

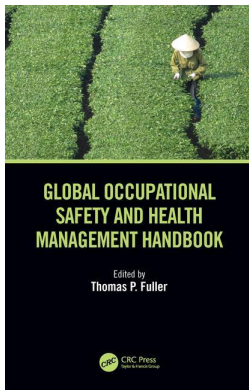
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International Reporting of Occupational Injuries, Illnesses, and Fatalities

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8 International Reporting of Occupational Injuries, Illnesses, and Fatalities

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8.1 INTRODUCTION

Perhaps one of the most important aspects of a successful occupational safety and health program, whether for an organization or a nation, is a robust and accurate means to measure and record occupational injury and illness statistics. Without an accurate assessment of where injuries and illnesses, and fatalities, are occurring, it is difficult to accurately identify the causes and take corrective action. Without sophisticated means to analyze complex data and associations, it is easy to be led off track from the true causes of poor worker health, and away from more effective improvements to occupational safety and health programs.

Accurate global estimates of occupational injury and disease are needed to understand where priorities for control and prevention should be placed by governments and businesses, and as a means to motivate and educate governments and enterprises to take corrective and proactive actions. Accurately reporting injuries and illnesses in order to make meaningful comparisons between nations is a big challenge. Recent studies have shown that fatal and nonfatal injuries in developing countries

are greatly underestimated (Hämäläinen, 2006). It has been shown that between 29% and 81% of occupational injuries go unreported (Tucker, 2014; Pransky, 2010; Shannon, 2002; Rosenman, 2006; Erickson, 2000; Moll Van Charante, 1998). In one study of rural South African workers, it was found that only 5% of workplace fatalities of women were reported (Schierhout, 1997). In the United States, where there are very sophisticated and regulated reporting requirements, between 33% and 69% of occupational injuries go unreported. Up to 88.3% of agricultural injuries go unreported (Leigh, 2004). In developing countries with poor communication infrastructure, and unsophisticated data collection methods or systems, the accurate reporting of work-related injuries and illnesses can be nearly nonexistent.

The starting point for the creation, development, and advancement of any safety and health program must be a clear understanding of occupational risks. The probability of an accident or illness based on a workplace exposure, multiplied by the severity associated with the injury or illness, will provide the level of risk, which will guide further research into the causes of the injuries, where and how workers are exposed, the progression of disease or injury, and the best means to control, minimize, and if possible eliminate the risk. It is widely recognized that transparent data regarding workplace safety can be a key driver of social change (Brown, 2005).

Estimates of workplace risks can guide private or public policy with regard to the use of limited resources to address the most significant and costly hazards, in terms of both money and suffering to workers and their families. Social benefits in terms of both are self-evident. According to the International Labor Organization (ILO), workplace injuries and illnesses worldwide cost the global gross domestic product (GDP) of about 4%, with losses in some particular countries as high as 10% of their GDP (ILO, 2012a).

The true value of an injury, illness, and fatality reporting system for a nation is the identification of programs and means that will reduce the economic burden on society by showing which systems, industries, and regions need the most improvement and assistance. That is, which workers are being affected most, and where will measures to minimize exposures to the hazards be most effective and efficient. Many successful and sophisticated companies already do this in order to maximize profits, but countries need to use the same techniques to improve GDP and protect citizens (ILO, 2002). A visual depiction of how occupational injury, illness, and fatality data can be used is provided in Figure 8.1 (ILO, 2013).

In the past few decades, there has been a significant expansion in the use of comparative risk assessment (CRA) to use available data and sophisticated mathematical methods to identify and prioritize risks to environmental factors (Embleton, 1996).

Despite powerful analytical and mathematical means to estimate the health outcomes associated with workplace exposures to hazardous agents and chemicals, most inaccuracies in assessing the risks associated with the hazards are the consequence of insufficient input data. Problems in defining what constitutes an illness or injury, what is considered work or a workplace, which workers are included in the data pool, and the accuracy of reporting are just some of the problems in creating accurate estimates. Additionally, accurate measures of exposure are extremely difficult to obtain and document in many parts of the world as well as for many different

