

2.

Data on Occupational Injuries and Illnesses

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Data on Occupation; Injuries and Illnesses

In this chapter, OTA presents a summary of the available statistical information concerning the number and distribution of occupational injuries and illnesses. In general, currently available data describe, with reasonable accuracy, the total num-

ber of occupational injuries in U.S. workplaces. For occupational illnesses, however, the data are extremely limited. (A fuller discussion of these topics is found in Working Paper #1 of this report.)

SOURCES OF INFORMATION

Prior to the passage of the Occupational Safety and Health (OSH) Act in 1970, occupational injury data collection efforts were limited. One source was a series of surveys by the Bureau of Labor Statistics (BLS). This information was limited by its dependence on voluntary reports from employers, by the particular standard most commonly used for recording occupational injuries, and by incomplete industry coverage by the BLS surveys. One study of data from 1967 and 1968 indicated substantial underreporting of injuries by employers (186). In addition, some limited data were available from the National Safety Council (NSC), state workers' compensation agencies, and employer records. In the OSH Act, Congress called for the creation of a new, mandatory system of data collection.

The system created by the Occupational Safety and Health Administration (OSHA) and BLS requires employees to keep records using a specified format. In addition, BLS conducts annual surveys of a sample of employers. These survey results are used to compute injury and, to a limited extent, illness rates by industry, as well as estimates of the total numbers of fatalities, lost-workday cases, and cases without lost worktime but that involved medical treatment.

The BLS Annual Surveys (604,606-608) are the best source of statistical information concerning work-related injuries. The published data are based on large survey samples, and, within the

limitations of the survey methods, appear to be reliable. These estimates, however, are subject to several limitations:

- they are available only since 1972,
- depending on the type of case, they cover only two-thirds to three-fourths of the U.S. work force,
- they are based on a survey that is administered only once a year, and
- they provide very little detail concerning the nature and causes of occupational injuries.

A possible fifth limitation is that these estimates are ultimately based on employer records of injuries and illnesses. (The extent of this possible bias is discussed below and in Working Paper #1.)

Nothing can now be done about the first limitation. The second and third could be improved, but these would involve changes in methods and perhaps require greater resources. To address the fourth limitation, BLS has initiated two additional data collection efforts. Since 1976, the Bureau has compiled information provided by 26 to 36 state workers' compensation agencies, in a data base known as the Supplementary Data System (SDS) (397). And since 1978, BLS has conducted a series of surveys of injured workers concerning specific types of occupational injuries, published as Work Injury Reports (599-601,603,605).

Two other Federal systems provide injury data. The National Health Interview Survey (NHIS) of

the National Center for Health Statistics (NCHS) collects information during household interviews. A system recently developed by the National Institute for Occupational Safety and Health (NIOSH) uses information from hospital emergen-

cy room admissions to produce information on occupational injuries. Finally, OSHA has published analyses of several different types of fatal injuries using information collected during accident investigations.

OCCUPATIONAL INJURIES

Fatal Injuries

As discussed in Working Paper #1, for the last five years, data from the BLS Annual Surveys indicate that between 3,000 and 5,000 occupational fatalities occurred each year in private sector establishments with 11 or more employees. About 1,000 deaths occur in private sector establishments with fewer than 11 employees. The NSC figures range between 11,000 and 13,500 for the entire workforce. Applying a variety of assumptions to data derived from death certificates yields a range of estimates from 5,500 to 11,000 for the entire workforce for 1977. OSHA inspection data suggest that at least 4,500 occupational fatalities occurred in the private sector workforce in fiscal year 1982.

The Annual Surveys conducted by BLS are the best source of statistical information on occupational injuries. They use a large survey sample that is capable of directly measuring the occurrence of injuries. However, because this sample covers only private sector employment (the self-employed and public sector employees are excluded),

an adjustment must be made to generate an estimate for the entire workforce.

