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The quest for meaningful and accurate occupational health and safety statistics

To help mark the Monthly Labor Review's centennial, the Review invited several producers and users of BLS data to take a look back at the last 100 years. This installment of the anniversary series comes from the Bureau's Occupational Safety and Health Statistics (OSHS) program. The U.S. Bureau of Labor Statistics collects and publishes data on occupational injuries and illnesses. The OSHS program administers these efforts and has evolved for the purpose of collecting more accurate and complete data. Over time, this evolution has required a variety of changes, including new classification systems, recordkeeping procedures, injury and illness categorization, data collection methods, and coding schemes.

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For much of its 130 year history, the U.S. Bureau of Labor Statistics (BLS)[1] has collected data and published reports on occupational injuries, illnesses, and fatalities. From the beginning, BLS has engaged in ongoing efforts to improve the breadth and accuracy of the data available for end users. As far back as 1912, the Occupational Safety and Health Statistics (OSHS) program published annual reports on work injuries and illnesses.[2] Two of the more recent annual reports are from the Survey of Occupational Injuries and Illnesses (SOII), which began with publishing 1972 data in 1974,[3] and the Census of Fatal Occupational Injuries (CFOI), which began with publishing 1992 data in 1994.[4] The SOII covers nonfatal work-related injuries and illnesses, and the CFOI covers fatal work-related injuries. In 2013, the SOII estimated that there were 3,007,300 occupational injuries and illnesses among private industry workers, a rate of 3.3 per 100 full-time equivalent workers. This was down from a rate of 5.0 a decade earlier. Likewise, CFOI data identified 4,585 fatal work injuries in 2013, down from 5,575 in 2003. BLS is continually improving collection methods to ensure that occupational injury, illness, and fatality data are accurately tracked.

The OSHS program has seen many new developments. The program has adapted to changes to the structure of jobs among American workers—moving from field to factory to office—and changing workplace safety regulations. This article updates an earlier article that traced the origins of the OSHS program from shortly after the founding of BLS in 1884.[5] The first section offers a recap of the history of the OSHS program. The next two

sections discuss broad changes to the program, including updates to the classification system and revisions designed to ensure more complete data collection. The next section examines specific changes, including the addition of ergonomic injuries and illnesses, the expansion of data to include a wider scope of government workers, and the rise of job transfer or restriction-only cases. Finally, this article discusses changes brought on by technological advances, including Internet data collection and computer-assisted coding.

Background

BLS has tracked workplace safety throughout its history. The timeline for this effort can be divided into three distinct periods. The first period covers the time before the to passage of the Occupational Safety and Health Act of 1970 (OSH Act). The second period covers data collection under the OSH Act from 1970 through 1992. And the third comprises data collection efforts under program revisions, undertaken pursuant to a National Academy of Sciences (NAS) study, from 1992 through the present.

1894–1970

Since 1894, BLS has published extensively on new developments in state and foreign social legislation and practices, including accident prevention and workers' compensation.[6] In the years preceding World War I, BLS began to give special attention to industrial accidents and occupational diseases. In 1909, BLS published a study of phosphorous poisoning in the match-making industry.[7] During that time, BLS reported on lead poisoning, railway incidents, mining fatalities, and other safety and health topics. In 1912, BLS issued its first annual report on injury rates in the iron and steel industry.[8] A few years later, cooperative arrangements with Massachusetts, New York, and Ohio were established for reporting industrial accidents;[9] additional states would later join the program.

Since 1926, BLS has produced an annual survey tracking the frequency and severity of industrial injuries for several manufacturing industries. This survey included data compiled from state records, as well as reports from establishments in targeted industries.[10] By 1930, BLS data covered a quarter of the workforce in some 30 manufacturing industries.[11] Nine years later, occupational fatality data were added.[12]

Newly passed workers' compensation laws in the 1910s generally required employers to record occupational injuries. These state records offered data collectors a much broader and more accurate source of work-related fatality statistics. However, because reporting standards differed from state to state, researchers continued to lack a uniform, comprehensive system from which to gather data at the national level.[13] Ironically, the enactment of workers' compensation statutes may have hindered development of national occupational injury and illness statistics, because many policymakers believed that these laws had largely eliminated the problem.[14] These concerns continued until passage of the OSH Act in 1970.

During World War II, BLS published monthly injury data for industries of particular wartime importance. Because industrial incidents could adversely affect production, government agencies relied on these data to identify industries and establishments with high injury rates. After the war, BLS expanded its survey of injury frequency and severity by adding more manufacturing industries and including nonmanufacturing industries as well. By 1966, more than 650 industries were included in the survey.[15] Throughout these early studies, the biggest

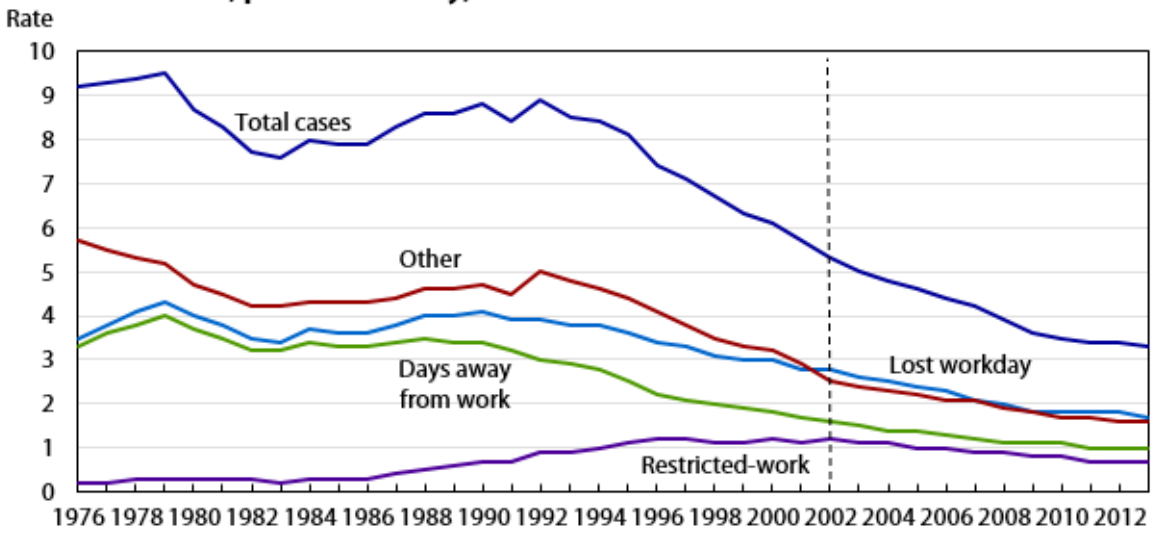
obstacle preventing researchers from accurately counting occupational injuries and illnesses was the lack of comprehensive, uniform data sources.

1970–92

The OSH Act (OSH Act) of 1970 required that states "develop and maintain an effective program of collection, compilation, and analysis of occupational safety and health statistics."[16] The act established the Occupational Safety and Health Administration (OSHA), as well as national definitions and recordkeeping standards. Under the OSH Act, employers must maintain accurate records of workplace injuries and illnesses.