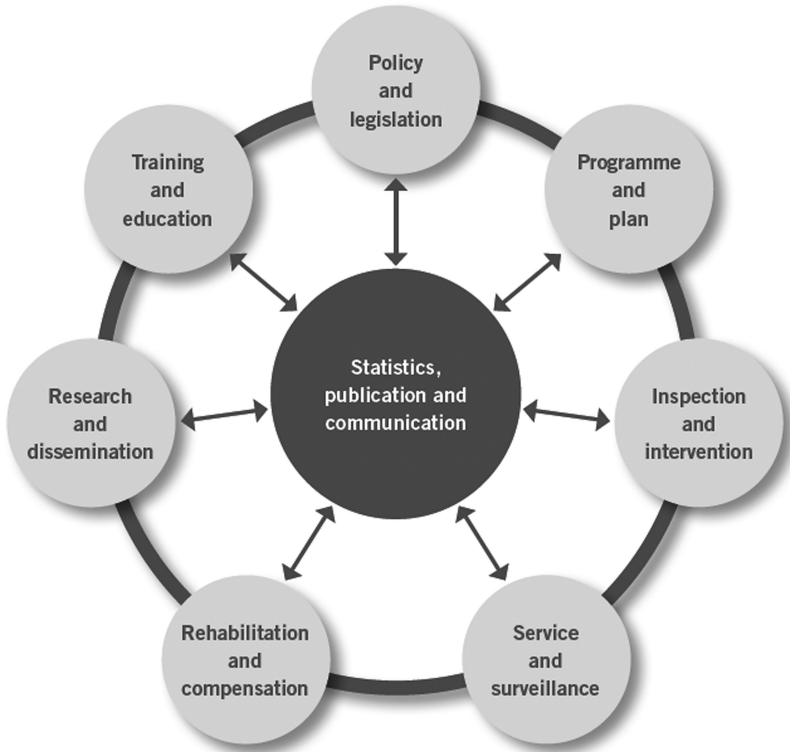


FIGURE 8.1 Use and application of occupational disease data. (Courtesy of ILO, 2013. With permission.)

jobs or tasks. Even within a single national reporting system, collection methods and data can vary between different regions or states.

8.2 VALUE TO ORGANIZATIONS

In developed countries (countries with GDP per capita exceeding \$12,000), where in general, workers are considered valuable and limited resources, national governments and enterprises typically realize that the human workforce assets must be protected from harm in order to ensure their maximum value and potential output (Investopedia, 2016). A healthy worker is a productive and happy worker. Worker skills, knowledge, and experience accumulate over time resulting in increased value to their employer.

Companies see the value of healthy workers from the standpoint of productivity or efficiency. In addition to reduced worker compensation costs, there are lower insurance premiums, better employee morale, improved public relations in the community, and fewer potential regulatory penalties for noncompliance to occupational health and safety regulations. Controls put in place in “high-risk” areas or processes to protect workers typically also protect, or reduce the likelihood of damage, to production equipment and process materials. Companies can assess the benefits of reduced economic costs

of accidents in terms of production time lost, penalties for missing product delivery timelines, damage to machinery and raw materials, and product liability (Alli, 2008).

Numerous studies have been completed over the years that demonstrate improved corporate profits or efficiencies for companies and organizations that have good safety programs. This can only be demonstrated when the data collected for comparing programs with injury and illness rates are accurate. This is an area where effective reporting and recording mechanisms improve productivity and efficiencies for companies using this data.

Direct costs of injuries and illnesses include monetary payments made directly related to the injury or illness. These include employer payments to insurance funds, wages paid to employees during injury/illness-induced absences, and medical expenses. Indirect expenses include a much broader and less well-defined list and include such items as damage to equipment and materials, production downtime caused by the accident, reduced output or quality due to the absence of the injured worker, costs of replacement staffing, decreased company morale, and administrative overhead time in responding to injuries and illnesses (ILO, 2012b).

8.3 VALUE TO NATIONS

When the U.S. Occupational Safety and Health Administration (OSHA) was created in 1970, one of the first actions for OSHA as directed by Congress was to perform an analysis of how many injuries, illnesses, and fatalities occur in the United States each year (OSHA, 1970). The rationale was to provide a basis for the creation of regulations and standards directed at reducing the risks in the most hazardous U.S. workplaces. It is believed that when accurate and consistent national data on workplace injury, illness, and fatalities are available, it becomes possible to clarify which safety or health programs and regulations are most needed or most effective. The first OSHA statistics were published in 1975, the total number of injuries or illnesses per 100 full-time workers was approximately 9.5. Thirty-eight years later, after the implementation of hundreds of risk-reducing rules and regulations, the development of risk-specific training programs, and special emphasis or regional enforcement programs that utilize the risk data to focus enforcement, injury and illness rates were reduced to around 3.3 in 2013. Similarly, fatalities have reduced from around 6,500 per year in the early 1990s to 4,585 fatalities in the United States in 2013 (Drudi, 2015).

The largest losses from injuries and illnesses are the losses in wages and benefits by employees. In the United States in 2007, these amounted to \$139 billion. They were more than double of the medical costs and triple of the lost home production costs (ILO, 2013; Leigh, 2011). Together, these three losses represent about 1.8% of U.S. GDP. It is expected that losses to other nations, particularly economically developing countries (EDCs), are also significant; however, this is an area where research and reporting are lacking.