OTA used two similar methods, both based on the BLS data, to develop its estimate of the number of occupational fatalities due to injuries. The first estimate uses the five-year average of the number of fatalities in establishments with 11 or more employees. For 1979 to 1983, this equals about 4,180. Approximately 11 percent of these are due to heart attacks. Subtracting these yields a total of 3,720 deaths due to injury (see table 2-1). To this should be added the five-year average from the BLS Annual Survey of deaths in establishments with fewer than 11 employees. For 1979 to 1983, after adjusting for heart attacks, this was 930. Thus, the total from the BLS Annual Survey is 4,650.

To this should be added the deaths among the self-employed and public employees. Applying the death rates for private sector workers, adjusted for heart attacks, to these workers yields a five-year average of 1,640. Adding this to the 4,650 generated directly by the Annual Survey yields a total of about 6,300 deaths.

Table 2-1.—Annual Occupational Fatalities From Injuries, Summary of Estimates

Universe	Years	Average annual total	Source of estimate or data
All employment	1979-83	12,200	NSC
All employment	1979-83	6,000	OTA ^a
Private sector workplaces with 11 + employees	1979-83	3,720	BLS
Private sector workplaces with 1-10 employees	1979-83	930 ^c	BLS

^aEstimate is based on BLS and OSHA data and is described in the text.

^b4,180 minus 11 percent of deaths reported as heart attacks (460).

^c1,040 minus 11 percent of deaths reported as heart attacks (110).

NOTE: Because of differing methods and definitions, some of these estimates are, strictly speaking, not directly comparable with each other.

SOURCE: Office of Technology Assessment.

Alternatively, the BLS figures for establishments with 11 or more employees for each individual year can be adjusted by applying the private-sector death rate (for injuries in establishments with 11 or more employees) to the workers excluded completely (self-employed and public employees) or for which *annual* estimates are not available (small, private sector establishments). Using this method, the total ranges from 7,265 in 1979 to 4,600 in 1983, with an average of 6,180 deaths per year.

Rounding either of these estimates to the nearest thousand yields OTA's estimate that about 6,000 deaths due to occupational injuries occur each year. The National Safety Council average of 12,200 is considerably higher. It is difficult if not impossible, to reconcile the estimates from the BLS and the NSC. The published data from state vital statistics are insufficient to do so (see Working Paper #1). Moreover, the NSC estimates have been criticized in the past for including duplicate reports and deaths from previous years and for not being based on the results of a probability survey. Instead they are developed using the results of special studies in combination with a variety of statistics from several sources. These methods may not generate reliable estimates, either for a particular year or over time.

OTA's estimate of 6,000 injury deaths per year translates into about 25 [occupation] fatalities each working day. Rarely, however, does this daily toll occur at the same time, in the same workplace. Usually, occupational deaths occur one or two at a time in widely scattered workplaces. Because of this, occupational fatalities only rarely receive significant publicity.

Motor vehicles (30 to 40 percent), off-the-road industrial vehicles (10 percent), and falls (10 percent) are associated with over half of the fatal occupational injuries. In addition, occupational fatalities are unevenly spread among industries. Table 2-2 presents fatality rates for the major industry divisions in the private sector. Mining, with a fatality rate of 44.3 per 100,000 full-time workers, is the most hazardous industry. Construction; agriculture, forestry, and fishing; and the transportation and public utility industries also present above-average risks of deaths due to in-

**Table 2.2.—Occupational Fatality Rates^a
By Industry for 1982**

Industry division	Rate ^b
Mining	44.3
Construction	28.7
Agriculture, forestry, and fishing	28.4
Transportation and public utilities	21.9
Average of private sector	7.4
Manufacturing	4.5
Wholesale and retail trade	3.8
Services	3.5
Finance, insurance, and real estate	2.5

^aFor establishments with 11 or more employees. Includes fatal injuries and

reported deaths due to illness.

^bFatalities per 100,000 full-time workers

SOURCE: (608)

jury. Manufacturing has a death rate below the average for the private sector, although it has a nonfatal injury rate substantially above the average. Wholesale and retail trade; services; and finance, insurance, and real estate are safer industries, with fatality rates between 2.5 and 3.8 deaths per 100,000 workers.