The act required employers, when selected to participate in the annual survey, to report workplace incidents to BLS.[17] In the past, such reporting had been optional. Since 1973, the SOII has published data on incidence rates for occupational injuries and illnesses in the private sector. These data capture both the private sector overall and specific private sector industries. Figure 1 presents overall private sector data from 1975 through 2013.

Figure 1. Rate of occupational injuries and illnesses per 100 full-time workers, by type of case, private industry, 1976–2013



Note: Vertical line represents OSHA recordkeeping change in 2002.
Source: U.S. Bureau of Labor Statistics.

In 1976, BLS developed procedures to examine workers' compensation records for additional information on injured workers and case characteristics associated with work-related injuries and illnesses. Out of these procedures came the Supplementary Data System (SDS), a comprehensive effort to standardize injury and illness data. By 1982, the SDS included 34 participating states. Data from state workers' compensation systems met many data needs not fulfilled by the annual survey. Still, individual states' varying definitions of industries, workers, and cases covered made interstate comparisons difficult and national aggregation of state data problematic.

In 1977, BLS initiated a series of direct studies of injured workers.[18] Data for these reports, called Work Injury Reports (WIR), were acquired by mailing questionnaires to injured and ill workers in states participating in the

SDS. The reports provided detailed information on the causes and effects of selected workplace injuries and illnesses.

In 1984, Congress appropriated funds for the NAS to study the accuracy and completeness of BLS occupational injury and illness statistics. The chief criticism was that, despite improvements like the SDS and WIR, BLS data shed little light on the characteristics of injured and ill workers. The NAS also found that BLS offered little information regarding the circumstances of individual incidents. Important information about the nature of the injury or illness, how it happened, and the specific kind of job involved was often missing. Moreover, the NAS found sampling error rates for estimates of work-related fatalities to be too high. In response to these concerns, the occupational injury and illness statistical program was redesigned.[19]

1992–present

Since 1992, OSHS has produced three annual products, as follows:

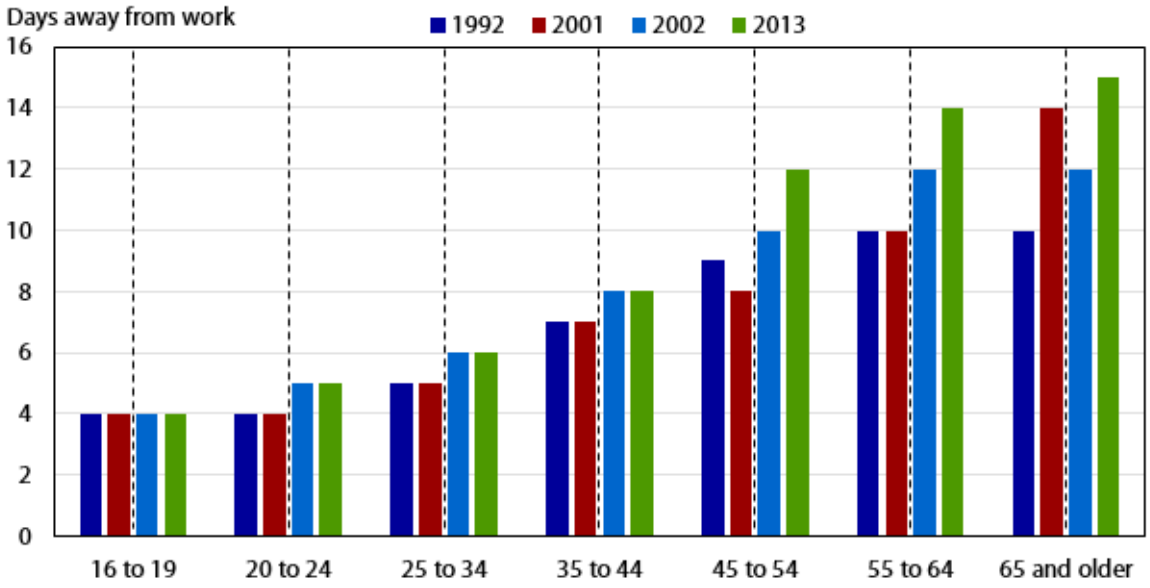
1. Counts and rates of nonfatal occupational injuries and illnesses by detailed industry and case type (SOII summary data)
2. Case circumstances and worker demographic data for nonfatal occupational injuries and illnesses resulting in days away from work (SOII case and demographic data)
3. Counts and rates of fatal occupational injuries (CFOI data)

While these outputs continue to provide comprehensive information on worker safety and health, BLS has introduced a number of program improvements in recent years; additional improvements are constantly being considered.

In 1992, the SOII was restructured to provide data that had escaped BLS systematic collection efforts in the past. The restructured survey added characteristics about workers whose injuries and illnesses required time away from work. The survey gathered more detailed information about the circumstances of the specific injury or illness: new detail on what happened and how it happened; the physical characteristics of the injury or illness; and the equipment, materials, tools, or substances involved. The survey also collected detailed demographic information on injured or ill workers, including occupation, age, gender, race or ethnic origin, and length of service.

Figure 2 provides median days away from work for selected age groups during 4 selected years—1992 (the first year in which the redesigned survey captured age data), 2001, 2002, and 2013 (the most recent year available).

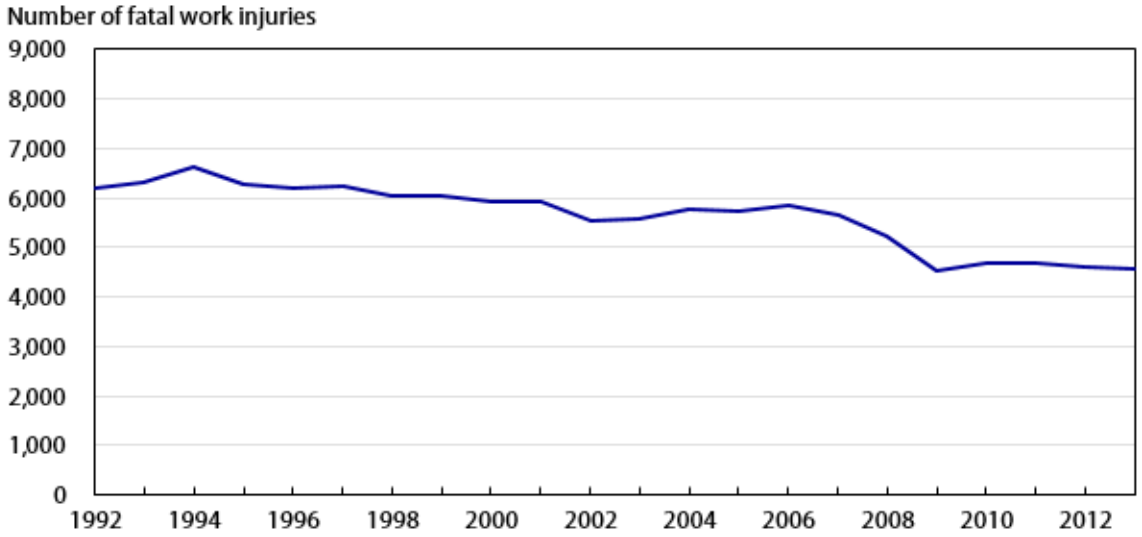
Figure 2. Median number of days away from work per year, by age group



Note: Vertical lines represent OSHA recordkeeping change in 2002.
Source: U.S. Bureau of Labor Statistics.

