A Different Approach to Measuring Workplace Safety: Injuries and Fatalities Relative to Output

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The authors present a different approach to gauging workplace safety by measuring injuries and fatalities relative to output rather than to employment.

Introduction

Trends in wages and other working conditions are important gauges of economic progress. One of the more important working conditions is safety on the job. For a number of years, BLS has produced indicators of job safety in the form of work-related injury and illness counts and rates, and work-related fatality counts. Those indicators suggest that job safety has improved in recent years. For example, the number of work-related fatalities in the United States declined over the past decade. Furthermore, this decline occurred despite rising employment and hours worked. These trends suggest that work environments in the United States have become safer in the sense that now there are fewer fatalities per hour worked than there were in the recent past.

This approach to assessing workplace safety--measuring the number of accidents or illnesses that occur divided by the number of hours that people are at work--is important because it provides a perspective on the exposure of workers to risk. BLS plans to continue to publish data reflecting this perspective, and, in fact, is working towards refining and expanding these measures. There are a number of intriguing approaches that could be examined; for instance, instead of counting the number of injuries and illnesses giving each the same weight, one might wish to weigh more heavily those injuries that are more severe, either in terms of the number of workdays lost or in terms of the costs of the injuries.

A quite different approach from a research perspective could be to examine injuries and illnesses not from labor inputs (the number of workers and hours worked) but rather related to labor outputs (the amount of production generated by workers.) Along with employment gains, the U.S. economy--the largest in the world--added almost $400 billion in output in 2005, bringing its total Gross Domestic Product (GDP) to well over $11 trillion. What would the trends over time be if the number of workplace injuries and illnesses were related to the output of goods and services, both economy wide and for specific industries? Are data available to permit such comparisons?

This article outlines the latter approach--calculating trends in injury and fatality rates using a "value-added" measure of output as the denominator. It describes the derivation of output data that can be used for this approach and points out some of the related issues and caveats. Analyses of work-related injury and fatality risks may differ, depending on whether the measure is injuries per hour worked or injuries per unit of output. It is also possible that some industries or sectors that appear to be relatively safer by one measure may appear to be less so by other measures.

Data Sources

BLS data on work-related injuries, illnesses, and fatalities come from two sources: the Census of Fatal Occupational Injuries (CFOI) and the Survey of Occupational Injuries and Illnesses (SOII).[1] The CFOI covers work-related fatalities occurring in the United States among private wage and salary workers, public sector employees, the self-employed, family workers, and members of the military. Because it is a census, the CFOI provides a complete count of all work-related injuries that result in fatalities. The CFOI is quite comprehensive in that it obtains information on workplace fatalities from multiple documentary sources, including (but not limited to) death certificates, Occupational Safety and Health Administration (OSHA) reports, news media reports, state workers' compensation claims, and coroner or medical examiner reports. Cross-referencing these different source documents ensures that the published number of fatalities is as accurate and complete as possible. Currently, CFOI data are available for the 1992-2004 period.

Data on nonfatal injuries and illnesses come from the BLS Survey of Occupational Injuries and Illnesses (SOII), a large annual survey that collects information from private sector employers only on the number of nonfatal injuries and illnesses by detailed industry.[2] BLS calculates injury and illness rates by dividing the number of injuries and illnesses in a given industry by the total number of hours worked by all employees in that industry. The survey distinguishes among injury and illness cases resulting in job transfer or restriction, cases resulting in missed days of work, and other cases. For injuries and illnesses requiring the employee to be away from work for 1 or more days, the survey also collects information about the incident and the injured employee. Nonfatal injury and illness case counts and rates have been available since the 1970s. However, in this article, the analysis of nonfatal injuries and illnesses data focuses on the 1992-2004 period.