Nonfatal Injuries

Table 2-3 summarizes the estimates of the numbers of occupational injuries. These estimates vary partly because of differences in the definitions of injuries, the population universes, and methods of estimation.

NSC defines a disabling injury as one that involves one or more days away from work, some form of permanent impairment, or death. For BLS and OSHA, a lost-workday injury is one that involves the employee either not working at all for one or more days beyond the day of the injury or reporting to work and being assigned to a "lighter duty" job (restricted work activity).

Combining the BLS estimate of lost-workday injuries (2.1 million in both 1982 and 1983) in the private sector with the estimates for Federal, State, and local employees (0.1 and 0.3 million) yields a total of 2.5 million lost-workday injuries. This compares to the NSC estimate of 1.9 million "disabling" injuries. Using the total of 2.5 million injuries, it appears that each working day results in about 10,000 injuries that are serious enough to lead to loss of worktime.

Table 2-3.—Annual Nonfatal Occupational Injuries,
Summary of Estimates

Definition	Universe	Year	Estimate (millions)	Source of estimate or data
Lost-workday cases	All private sector workplaces	1983	2.1	BLS
Lost-workday cases	U.S. Government—civilian and personnel	1982	0.1	OSHA
Lost-workday cases	State and local government	1982	0.3	SDS ^a
“Disabling”	All employment	1983	1.9	NSC
Total “recordable”	All private sector workplaces	1983	4.7	BLS
Total “recordable”	U.S. Government—civilian and personnel	1982	0.2	OSHA
Total “recordable”	State and local government	1982	0.7	SDS ^a
Medically attended or activity restricted	All employment	1981	11.3	NHIS
Treated in emergency rooms	All employment	1982	3.2	NIOSH

^aEstimate is based on data from SDS and Annual Survey and is described in Working Paper #1.

NOTE: Because of differing methods and definitions, some of these estimates are, strictly speaking, not directly comparable with each other.

SOURCE: Office of Technology Assessment

The BLS/OSHA definition of “recordable” injury includes all lost-workday injuries plus all those that involve medical treatment beyond first aid. The National Health Interview Survey includes all injuries that are “medically attended” (which may involve only a consultation with a doctor) or cause “restricted activity,” whether or not that also involves lost worktime. Data developed by NIOSH through the National Electronic Injury Surveillance System (NEISS) include all cases treated in hospital emergency rooms.

These various sources again yield differing estimates. The sum of BLS data and the Federal, State, and local government estimates is 5.7 million recordable cases in 1982. The number of private sector injuries went down slightly in 1983. Assuming that the number of public sector injuries stayed the same (0.9 million), the sum of the BLS and public sector estimates would be 5.6 million in 1983. The NHIS estimates 11.3 million cases. This translates into a range of between 22,000 and 45,000 injuries each working day. And the NIOSH estimate of the number of emergency room cases, based on the NEISS data, is 3.2 million cases or about 12,000 cases per day.

The largest difference in these figures is between the combined BLS and public sector estimate (5.6 million cases) and the National Health Interview Survey (11.3 million). Most of this difference remains even when data from the same year are used. The 1981 BLS and public sector estimate is a total of about 6 million cases.

The NHIS includes self-employed persons, but it is unlikely that approximately 8.7 million self-employed workers can account for the remaining 5.3 million injuries. It could be that the slightly different definitions of the BLS Annual Survey and the NHIS contribute to this discrepancy. It is also possible that employees and their families are reporting to the NHIS injuries that are not recorded by employers. A number of reasons could account for employers not recording an injury: an employee may not have reported it to the employer; the employer judged the injury to be a “first aid only” case that is not required to be recorded; or the employer’s records are not accurate and comprehensive.