To improve the accuracy of workplace fatality data, the NAS recommended that BLS compile a universe of fatalities.[20] In 1992, in response to this recommendation, BLS launched the CFOI. The CFOI assembles data on all work-related fatal injuries from a diverse array of sources. Figure 3 presents the annual totals of fatal occupational injuries from 1992 through 2013.

Figure 3. Number of fatal work injuries per year, 1992–2013



Note: Data for all years are revised and final. Data from 2001 exclude fatal work injuries from the September 11 terrorist attacks.
Source: U.S. Bureau of Labor Statistics.

To support both the SOII and the CFOI, BLS developed the Occupational Injury and Illness Classification System (OIICS). The OIICS provides detailed classifications of the nature of injury or illness, part of body affected, source directly leading to injury or illness, secondary source contributing to injury or illness, and event or exposure. The OIICS enables the SOII and CFOI to provide data users with more comprehensive data.

These improvements reflect the program's commitment to continually provide the most complete and accurate data feasible.

Changes to classification systems

In 2007, BLS began revising the OIICS. Over the course of 3 years, revision efforts focused on the evolving nature of the workplace, medical and technological advances, and feedback from data users, coders, and other stakeholders. Among the issues considered were emerging diseases and disorders, as well as newly recognized hazards that had not been adequately accounted for in the original classification system.

In September 2010, BLS proposed its first major OIICS revision. After receiving input, BLS released a revised version, version 2.01, in January 2012. The new version was first used in the CFOI and SOII for 2011 data. OIICS version 2.01 clarified existing coding rules to promote consistency and facilitate coding; harmonized with other data sources when feasible, such as the International Classification of Diseases (version 10) (for nature of injury or illness) and OSHA (for event or exposure); and developed an ongoing revision process.[21] See Appendix for an example of changes to the injury and illness classification system.

Questions about data completeness

The goal of providing the most complete data possible is the primary objective of OSHS. In this regard, both the SOII and CFOI present unique challenges for data collectors. Disease latency periods and the difficulty of ascertaining whether a worker contracted a disease at work or elsewhere make it difficult for either program to accurately track occupational illnesses.

SOII data frequently undercount occupational illnesses because workers who contract diseases with long latency periods often retire, change employers, or move before the disease is diagnosed. Moreover, it is often difficult to associate a medical condition directly to an exposure in the workplace.

The CFOI program has found that it is not feasible to publish data on fatal occupational illnesses. Because of long latency periods and the often tenuous connection between the illness and workplace exposure, such data are nearly impossible to collect with an acceptable level of accuracy. Outside researchers have attempted to compile such data; one researcher estimates that in 2007, there were more than nine times as many fatal illnesses as there were fatal injuries in the workplace.[22]

In recent years, some state agencies that report data to the CFOI program have experienced difficulty gaining access to source documentation. In some instances, this difficulty is due to austerity measures; in others, it is due to heightened privacy restrictions. To assist responding agencies, BLS has played a more proactive role in identifying cases.

Transportation is one area where BLS has taken a more proactive role in identifying cases. While CFOI methods generally produce complete and accurate data, anecdotal evidence suggests that some states have trouble identifying work-related transportation injuries. In response, the CFOI program has worked with a number of federal agencies to gain access to data on incidents tracked and investigated at the federal level.[23]

BLS has directed a more formalized effort toward SOII completeness concerns. As far back as the late 1990s, outside researchers used various analytical techniques (e.g., matching SOII cases to state workers' compensation cases and analyzing hospital admission and emergency room records) to determine that the SOII substantially undercounts nonfatal occupational injuries and illnesses.[24] While attempting to find the cause of the undercounts, researchers noticed several important factors related to the data sources. These factors, including establishment type, the time the case was filed, and the kind of injury, varied widely from establishment to establishment. The evidence suggested that data are easier to match across data sources for single-establishment firms than for multi-establishment firms.

BLS internal research also identified other factors that contribute to SOII undercounts, including type of injury and disincentives for accurate recordkeeping. Injuries or illnesses with lengthy onsets or long latency periods, such as hearing loss and carpal tunnel syndrome, are less likely to be included in the SOII than are easily identifiable traumatic work injuries, like lacerations or fractures. This is partially due to the timing of SOII data collection, which occurs shortly after the close of the calendar year. Because workers' compensation claims may be established, updated, or adjudicated years after the injury occurs, these records alone cannot offer complete data of worker injuries timely to SOII's publication schedule. For similar reasons, injuries and illnesses occurring at the end of the calendar year also tend to appear less frequently in the SOII data than in workers' compensation records.[25]

The SOII captures information from the OSHA logs that employers are required to maintain. Accordingly, issues affecting the accuracy of the logs would likewise affect the accuracy of SOII data. The Government Accountability Office (GAO) analyzed audits of the OSHA logs and identified several factors that negatively affected the accuracy of the logs. Notably, GAO found disincentives for both employers and employees to record all injuries and illnesses. For workers, potential reprisals for reporting injuries and illnesses, and rewards for the establishment maintaining low rates of injuries and illnesses, might encourage underreporting. For employers, the desire to keep workers' compensation costs low may have kept reporting rates low.[26]

At the request of Congress, BLS has established an ongoing research program to look into the completeness of the SOII injury and illness counts. The program's goals include quantifying the magnitude of any undercount; determining whether the magnitude of any undercount has changed over time; determining whether undercounts are more pronounced for certain industries, occupations, or kinds of injuries; implementing improvements; and providing data users with information on data quality.

The first round of research was conducted from 2009 through 2012, in coordination with several state agency grantees and a contractor. One pilot study used multiple data sources (including the SOII, workers' compensation claims, trauma registries, hospital discharge records, and emergency room records) to determine the total number of work-related amputations and instances of carpal tunnel syndrome in three states. Another study supplemented previous research that matched the SOII with workers' compensation data to determine what proportion of eligible cases were captured by the SOII when compared with workers' compensation

records. In another study, followup interviews were conducted with a small number of selected establishments to determine how different recordkeeping practices affect reporting discrepancies between the SOII and workers' compensation.

BLS determined that, rather than a single cause, several factors contributed to undercounting nonfatal injuries and illnesses. BLS has the programmatic authority to directly address some factors, such as a reduced likelihood of capturing injuries or illnesses incurred late in the reporting cycle. While other factors, such as those related to OSHA recordkeeping, are beyond the reach of BLS.

BLS also determined that the magnitude of undercounts discovered varies dramatically based on research methodology, primarily because of the technical difficulties associated with matching the SOII and workers' compensation data. The magnitude may differ by state. BLS could not determine whether the undercount changes over time or in response to regulatory changes affecting the SOII and workers' compensation.

The multisource pilot study showed that more cases of work-related injuries—including amputations and carpal tunnel syndrome—would be identified than from a single source such as the SOII. Data from one state suggested that the SOII captures a mere one-quarter to one-half of carpal tunnel syndrome cases and one-half to three-quarters of amputations.

Researchers considered the possibility of a multisource compilation of nonfatal workplace injuries and illnesses on the national level, but determined that such an approach would not be feasible because it would be too cost prohibitive, because matching individual cases across multiple datasets would be too resource intensive and methodologically challenging,[27] and because variations in resource availability and data-source access vary from state to state.[28]

Efforts to improve the completeness and accuracy of SOII data did not end after the first phase of the study. From 2012 through 2014, guided by the results of the first phase of SOII research, efforts for survey improvements continued.