Measuring fatalities relative to either output or labor requires external estimates of output or labor that are comparable in scope to the fatalities data. Estimates of employment and hours worked are derived from the Current Population Survey (CPS), a large monthly household survey. The CPS sample is designed to represent the broad economy, and therefore its scope is roughly comparable to that of the fatalities data.[3] Among respondents who are employed, the CPS collects data on the number of hours worked, the industry in which they worked, and other employment attributes. To get a comprehensive measure of worker exposure to on-the-job fatality risks, all reported hours worked by employed persons during the course of the year are aggregated. Throughout this article, hours totals are shown in terms of "full-time equivalent" (FTE) workers, under the assumption that a full-time worker works 2,000 hours annually.[4]

Estimates of output, for which the concept of value added is used, come from the Bureau of Economic Analysis (BEA) series on gross domestic product (GDP).[5] Value added is equal to gross output (sales or receipts and other operating income, commodity taxes and inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). To derive real value added, the components of nominal dollar GDP are deflated using chain-type price indexes.[6] Because the fatalities data are for all sectors of the economy, GDP for the economy as a whole provides the most comparable measure of output.

Measuring nonfatal injuries and illnesses relative to output requires output estimates comparable in coverage to that of the injuries data, which has a slightly narrower scope than the fatalities data. Thus, output associated with employment not in the scope of the SOII is excluded from the broad GDP measure. National income accounts series allow one to easily make some, but not all, of these exclusions. For output associated with self-employment, the corresponding value added is excluded by netting out proprietor’s income from GDP. Government sector value added is excluded as well.[7] External estimates for employment and hours worked are not required for nonfatal injuries, because they are collected directly in the SOII.

In addition to looking at aggregate trends, it is possible to investigate differences across industries in workplace safety. All of the data sources described here now use the North American Industry Classification System (NAICS). BLS injury and illness counts and rates and CPS employment estimates are available for NAICS-based industries. In addition, the national income accounts produce real and nominal value added series and price index series for NAICS-based industries. A given industry’s value added is gross output less intermediate inputs--those goods produced in other industries and used in this industry.

Trends

Table 1 shows the fatality count and two different fatality rates for 1992 and 2004, the most recent year available. One fatality rate shows fatalities per 100,000 full-time-equivalent (FTE) workers, and the other shows fatalities per billion dollars of real GDP, measured in year 2000 dollars. The number of fatalities fell over the period by 7.3 percent. In 1992, 6,217 workers were killed on the job, a rate of 5.4 fatalities per 100,000 FTE workers. In 2004, 5,764 workers were killed, a rate of 4.2 fatalities per 100,000 workers. Therefore, the fatality rate, as measured by fatalities per FTE workers, fell by more than 20 percent over this period. The 20-percent decline in the fatality rate exceeded the 7.3-percent decline in the number of fatalities because employment increased substantially during the period.

As mentioned previously, one can also measure how many fatalities occur during the production of a given amount of aggregate real output. In 1992, there were 0.85 fatalities per billion dollars of real GDP.[8] By 2004, that figure had fallen to

0.54 fatalities per billion dollars, a decline of approximately 36 percent. The greater improvement in fatality rates when rates are measured against output stems from the fact that there was substantial real productivity growth over this period.[9] Labor productivity, which typically is measured as output per hour worked, increased due to a variety of factors, including technological innovation and investments in human and physical capital. But whatever the ultimate source of the productivity improvement, the fact remains that the U.S. economy currently produces more real output per unit of labor input than it did in the early 1990s. This increase in productivity helps explain why the fatality rate based on output declined more rapidly than the fatality rate based on FTE workers.

Table 2 presents similar statistics for injury and illness counts and rates. In 1992, there were almost 6.8 million OSHA-recordable injury and illness cases. That translates into a rate of 8.9 injuries per 100 full-time workers, and about 1.2 injuries per million dollars of real GDP. In 2004, there 4.3 million reported workplace injuries and illnesses, which translates into a rate of 4.8 per 100 full-time workers and 0.49 per million dollars of real GDP. Although both rates fell substantially over the period, the decrease was greater for the output-based measure (58 percent) than it was for the employment-based measure (46 percent). Note that the decreases for nonfatal injuries and illnesses are greater in percentage terms than the corresponding figures for fatalities.