In addition to the value to nations in terms of worker longevity and morbidity, the value can be measured in monetary value. A significant amount of data is available that shows the reduction in the number of workplace injuries and fatalities improves the financial and economic figures for countries that implement health and safety

regulations which are associated with the reduction in the number of injuries, illnesses, and fatalities. Societal costs related to occupational injuries and illnesses include wage replacements for injured workers, increased medical insurance costs, and additional costs associated with social support structures related to work-related injuries and illnesses (ILO, 2012b).

Data on injuries, illness, and fatalities in EDCs are much less available. In one study on Mexico, researchers looked at workplace injuries that were treated in medical centers operated by the Mexican Institute of Social Security. The study showed an injury rate of 2.9 per 100 workers with an average incident cost for medical expenses of approximately \$2,000 (Carlos-Rivera, 2009). The results of this study could be extrapolated to the remaining Mexican workforce, but it must be noted that 70% of Mexicans are not covered by the Mexican Institute of Social Security, and they would likely not report injuries or receive treatment at the same rates and costs.

The basic problems about collecting injury, illness, and fatality data in developed countries seem to be exacerbated in EDCs where there are poor communication infrastructure, low education, and poor governance. Due to poor associations between diseases and potential occupational exposures made by healthcare systems, policy makers, and public health officials, even more go unidentified in developing countries. Not only are informal workplace injuries likely to be unreported, but also much higher percentages of workers are in the informal workforce in low economic countries. And perhaps most importantly, lower economically performing countries have weaker and less comprehensive reporting systems and methodologies and enforcement, so fewer injuries are reported in even the formal sectors (ILO, 2013).

8.4 GENERAL SURVEILLANCE OF WORKER HEALTH

Worker health surveillance is a strategy that uses medical evaluations and screening to determine whether workers are capable of safely performing assigned tasks, and not susceptible to potential hazards in specific work conditions (Alli, 2008). A secondary activity of health surveillance is the identification of workplace exposures that are having detrimental effects on worker health, and the development of subsequent exposure control plans and worker health treatment plans (Halperin, 1996).

Pre-employment medical screenings provide a baseline of new employee health and identify preexisting medical conditions. This can be valuable information for an organization moving forward, and specific examinations can be performed to quantify and document the current status of worker health when work begins. For example, a health-care worker can be tested for tuberculosis or hepatitis prior to assignment. This would allow for treatment of the worker and elimination of the potential to spread the disease in the hospital where they are working to other workers or patients. Another example would be the use of pre-assignment audiograms to document a worker's hearing levels when they begin work, to have a baseline to compare against later measurements.

ILO Occupational Health Services Recommendation No. 171 of 1985 says that health surveillance for workers should include health assessment prior to assignment to hazardous tasks, health evaluation at periodic intervals related to hazardous work, health assessment upon the resumption of work after a prolonged absence, and health

assessment at the termination of assignments involving hazardous work. The results of health assessments should never be used to refuse employment or dismiss workers who are found to have certain conditions, but rather used to identify illnesses and provide the basis for future treatments and protections for the worker and others. Nor are health assessments a replacement for comprehensive worksite hazard evaluation and control programs (ILO, 1985).

The determination of particular workplace hazards and effective surveillance and control involve active communication and participation of three groups: occupational hygienists, occupational health doctors and nurses, and workers. Occupational hygienists must accurately evaluate, quantify, and report the workplace risks from various exposures to chemical or physical agents. It is also the hygienist's job to report the risks to management and take action to control worker exposures to the hazards so as to minimize the risks. The occupational hygienist must communicate the results of risk evaluations to occupational medicine physicians for consideration in their surveillance activities for the workers. The occupational medicine physician should be familiar with potential health symptoms and outcomes from worker exposures to the hazard. Occupational health physicians and nurses must be able to tie symptoms together with exposures and effectively treat the injury or illness. The workers must be aware of the potential health consequences to the workplace exposures and be able to recognize hazardous exposure conditions, and possible symptoms of overexposure, and where and when to report potentially work-related symptoms. Working together with the occupational hygienists, occupational medicine physicians and nurses, and the workers can develop strategies to minimize future exposures and protect the workers further, when necessary.

For certain workplaces, medical surveillance can be used to identify and quantify worker exposures to particular hazardous agents. Biological Exposure Indices (BEIs) have been developed for numerous chemicals. These chemicals or their metabolites may show up in an exposed worker's blood, urine, hair, breath, and other body parts or excretions that can be used to quantify the worker's exposure at the jobsite. Lead concentrations in urine are one example. Thyroid scanning for gamma rays is commonly used in nuclear power plants to determine whether workers had been exposed to radioactive iodine. Again, working as a team, the knowledge gained from BEI results can be used to identify where workplace exposures may be occurring, and how to better control them. And workers can use the information to better understand that increased vigilance on their part, perhaps in better use of PPE, may be appropriate.

