of work and nonwork factors. As a result, providing retrospective reports of the single cause of the disability over a period of many years may be difficult. Additionally, self-reports of workers’ compensation receipt may be underestimated if, for instance, respondents perceive a stigma associated with workers’ compensation. For these reasons, future research and data collection should examine in longitudinal surveys prospective reports of injury, accidents, disability, and participation in workers’ compensation and Social Security Disability Insurance to enhance the understanding of the dynamics of these processes.

Results

Work Limitation

Among the population aged 51 to 61, 20.5 percent have a health problem that limits the amount or kind of work they can do (Table 1). The rates for men (20.4 percent) and women (20.6 percent) are virtually identical. The rates are roughly the same for Hispanics and non-Hispanic blacks (about 28 percent), with non-Hispanic whites about 10 percentage points lower than either of these two groups. The differences across racial groups are very similar for men and women.

Among the disabled population aged 51 to 61, 17 percent report that the impairment that caused them to be disabled was the result of an accident or injury at work (definition 1 in Table 2). An additional 14.7 percent stated that the impairment was due to the nature of their work (though not to an accident or injury at work). Relatively few additional disabled individuals were impaired because of workplace hazards (and not because of an accident or injury or the nature of their work)—0.8 percent of those who were nonpermanently impaired and 3.8 percent who were permanently impaired. Combining all four categories, 36.3 percent of disabled individuals attribute their disability to work (Table 2).

Estimates from the SIPP corroborate the estimates of the HRS. Using definition 1, 15.3 percent of adults aged 51 to 61 in the SIPP attribute their disability to an accident or injury at work; this estimate is similar to the estimate of 17 percent from the HRS (Table 2). The workplace is less likely to be the source of impairment for young, disabled people; in the SIPP, an estimated 6.1

percent of the population aged 16 to 30 that are disabled attribute their disability to an accident or injury at work. The lower rate is not surprising, since they have worked relatively few years. For disabled people aged 16 to 61, 13.7 percent fall under definition 1, which attributes disability to accidents and injuries at work.

Estimates in Table 3 confirm our expectation that, relative to disabled people with impairments caused by the nature of work or workplace hazards, disabled individuals whose impairment is caused by an accident or injury are more likely to have musculoskeletal conditions than heart, circulatory, or blood conditions. More than three-quarters (78.3 percent) of workplace accident or injury victims have conditions related to the musculoskeletal and connective tissues compared with 40.1 percent for the group of disabled individuals in the other three definitions. At the same time, the latter group is seven times more likely to have a heart, circulatory, or blood condition (24.5 percent versus 3.4 percent) or a respiratory condition (14.2

Table 1.
Proportion of the population aged 51 to 61 who were disabled, 1992

Population	Number of unweighted observations	Health limits amount or kind of work	Receives Social Security Disability Insurance
All	9,754	0.205 (0.004)	0.059 (0.002)
Men	4,595	0.204 (0.006)	0.068 (0.004)
Non-Hispanic			
White	3,379	0.190 (0.007)	0.059 (0.004)
Black	706	0.287 (0.017)	0.136 (0.013)
Other	99	0.189 (0.040)	0.032 (0.018)
Hispanic	411	0.266 (0.022)	0.094 (0.014)
Women	5,159	0.206 (0.006)	0.051 (0.003)
Non-Hispanic			
White	3,593	0.188 (0.007)	0.039 (0.003)
Black	969	0.282 (0.014)	0.123 (0.011)
Other	105	0.234 (0.042)	0.045 (0.020)
Hispanic	492	0.282 (0.020)	0.076 (0.012)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTE: Standard errors are in parentheses.

Table 2.
Proportion of the disabled population aged 51 to 61 whose disability was due to work, by definition of work place attribution of disability

Definition	Proportion disabled
Definition 1. Caused by accident or injury at work	0.170 (0.008)
Definition 2. Caused by nature of work, but not definition 1	0.147 (0.008)
Definition 3. Nonpermanent impairment from workplace hazards that occurred after having started working regularly, but no definition 1 or 2	0.008 (0.002)
Definition 4. Permanent impairment from workplace hazards and occurred after having started working regularly, but not definition 1, 2, or 3	0.038 (0.004)
Definition 5. Any of the above	0.363 (0.011)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTE: Standard errors are in parentheses.