To analyze any undercount trends over time, researchers in one state matched 10 years of SOII data to workers' compensation records and determined that SOII captures 70 percent of workers' compensation cases which meet the criteria for SOII inclusion.[29] They also conducted a small number of interviews with the SOII respondents who reported apparent OSHA recordable injury and illness cases to workers' compensation but did not report them to SOII. SOII respondents' bases for reporting cases that meet SOII criteria to workers' compensation, but not to the SOII, will inform future research.[30]

Interviews were conducted with a large sample of employers in four states to obtain statistically significant results on various recordkeeping practices. These interviews asked those responsible for completing the SOII (or if unavailable, those responsible for OSHA recordkeeping) about how they record and report injuries and illnesses. Respondents indicated that they used different approaches: some adhered to OSHA recordkeeping criteria, some recorded all injuries, others recorded only injuries found on workers' compensation reports, and others recorded only injuries that required medical attention. The results indicated significant employer confusion regarding injury and illness cases that should be recorded and reported to BLS per OSHA recordkeeping criteria.

BLS is building on the results from the four-state study with a national follow-back survey of SOII respondents and is conducting exploratory research on the feasibility of collecting injury and illness data from workers to complement the SOII data received directly from employers.

In the past, BLS relied on workers' compensation records for occupational injury and illness data. Since 1926, workers' compensation records likely played a role, directly or indirectly, in the earliest annual survey of occupational injuries for several manufacturing industries. Before 1939, occupational fatalities were tallied by aggregating workers' compensation figures. From 1939 through 1976, relying on workers' compensation records fell out of favor. In 1976, BLS established the Supplementary Data System (SDS), which is based on workers' compensation records.

When the redesigned SOII was first introduced in 1992, respondents in some states were allowed to submit workers' compensation forms as long as these forms addressed the survey questions. However, 2003 was the last year this practice was allowed.

As the SDS showed, because workers' compensation data differ from state to state, relying upon such data as the sole source of information can lead to inconsistent data from one state to another. When answered correctly in accordance with OSHA recordkeeping guidelines, the SOII provides the only comprehensive, nationally consistent data on worker injuries and illnesses. Multisource data collection would likely be more robust and accurate than data drawn from a single source, but BLS-sponsored research has shown that such an approach is not feasible at the national level. Data quality might be improved were workers' compensation and medical reports relied upon to follow back with respondents to ascertain, for example, whether cases not reported to BLS were within the scope of the OSHA recordkeeping guidelines or whether the nature of injury on cases reported to BLS was not accurately reported on the SOII form.

Ergonomic injuries and illnesses

Over time, capturing reliable data on ergonomic injuries and illnesses has proven to be a challenging endeavor. When the SOII first came online, many respondents did not report ergonomic injuries and illnesses. As recognition of these conditions improved, demands for reliable data on their prevalence increased. In 1972, OSHA established seven basic occupational illness categories for collecting and publishing data.[31] One category, "disorders associated with repeated trauma," included ergonomic injuries and illnesses and noise-induced cumulative hearing loss. In 2002, because of changes in OSHA recordkeeping, this category was removed, and items that had previously been classified within it were placed within the catch-all category.[32] In 2004, hearing loss became its own distinct category.[33]

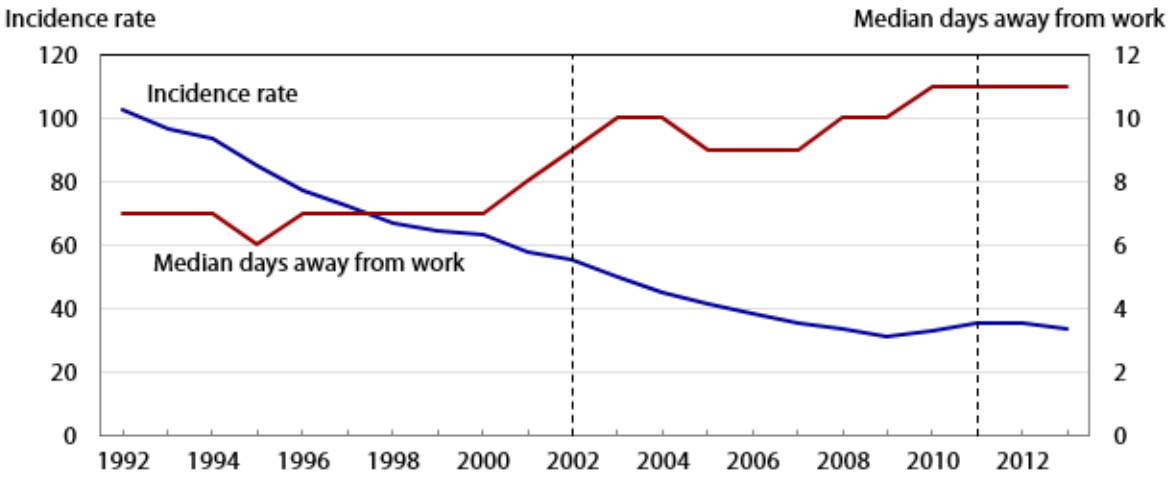
Because the seven categories proved limiting, OSHA provided criteria for identifying ergonomic injury and illness cases using the case details for days away from work (DAFW) cases. In April 2000, BLS published 1998 estimates for work-related musculoskeletal disorders (MSD) using the OSHA criteria.[34]

The revised OIICS enabled BLS to better match the criteria OSHA had provided. Since 2011, BLS has used the following criteria to report estimates for work-related musculoskeletal disorders based on the current OIICS:

Musculoskeletal disorders (MSDs) include cases where the nature of the injury or illness is pinched nerve; herniated disc; meniscus tear; sprains, strains, tears; hernia (traumatic and nontraumatic); pain, swelling, and numbness; carpal or tarsal tunnel syndrome; Raynaud's syndrome or phenomenon; musculoskeletal system and connective tissue diseases and disorders, when the event or exposure leading to the injury or illness is overexertion and bodily reaction, unspecified; overexertion involving outside sources; repetitive motion involving microtasks; other and multiple exertions or bodily reactions; and rubbed, abraded, or jarred by vibration.

Figure 4 illustrates incidence rates and median days away from work for musculoskeletal disorders for the private sector from 1992 through 2013, with the OSHA-provided criteria retroactively applied to 1992–97 data.

