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Occupational amputations in Illinois 2000–2007: BLS vs. data linkage of trauma registry, hospital discharge, workers compensation databases and OSHA citations

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ABSTRACT

Background: Workplace amputation is a widespread, disabling, costly, and preventable public health problem. Thousands of occupational amputations occur each year, clustering in particular economic sectors, workplaces, and demographic groups such as young workers, Hispanics, and immigrants.
Objectives: To identify and describe work related amputations amongst Illinois residents that occur within Illinois as reported in three legally mandated State databases; to compare these cases with those identified through the BLS-Survey of Occupational Illnesses and Injuries (SOII); and to determine the extent of direct intervention by the Occupational Safety and Health Administration (OSHA) for these injuries in the State.
Methods: We linked cases across three databases in Illinois – trauma registry, hospital discharge, and workers compensation claims. We describe amputation injuries in Illinois between 2000 and 2007, compare them to the BLS-SOII, and determine OSHA investigations of the companies where amputations occurred.
Results: There were 3984 amputations identified, 80% fingertips, in the Illinois databases compared to an estimated 3637, 94% fingertips, from BLS-SOII. Though the overall agreement is close, there were wide fluctuations (over- and under-estimations) in individual years between counts in the linked dataset and federal survey estimates. No OSHA inspections occurred for these injuries.
Conclusions/recommendations: Increased detection of workplace amputations is essential to targeting interventions and to evaluating program effectiveness. There should be mandatory reporting of all amputation injuries by employers and insurance companies within 24 h of the event, and every injury should be investigated by OSHA. Health care providers should recognise amputation as a public health emergency and should be compelled to report. There should be a more comprehensive occupational injury surveillance system in the US that enhances the BLS-SOII through linkage with state databases. Addition of industry, occupation, and work-relatedness fields to the Electronic Health Record, the Uniform Billing form, and national health surveys would allow better capture of occupational cases for prevention and for assigning bills to the right payer source.

Introduction

Workplace amputation is a widespread, disabling, costly, and preventable public health problem. Thousands of occupational amputations occur each year, clustering in particular economic sectors, workplaces, and demographic groups such as young workers, Hispanics, and immigrants.[1–10] Traumatic amputations are particularly catastrophic for these groups – because of their often limited educational attainment and the challenges of language and literacy, manual labour may be their only employment option.[11,12] Amputation injuries affect not only physical functioning and economic viability, but also psychological and social well being.[13,14] Studies estimate the total cost of workplace amputations to be in the billions of dollars annually.[15] But what is perhaps most disturbing and tragic about workplace amputations is that these injuries are preventable if legally mandated protections are in place.[16]

The Bureau of Labor Statistics (BLS) is the primary source of fatal and non-fatal occupational injury and illness surveillance in the US.[11] The BLS Survey of Occupational Illnesses and Injuries (SOII) has been shown to significantly undercount the number of work-related injuries, illnesses, and fatalities.[17–20] Furthermore, although detailed information about the employer of workers suffering an amputation is available in SOII, there is little information on risk factors and no information regarding the severity of injury and outcomes relating to future employment prospects – disability and impairment. An accurate count and information about risk factors and disability are critical to

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targeting and evaluating interventions to prevent occupational amputation injuries.

The Occupational Safety and Health Administration (OSHA), charged with preventing injury and illness in the workplace, developed a National Emphasis Program to prevent amputations. Ongoing since 1997, OSHA area offices are supposed to systematically investigate at-risk workplaces, looking for violations that could lead to amputation injuries. Citations issued as part of the investigations are posted on OSHA's website.[21] Examination of OSHA investigations relating to occupational amputations has not been published.

The goal of this project was to identify and describe work related amputations amongst Illinois residents that occur within Illinois as reported in three legally mandated State databases for the years 2000–2007; to compare these cases with those identified through the BLS-SOII; and to determine the extent of direct intervention by OSHA for these injuries in the State.