Chart 1 and chart 2 provide a graphic representation of these trends. Chart 1 shows the number of fatalities and the two different fatality rates for the 1992-2004 period, and chart 2 shows the same information for injuries and illnesses over the same period. These figures are useful for looking at the timing of changes that occurred during the period, and they help confirm that the statistics shown in tables 1 and 2 give a reasonable summary of the complete time series. Both series show cumulative percentage changes relative to 1992.

As chart 1 shows, each of the three fatalities series declined over the 1992-2004 period. The fatality count increased somewhat in the early part of the period, and it began to decline around the mid-1990s.[10] As described previously, the fatality rates declined more in percentage terms than the number of fatalities, due to increases in employment and output. The rates also began to fall earlier in the period than did fatality counts, because of employment and output growth in the early 1990s. The two fatality rate series diverge at a somewhat faster rate in the latter part of the period than in the early part, reflecting the fact that productivity increases were smaller in the early 1990s than they were in later years. However, note that the divergence in the three series occurs gradually over the entire period and thus is not due simply to sporadic or one-time shifts.

Chart 2 shows the number of workplace injuries and illnesses that occurred over the 1992-2004 period. As was the case with the fatality statistics described previously, the injuries and illnesses statistics gradually change over time.[11] Dating the exact timing of observed trend changes is not an objective process, but one could reasonably interpret the timing of the changes in the two figures as being roughly comparable. What differs most between the two figures is the greater magnitude of the case count decline for injuries and illnesses as opposed to fatalities.

The Industrial Distribution Of Injuries, Illnesses, And Fatalities

Fatality counts and rates vary substantially across industry groups. The same holds true to a lesser extent for injuries and illnesses. This variation in the industry-specific level of risk reflects the different work environments and technologies in different industries. Information on differential risk across industry groups has long been used to target safety inspections and safety regulation enforcement, as well as to inform worker decisions. In part because different industries employ different technologies, value added per worker varies across industries as well.

One interesting exercise would be to look at trends in fatality rates by industry. The exercise is complicated by the fact that the industry classification system changed from the Standard Industrial Classification (SIC) system to the NAICS. Moreover, the change was implemented at different times in the different data sources used here. Because the classification changes were substantial, even at fairly aggregate levels, they preclude a useful retrospective look at trends by industry.[12]

Although giving industry-specific trends is problematic, it can be shown how using different fatality rate measures might affect one's assessment of industry riskiness at a particular point in time. Such information may be interesting prospectively, because it allows for tracking the future evolution of the industrial distribution of the riskiness of jobs.

Table 3 shows the industrial distribution of fatality counts and employment and output statistics for 2004. The industries with the most workplace fatalities are construction (1,234), transportation and warehousing (840), and agriculture and related industries (669). These three industry groups account for nearly half (48 percent) of all fatalities in 2004. Table 3 also shows the fraction of employment in the given industry, and that industry's fraction of the economy's total value added. For example, the three industry groups with the most fatalities account for about 13 percent of all employment and about 9 percent of the economy's value added.

To gauge how an industry's fatality rate compares with the economy-wide average (its relative risk), table 3 includes relative risk measures for two fatality rates, one using employment (fourth column) and the other using value added (sixth column). Relative risk is simply the fatality rate for the particular industry divided by the fatality rate for the economy as a whole.[13] A relative risk value greater than 1 means that the industry is more risky than the economy as a whole. A relative risk value less than 1 indicates that the industry is safer than the economy as a whole.