Figure 4. Musculoskeletal disorders incidence rates and median days away from work, per 10,000 full-time workers, private sector, 1992–2013

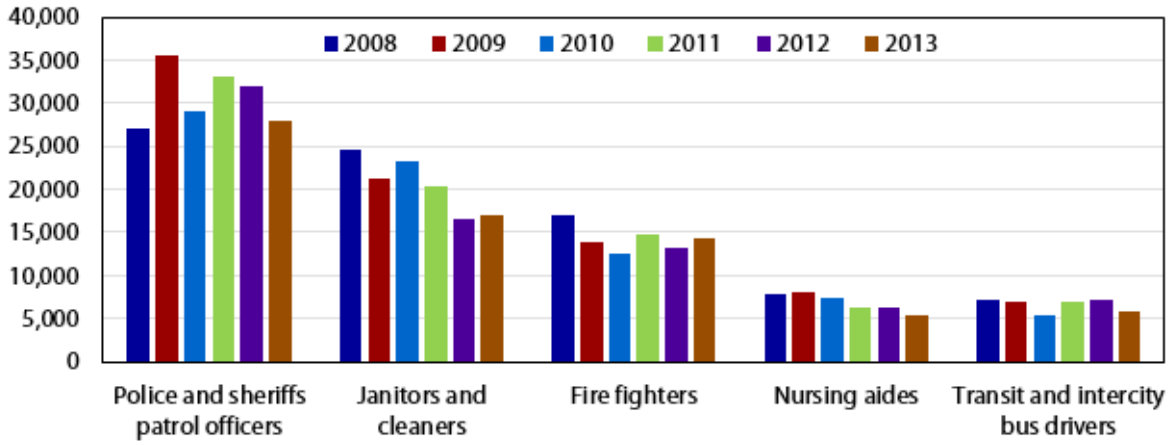


Note: OSHA criteria has been retroactively applied to 1992–97 data. Vertical lines represent OSHA recordkeeping change in 2002 and a change to Occupational Injury and Illnesses Classification System coding in 2011.
Source: U.S. Bureau of Labor Statistics.

Expansion of data to include government workers

Since 1992, BLS has published data on fatal work injuries for government workers at all levels. Since 2008, BLS has collected and published nonfatal injury and illness summary data, as well as more specific case-circumstance and worker-characteristics data, for all state and local government workers. But prior to 2008, there were only nonfatal data for state and local government workers in selected states, and no such data were available for federal workers. Figure 5 shows annual estimates for the number of DAFW cases for selected occupations in state and local government.

Figure 5. Number of nonfatal occupational injuries and illness cases with days away from work for selected occupations in state and local government, 2008–13



Note: In 2011, nursing aides underwent a definitional change under the Standard Occupation Classification system that reclassified nursing assistants and orderlies into separate categories. These were combined to represent nursing aides for this figure in order to maintain comparability of the data for the years presented.
Source: U.S. Bureau of Labor Statistics.

In August 2013, a new OSHA regulation required that federal agencies report data on occupational injuries and illnesses their employees suffered.[35] While 2013 data have been collected and provided to OSHA, BLS has not published them. However, such data may be included in future SOII estimates.

The rise of job-transfer or restriction-only cases

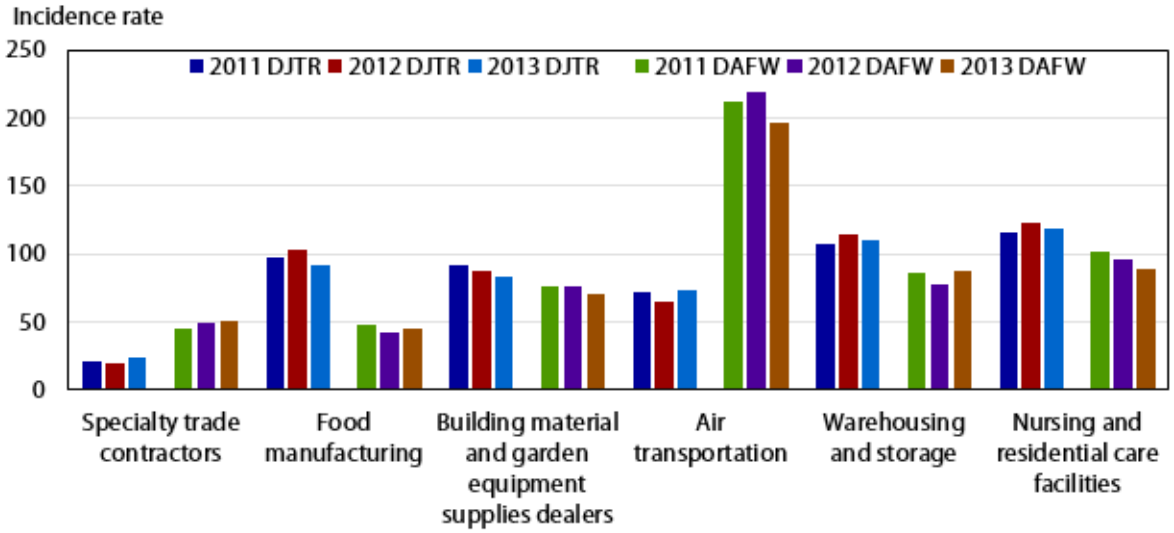
OSHA relies on rates of days away from work, restriction, and transfer (DART) to set standards and program goals. Such data are also used to compare the relative safety and health conditions of workplaces across industries. In 1992, 21 percent of nonfatal injuries and illnesses led to days of job transfer or restriction (DJTR), but not days away from work. By 2011, DJTR-only cases accounted for 41 percent of DART cases. In manufacturing, the rate for DJTR only cases is consistently higher than the rate for cases requiring days away from work (DAFW).

Since 1992, BLS has reported data on specific case circumstances and worker characteristics for injuries and illnesses involving DAFW. However, these more specific data are not collected and, consequently, not reported, for DJTR cases. The increase in the proportion of injuries and illnesses that lead to DJTR has given rise to questions about whether such cases are fundamentally different from DAFW cases. There is an ongoing debate about whether placing injured workers on restricted duty facilitates recovery (and subsequent productivity and earnings) or impedes it.[36]

BLS conducted a pilot study to assess the feasibility of collecting case circumstances and worker characteristics data for DJTR cases. Data were collected and processed for workers in six selected industries for 2011–13. The resulting data have already provided researchers with important information for understanding work-related musculoskeletal disorders.

Without DJTR data, users might reach different conclusions about work-related injury and illness experiences than they would relying solely on DAFW data. Figure 6 illustrates how DAFW and DJTR cases exhibit vastly different incidence rates for MSDs in different industries. The incidence rate for DJTR in food manufacturing, for example, is higher than that industry's DAFW incidence rate, whereas in air transportation it is much lower.

Figure 6. Incidence rates of musculoskeletal disorders resulting in days of job transfer or work restriction, or days away from work, per 10,000 full-time workers, for selected industries, 2011–13



Note: DJTR = Days of job transfer or work restriction. DAFW = Days away from work.
Source: U.S. Bureau of Labor Statistics.

In 2014, BLS selected another set of six different industries as part of a 3-year pilot study to assess the feasibility of collecting case-circumstances and worker-characteristics data.[37]

There is currently no national data across all industries that allow end users to compare DJTR and DAFW cases. Such data are desirable because they would show whether DJTR cases are genuinely less severe than DAFW cases (as was once thought) or whether similar cases are being managed differently. Because the SOII is uniquely suited to collect and analyze these details, BLS is likely to look for ways to expand collection of DJTR data.