Materials and methods

Data sources

The Illinois Trauma Registry (TR) captures the records of patients treated in a level I or II trauma centre for 12 or more hours. The TR does not include patients admitted to a hospital that is not designated as a trauma centre, those who die at the scene of the traumatic injury but are not transported to a trauma centre, or patients that are cared for at a trauma centre for less than 12 h. The variables in the TR that we used for this investigation are: age; birth date; sex; race/ethnicity; injury date and time; county code (Federal Information Processing System code) for home and scene of the event; ICD9 External Injury (E)-codes for mechanism and place of injury; ICD9 Diagnosis (N)-codes for type of amputation injury; discharge criteria; time of admission; and home postal zip code.

Hospital discharge (HD) data are collected by the Illinois Hospital Association. This database provides information from all inpatient hospitalisations within the State. Inpatients have a hospitalisation length of stay of 24 or more hours; anyone that stays in the hospital for less than 24 h is considered an outpatient and is not entered into the database. The variables used in the HD database are: demographic characteristics (birth date, sex); hospital ID number; hospital name; zip-code of residence; ICD9 codes for diagnosis, procedure and external cause of injury (N-codes, P-codes, E-codes); hospital outcomes; payer source; and hospital billing charges.

The Illinois Workers Compensation Claims (WC) database captures reports from injured workers who are not satisfied or anticipate a dispute regarding compensation for medical costs, wage replacement, or permanent partial/total disability; a claim is a request for arbitration through the State of Illinois Workers' Compensation system. These claims are filed and entered into a separate database. In Illinois, there is not a statewide fund that manages all workers compensation claims. "Claims" are to be distinguished from "First Reports of Injury," which are filed immediately after injury for those injuries that result in three days of lost work time according to Illinois statute. There are approximately 60,000 claims filed for arbitration each year, although this number has been declining in recent years. To put this in context, the BLS estimated that a total of 137,900 work related injuries and illnesses occurred in Illinois in 2009, of which 42,700 resulted in days away from work. Data elements included in the Workers Compensation Claims database (WC) are demographic variables (age, sex, marital status, number of dependents); nature of injury; part of body; date of injury; pro-se (advocating for oneself rather than hiring an attorney); date of claim filing; employer name; total medical costs; weekly wages; total weeks of temporary total disability; percent permanent partial disability awarded to the employee; and the monetary compensation disbursed.

A description of these databases, criteria for inclusion of cases, and data elements by category for each of the Illinois databases used in this study are shown in Table 1.

Illinois population

According to the 2010 census, there were 12.9 million people in the State of Illinois, with 71.5% of them white, 14.5% black and 15.8% Hispanic.[22] Some 6.0 million people were employed, with ~200,000 in temporary jobs.[23]

Case definition – work related amputations

The injured workers that were included in the study were employed in both public and private sectors suffering amputations

Table 1
Data elements showing the complementary nature of Illinois workers compensation and health outcomes databases that can be used to describe frequencies, calculate prevalence, and be used for multivariate analyses.

Database	Inclusion criteria	Data elements			
		Demographics	Exposure data	Health data	Economic variables
Trauma registry (ITR)	Persons treated in level 1 or 2 trauma unit for ≥ 12 h (~45,000/yr)	Name SSN Gender Age Race/ethnicity	ICD9 E-codes E849*, showing location where injury occurred Time, day, date of injury	ICD9N & E-codes Body site Severity Hospital procedures Treatment Disability status on discharge Blood alcohol	Cost of hospitalisation Hospital procedures Hospital days
Hospital discharge (HD)	All individuals hospitalised in Illinois	Gender Age Race/ethnicity	ICD-9N and E-codes	ICD9 codes Hospital procedures Hospital cost Discharge status	Cost of hospitalisation Hospital days Payer source
Workers compensation claims (IWCC)	Persons filing workers compensation claims for arbitration through IWCC (~70,000/yr)	Name SSN Gender Age	Employer Name Nature of injury Narrative of injury circumstances	ICD9 codes Hospital procedures Level of disability	Total medical costs Lost wages Cost of compensation Payer source

* ICD9 External Injury Code E 849 has decimal points that give the place injury occurred, e.g., E849.1 is Farm.