Because a large fraction of workplace fatalities are concentrated in just a few industries, the relative risk measures will tend to be quite large for those industries and less than 1.0 for most of the other industries. Not surprisingly, the relative risk measures are large for the three industries with the highest fatality counts, as well as for the mining industry. The relative risk measures are quite small for the information, financial activities, and educational and health services industry groups. Industry rankings for relative risk generally are consistent across the two measures. If there is a pattern, it is that accounting for different levels of value added per worker in the different industries tends to make the extreme values in the industry distribution somewhat more extreme.[14] For instance, there are relatively few fatalities in the financial activities industry, which employs about 7.2 percent of the FTE workforce. That industry group, however, is responsible for more than 20 percent of the economy's output, as measured by value added. Thus, measuring risk relative to output rather than to employment lowers the relative risk measure for that industry group by about two-thirds.

Table 4 shows the industrial distribution of nonfatal injuries and illnesses and employment and output statistics for 2004. Columns 1 and 2 give the industrial distribution of injury and illness case counts and rates, respectively. The injury rate in column 2 is the SOII published rate and is therefore based on FTE employment. The across-industry variation in injury and illness rates is substantial, but still much smaller than for fatalities. For example, the relative risk measure based on employment, which is the injury and illness rate for the industry divided by the rate for the economy (4.8), varies considerably over the period, from a low of 0.33 to a high of 1.52. That range is much smaller than what is observed for fatalities.

Table 4 also gives a value-added measure of the relative risk of a worker incurring a nonfatal injury or illness and shows a somewhat greater across-industry variation than the employment-based measure. Generally, however, both tables 3 and 4 show that the ranking of industries by relative risk does not differ substantially whether the measure is employment based or value-added based.[15] For example, a user interested in targeting workplace safety enforcement would likely make similar assessments regardless of which relative risk measure he or she used.

Conclusion

This article outlines a different approach to measuring rates of work-related fatalities and nonfatal injuries and illnesses in which output is used as the denominator rather than employment, as is traditional in BLS safety and health estimates. Readers should treat the estimates of injury and illness rates that utilize this approach as coarse ones, subject to substantial nonsampling error. Which measure a data user finds most relevant depends on the user's particular needs and focus. Moreover, certain caveats should be borne in mind when constructing any workplace fatality rates or nonfatal injuries and illnesses rates. The main caveats stressed here are the need to ensure time series consistency in terms of definitions and coverage and the need to match the scope of external data (such as employment or output) with the scope of the corresponding data from the occupational injuries, illnesses, and fatalities program.

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Notes

1 For more information on these two BLS programs, see "Occupational Safety and Health Statistics," *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, April 1997), pp. 70-88; available on the Internet at http://www.bls.gov/opub/hom/homch9_a1.htm.

2 The survey scope for national estimates excludes the self-employed and private household workers, employees working in the government sector, and those working for agricultural employers with fewer than 11 employees. (The survey scope includes State and local government employees for many State estimates, but not for national estimates.) The survey data are based on logs kept by employers under recordkeeping guidelines established by the Occupational Safety and Health Administration (OSHA). Data for the railroad industry are from the Federal Railroad Administration, and data for the metal and nonmetal mining industries are from the Mine Safety and Health Administration. For more information on the Survey of Occupational Injuries and Illnesses, see "Occupational Safety and Health Statistics," *BLS Handbook of Methods*, pp. 71-75.

3 Minor scope differences arise in that the CPS doesn't collect employment data for members of the military, or those less than 16 years old.

4 Current BLS practice is to publish fatality rates on a per-employee basis, rather than on the basis of FTE workers, as is done in this article. BLS continues to experiment with calculating fatality rates on a FTE-worker basis. For example, see Janice Windau, Eric Sygnatur, and Guy Toscano, "Profile of Work Injuries Incurred by Young Workers," *Monthly Labor Review*, June 1999, pp. 3-10; or John W. Ruser, "Denominator Choice in the Calculation of Workplace Fatality Rates," in *Fatal Workplace Injuries in 1996: A Collection of Data and Analysis*, Report 922 (Bureau of Labor Statistics, June 1998). Publicly available CPS microdata records were used to calculate hours totals.