At the national level, policies and mechanisms for recording occupational disease should be created in all branches of economic activity, to provide consistent and reliable information through established channels. Responsibilities for collecting and analyzing data by competent authorities need to be assigned in laws and regulations. Data sources may include death certificates, hospital discharge records, and other disease registries. Accurate data on occupational exposures to a broad variety of hazardous agents including biological, chemical, physical, and psychosocial are also needed. Further, mechanisms need to be coordinated by which various authorities and institutions can access data to conduct research and coordinate such services as social support and health care. A sample organizational structure for a national health surveillance network system is provided in Figure 8.2 (ILO, 2013).

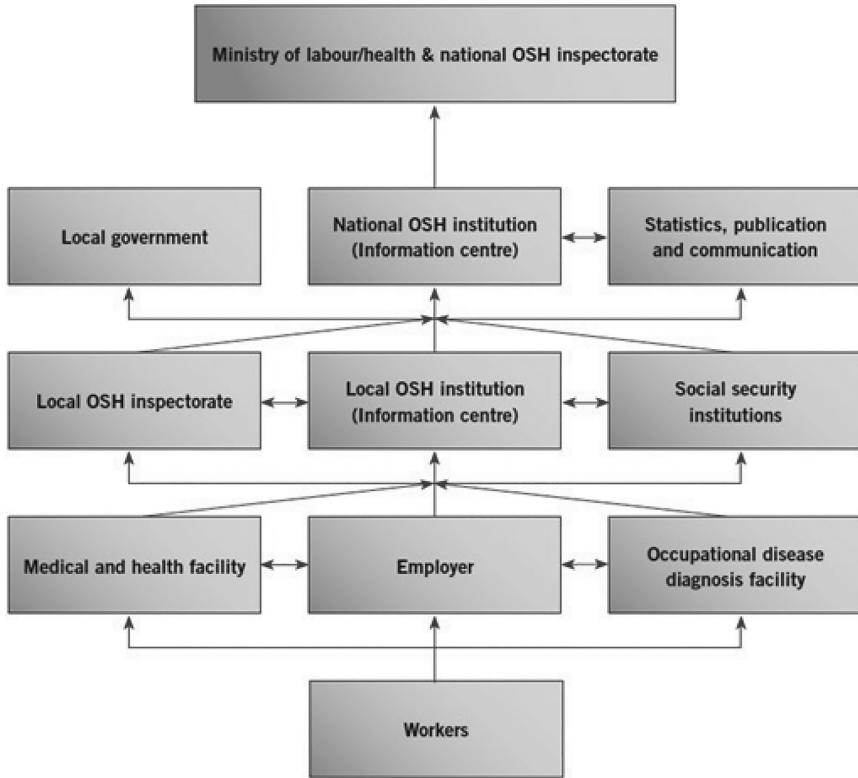


FIGURE 8.2 A model mechanism for recording and notification of occupational diseases. (Courtesy of ILO, 2013. With permission.)

8.5 WHAT IS WORK AND WORK RELATED?

One of the main problems in attaining consistency in measures of risk when comparing different work processes is the determination of when the individual is “working,” and if they were exposed to the hazard during work. Perhaps the simplest observation is a worker painting an object on an assembly line. They are clearly at work in the factory at the post. And they can be seen applying the paint, so they are being exposed to the vapors to some extent. And they are also exposed to some musculoskeletal risk since they are standing/or sitting and moving their arms to dip the brush and paint the object. All that remains is a measure of duration on the job doing these tasks and perhaps a concentration of the paint vapors they are exposed to for an assessment of the risk from the chemicals.

The abovementioned example paints a simple picture of a workplace and exposures. But many workplaces are not so well defined. A huge portion of work globally today is in the informal sector, meaning it is not in a traditional enterprise setting. Not only are these types of small businesses less likely to identify injuries as work related, but they are also less likely to record and report them. Some examples might

be a childcare center being run at someone's home. If a child bites one of the assistants, and the bite gets infected, would this be likely to be reported? Or if a person is working at home as a call center support staff answering the phone or making telemarketing calls all day, would they be likely to report wrist or neck pain from typing and holding the phone all day? And if they got up to take a restroom break and tripped on the way there and broke their arm, would it be work related, as it might be in a factory?

A direct way to determine work relatedness is to ask whether the person was doing work when they were exposed, and did the exposure have a direct impact on the initiation or progression of the injury or disease? If the answer is "yes" to both questions, then it would be considered work related and should be recorded as such. In general, when a worker is on company property, they are considered to be working. So an employee who slips and breaks their wrist in the parking lot on the way into the office would usually be counted as work related.

