

# Multiyear nonfatal work injury rates

*Longitudinal data indicate a higher rate of nonfatal workplace injuries than might be expected from annual statistics; less educated workers, whose jobs often involve considerable physical activity, have a substantial risk of on-the-job injury*

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Every year, millions of Americans are injured on the job. According to the U.S. Bureau of Labor Statistics (BLS; the Bureau), in 2004 alone, more than 4 million workers suffered a workplace injury or illness, the vast majority of which were injuries.<sup>1</sup> Just over half of these injuries and illnesses involved lost days of work or days of job transfer or restricted work. The annual numbers, however, tell only part of the story. An important question is, How many workers have ever been injured on the job? Occupational safety and health data collected from business establishments do not provide an answer to that question. This article takes a first step toward answering the question by using an unexploited data source on work injuries: the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79).<sup>2</sup>

Examining nonfatal workplace injury rates from the NLSY79 in 8 of the years from 1988 to 1998,<sup>3</sup> the article finds that, over the entire 8 years studied, the overall injury rate for those responding in any of the 8 years was 27.6 percent, indicating that more than a quarter of the sample was injured at least once during those years. The article also finds that (1) a large proportion of injuries resulted in restricted or lost workdays and (2) there are significant differences in injury rates by sex, education level, and, in some cases, race or ethnicity.

## Methods

The NLSY79 is an ongoing longitudinal survey sponsored by the Bureau of Labor Statistics.<sup>4</sup>

Beginning in 1979, a sample of individuals aged 14 to 22 years at that time was interviewed annually until 1994 and biennially since then. Retention rates have been quite high. In 2002, 7,724 respondents were interviewed, representing 78.5 percent of the eligible sample. The NLSY79 collects information on individuals' labor market behavior and on items that influence or are influenced by that behavior. The range of information available in the survey is extensive and includes regular information on education, job training, marital history, fertility, health, income, and assets. A complete work history has been collected identifying beginning and ending dates of all jobs, characteristics of those jobs (for example, hours and earnings), and periods of nonwork.

Beginning in 1988, questions were added to capture information on injuries incurred at work. Respondents were asked whether they had incurred any injuries or illnesses in the 12 months before the survey.<sup>5</sup> For the most recent injury or illness, information was obtained about the month and year of the injury, the activity being performed at the time of the injury, the part of the body hurt or otherwise affected, the number of days away from work, the number of days of restricted work activity, how the incident affected the individual's employment status, whether the injured worker lost wages, and whether the individual filed a worker's compensation claim. If the most recent injury or illness was not the most severe during the reference period, then respondents were asked for the details of the most severe injury or illness.<sup>6</sup>

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Workplace injury data are available for the 1988–90, 1992–94, 1996, 1998, and 2000 survey years.

In calculating injury rates, the analysis considered the most recent injuries reported; illnesses were not included.<sup>7</sup> If the report of the most recent injury or illness was an illness, then the most severe injury was counted. Therefore, at most one injury per person was counted in a year. Because the NLSY79 does not ask about all work injuries incurred during the year, complete counts of injuries for each respondent cannot be calculated. However, the data do support calculating the number of years in which a respondent suffered a work injury, providing a lower bound on the percentage of workers who were injured more than once during the study period. Summing across the 8 years reveals that approximately 10 percent of the sample reported injuries in more than 1 year. Although not a large percentage of the workforce, the 10-percent figure represents about 36 percent of all those who reported any injuries. As a lower bound, that percentage indicates a substantial number of workers who suffered multiple work injuries.

The severity of an injury can be measured in terms of the number of workdays lost due to the injury. Injuries were classified on the basis of whether they resulted in days away from work or restricted days of work (days in which the respondent was not able to perform his or her regular duties or could not work full time). A lost-workday injury is an injury that results in either missed or restricted days of work. The number of missed and restricted workdays was collected. Demographic variables such as sex and race or ethnicity (Hispanic, black, and nonblack non-Hispanics) were used from the first year of the data. Each year, the respondents were asked about their highest grade completed and highest degree received. The highest degree completed over the 8 years of the survey was calculated from these data and used to measure educational attainment.

Included in the analysis sample was any participant who responded to the injury questions in any of the 8 years. To represent the cohort population, the estimates were weighted to account for the overrepresentation of minorities. The weights were rescaled for each year and applied separately every year the observation was in the sample.

To provide context, it is worthwhile to compare annual injury rates derived from the NLSY79 with BLS estimates of occupational injuries from its employer survey, although many caveats make the comparison problematic. For one, the official statistics are collected from business establishments that use Occupational Safety and Health Administration (OSHA) logs, whereas NLSY79 data are collected directly from individuals. Comparisons of the two series also are confounded by the fact that the NLSY79 represents a specific age cohort. Furthermore, at most one injury per person per year is counted in the NLSY79 data, while BLS data include repeat injuries. Finally, BLS estimates are weighted by hours to create rates per full-time-equivalent employee,

whereas NLSY79 rates are per person, regardless of hours worked.