5 These series are available in electronic form at the Bureau of Economic Analysis (BEA) website at http://www.bea.gov/; for paper form, see *Survey of Current Business* (Bureau of Economic Analysis). The BEA website has extensive data tables in a downloadable format.

6 For more information on chain-type indexes, see J. Steven Landefeld and Robert P. Parker, "BEA's Chain Indexes, Time Series, and Measures of Long-Term Economic Growth," *Survey of Current Business*, May 1997, pp. 58-68.

7 Exactly identifying the output associated with the excluded sectors in SOII is difficult. For example, one output exclusion we are unable to make is the SOII exclusion of small farms. In addition, it would have been desirable to exclude private household income and rental income for owner-occupied housing, but that was not possible with the industry breakdown explored here. Furthermore, the treatment here assumes that price deflators appropriate for private sector value added are also approximately appropriate for our narrower measure.

8 Real output is stated in 2000 dollars and is constructed using the BEA's chain-type price index for value added.

9 Note that the output and hours measures published by the BLS productivity program differ from the measures discussed in this article. Most notably, the productivity program relies primarily on the Current Employment Statistics survey to develop hours measures for the business sector and for industries. In addition, the output measures used in BLS industry productivity measures are "sectoral output" measures rather than value-added measures; sectoral output is computed as the total value of goods and services leaving the industry, adjusted for price change.

10 The series used in this article excludes fatalities related to the September 11, 2001 terrorist attacks.

11 The SOII survey changed substantially between the 2001 and 2002 survey years. That change was necessitated by OSHA changes in the definition of what constitutes an injury or illness. Those changes introduce some uncertainty into time series comparisons such as those in chart 2. However, the changes are unlikely to be of sufficient magnitude to overturn the qualitative results. For a discussion of the OSHA regulatory and SOII changes, see William J. Wiatrowski, "Occupational Injury and Illness: New Recordkeeping Requirements," *Monthly Labor Review*, December 2004, pp. 10-24.

12 For a discussion of how the classification system changes affected data on workplace fatalities and nonfatal injuries and illnesses, see William J. Wiatrowski, "Occupational Safety and Health Statistics: New Data for a New Century," *Monthly Labor Review*, October 2005, pp. 3-10. For a comparison of SIC- and NAICS-based estimates of value added by industry sector, see Robert E. Yuskavage and Yvon H. Pho, "Gross Domestic Product by Industry for 1987-2000: New Estimates on the North American Industry Classification System," *Survey of Current Business*, November 2004, pp. 33-53, especially table F.

13 Write fatalities in industry *i* and the economy as a whole as F_i and F, respectively, and write employment in the industry and the aggregate economy as N_i and N. Then the relative risk is defined as the fatality rate for the industry measured relative to that for the economy as a whole, or (F_i/N_i) divided by (F/N). This equals (F_i/F) divided by (N_i/N), that is, column 2 divided by column 3 in table 3.

14 The main exception appears to be mining.

15 The across-industry qualitative results generally hold with alternative treatments of self-employment income (for example, not excluding proprietor's income, or by excluding broader measures of operating surplus). These qualitative results also generally hold when differences in employment measures from the national income accounts and the SOII data are netted out (by comparing injury rates from the SOII to value added per FTE worker from the national income accounts). The trend results shown previously are also robust to these different approaches.

Table 1. Fatality Counts and Rates, 1992 and 2004

Year	Number of fatalities	Fatalities per 100,000 FTE Workers	Fatalities per $B real GDP
1992	6,217	5.4	0.85
2004	5,764	4.2	0.54

NOTE: Fatalities are from the CFOI. Hours worked data are from the CPS, and full-time equivalence (FTE) is defined based on the assumption that a full-time worker works 2,000 hours per year. Gross domestic product (GDP) is deflated to year 2000 dollars using a chain-type price index for value added. In contrast to a fixed-weight index, the weights of a chain-type price index change over time as the composition of output changes over time. Value added is defined as gross output minus intermediate inputs.