The NEISS estimate of emergency room cases could be consistent with either the BLS estimate or the NHIS figure. The 3.2 million emergency room cases (in 1982) would constitute about 55 percent of the 5.7 million cases in the private and public sectors from (the 1982) BLS and government reports or about 30 percent of the 11.3 million cases estimated by the NHIS. The figure of 30 percent is roughly consistent with a special study of data from 1975, which estimated that about 36 percent of all injuries occurring “at job or business” were medically attended at emergency rooms (388).

Table 2-4 summarizes various estimates of the amount of time lost due to nonfatal occupational injuries, including lost worktime, bed disability, and restrictions on daily activity. The BLS esti-

**Table 2-4.—Days Lost Annually From Occupational Injuries,
Summary of Estimates**

Definition	Universe	Year	Estimate (millions)	Source of estimate or data
Lost workdays.	All private sector workplaces	1983	36.4	BLS
Lost workdays.	U.S. Government—civilian and personnel	1982	1.2	OSHA
Lost workdays.	All employment	1981	60-70 ^a	OTA
Bed disability days.	All employment	1981	44.0	NHIS
Restricted activity days	All employment	1981	214.9	NHIS

^aOTA estimate is based on data from NHIS and is described in Working Paper #1.

NOTE Because of differing methods and definitions, some of these estimates are, strictly speaking, not directly comparable with each other.

SOURCE Office of Technology Assessment

mate of days away from work and of restricted work activity ("light duty") equals 36.4 million days—the equivalent of over 140,000 people working full-time for a year. Time lost by Federal civilian employees adds about 1.2 million days to this total. No estimates for State and local employees or for the self-employed are directly available.

A higher total of about 60-70 million "lost workdays" can be indirectly estimated using the results of a special NCHS analysis of injuries. Part of the reason for the higher figure is that this estimate should cover the entire work force. In addition, the varying definitions and survey methods between the BLS and the NHIS may contribute to the difference. The NHIS also provides data on bed disability (44 million days) and of days of restricted daily activity (close to 215 million days).

The BLS figures imply that about 1 in 13 U.S. workers suffered an occupational injury in 1982. Nearly half of these were serious enough to result in the employee missing one or more days of work beyond the day of the injury. On average each lost-workday injury results in 17 days lost from work. The NSC has estimated that the direct and indirect costs of work injuries totaled \$30.2 billion in 1980 (324),

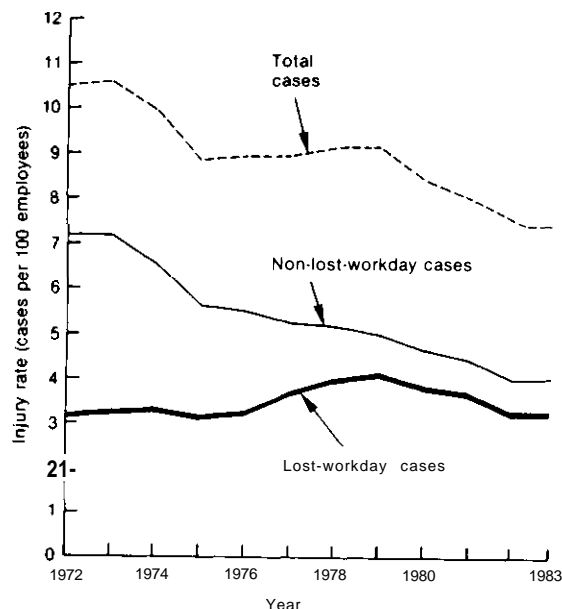
Trends in Injury Rates

It is probable that occupational injury rates have fallen since the turn of this century. The data published by the NSC support this, but these data may not be accurate or reliable. In particular, recent trends in the NSC data are inconsistent with

data collected from other sources. However, accounts of working conditions earlier in this century reveal many instances of job hazards that are considered appalling by today's standards. Many of these have been improved, and injury rates have fallen. (Of course, this decline in injury rates may not apply to occupational *illness* rates.)