In most cases, injuries that occur while commuting on public roads, or other transportation, to and from work are not considered work related. However, injuries that occur as part of a job and traveling would be considered work related. These might include traffic accidents with truck drivers, physical assaults of taxicab drivers, or a bicycle courier who has an accident while delivering a package. Different countries are likely to have different definitions of when work begins which are important to consider. The definitions of "work" and "workplace" become even more vague when activities in the informal sector are included (Nelson, 2005).

8.6 FATALITY REPORTING

The simplest and most accurate workplace statistic is the number of fatalities from accidents. This is of course because it is the easiest to quantify and document in the case of workplace accidents that happen in a discrete time period. There are fewer gray lines, as a fatality is easy to measure and document. Deaths of workers, even in informal settings, are typically recorded at the hospital. And if not in a hospital, even in EDCs, a medical practitioner, or coroner, is commonly responsible for acknowledging a death and determining and recording a cause.

Deaths are much more difficult to identify however, when workplace exposures cause diseases with long latency periods. Many workplace exposures that cause disease, and eventually death, are never identified as workplace related. As a result, many workplace exposures and hazards are greatly underestimated (Hämäläinen, 2006; Takala, 2014). One example would be worker exposures to bloodborne pathogens in health care. A worker may be exposed to hepatitis B or hepatitis C and not become ill or symptomatic, even die from the disease, until many years after exposure, when they may no longer work in health care. In addition, the individual may have been exposed through other, non-workplace pathways, potentially resulting in a misdiagnosis that the condition is not work related. As a result, many healthcare workers who die of liver cancer many years after a workplace exposure to hepatitis B are not identified as work related, burying the true significance of these workplace exposures. Another example includes exposure to workplace chemicals that are carcinogenic with long latency periods. It can be difficult to trace a workers' cancer death

to a workplace exposure, when exposures were not measured or recorded while the work was being performed, especially when the work was performed many years earlier (IARC, 2017).

In recent years, the use of Disability Adjusted Years of Life (DALYs) has expanded to allow comparison between injuries/illness and exposure, in limited terms. By weighting the estimated number of years living with a disability, a relative severity can be estimated. The DALY represents the gap between a normal standard life expectancy in perfect health and the morbidity caused by exposures in the workplace (Driscoll, 2005; Nelson, 2005; Ezzati, 2004). DALYs represent the present value of the future years of healthy life lost due to injury or illness, plus the future years of life lost due to premature death (Murray, 1994, 1997).

In one systematic evaluation of the global burden of disease for the years 1990–2016, risk factors were identified for a variety of workplace exposures and risk factors. CRA was used to quantify and compare risks of a variety of exposures to carcinogens, infectious agents, and physical hazards, and relate these exposures to DALYs for a broad range of injury, illness, and fatality outcomes (Gakidou, 2017). Using epidemiological models, population attributable risks can be identified for a specific type of disease and exposure scenario for a given country. Global burdens of disease, including those attributable to occupational exposures, can then be determined and reported (Bikbov, 2014).

8.7 INJURY AND ILLNESS REPORTING

As stated earlier, accurate accident and injury reporting can be a valuable tool for organizations to identify and correct problem areas and processes that are associated with accidents and injuries. Correction of deficiencies can improve profits and worker morale. Nations should have an interest in generating the same sort of data as a means to improve the health of workers, reduce injuries and illnesses that contribute to hindering overall national economic advancement, and become a burden on social and health-care systems. Associations between reporting injuries and illnesses and improved economic outcomes have been routinely demonstrated in many developed nations (UK HSE, 2017). Less current information is available to show benefits in EDCs, but it should be expected that outcomes and benefits would be comparable (ILO, 2012b).

With better national data and recording systems, it becomes possible to identify particular industries or regions with increased injury and illness rates. It would indicate where more advanced exposure assessment or possible exposure reduction controls would be useful. More detailed data could be used to identify particularly hazardous tasks or agents within an industry or region. Injury and illness reporting data may indicate where additional regulations may be needed, or where enforcement of existing regulations may need to be expanded. The data may also support the development and implementation of advanced or special training for particular industries or hazardous agents or activities.

In EDCs, injury and illness data may come from either worker compensation databases or government agencies. Worker compensation systems can be accurate sources of information, as they are tightly bound to the workers' injuries, and time

away from work. These can be useful, accurate, and quantifiable measures over time. Government reporting can also be accurate, when required reporting methods and measures are explicit and enforced regularly and consistently.

Problems with injury and illness reporting stem from a variety of inherent weaknesses in data collection systems. These may include vagueness or difference in reporting timeframe requirements or injury and illness terminology. Variability in the collection of data between worker compensation systems can make it difficult to make broad comparisons of working conditions and injury/illness rates. The population attributable risks approach using multifactorial analysis of data to estimate the number of incident cases attributable to occupational exposures can be useful, but typically the lack of baseline data on the incidence of the disease in the working population or the general population can make it difficult to draw conclusions.