Table 3.
Proportion of persons whose disability was due to workplace accidents or exposure to hazards, by type of condition and definition of workplace attribution of disability

Type of condition	Definition 1	Definition 2, 3, or 4	Definition 5
Musculoskeletal system and connective tissue	0.783 (0.022)	0.401 (0.025)	0.580 (0.018)
Heart, circulatory system, and blood	0.034 (0.010)	0.245 (0.022)	0.146 (0.013)
Respiratory system	0.021 (0.008)	0.142 (0.018)	0.085 (0.010)
Neurological and sensory	0.067 (0.013)	0.062 (0.012)	0.064 (0.009)
Emotional and psychological	0.009 (0.005)	0.030 (0.009)	0.020 (0.005)
All other	0.087 (0.015)	0.120 (0.016)	0.104 (0.011)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTES: Definition 1—disability is caused by accident or injury at work. Definition 2, 3, or 4—disability is caused by nature of work or by nonpermanent or permanent impairment from workplace hazards that occurred after having started working regularly. Definition 5—any of the previous four definitions.

Standard errors are in parentheses.

percent versus 2.1 percent in Table 3).

Among the disabled, men are much more likely than women to suffer an impairment that is due to work (50 percent for men compared with 23.9 percent for women in definition 5 in Table 4). This difference is not surprising given the differences in labor force attachment of men and women in this cohort. But as the gap in labor force attachment between men and women has narrowed for more recent birth cohorts, the corresponding gap in the role of workplace injuries and accidents to disability is also likely to diminish.

Among disabled women, the racial and ethnic differences in workplace attribution are fairly small, which range from 23.8 percent to 26.8 percent (Table 4). The racial and ethnic disparities are larger among men. While Hispanic men have the highest level of workplace attribution at 55.8 percent, non-Hispanic blacks have rates that are 15.4 percentage points lower. In the middle of this range are non-Hispanic whites at 50.8 percent (Table 4).

Social Security Disability Insurance Participation

Although 20.5 percent of adults aged 51 to 61 report a health condition that limits the kind or amount of work they can do, just 5.9 percent are enrolled in the Social Security Disability Insurance program (Table 1). The rate of enrollment is low because this program is intended to provide income support to a more severely disabled population, namely those whose health condition is preventing work rather than limiting it. Disability Insurance participation rates are somewhat higher for men (6.8 percent) than for women (5.1 percent). Blacks and Hispanics are much more likely to be enrolled in the program than are whites (Table 1).

However, the proportion of the disabled population whose impairment was due to work is the same regardless of the definition of disability: 36.5 percent among Social Security Disability Insurance recipients (under the all-inclusive definition 5 in Table 5) and 36.3 percent among people who report that their health limits the amount or kind of work they can do (definition 5 in

Table 4.
Proportion of the disabled population aged 51 to 61 whose disability is due to work, by sex, race, and ethnicity

Population	Definition 1	Definition 5
All	0.170 (0.008)	0.363 (0.011)
Men	0.242 (0.014)	0.500 (0.016)
Non-Hispanic		
White	0.233 (0.017)	0.508 (0.020)
Black	0.205 (0.029)	0.404 (0.035)
Hispanic	0.364 (0.046)	0.558 (0.048)
Women	0.106 (0.009)	0.239 (0.013)
Non-Hispanic		
White	0.106 (0.012)	0.239 (0.016)
Black	0.100 (0.019)	0.238 (0.026)
Hispanic	0.134 (0.029)	0.268 (0.037)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTES: Definition 1—disability is caused by accident or injury at work. Definition 5—disability is caused by accident or injury at work, by nature of work, or by nonpermanent or permanent impairment from workplace hazards that occurred after having started working regularly.

Standard errors are in parentheses.

Table 5.
Proportion of Social Security Disability Insurance participants whose disability is due to work, by sex, race, ethnicity, and definition of workplace attribution of disability

Population	Definition 1	Definition 5
All	0.157 (0.014)	0.365 (0.019)
Men	0.207 (0.022)	0.450 (0.027)
Non-Hispanic		
White	0.212 (0.029)	0.464 (0.038)
Black	0.197 (0.042)	0.400 (0.051)
Hispanic	0.190 (0.063)	0.410 (0.079)
Women	0.097 (0.017)	0.262 (0.025)
Non-Hispanic		
White	0.083 (0.023)	0.265 (0.037)
Black	0.102 (0.029)	0.260 (0.041)
Hispanic	0.162 (0.060)	0.270 (0.072)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTES: Definition 1—disability is caused by accident or injury at work. Definition 5—disability is caused by accident or injury at work, by nature of work, or by nonpermanent or permanent impairment from workplace hazards that occurred after having started working regularly.

Standard errors are in parentheses.

Table 4). Among men on Disability Insurance, almost one-half (45 percent) were disabled because of work, while the rate for women on Disability Insurance (26.2 percent) was again about half that for men (definition 5 in Table 5). Racial and ethnic differences are fairly small for both men and women. In sum, a large share of Social Security Disability Insurance recipients became disabled because of an accident, injury, or exposure to hazards at work.