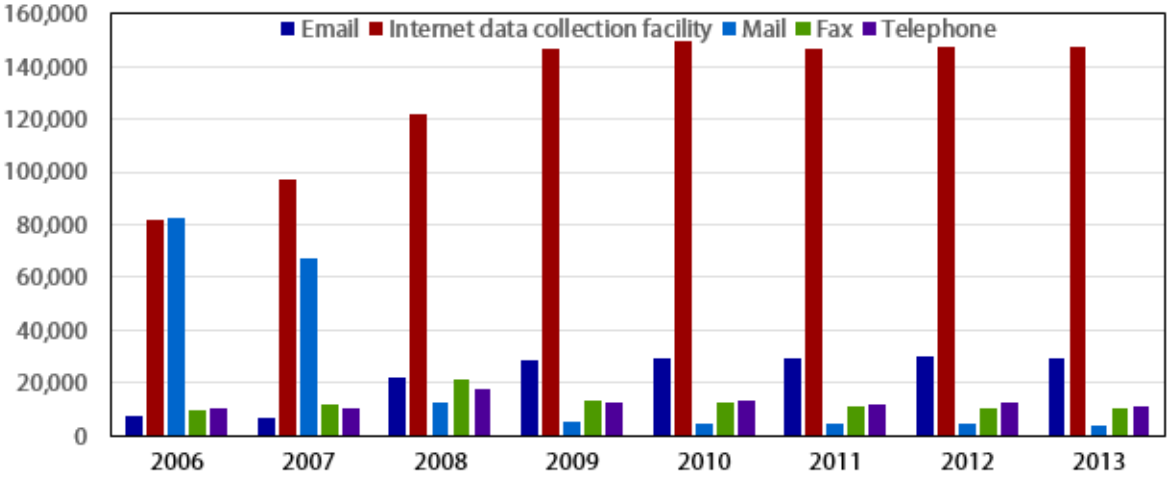
Internet data collection

Although, from the beginning of SOII, BLS relied upon preprinted forms mailed to employers selected for a given year's survey, BLS began taking advantage of the opportunity to collect data through the Internet to lower postage, processing, and printing costs.[38] BLS piloted an "Internet data collection facility" (IDCF) for SOII survey respondents starting with 2002 data and made the IDCF available to all respondents by the time 2004 data were collected.[39] In 2004, BLS offered email data collection for the first time. In 2005 and 2006, BLS tested respondent receptivity to Internet and email data collection.[40] In 2006, BLS began tracking SOII responses by collection mode. By 2013, 73 percent of useable survey responses were provided via the IDCF, while an

additional 15 percent were sent via email, rather than being submitted on preprinted forms or collected over the telephone. IDCF is now SOII's primary method of data collection.

Figure 7 shows the principal SOII collection modes for 2006–13.

Figure 7. Modes of collection for the Survey of Occupational Injuries and Illnesses



Note: Unclassified responses (less than 10 percent of all responses in 2007 and 2008, less than 2 percent of all responses in 2009, and less than 0.5 percent of all responses thereafter) not shown. Telephone responses include data collected via face-to-face personal visit.
Source: U.S. Bureau of Labor Statistics.

Computer-assisted coding

BLS is constantly looking for ways to upgrade data collection that will minimize the impact of human error. Because much of the occupational data are provided in narrative form, BLS and its state partners must manually translate these narratives into codes. While BLS has incrementally developed rules for identifying coding errors, consistency remains a concern. In 2012, BLS began researching the concept of using computer learning algorithms to "autocode" free-form written case narratives from survey respondents. The initial results proved promising and indicated that computer-assisted coding would be feasible.

Currently, BLS is using the research output as part of the annual review of the codes state coders have assigned to occupation and case circumstances for more than a quarter million nonfatal injuries and illnesses. BLS will continue to develop and evaluate computer-assisted coding with the twin goals of improving consistency and freeing personnel for more complex assignments where staff expertise is critically needed.

For the 2014 SOII, BLS began automatically assigning occupation codes. BLS found that it could successfully automatically assign codes to about one-quarter of 2014 SOII cases. SOII plans to expand occupation autocoding for the 2015 survey and to begin nature of injury or illness and part of body affected autocoding.

Conclusion

Since the days of Carroll Wright, the first BLS Commissioner,the agency has been called upon to keep track of what one of his contemporaries, C.H. Mark, characterized as the “stupendous loss” of life and injury experience consequent to industrialization.[41] But there was not much data available on the prevalence of such injuries until the passage of the OSH Act in 1970. Since then, there has been constant improvement in the range and quality of occupational injury and illness data.

Despite these improvements, BLS continues to search for ways to provide more accurate and comprehensive occupational injury and illness data. It is interesting to note that the use of workers’ compensation data to identify the SOII undercounts mirrors earlier approaches employed by BLS for capturing workplace safety data. Historically, BLS vacillated between using direct surveys and using workers’ compensation records to collect occupational injury and illness data. Both methods faced serious challenges. Direct surveys were often flawed because of underreporting by firms with the worst injury and illness records in the years preceding the OSH Act.[42] And it was difficult to rely on workers’ compensation records because of the lack of consistent reporting requirements from state to state. While workers’ compensation forms ultimately proved unreliable for documenting work injuries, they were a key resource for determining SOII undercounts.

It is as yet unclear that the present conditions which make current occupational health and safety data so reliable will continue into the future. Just as the present system for collecting occupational injury and illness statistics would have been unimaginable more than a century ago, it is quite possible that the present system will be intolerably antiquated a century from now. Budgetary conditions, public demand, and available information resources may all change in a manner that enables organizations to improve their methods and to produce better and more accurate safety and health statistics. Will there be sufficient resources to undertake special followup studies, improve data, or develop new information sources in the proximate future?

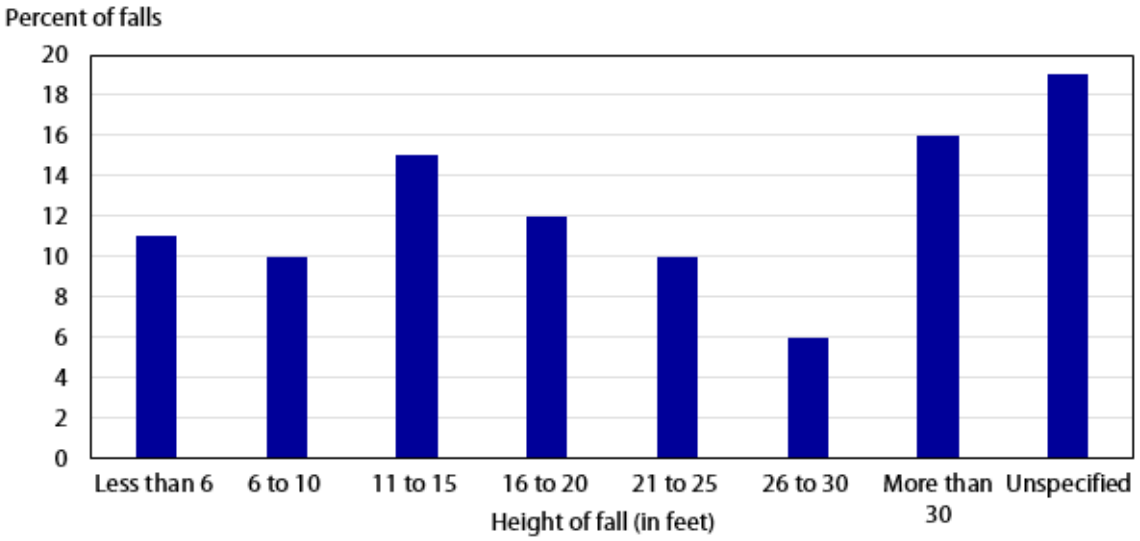
Recently, BLS has identified areas for expansion and improvement, and will continue to take incremental steps in these areas. But because the nature of the work changes rapidly, tomorrow’s workplace safety and health issues may not be on today’s radar screen. BLS will continue its efforts to understand present and future worker safety and health challenges, while providing the data needed to address such challenges.