Other weaknesses with existing reporting systems include the lack of accurate and quantifiable worker exposure data to associate with the health outcomes. Relatively accurate data are generally available in some industries, such as exposure to noise and the resulting hearing loss. But an exposure–outcome relation can be much more difficult in other industries where possible exposures can come from other community settings, such as tuberculosis or hepatitis B in health-care workers. Or where the disease latency period is extremely long, such as cancer in radiation workers. In industries or jobs where there are long latencies and community exposures, it is especially difficult to identify the disease as work related, such as in occupational exposure to ultraviolet radiation in construction workers and occurrence of a malignant melanoma.

Many nations' accident and injury reporting schemes use their own recording systems that are not easily comparable to other countries (Takala, 2014). Many worker illness reporting directories do not include respiratory diseases, infectious agents, heart disease, or cancer. Inconsistencies in data collection make accurate comparisons between nations difficult. The inaccuracies in the estimates of injury and illness cause the global burden of occupational disease to be underestimated (Driscoll, 2005).

Reporting systems may be exceptionally deficient in several other areas. Some national injury and illness recording systems exclude large segments of the population. In the United States for example, two million workers in government jobs and the military are summarily excluded from reporting (US OPM, 2018). Also in the United States, most agricultural workers, including migrant workers, are not included in injury and illness federal reporting. In one U.S. study, it was determined that as many as two-thirds of all occupational injuries may go unreported (Leigh, 2004; Boden, 2008). This is similarly true in numerous other countries. In many less developed countries, more than 50% of the working population is in the informal sector and these workers are often excluded from official labor force injury and illness estimates (Giuffrida, 2002). According to a study by Probst (2008) the rate of eligible injuries that were not reported to OSHA was 10.9 injuries per 100 employees. In addition, in companies with poor safety climate up to 81 percent of eligible injuries went unreported. In the United States, businesses with fewer than 11 employees are not required to report worker health statistics. EU member states do

not do much better, and studies have shown that only between 40% and 50% of non-fatal occupational accidents are ever reported (Hämäläinen, 2009). Underreporting leads to gross inaccuracies in actual national and industry morbidity rates.

In the European Union, an accident is defined as a discrete event that takes place during work and leads to physical harm. This includes cases of acute poisoning and willful acts by other persons such as violence, as well as accidents occurring during work but not on the company's premises. EU definitions of accident exclude deliberate self-inflicted injuries, accidents on the way to and from work (commuting accidents). This includes cases of road traffic accidents in the course of work (EU, 2001 DG employment).

There may be numerous reasons for the lack of reporting injuries and illnesses. In a study by Azaroff (2002), a variety of key factors were identified to include the following: workers not reporting due to fear of reprisals by supervisors or peers, workers not wanting to miss work and loss of pay, lack of insurance for medical care, gaps in coverage or time delays in worker compensation, economic incentives for employers not to report and not to make insurance claims, and the inability of both workers and health-care practitioners to relate illnesses to workplace exposures. Workplace causes for illnesses are particularly difficult to identify, and some studies have estimated that for every fatal accident at work, there are approximately ten deaths caused by work-related diseases (Leigh, 2000; Steenland, 2003).

8.8 SELF-EMPLOYED REPORTING

In light of the large numbers of workers who are either self-employed or work in the informal sector, special attention should be paid to the development of education and reporting mechanisms to collect data on injuries, illnesses, and fatalities in this broad and diverse group. National policies and programs should be developed to provide training to this large workforce segment regarding the definitions of occupational illnesses and diseases, and why it is in everyone's interest that they be reported from all workplaces. Resources should be committed to ensuring the self-employed know what to report, when, and to whom. Methods to report should be made as simple as possible to ensure that the maximum number of notifications is made and that there are no negative consequences to the individuals or organization making a report.

The provision of socially provided health services or worker compensation for the injured or ill self-employed could be one incentive for these workers to report workplace injuries or illnesses. Part of this service would presumably include an assessment of worker exposure, even if only performed post-injury. Various interview and case analysis methods could be used to reconstruct exposures and doses. As more information is collected and disseminated, workplace risks can be better identified and presumably better controlled to prevent future worker exposures and resulting injuries.

8.9 ETHICAL ISSUES

Regardless of the details of the structure of the reporting system, there are certain ethical standards of practice associated with the collection of information and the

rights of the workers. Laws or wording may vary from country to country, but the basic rights should include at a minimum:

- The right to confidentiality of personal and medical information
- The right to full explanation of the purposes and results of the surveillance
- The right to refuse invasive medical procedures
- The results of surveillance cannot be used to discriminate against the worker
- The right of the worker or their representative to observe and analyze workplace exposure data related to the worker's assignments (Alli, 2008)

8.10 INTERNATIONAL LABOR ORGANIZATION

The ILO Code of Practice, Recording and Notification of Occupational Accidents and Diseases provides fundamental guidance for the development of reporting programs (ILO, 1995).