Table 2. Injury and Illness Counts and Rates, 1989 and 2004

Year	Injuries and illnesses (in thousands)	Injuries and illnesses per 100 FTE workers	Injuries and illnesses per $M real value added
1992	6,799.4	8.9	1.2
2004	4,257.3	4.8	0.49

NOTE: Injuries are total OSHA-recordable case counts for injuries and illnesses. Value added is private sector gross domestic product (GDP) less proprietors' income. Value added is deflated to year 2000 dollars using a chain-type price index for value added. The conversion of hours worked into full-time equivalent (FTE) workers assumes that a full-time worker works 2,000 hours annually. Value added is defined as gross output minus intermediate inputs.

Table 3. Industrial Distribution of Fatalities, 2004

Industry	(1) Fatalities	(2) Fraction of fatalities	(3) Fraction of employment	(4) Relative risk using FTE measure (4) = (2)/(3)	(5) Fraction of Value Added	(6) Relative risk using value added measure (6)=(2)/(5)
Agriculture, forestry, fishing, hunting	669	0.116	0.017	6.73	0.012	9.62
Mining	152	0.026	0.005	5.48	0.015	1.8
Utilities	51	0.009	0.007	1.35	0.02	0.44
Construction	1,234	0.214	0.077	2.8	0.047	4.57
Manufacturing	463	0.08	0.129	0.62	0.121	0.66
Wholesale trade	205	0.036	0.036	0.98	0.059	0.6
Retail trade	377	0.065	0.111	0.59	0.067	0.97
Transportation and warehousing	840	0.146	0.036	4.01	0.028	5.14
Information	55	0.01	0.024	0.39	0.046	0.21

NOTE: Fatality counts are from the Census of Fatal Occupational Injuries (CFOI). Employment figures are from the Current Population Survey (CPS). It is the number of full-time equivalent (FTE) workers, defined as aggregate annual hours worked by workers in the industry divided by 2,000. Value added is from the national income and product accounts of the Bureau of Economic Analysis (BEA).

Industry	(1) Fatalities	(2) Fraction of fatalities	(3) Fraction of employment	(4) Relative risk using FTE measure (4) = (2)/(3)	(5) Fraction of Value Added	(6) Relative risk using value added measure (6)=(2)/(5)
Financial activities	116	0.02	0.072	0.28	0.206	0.1
Professional and business services	452	0.078	0.101	0.78	0.115	0.68
Educational and health services	157	0.027	0.126	0.22	0.077	0.35
Leisure and hospitality	247	0.043	0.073	0.59	0.036	1.19
Other services, except government	207	0.036	0.047	0.77	0.024	1.52
Government	535	0.093	0.139	0.67	0.126	0.73
Total with industry specified	5,760	1	1	1	1	1

NOTE: Fatality counts are from the Census of Fatal Occupational Injuries (CFOI). Employment figures are from the Current Population Survey (CPS). It is the number of full-time equivalent (FTE) workers, defined as aggregate annual hours worked by workers in the industry divided by 2,000. Value added is from the national income and product accounts of the Bureau of Economic Analysis (BEA).

