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NIOSH Science Blog

Improving Our Understanding of Nonfatal Occupational Injuries

Posted on April 13, 2021 by Audrey Reichard, MPH; and Suzanne Marsh, MPA

Counting and describing nonfatal occupational injuries are vital to understanding and prevention. However, this is very difficult to accomplish on a national level. There are large numbers of injuries that are captured, in part, by different sources, and some are not captured at all. There is no single, comprehensive national source of occupational injury data. Additionally, there are numerous issues with occupational injury surveillance because workers and employers underreport injuries as described in the *American Journal of Public Health* (2002). One example of this is workers being fearful of reporting due to potential stigma or disciplinary action. Workers may also be reluctant to report because they can't afford lost work time. In addition to these worker-based issues, employers may not understand how to correctly record injuries in OSHA logs or they may intentionally obscure injuries for their own benefit, such as lower workers' compensation rates.

Emergency Department (ED)-treated Occupational Injuries

NIOSH recognized more than one surveillance system was needed to develop a comprehensive understanding of occupational injuries. When the opportunity presented in 1982 to capture ED-treated occupational injuries using an already established surveillance system, NIOSH began exploring this cost-effective approach by analyzing and publishing some results from this surveillance system. While this proved promising, budget constraints prohibited continuous investment in this system for multiple years until 1998 when NIOSH began consistently collecting the occupational supplement to the National Electronic Injury Surveillance System (NEISS-Work). Collected through an interagency agreement with the Consumer Product Safety Commission (CPSC), NEISS-Work became one of two national, nonfatal occupational injury datasets, complementing the data captured by the Survey of Occupational Injuries and Illnesses captured by the Bureau of Labor Statistics. NEISS-Work captures ED-treated occupational injuries to paid, self-employed, and volunteer workers through a probability based stratified sample of about 67 U.S. hospitals. These data are weighted to produce national estimates. Work-relatedness can be identified in any part of the ED record (e.g., patient report, workers' comp payer). NEISS-Work includes worker demographic characteristics, nature of injury, incident characteristics, and employment information. Public access to a subset of NEISS-Work variables is available in the Work-RISQS query system.

The interagency agreement between NIOSH and CPSC to collect NEISS-Work is one of CPSC's longest running interagency agreements and a good example of government agencies working together in a cost-effective manner. NEISS-Work analyses have made valuable contributions to understanding and preventing occupational injuries by providing national estimates of ED-treated occupational injuries characterizing affected workers, enumerating types of injuries and events, and describing trends. The data have been analyzed to describe injury events such as falls and motor vehicle incidents. Analyses of nail gun injuries identified the injury risks associated with this common construction tool and led to the creation of an article and a podcast to raise awareness of this hazard. The data have also been used to describe high risk demographic populations such as younger and older workers and for the creation of prevention messages specifically for these audiences. ED-treated injuries have been analyzed for multiple occupations, including emergency responders, correctional officers, and construction workers. NEISS-Work has also contributed to describing the incidence of occupational injury diagnoses such as traumatic brain injuries and burns. The Work-RISQS query system provides links to the abstracts of all NEISS-Work publications.

More Than Just Standard Data Collection

In addition to the value of the routine data, NEISS-Work has the unique ability to support follow-back surveys to further enhance our understanding of occupational injuries. These worker follow-back surveys capture specific details about workers and injuries not always found in traditional surveillance systems. For these surveys, select cases are identified from the routine NEISS-Work data and worker contact information is requested from the respective hospitals. Selected workers receive a letter notifying them of their study eligibility, their rights as a human subject, and information to opt out if they choose. If they do not opt out, the workers are contacted by telephone and asked to participate in the survey. NIOSH has conducted several follow-back surveys that have addressed areas such as exposure to bloodborne pathogens, exposure to workplace violence, injuries to older workers, and injuries to EMS providers. There are currently two follow-back surveys being administered to describe injuries to firefighters and injuries to law enforcement officers.

Recent Advancements

Collecting surveillance data can be time and labor intensive. To alleviate some of these costs, many surveillance systems have implemented the use of artificial intelligence to automate various components of data processing. In 2018, we began exploring the use of machine learning to apply standardized injury event and source codes in NEISS-Work. This evolved into an internal crowdsourcing competition to improve the initial machine learning algorithm. Eventually, an external crowdsourcing competition was conducted that resulted in an algorithm with nearly 90% coding accuracy. Use of this algorithm has reduced the time needed to code a year of data from almost one year to less than six months. This leads to faster finalization of the data. Based on the success of this algorithm, we are currently exploring additional uses of machine learning to code other variables within NEISS-Work.

NEISS-Work data estimates indicate there were approximately 2.5 million ED-treated occupational injuries in 2018. We recognize that this does not represent all occupational injuries. As we celebrate NIOSH's 50th anniversary, we would like to highlight the role that NEISS-Work plays in capturing an important piece of the overall occupational injury count and how the data provide valuable insight into who is being injured and how, which helps advance efforts for preventing non-fatal occupational injuries. Please share in the comments how nonfatal occupational injury data are useful in your workplace. We'd especially like to hear how you have used NEISS-Work data.

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This blog is part of a series for the NIOSH 50th Anniversary. Stay up to date on how we're celebrating NIOSH's 50th Anniversary on our website.

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Categories 50th Anniversary Blog Series, Safety and Health Data, Surveillance

2 comments on "Improving Our Understanding of Nonfatal Occupational Injuries"

I believe that the concept of DALYs (disability-adjusted life years) is very useful in this respect. In the 1990's (when I was still working at WHO), this concept was taking up increasing importance, however, I have not seen much in this respect lately. Have you used it in your studies? Best greetings Berenice Goelzer
Reply

Thank you for your comment. We have not used disability-adjusted life years in recent studies of nonfatal occupational injuries.

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