Appendix. Example of change in injury and illness classification system

The Occupational Injury and Illness Classification System (OIICS) was changed to improve the accuracy, clarity, and consistency of the data. For example, in the original OIICS, slips, trips, and losses of balance without fall (under the bodily reaction and exertion category) accounted for approximately 3 percent of nonfatal occupational injuries and illnesses resulting in days away from work and falls accounted for 22 percent. Because these injuries require similar preventative measures, OIICS 2.01 combined them in a single category—Falls, Slips, Trips. To enhance analytical detail, new codes, such as slips on a substance and trips from stepping into a hole without falling, fall on the same level while sitting, and falls due to tripping on uneven surfaces were added. In the original OIICS, in order to be classified as a fall, an incident must have resulted in an impact injury. Thus, if a fall from a pier resulted in a drowning, it would have been classified as a drowning instead of a fall. In

OIICS 2.01, this type of incident is classified as a fall.[43] OIICS 2.01 parsed various kinds of falls from elevation which had previously caused confusion. In the original OIICS, falls were often coded inconsistently. For example, if a fall were caused by scaffolding that shifted or collapsed, some coded this type of incident as a fall, while others coded it as caught in collapsing structure. OIICS 2.01 solved that coding quandary by introducing three fall to lower-level subcategories: from collapsing structure or equipment, through surface or existing opening, and all other. OIICS 2.01 also introduced detailed codes for height of fall for falls to lower level to help determine the severity of falls from varying heights. Figure 8 illustrates how OIICS 2.01 allows BLS to analyze varying heights of fatal falls.

Figure 8. Fatal falls to lower level, by height of fall, 2013



Note: Percentages may not add to 100 because of rounding.
Source: U.S. Bureau of Labor Statistics.

ACKNOWLEDGEMENTS: Mark J. Zak, Matthew M. Gunter, Ryan T. Smith, and Ryan Farrell, economists in the Office of Safety, Health, and Working Conditions, U.S. Bureau of Labor Statistics, assisted with data development for this article.

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[6] Goldberg and Moye, "The first hundred years of the Bureau of Labor Statistics," p. 26.

[7] John B. Andrews, *Phosphorous poisoning in the match industry in the United States*, Bulletin 86, (U.S. Bureau of Labor Statistics, January 1910) pp. 31,145–146; Hearings on Health Activities of the General Government before the House Committee on Interstate and Foreign Commerce, 61st Congress, 1910, pt. VI, p. 408.

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[11] Goldberg and Moye, *The First Hundred Years of the Bureau of Labor Statistics*, p. 133.

[12] Max Kossoris and Swen Kjaer, "Industrial accidents in the United States during 1939," *Monthly Labor Review* (October 1940), pp. 86, 89.

[13] Marc Linder, "Fatal subtraction: statistical MIAs on the industrial battlefield," *Journal of Legislation*, vol. 20, No. 2 (Notre Dame Law School, 1994), pp. 106–110.

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[In] Connecticut…[w]e passed an employer's liability compensation act, which requires all employers… to see to it that their employees should be protected at work. Now, this had the very natural effect of making the manufacturers do what they should have done before, look into the causes of their own accidents and guard against them. [T]his is the proper theory of government, put on the individual the initiative of seeing to it that he corrects his own errors, rather than to have the Government to tell him what he must do in order to correct them,and that is the reason, I take it, why we do not find it necessary to collect accident statistics anymore; it is

because the workmen are protected, and the manufacturers themselves are seeing to it that they can and do establish the very latest form of safety devices, for their own protection, and for the saving in insurance, and for the safety of their workers.

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[22] J. Paul Leigh, "Economic burden of occupational injury and illness in the United States", *The Milbank Quarterly*, Vol. 89, Issue 4, (December 2011), p. 728, http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0009.2011.00648.x/abstract.

[23] These agencies include the National Transportation Safety Board for air crashes; the U.S. Department of Transportation Federal Railroad Administration for railway incidents and National Highway Traffic Safety Administration for vehicle and pedestrian and roadway fatalities; the U.S. Department of Homeland Security U.S. Coast Guard for water vessel incidents; and the U.S. Department of Labor Occupational Safety and Health Administration and Mine Safety and Health Administration for fatality investigation reports conducted under their jurisdiction, and Office of Workers' Compensation Programs for federal employee and longshore and harbor worker fatalities. These resources typically initiate several dozens of cases per year which the CFOI might otherwise have missed.

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Medicine (2004), Vol. 46(1), pp. 10 –18; S. M. Marsh, S. J. Derk, and L. L. Jackson, "Nonfatal occupational injuries and illnesses among workers treated in hospital emergency departments—United States, 2003" *Morbidity and Mortality Weekly Report* (2006), Vol. 55(16), pp. 449–452; T. Morse, C. Dillon, E. Kenta-Bibi, J. Weber, U. Diva, N. Warren, and M. Grey, "Trends in work-related musculoskeletal disorder reports by year, type, and industrial sector: a capture-recapture analysis," *American Journal of Industrial Medicine* (2005) Vol. 48(1), pp. 40–49; T. Morse, C. Dillon, J. Weber, N. Warren, H. Bruneau, and R. Fu, "Prevalence and reporting of occupational illness by company size: population trends and regulatory implications.,"*American Journal of Industrial Medicine* (2004) Vol. 45(4) pp. 361–370; T. Morse, L. Punnet, W. Warren, C. Dillon, A. Warren "The relationship of unions to prevalence of claim filing for work-related upper extremity musculoskeletal disorders," *American Journal of Industrial Medicine* (2003), Vol. 44(1), pp. 83–93; T. Morse, C. Dillon, N. Warren, C. Levenstein, and A. Warren, "The economic and social consequences of work-related musculoskeletal disorders: The Connecticut upper-extremity surveillance project (CUSP)," *International Journal of Occupational and Environmental Health* (1998) Vol. 4(4), pp. 209–216; Oleinick, A. and B. Zaidman, "Methodologic issues in the use of workers' compensation databases for the study of work injuries with days away from work. I. Sensitivity of case ascertainment," *American Journal of Industrial Medicine* (2004), Vol. 45, pp. 260–274; K. D. Rosenman, A. Kalush, M. J. Reilly, J. C. Gardiner, M. Reeves, and Z. Luo, "How much work-related injury and illness is missed by the current national surveillance system?" *Journal of Occupational and Environmental Medicine*, (April 2006), Vol. 48(4) pp. 357–365; M. Stanbury, M. J. Reilly, and K. D. Rosenman, "Work-related amputations in Michigan, 1997," *American Journal of Industrial Medicine* (2003), Vol. 44 pp. 359–367.

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[29] Sara Wuellner, Dave Bonauto, and Darrin Adams, "SOII undercount research: Washington SOII-workers' compensation record linkage, 2000-2011," *Washington State Department of Labor and Industries*, August 30, 2014, available at www.bls.gov/iif/wa_workercomp.pdf.