Although a large share of the disabled became impaired because of their job, relatively few have ever received workers' compensation. Among all disabled people (defined as having a health problem that limits the amount or kind of work that they can do), just 5.3 percent ever received workers' compensation (Table 6). This low rate of participation is consistent with a growing body of evidence that shows that many injured workers do not claim benefits from workers' compensation (Burton and Spieler 2001). At the same time, 28.9 percent were currently enrolled in Social Security Disability Insurance (Table 6). (Information on whether the person had ever received Social Security Disability Insurance is not reported in the HRS.) More significantly, even among the disabled who report that their health condition was caused by their work, just 12.3 percent ever received workers' compensation, while nearly one-third (29 percent) were currently enrolled in Social Security

Disability Insurance. Moreover, among those on Disability Insurance, only a small fraction (4.7 percent) have ever received workers' compensation (Table 6).

Comment

This study finds that among people aged 51 to 61 whose health limits the amount or kind of work that they can do, 36.3 percent report that an injury, accident, or illness at work caused the disability. This rate is higher among men than among women, which is consistent with the fact that within these birth cohorts men were employed for a much greater share of their lives than were women. With more recent study cohorts, men and women have had more similar work attachment patterns, suggesting that the workplace may become a more common source of disability for women. At the same time, during the past 40 years, the share of workers in physically demanding jobs has declined (Murphy and Welch 1993), which may reduce the importance of workplace injuries overall. However, the new occupations may be associated with a different set of health conditions, such as repetitive stress injuries, obesity, and stress-induced mental illness. In fact, the prevalence of disability among 45- to 54-year-olds increased between the late 1980s and late 1990s (Burton and Spieler 2001), a period during which policy changes made it more difficult for injured workers to receive workers' compensation (Spieler and Burton 1998).

Workers' compensation is designed to provide cash and medical assistance to employees injured on the job. These benefits totaled \$49.4 billion in 2001 (Thompson Williams, Reno, and Burton 2003). However, as shown in this study, 37 percent of recipients of Social Security Disability Insurance became disabled at work, implying that the societal costs of workplace injuries are much higher than what is suggested by estimates that rely only on workers' compensation benefits. In 2001, participants in the Disability Insurance program received a total of \$59.6 billion in cash benefits and \$29.7 billion in Medicare expenditures (Thompson Williams, Reno, and Burton 2003). A simple extrapolation of our estimate that 37 percent of recipients of Disability Insurance are disabled because of work implies that occupational injuries and illnesses account for \$22.1 billion (37 percent of \$59.6 billion) in Social Security Disability Insurance payments and \$11.0 billion (37 percent of \$29.7 billion) in Medicare expenditures, or \$33.1 billion in total in 2001. This additional annual expenditure on social insurance is not counted as a cost of workplace injuries in the United States. Workplace injury prevention may have far greater social benefits than has been previously realized. Moreover, effective interventions and rehabilitations not only reduce workers' compensation costs and increase

Table 6.
Proportion of the disabled population aged 51 to 61 receiving Social Security Disability Insurance, workers' compensation, or both

Disabled population	Currently receiving—		Ever received workers' compensation
	Social Security Disability Insurance	Workers' compensation	
All disabled	0.289 (0.010)	0.017 (0.003)	0.053 (0.005)
Disabled under definition 5	0.290 (0.017)	0.045 (0.008)	0.123 (0.012)
Disabled and receiving Disability Insurance	1.00	0.021 (0.006)	0.047 (0.008)

SOURCE: Data are from the 1992 Health and Retirement Study.

NOTES: The term "disabled" refers to people whose health limits the amount or kind of work they can do.

Definition 5—disability is caused by accident or injury at work, by nature of work, or by nonpermanent or permanent impairment from workplace hazards that occurred after having started working regularly.

Standard errors are in parentheses.

employment, but they also most likely reduce Social Security Disability Insurance and Medicare expenditures.

The results of this study suggest that Social Security Disability Insurance is serving as a major if not primary source for insurance for workplace disabilities. Coordinating the workers' compensation and Social Security Disability Insurance programs likely could yield substantial benefits, because their target service populations overlap. Presumably some people who are injured at work apply for and receive workers' compensation and never apply for Social Security Disability Insurance. Others enroll only in Social Security Disability Insurance, and a third group participates in the worker's compensation program for some period and then eventually applies for Social Security Disability Insurance. We do not know how common is each pathway of program utilization, but an understanding of who applies for which programs, why they make these decisions, and the timing of these decisions over the life course is fundamental to the optimal provision of services to the disabled population.

Note

Acknowledgments: Funding and support was provided by the RAND Institute for Civil Justice to R.T. Reville and the National Institute on Aging (Grant No. K01AG00670) to R.F. Schoeni. No funder played a role in any aspect of the study.

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