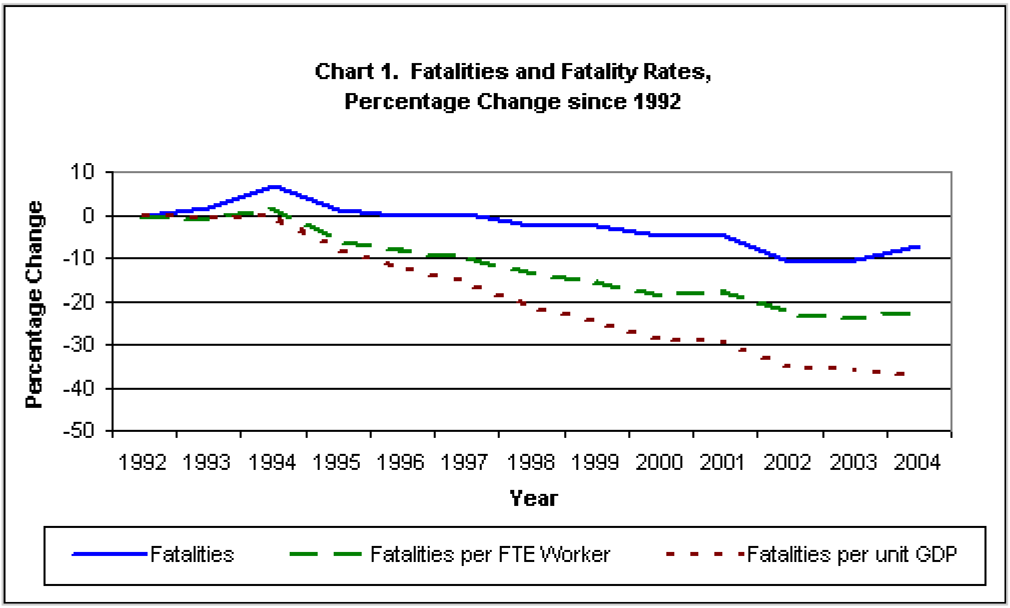
Table 4. Industrial Distribution of Injuries and Illnesses, 2004

Industry	(1) Injuries and Illnesses [in thousands]	(2) Injury and illness rate per 100 FTE Workers	(3) Fraction of injuries and illnesses	(4) Relative risk using FTE measure	(5) Fraction of Value Added	(6) Relative risk using value added measure (6) = (3)/(5)
Agriculture, forestry, fishing, hunting	54.7	6.4	0.013	1.34	0.01	1.23
Mining	21.6	3.8	0.005	0.79	0.016	0.31
Utilities	29.1	5.2	0.007	1.09	0.023	0.3
Construction	401	6.4	0.094	1.34	0.047	1.99
Manufacturing	941.9	6.6	0.221	1.38	0.144	1.53
Wholesale trade	241.5	4.5	0.057	0.94	0.071	0.8
Retail trade	626.1	5.3	0.147	1.11	0.078	1.88
Transportation and warehousing	285.5	7.3	0.067	1.52	0.033	2.05
Information	57.6	2	0.014	0.42	0.055	0.24
Financial activities	113.3	1.6	0.027	0.33	0.241	0.11
Professional and business services	280.3	2.4	0.066	0.5	0.124	0.53
Educational and health services	720.5	5.8	0.169	1.21	0.088	1.93
Leisure and hospitality	389.5	4.7	0.091	0.98	0.043	2.14

NOTE: Injuries and illnesses are total OSHA-recordable cases, from the SOII. Column (2) gives injuries and illnesses per 100 FTE workers based on aggregate hours worked from the SOII; every 200,000 hours worked by employees in the industry counts as 100 FTE workers. Column (4) is defined as column (2) divided by the economy-wide average of 4.8 cases per 100 FTE workers. Value added is private sector value added, excluding Proprietor's Income, from the BEA. The conversion of hours worked into full-time equivalent (FTE) workers assumes that a full-time worker works 2,000 hours annually.