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[35] 29 CFR §1960.72; FR Doc. 2013-18457 08/05/2013; Docket No. OSHA-2013-0018; Federal Register, August 5, 2013; National Archives and Records Administration, https://s3.amazonaws.com/public-inspection.federalregister.gov/2013-18457.pdf; OSHA news release "OSHA announces changes to recordkeeping rule for federal agencies to improve tracking of federal workplace injuries, illnesses," www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=24477.

[36] Examples of the debate include Gordon B. Coyle, "Return to work strategy can save New York employers thousands of dollars in workers compensation costs," "Return to work/stay at work," Texas Department of Insurance, http://www.tdi.texas.gov/wc/rtw/newrtw.html. Because injured workers who remain at work or are returned to work as soon as possible following an injury require less medical care and experience less disability, workers' compensation medical costs can be significantly reduced. Critics counter that "return-to-work" policies often result in employers pressuring workers to return to work earlier than medically advisable or even safe. If injured workers return too early, they might be susceptible to further injury and might compromise their claim to workers' compensation benefits. "Rights of injured workers," available at www.lawfirms.com/resources/disability/workers-compensation/injured-workers-rights.htm.

[37] The industries selected for 2014 are beverage and tobacco product manufacturing, general merchandise stores, couriers and messengers, waste management and remediation services, hospitals, and accommodation.

[38] Kathy Downey, Dee McCarthy, and William McCarthy, "Encouraging the use of alternative modes of electronic data collection: results of two field studies" (U.S. Bureau of Labor Statistics, June 2007), www.bls.gov/osmr/pdf/st070180.pdf.

[39] Stephen Cohen, Dee McCarthy, Richard Rosen, and William Wiatrowski, "Internet collection at the Bureau of Labor Statistics: an option to report data" *Monthly Labor Review* (February 2006), p. 50.

[40] Downey, McCarthy, and McCarthy, “Encouraging the use of alternative modes of electronic data collection,” pp. 2–4.

[41] C.H. Mark, “Our murderous industrialism,” *World Today*, Vol. 12, 1907, p. 97.

[42] For further explanation, see Linder,“Fatal subtraction,” p. 115; Schauer and Ryder, “New approaches to occupational safety,” pp. 14-19; and Dino Drudi, “The Evolution of Occupational Fatality Statistics,” *Compensation and Working Conditions*, (Bureau of Labor Statistics, July 1995), p. 2.

[43] Joyce M. Northwood, Eric F. Sygnatur, and Janice A. Windau, “Updated BLS occupational injury and illness classification system,” *Monthly Labor Review* (August 2012), p. 23.

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7 John B. Andrews, *Phosphorous poisoning in the match industry in the United States*, Bulletin 86, (U.S. Bureau of Labor Statistics, January 1910) pp. 31,145–146; Hearings on Health Activities of the General Government before the House Committee on Interstate and Foreign Commerce, 61st Congress, 1910, pt. VI, p. 408.

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20 *Ibid*., p. 106.

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22 J. Paul Leigh, "Economic burden of occupational injury and illness in the United States", *The Milbank Quarterly*, Vol. 89, Issue 4, (December 2011), p. 728, http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0009.2011.00648.x/abstract.

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25 Nicole Nestoriak and Brooks Pierce, “Comparing workers’ compensation claims with establishments’ responses to the SOII,” *Monthly Labor Review* (May 2009), pp. 57–64, available at http://www.bls.gov/opub/mlr/2009/05/art4full.pdf.

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29 Sara Wuellner, Dave Bonauto, and Darrin Adams, “SOII undercount research: Washington SOII-workers’ compensation record linkage, 2000-2011,” *Washington State Department of Labor and Industries*, August 30, 2014, available at www.bls.gov/iif/wa_workercomp.pdf.

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33 "Occupational injury and illness recording and reporting requirements," (Occupational Safety and Health Administration, December 17, 2002); for more information, see www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=17536.

34 Data for 1992-2010 use the following criteria to report counts and rates of work-related musculoskeletal disorders based on the original OIICS version: Cases where the nature of the injury or illness is sprains, strains, tears; back pain, hurt back; soreness, pain, hurt, except the back; carpal tunnel syndrome; hernia; or musculoskeletal system and connective tissue diseases and disorders, when the event or exposure leading to the injury or illness is bodily reaction/bending, climbing, crawling, reaching, twisting; overexertion; or repetition. Cases of Raynaud's phenomenon, tarsal tunnel syndrome, and herniated spinal discs are not included. Although they may be considered MSDs, the survey classifies these injuries and illnesses in categories that also include non-MSD cases. The OIICS version implemented for 2011 on includes categories, such as Raynaud's phenomenon and tarsal tunnel syndrome, designed to better match OSHA's MSD criteria.

35 29 CFR §1960.72; FR Doc. 2013-18457 08/05/2013; Docket No. OSHA-2013-0018; Federal Register, August 5, 2013; National Archives and Records Administration, https://s3.amazonaws.com/public-inspection.federalregister.gov/2013-18457.pdf; OSHA news release "OSHA announces changes to recordkeeping rule for federal agencies to improve tracking of federal workplace injuries, illnesses," www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=24477.

36 Examples of the debate include Gordon B. Coyle, "Return to work strategy can save New York employers thousands of dollars in workers compensation costs," "Return to work/stay at work," Texas Department of Insurance, http://www.tdi.texas.gov/wc/rtw/newrtw.html. Because injured workers who remain at work or are returned to work as soon as possible following an injury require less medical care and experience less disability, workers' compensation medical costs can be significantly reduced. Critics counter that "return-to-work" policies often result in employers pressuring workers to return to work earlier than medically advisable or even safe. If injured workers return too early, they might be susceptible to further injury and might compromise their claim to workers' compensation benefits. "Rights of injured workers," available at www.lawfirms.com/resources/disability/workers-compensation/injured-workers-rights.htm.

37 The industries selected for 2014 are beverage and tobacco product manufacturing, general merchandise stores, couriers and messengers, waste management and remediation services, hospitals, and accommodation.

38 Kathy Downey, Dee McCarthy, and William McCarthy, "Encouraging the use of alternative modes of electronic data collection: results of two field studies" (U.S. Bureau of Labor Statistics, June 2007), www.bls.gov/osmr/pdf/st070180.pdf.

39 Stephen Cohen, Dee McCarthy, Richard Rosen, and William Wiatrowski, "Internet collection at the Bureau of Labor Statistics: an option to report data" *Monthly Labor Review* (February 2006), p. 50.

40 Downey, McCarthy, and McCarthy, "Encouraging the use of alternative modes of electronic data collection," pp. 2–4.

41 C.H. Mark, "Our murderous industrialism," *World Today*, Vol. 12, 1907, p. 97.

42 For further explanation, see Linder,"Fatal subtraction," p. 115; Schauer and Ryder, "New approaches to occupational safety," pp. 14-19; and Dino Drudi, "The Evolution of Occupational Fatality Statistics," *Compensation and Working Conditions*, (Bureau of Labor Statistics, July 1995), p. 2.

43 Joyce M. Northwood, Eric F. Sygnatur, and Janice A. Windau, "Updated BLS occupational injury and illness classification system," *Monthly Labor Review* (August 2012), p. 23.

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