Basic ILO Codes of Practice most related to OSH include the following:

- Occupational Cancer Recommendation (No. 147)
- Occupational Safety and Health Convention (No. 155)
- Occupational Health Services Convention (No. 161)
- Recommendation (No. 171)
- Asbestos Convention (No. 162)
- Chemicals Recommendation (No. 177)

The ILO Codes of Practice provide internationally accepted definitions and requirements for reporting, and also provide countries with ready-to-use tools for developing programs and collecting data. The ILO suggests that nations use the ILO definitions within their national legally binding legislation on occupational injury and illness reporting to ensure a maximum level of accuracy and consistency within nations and to provide a broad platform of data for international comparisons. Just as international companies may use injury and illness data to benchmark against competitors, nations could use national data and statistics to evaluate themselves against other nations in terms of worker protections, and economic advancement, as it relates to occupational injuries, illnesses, and fatalities.

As an example of the variation in injury, illness, and fatality statistics between countries, Table 8.1 demonstrates the fatal occupational injury rates per 100,000 workers for the manufacturing section for several different nations.

In just this short excerpt from data published by the ILO for various countries, we can see wide and unexpected variation in the values. In a modern developed country like Switzerland, we might have expected that the fatality rates would be lower than for a less advanced country like Bulgaria, yet the fatality rates in Switzerland are double those of Bulgaria. It is difficult to ascertain how and why the numbers are so different.

Employer-based record-keeping systems should be designed and required at the national level to ensure that injuries, illnesses, and fatalities are reported to a competent authority. The rules and definitions should be explicit to provide as much guidance as possible in order to improve consistency and usefulness of the data at

TABLE 8.1
Injury, Illness, and Fatality Statistics per 100,000
Workers per Year for a Sample of Nations

Nation	Years		
	2013	2014	2015
Australia	1.3	1.5	1.3
Canada	2.5	0.3	0.4
Switzerland	12.3	9.9	6.9
Turkey	7.7	6.2	2.3
United States	2.1	2.3	—

Source: Adapted from ILO, 2018.

the national level. At a minimum, employer-based recording and notification systems should include the following (ILO, 2013):

- Standard forms for recording and notification
- Detailed requirements for what must be reported
- Procedures for making notifications
- Requirements for the validation and verification of recorded and reported cases
- Identification of responsible individuals
- The use of technology in the system
- Training and education regarding recording and notification

The ILO has played a key role in the harmonizing of international definitions and designations of occupational diseases as a means to identify and control them in the workplace since 1925 (Kim, 2013). The ILO lists are added to and updated on a regular basis, when needed. Recent additions to occupational illness designations include expanded definitions of occupational cancer and the addition of musculo-skeletal diseases. Inconsistencies in national reporting definitions of disease remain, however, and make an effective international comparison of global injury and illness rates difficult.

8.11 VARIOUS NATIONAL REPORTING SYSTEMS

Reporting methods vary greatly between countries. In the ILO, occupational injury refers to a death or any personal injury or disease that results from an occupational accident. Occupational accidents are events that arise out of or in the course of work that results in fatality or nonfatal occupational injury. The criteria for nonfatal injuries are those where the employee missed 3 or more days of work (74) (ILO, 1996). This methodology makes a comparison to the U.S. Bureau of Labor Statistics methods used in the United States difficult since they record injuries and illnesses by the number of days lost, and do not consider the sudden nature of the illness *per se*.

In 2013, Great Britain updated and expanded requirements for health and safety reporting. These regulations provided detailed definitions of terms to be used in injury and illness reporting. This document requires any workplace to report injuries that occur to workers who are incapacitated and out of work for three consecutive days (including the day of the accident) within 15 days of the accident. Fatalities that occur within one year of a workplace accident must be reported, including those that result from a biological exposure. An exception to reporting of a fatality is made when the deceased is self-employed. And the regulation includes a list of work-related diseases that might result from physical (e.g., carpal tunnel syndrome) and chemical exposures (e.g., cancer) that are to be reported (UK, 2013). The requirements also apply to certain workplaces and activities that occur outside of Great Britain. The UK reporting document requires that injuries and illnesses in workers working offshore must also be included in reports.

In Finland, accidents to farmers and self-employed workers are not included in country statistics. In the United States, employers with fewer than 11 employees, small farms, and federal government workers are not included in national injury and illness statistics. Also in the United States, state and local government workers in 27 states are not included in national injury and illness reporting (Ruser, 2008). Although fatality rates are usually easier to calculate, in many countries accurate estimates of the population do not exist, so it is difficult to calculate national fatality rates (UN, 2017).