Trends over the last two decades have not been constant from year to year and measures of different types of injuries sometimes go in different directions. During the 1960s, the BLS surveys of manufacturing showed rising injury rates. The BLS Annual Surveys from the 1970s show a relatively large drop in *non-lost-workday injuries* from 1972 to 1975, and then a continuing decline from 1975 to 1983. The BLS *lost-workday case* rate rose during most of the 1970s, falling only between 1974 and 1975 and for the three years after 1979 (fig. 2-1). The BLS *total case* rate, which combines the non-lost-workday and lost-workday cases, shows a slight rise from 1972 to 1973, and then a decline from 1973 to 1975. This rate then began a slight rising trend until its peak in 1979. By 1982, the total case rate had declined to 7.7 per 100 workers. This decline continued in 1983, when the total case rate was 7.6 per 100 workers. This is the lowest level reported since 1972, when these data were first collected. *Fatality* rates calculated from the BLS estimates show a general decline through the 1970s. *Injury* rates calculated from the National Health Interview Study show no readily apparent trend from 1962 to 1981, possibly because of the relatively larger sampling error for this survey.

Injury and fatality rates are affected by a number of factors. These include the effects of the busi-

Figure 2.1.-Occupational Injury Rates, 1972-83

ness cycle, various changes in the administration of workers' compensation, the practice of occupational medicine, and other socioeconomic factors. In addition, OSHA and NIOSH and other safety and health programs may have contributed to changes in rates. But the effects of OSHA activities, in particular, may be difficult to discern in national injury trends because of the low probabilities of OSHA inspections, the relatively low penalties for violations of standards, and the possibility of differential effects on various types of hazards. There may also be variations in the effectiveness among the 24 separate State programs and Federal OSHA operations, which cannot be detected using national data.

Injury Rate Trends, the Business Cycle, and OSHA Policies

The lack of any dramatic improvements in injury rates during the 1970s has been cited to support the belief that OSHA has been ineffective. More recently, it has been claimed that the recent declines in the injury rates resulted from the current administration's "cooperative, non-adversary approach to job safety and health" (643,644,650).

Although it is possible that some of the decline can be explained by these changes, several other features must also be considered.

First, as figure 2-1 shows, the decline in injury rates started in 1980—before the changes in OSHA policies that were instituted in 1981. Moreover, the installation of controls, changes in employee training, etc., often take place over several years. Thus it is possible that the observed changes from 1979 to 1983 represent the effects of some combination of the policies of the "old" and the "new" OSHA. Second, the new policy that targets inspections on the basis of injury records may influence employer recordkeeping toward undercounting. Independent verification of employer injury records is necessary to assess the possible impact on changes in employer recordkeeping. Third, as mentioned above, a number of factors besides the effectiveness of OSHA can influence injury-rate trends.

Foremost among the factors influencing injury statistics is the business cycle. Since the 1930s researchers have noted that, other things being equal, increased business activity leads to higher injury rates while decreased activity lowers rates. The general explanation for this phenomenon is that as business picks up, employers hire more young and inexperienced workers. Both younger workers and inexperienced workers of all ages tend to have higher injury rates than older, more experienced workers. Moreover, as production expands, businesses open new plants and bring new machinery on-line. For both of these cases there may be a period of adjustment as management and workers learn how to use the machinery safely. In addition, during a business upturn there will be increases in the pace of production, increases in the amount of overtime worked, less down time, and less time devoted to repair and maintenance, all of which lead to increases in accidents. During business downturns, all of these elements are reversed—younger and less experienced workers are laid off while older and more experienced employees are retained, plant operations slow down, and more effort is devoted to repair and maintenance (254,444).