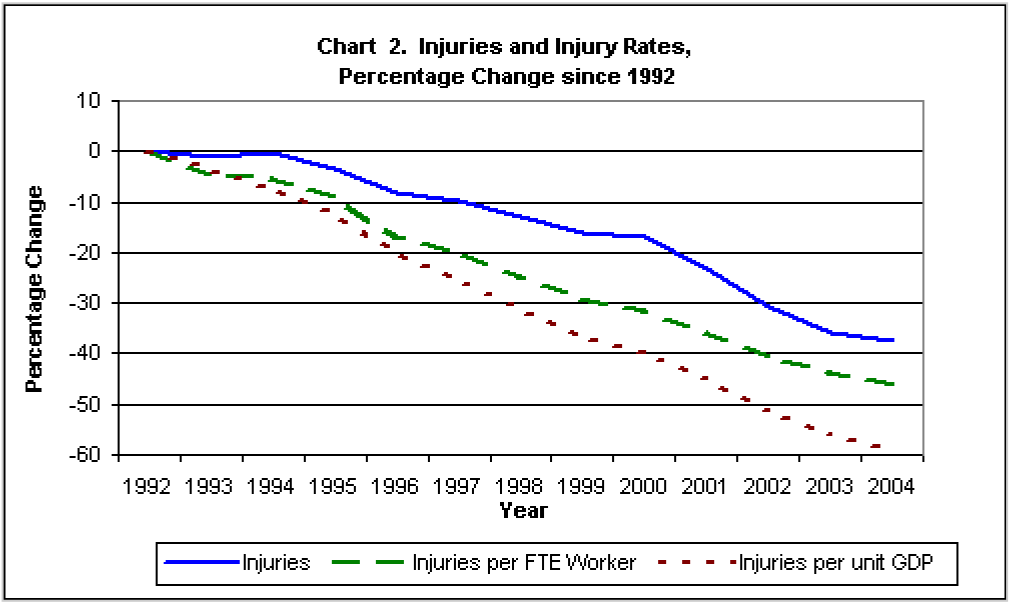
Industry	(1) Injuries and Illnesses [in thousands]	(2) Injury and illness rate per 100 FTE Workers	(3) Fraction of injuries and illnesses	(4) Relative risk using FTE measure	(5) Fraction of Value Added	(6) Relative risk using value added measure (6) = (3)/(5)
Other services, except government	94.6	3.2	0.022	0.67	0.026	0.86
Total	4,257.30	4.8	1	1	1	1

NOTE: Injuries and illnesses are total OSHA-recordable cases, from the SOII. Column (2) gives injuries and illnesses per 100 FTE workers based on aggregate hours worked from the SOII; every 200,000 hours worked by employees in the industry counts as 100 FTE workers. Column (4) is defined as column (2) divided by the economy-wide average of 4.8 cases per 100 FTE workers. Value added is private sector value added, excluding Proprietor's Income, from the BEA. The conversion of hours worked into full-time equivalent (FTE) workers assumes that a full-time worker works 2,000 hours annually.



Data for Chart 1. Fatalities and Fatality Rates, Percentage Change since 1992

Year	Fatalities	Fatalities per FTE	Fatalities per unit GDP
1992	0.000	0.000	0.000
1993	1.834	-0.957	-0.816
1994	6.675	1.651	-0.116
1995	0.933	-5.591	-7.802
1996	-0.241	-8.026	-12.126
1997	0.338	-10.214	-15.420
1998	-2.606	-13.806	-21.192
1999	-2.622	-15.724	-24.561
2000	-4.777	-18.814	-28.836
2001	-4.858	-17.797	-29.426
2002	-10.986	-22.634	-35.011
2003	-10.327	-23.772	-36.254
2004	-7.286	-22.142	-36.759



Data for Chart 2. Injuries and Injury Rates, Percentage Change since 1992

Year	Injuries	Injuries per FTE	Injuries per unit GDP
1992	-0.000	-0.000	0.000
1993	-0.912	-4.494	-3.454
1994	-0.478	-5.618	-7.440
1995	-3.294	-8.989	-12.303
1996	-8.243	-16.854	-20.046
1997	-9.616	-20.225	-25.153
1998	-12.892	-24.719	-31.080
1999	-16.063	-29.213	-36.671
2000	-16.903	-31.461	-39.676
2001	-23.293	-35.955	-44.868
2002	-30.867	-40.449	-51.248
2003	-35.800	-43.820	-55.949
2004	-37.387	-46.067	-58.844