Table 1 shows the annual incidence of occupational injuries from BLS Occupational Safety and Health Statistics (OSHS) and from the NLSY79 for 1988–98.<sup>8</sup> A comparison of the annual injury rates from the OSHS and the NLSY79 indicates that the overall injury rates are lower in the NLSY79. Most of the difference occurs for cases without lost workdays. The injury rates for lost-workday cases, particularly cases with days away from work, are more comparable, although the NLSY79 numbers are still slightly lower in most years. While the small differences in the lost-workday-related measures from the two data sources probably are due to technical differences in the collection methods, the large differences in the all-injuries measure more likely is due to the nature of retrospective reporting in the NLSY79. At the time of the interview, respondents most likely do not report as many of the minor injuries that may no longer be salient to them.<sup>9</sup>

## Results

On the basis of data from eight interviews conducted over an 11-year period, the percentage of workers who were injured at any time during the 8 interview years was calculated. Table 2 shows the incidence rates by race or ethnicity and sex for all injuries, lost-workday injuries, and injuries involving days away from work.

Although only about 6 percent to 8 percent of the workforce suffers a work injury each year, as mentioned earlier, a sizable 27.6 percent of the cohort studied was injured at some time during the 8 years studied between 1988 and 1998. A similar relationship holds when the definition of work injury is restricted to those injuries involving time lost. About 3 percent to 4 percent of the workforce each year suffers an injury resulting in lost workdays, while more than 20 percent had such an injury at some point in the 8 years studied. Even fewer injuries result in days away from work, yet about one-sixth (16.7 percent) of this cohort had such a serious injury during that period.

The differences by sex are striking. Men have injury rates 63 percent to 88 percent higher than women, depending on the measure chosen. Men have injury rates of approximately 34 percent, 26 percent, and 22 percent for all injuries, lost-workday injuries, and injuries involving days away from work, respectively. The comparable numbers for women are 21 percent, 15 percent, and 12 percent.

Race or ethnicity differences are not as pronounced. Both Hispanics and nonblack non-Hispanics have similar rates, regardless of the definition of injury. Blacks have lower rates for all injuries and slightly lower rates for lost-workday injuries. The difference vanishes when injuries are restricted to only those resulting in days away from work.

These results show that the cumulative rate of injuries is higher than would be implied by an annual time series. In particular, rates for men are quite large. Much of what deter-

**Table 1. Incidence of nonfatal occupational injuries by year, OSHS and NLSY79, 1988–98**

Year	Total cases		Lost-workday cases				Cases without lost workdays	
	OSHS	NLSY79	Total		With days away from work		OSHS	NLSY79
			OSHS	NLSY79	OSHS	NLSY79		
1988 .....	8.3	6.9	3.8	4.2	3.4	3.2	4.4	2.3
1989 .....	8.2	5.3	3.9	3.5	3.3	2.9	4.4	1.9
1990 .....	8.3	4.8	3.9	3.0	3.3	2.3	4.5	1.6
1991 .....	7.9	—	3.7	—	3.1	—	4.2	—
1992 .....	8.3	4.4	3.6	2.7	2.9	2.1	4.7	1.3
1993 .....	7.9	4.7	3.5	3.2	2.7	2.3	4.4	2.1
1994 .....	7.7	4.7	3.5	3.3	2.6	2.7	4.2	1.9
1995 .....	7.5	—	3.4	—	2.4	—	4.1	—
1996 .....	6.9	4.7	3.1	3.3	2.1	2.6	3.8	2.1
1997 .....	6.6	—	3.1	—	2.0	—	3.5	—
1998 .....	6.2	4.1	2.9	2.6	1.9	2.0	3.3	1.8

NOTE: Rates listed are per 100 workers. Dash indicates data not available. SOURCE: OSHS data, *Workplace Injuries and Illnesses in 1999* (Bureau of Labor Statistics, 2000), table 6; NLSY79 data, authors' tabulations.

**Table 2. Eight-year nonfatal work injury rates for NLSY79 cohort**

Sex	Total	Nonblack non-Hispanics	Blacks	Hispanics
<b>All injuries</b>				
Total .....	27.6	28.4	23.9	26.3
Men .....	34.2	35.4	26.7	36.2
Women .....	21.0	21.4	21.1	16.4
<b>Lost-workday injuries</b>				
Total .....	20.3	20.5	19.2	20.1
Men .....	25.8	26.3	22.1	28.3
Women .....	14.7	14.7	16.4	11.8
<b>Days-away-from-work Injuries</b>				
Total .....	16.7	16.8	16.6	16.5
Men .....	21.8	22.1	19.7	23.0
Women .....	11.6	11.4	13.5	9.8

NOTE: Rates listed are per 100 workers.

mines injury rates is the risk of injury from the jobs individuals hold. It is not practical to differentiate injuries by industry or occupation in the context of a longitudinal survey. The individuals in the sample examined in this article have held many different jobs over the years studied. However, the nature of those jobs is most likely correlated with the individual's level of education. Thus, table 3 presents injury rates for all three types of injuries for individuals with either of two levels of education: those with at most a high school degree and those with more than a high school degree.<sup>10</sup>

Table 3 shows significant differences in injury rates by education level. Those with no more than a high school degree have injury rates 62 percent to 105 percent higher than those with some postsecondary education. The less educated group has injury rates of 34 percent, 26 percent, and 22 percent for all injuries, lost-workday injuries, and days-away-from-work injuries,

respectively. The comparable rates for the more educated group are 21 percent, 14 percent, and 11 percent.