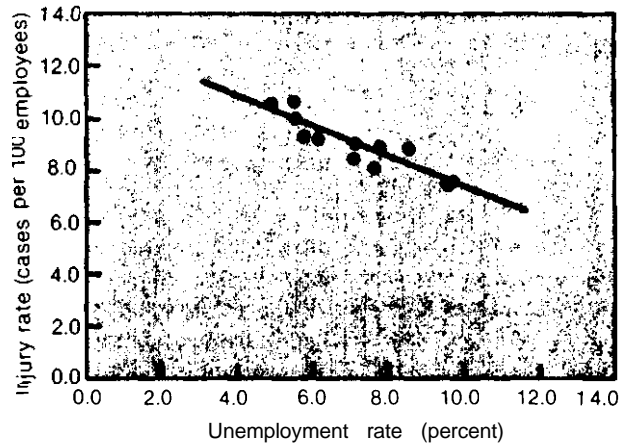
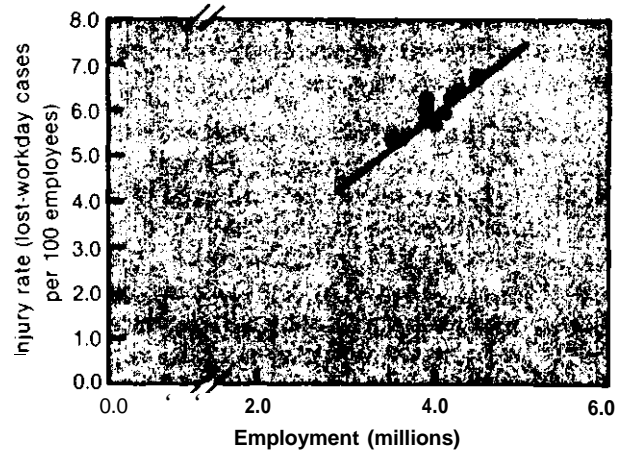
OTA has compared injury rates with several measures of the business cycle. Figure 2-2 shows data for the BLS total recordable injury rate and

Figure 2.2.—Injury Rates and Unemployment—Private Sector: 1972-83

the unemployment rate for 1972 to 1983. The total recordable injury rate declined from 1973 to 1975 and again from 1979 to 1982, simultaneously with rising unemployment rates. In addition, the rising injury rates from 1975 to 1979 coincided with declining unemployment rates. From 1982 to 1983, the total injury rate and unemployment went down slightly, while the lost workday rate stayed the same.

In figure 2-3, these two variables have been plotted against each other, with the unemployment rate on the horizontal (or x-axis) and the injury rate on the vertical (or y-axis). Examination of this figure reveals an apparent inverse relationship between injury rates and unemployment. That is, as unemployment rises in a recession, injury rates decline.

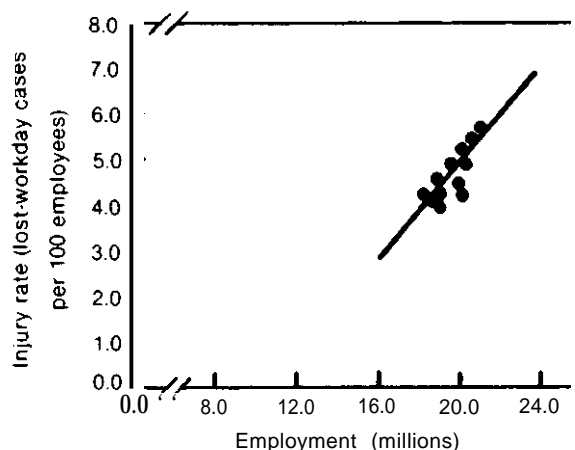
Another possible measure of the business cycle is to examine the level of employment, as opposed to the unemployment rate. This must be done carefully because in the last few years, the changes in the level of employment have not been the same in all industries. In fact, from 1979 to 1982, employment in the more hazardous manufacturing and construction industries declined, while employment in the other major private sector industry groups has stayed the same or increased. Figures 2-4 and 2-5 show the relationship between employment and lost-workday injury

Figure 2-3.—Injury Rates and Unemployment—Private Sector: 1972-83**Figure 2.4.—Lost-Workday Rate and Employment—Construction: 1972-83**

rates in construction and manufacturing alone. Again there appears to be a close relationship. As employment rises, so do injury rates.