A comprehensive study of reporting in New Zealand demonstrated that OSH reporting was often incomplete, inconsistent, unverifiable, and inaccurate (Brown, 2005). It was determined that additional government oversight and direction for the collection of data was needed in order for substantial improvements for injury illness reporting to be made. Voluntary corporate reporting tended to be insufficient and incomplete, and reduced the usefulness of the data at the national social level.

In France, all employees are covered by compulsory occupational medicine. Occupational physicians are familiar with workers and their risks of exposure to hazards in their workplaces. Occupational physicians have an obligation to report work-related diseases, but only 33% of illnesses are reported (Valenty, 2012). And data that are collected by physicians are not useful for epidemiological purposes due to inconsistencies in data collection.

One author estimated that in Malaysia, only 7% of actual occupational accidents were reported. And in sub-Saharan Africa, where there were an estimated 54,000 fatal accidents per year, 0% of the estimated number was actually reported. In the Middle East, only 0.9% of occupational accidents are reported (Hämäläinen, 2006).

In a 2-year South African study of work-related fatalities, it was found that only 15% of the deaths had been reported (Schierhout, 1997). Reporting in rural areas and on farms was particularly poor.

8.12 CONCLUSIONS/RECOMMENDATIONS

On a global scale, CRA estimates for the global burden of occupational work-related deaths are probably significantly underestimated due to unavailability and inconsistency of data. Additionally, work-related diseases are probably also underestimated,

stemming from problems recognizing or quantifying occupational exposures to causative agents (Driscoll, 2005).

Due to wide variations and discrepancies in the measures and methods to collect and analyze data used by different countries, comparisons are difficult to make. Extrapolation of morbidity between countries is also difficult due to gross differences in such factors as community health, social support structures, healthcare systems, and environmental exposures.

Research on injury and illness reporting is lacking in developing countries. Accurate measures need to be standardized to ensure consistency and the ability to extrapolate study results to other industries, working conditions, and countries. Linking financial and economic benefits to accurate injury, illness, and fatality reporting systems can become a major incentive for any developing countries to track these events and make fundamental improvements to occupational safety and health at the national level. The ILO has identified several detailed areas where reporting should be improved in all nations and developing countries in particular. Data to be collected necessary to raise OSH development policy include the following:

- Credible estimates of the incidence rates of occupational injuries and, if possible, illnesses
- Disaggregated according to major industry and occupational categories
- Plausible estimates of the costs to employers of occupational injuries and illnesses, taking into account relevant absenteeism and presenteeism multipliers
- Credible estimates of the direct costs to households of occupational injuries and illnesses, including medical expenses and lost income
- Plausible estimates of the indirect costs to households, including lost household production
- Lost market work from unpaid caregivers and detrimental effects on education
- Credible estimates of the role of unanticipated occupational morbidity and, if possible
- Mortality shocks in the propagation of poverty and
- Credible estimates of the costs socialized by government programs not funded by contributions tied to injury or illness events (ILO, 2013)

There is a need for additional survey tools globally to collect data on injuries and illnesses that occur in the informal sectors. Methods need to be developed and piloted to identify weaknesses and make necessary improvements. Then, larger studies using these data collection tools can be used to collect data and make reports. As the methods become more standardized, they could be used to make associations with other industries and informal workers in other countries. The creation of an informal sector reporting tool, for even developed nations, could eventually be modified and used in EDCs.

Since such a large number of injuries and illnesses go unreported by employees, special emphasis and training by employers and the government is needed to

encourage workers to report. Young workers in particular often downplay their injuries and tend to blame themselves and thus not report injuries (Tucker, 2014). They need special encouragement and a better understanding of the reasons why reporting is valuable.

With significant problems in data consistency, the emergence of new diseases and occupational risk factors complicates useful data collection even further. As reporting systems are expanded to collect information on new agents such as nanoparticles or human immunodeficiency virus, the databases need to change (Wiatrowski, 2005). Special care must be taken to ensure that the systems not only remain inclusive of original measures for the sake of consistency but also expand to include new diseases for the sake of comprehensiveness and accuracy. Even medical treatments change over time and need to be included in reporting schemes. For example, a new bandage design might require a modification to what is considered first aid. There is also the potential to just “improve” existing systems to be more thorough, such as the inclusion of such characteristics as “race, gender, and ethnicity.”

Accurate reporting of injuries, illnesses, and fatalities is closely linked to the improvement in occupational safety and health at corporate levels (Suan, 2017). Communication of issues and risks helps improve the bottom line and even helps to make workers more aware and responsive to OSH initiatives. The inclusion of OSH reporting in corporate social responsibility reporting schemes would be a valuable tool for employers, employees, and community stakeholders (Brown, 2005). More research and development should be done in this area.

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