Education mitigates some of the sex differentials. Less educated men are 87 percent to 105 percent more likely to be injured than less educated women, whereas more educated men are 23 percent to 43 percent more likely to be injured than more educated women. Especially important to note are the extremely high rates for less educated men: more than 43 percent of less educated men were injured at some time during the 8 years examined, with about one-third (34 percent) of them having injuries that resulted in lost workdays and 29 percent having injuries that resulted in days away from work.

Small race or ethnicity differences appear within educational groups. Nonblack non-Hispanics who are less educated have higher injury rates than less educated blacks or Hispanics for any type of injury. Nonblack non-Hispanics who

**Table 3. Eight-year nonfatal injury rates by educational attainment, sex, and race or ethnicity**

Highest grade completed	Total	Men	Women	Nonblack non-Hispanics	Blacks	Hispanics
<b>All injuries</b>						
12th grade or less .....	33.9	43.5	23.3	36.2	25.3	28.4
Higher than 12th grade .....	21.0	23.5	18.9	20.8	21.8	23.1
<b>Lost-workday injuries</b>						
12th grade or less .....	26.2	34.1	17.4	27.7	20.5	22.6
Higher than 12th grade .....	14.1	16.2	12.3	13.5	17.4	16.1
<b>Days-away-from-work injuries</b>						
12th grade or less .....	22.2	29.4	14.3	23.3	18.4	18.9
Higher than 12th grade .....	10.9	13.0	9.1	10.4	14.0	12.5

NOTE: Rates listed are per 100 workers.

are more educated, however, have lower injury rates than more educated blacks or Hispanics for any type of injury, although not all of the differences are statistically significant.

WORKPLACE INJURIES AFFECT MILLIONS OF WORKERS each year. Likewise, employers face lost productivity and increased workers' compensation costs when such injuries occur. The National Safety Council estimated the economic costs of workplace injuries and fatalities to be \$131.2 billion in 2000.<sup>11</sup> Annual statistics document an important problem. By using

longitudinal data on individuals, this article has presented rates of nonfatal workplace injuries that are somewhat higher than those obtained from annual statistics.

Although some jobs have very low injury rates, other jobs are quite risky. The estimates presented here for less educated men, who tend to hold jobs that require more physical activity, indicate that, among certain groups, the risk of a job injury is substantial. Considering that approximately one-third of less educated working men suffers at least one workplace injury involving lost workdays in an 8-year period, the need for workplace safety is substantial. □

## Notes

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<sup>1</sup> "Workplace Injuries and Illnesses in 2004," BLS press release, Nov. 17, 2005.

<sup>2</sup> The NLSY79 is the only national survey that covers all types of workplace injuries, including nondisabling and injuries for which no claim was submitted. (See R. T. Reville, Jayanta Bhattacharya, and L. R. Sager Weinstein, "New Methods and Data Sources for Measuring Economic Consequences of Workplace Injuries," *American Journal of Industrial Medicine*, vol. 40, 2001, pp. 452–63.)

<sup>3</sup> In 1991, the NLSY79 did not ask questions about injuries, and in 1995 and 1997, no survey was conducted.

<sup>4</sup> For more information on the NLSY79, see *NLS Handbook* (Bureau of Labor Statistics, 2005); and Michael R. Pergamit, Charles R. Pierret, Donna S. Rothstein, and Jonathan R. Veum, "Data Watch: The National Longitudinal Surveys," *Journal of Economic Perspectives*, spring 2001, pp. 239–53.

<sup>5</sup> After 1988, respondents were asked to report any injuries since the date of the last interview. The analysis presented in this article includes only injuries occurring during the 12-month period preceding the date of the interview.

<sup>6</sup> Only 3.3 percent of those who ever reported an injury or illness also reported a more severe injury or illness.

<sup>7</sup> Very few illnesses are reported in the NLSY79 data. As a result, illnesses were left out of the analysis because of the relatively high likelihood that the reports would be statistically unreliable.

<sup>8</sup> At the time this research was begun, NLSY79 data were not available for 2000. Thus, only data through 1998 are used.

<sup>9</sup> This effect must offset a countervailing expectation that workers are more likely to report minor injuries through the medium of a survey that they might not have reported to their employer (and thus the injuries escaped notice by OSHA).

<sup>10</sup> The latter category consists of those who completed at least 1 year of postsecondary education.

<sup>11</sup> *Injury Facts* (Itasca, IL, National Safety Council, 2001); see also the frequently cited study by J. Paul Leigh, Steven Markowitz, Marianne Fahs, Chonggak Shin, and Philip Landrigan, "Occupational Injury and Illness in the United States," *Archives of Internal Medicine*, July 28, 1997, pp. 1557–68, in which the authors estimate the total costs of workplace injuries, including fatal injuries, in 1992 at \$145 billion. The costs of workplace illnesses are estimated to be an additional \$26 billion.