OSHA has suggested to OTA that the recent injury rate declines are not the result of the current recession because "BLS has estimated that only 16 percent of the decline in injury rates in 1982 can be attributed to a disproportionate drop in hours worked in high-risk industries" (34). BLS, however, noted that the procedure they used for this calculation, "does not take into account . . . other factors which may also affect the rate, but

**Figure 2.5. -Lost. Workday Rate and Employment—
Manufacturing: 1972-83**



which have not been measured, such as the demographic composition of the workforce, worker education, improved safety measures, the role of State and Federal agency compliance programs, technological change, etc” (607).

But the “demographic composition of the workforce” and “technological change” are two variables that are particularly affected by the business cycle. In addition, the amount of overtime worked, the pace of production, and the rate of new hires are affected by the business cycle. The BLS procedure for calculating the effects of the decline in hours worked may not fully capture the effects of these other variables on injury rates.

Additional analysis using variables that directly measure the new hire rate, the number of overtime hours, the rate of production, and capacity utilization in specific industries may clarify this relationship further. (Examination of the influence of new hires is, however, made more difficult because BLS no longer publishes statistics on labor turnover, which included the new hire rate.) But at present, it appears that the effect of the recent recession, especially in construction and manufacturing, is the most important factor behind the injury rate declines from 1979 to 1983. In addition, it appears that national injury rates since 1972 have been largely related to the level of business activity.

When the OSH Act was enacted in 1970, Congress placed the legal responsibility for preventing occupational injuries and illnesses with employers and created several agencies, including NIOSH and OSHA, to conduct research and administer regulations. Employees, of course, also have a personal stake in preventing disease and injury in the workplace. Some detailed studies on the effectiveness of OSHA in improving the efforts of employers and employees have found a favorable but small impact, while other studies have not found any effect (see ch. 13 for a summary). Even the favorable effects detected in several studies may not be large enough to be discerned in national injury statistics, while shifts in the nature of the injury rate-business cycle relationship may be difficult to detect. However, it is clear that if any improvements have been made they have not been large.

Accuracy of Occupation Injury Estimates

Questions raised about the accuracy of estimates based on employer-maintained injury records have intensified with the current administration’s inspection targeting system. OTA has conducted a limited comparison of data from the BLS Annual Survey and from the BLS Supplementary Data System (SDS) to see if they are consistent. Data were available only for years *before* the implementation of the new inspection targeting system and the conclusions of this analysis, therefore, apply just to that period.

Some States participating in the SDS report only lost-workday cases while others report all cases involving either lost workdays or medical treatment. OTA found that for States reporting only lost-workday cases to the SDS, the numbers of cases were not consistently higher or lower from either SDS or the Annual Survey, after adjusting for the minimum waiting periods (as defined by State workers’ compensation). Although there were some differences between these two data sources, these differences were not consistent from one State to the next. In States that report all cases involving either lost workdays or medical treatment to the SDS, consistently more cases were reported to the SDS than would be expected from the Annual Survey data.

In another analysis, OTA compared BLS Annual Survey injury rates with rates calculated from the estimates of the NHIS. This analysis compared information derived from employer records (BLS) with that from workers and their families (NHIS). This comparison showed that, in recent years, overall injury rates based on the NHIS are about one-third higher than those from the BLS Annual Survey.

Differences among the various sources could arise from different methodologies and, as such,

may not be worrisome. Or it could be that employers do not report certain types of injuries to the BLS Annual Survey even though they do submit reports to workers' compensation. As discussed above, the differences between the BLS Annual Survey and the NHIS may also stem from employers labeling some injuries as cases involving only first-aid treatment, even though employees and other family members consider them serious enough to report to the NHIS.

OCCUPATIONAL ILLNESSES

There is substantially less quantitative information on occupational illnesses than on injuries. Although employers are required to include occupational illnesses in their records, it is well accepted that employer records and the BLS Annual Survey estimates, which are based on employer records, underestimate the magnitude of the occupational disease problem. This *is* because many occupational diseases are indistinguishable from non-occupational diseases, because they often become manifest only after a latent period, and because of a general lack of recognition of the occupational causes of many diseases. For 1983, the BLS Annual Survey estimate is about 106,000 occupational illnesses, but that is almost certainly an underestimate.

The most commonly quoted estimates are that up to 100,000 deaths due to illness and 390,000 illness cases occur each year as a result of workplace conditions. Although the estimate of 390,000 cases was cited during the Congressional debates about the Occupational Safety and Health Act, OTA has not been able to determine the exact methods for deriving this estimate.

The estimate of 100,000 deaths was derived first by a crude technique using the results of three epidemiologic studies and later by an analysis of information in a 1951 British death registry. As a result, the 100,000-deaths figure can only be considered an estimate, but it is unclear to what extent the figure is biased. Peter Barth and Allen Hunt (46) have reported other estimates that range

from 10,000 deaths to 210,000 deaths. More accurate estimates are difficult because of a general lack of information on both historical and *current* worker exposures, incomplete knowledge of the deleterious effects of workplace exposures, and the general problems of assigning single "causes" to diseases created by multiple factors.

Although it is well accepted that employer records understate the magnitude of the occupational illness problem, it is very difficult to quantify the extent of this understatement. One pilot study, conducted by David Discher and colleagues (143), explored the usefulness of medical examinations and industrial hygiene surveys for identifying the extent of occupational illness in several industries. The researchers administered medical exams to workers in four industries, conducted industrial hygiene surveys, and classified a total of 451 medical conditions among the surveyed workers as probably linked to occupational exposures. Eighty-nine percent of these 451 conditions were not noted in either the workers' compensation claims or the employers' logs. Although this percentage of non-reporting may not be applicable to all workplaces, this study did reveal a large number of cases that were not being recognized by employers and were thus not recorded.

It is also interesting to note that the BLS Supplementary Data System reported only 234 workers' compensation cases for all cancers in 1980. This can be compared to the range of estimates for occupational cancer caused by asbestos alone,

which is between 4,000 and 12,000 cases annually. Even if the SDS total is adjusted for all the states that do not currently report to the SDS, there appears to be substantial underreporting of cancer cases to workers' compensation programs.

The absence of an accurate accounting of the occupational disease toll highlights the need for accurate and comprehensive information on employee exposures, both to provide a basis for more accurate disease estimates and to measure the effectiveness of current occupational health efforts.

CONCLUSION

OTA estimates that about 6,000 U.S. workers die each year from occupational injuries, or about 25 each working day. In addition, each working day there are at least 10,000 injuries that result in lost worktime, and about 45,000 that result in restricted activity or that require medical attention. Estimates of the number of nonfatal injuries vary partly because of differences in the definitions of injuries, the population universes, and methods of estimation. Some discrepancies may also be due to differences in how employers and employees interpret the severity of an injury.

Injury and fatality rates are affected by a number of factors. These include the effects of the business cycle, and various changes in the administration of workers' compensation, the practice of occupational medicine, and other socioeconomic factors, as well as the possible effectiveness of OSHA in reducing injury frequency and severity.

The NIOSH National Occupational Hazard Survey (564,565,566) and National Occupational Exposure Survey can provide information on the number of employees potentially exposed to hazardous substances, but they do not provide any information on the level of exposure and only limited information on the duration of exposure. Although it may be possible to use the data collected by OSHA during inspections to develop estimates of worker exposures, such analysis depends on further research.

OTA finds that the effect of the recent recession, especially in construction and manufacturing, is the most important factor behind the injury rate declines from 1979 to 1983. In addition, it appears that most of the changes in national injury rates since 1972 are associated with changes in business activity.

Compared with occupational injuries, there is substantially less quantitative information on occupational illnesses. Although employers are required to include occupational illnesses in their records, it is well accepted that employer records underestimate the magnitude of the occupational disease problem. However, it is difficult to quantify the extent of this understatement.