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Disparities in Work-Related Injuries Associated With Worker Compensation Coverage Status

Valerie J. Nicholson, MD, MHA, Terry L. Bunn, PhD, and Julia F. Costich, JD, PhD*

Background *This exploratory study addresses patterns of injury in an emerging population of contingent workers who are not covered by either worker's compensation (WC) or health insurance. The primary purpose is to improve the information base regarding the entire population of uninsured, injured workers. Because Latino workers are over-represented in the uninsured group, we include additional characterization of their patterns of injury. Recent studies have found that worker compensation claims and reports address a shrinking proportion of occupational injury and exposure, and about two-thirds of occupational injuries are not captured in the U.S. national surveillance system.*

Methods *Following the NEISS methodology, a work-relatedness indicator was retrieved for emergency department (ED) visits to an academic health center in fiscal year 2005.*

Results *Twenty percent of self-declared work-related injuries were not associated with self-reported WC coverage. Parametric and non-parametric statistical analysis found several significant disparities in workers without WC. These disparities included a higher proportion of Latinos, workers under age 25, and construction workers. In the uninsured group, Latino workers had a higher proportion of moderate and severe injuries. Nearly all (92 percent) workers without WC also lacked health insurance. Injured low-income workers who lack access to both WC and employer-sponsored health insurance comprise an increasing percentage of the occupationally injured. Our exploratory study found this to be particularly true in high-risk populations.*

Conclusions *Work-relatedness indicators collected routinely in ED and outpatient settings should be incorporated into standard reporting systems to facilitate more accurate and comprehensive surveillance and better-targeted interventions.* Am. J. Ind. Med. 51:393–398, 2008. *© 2008 Wiley-Liss, Inc.*

KEY WORDS: worker compensation; uninsured; emergency department

BACKGROUND

Occupational safety and health (OSH) surveillance has traditionally focused on the organized workplace where large numbers of employed workers performed well-defined functions for a common employer over a period of years [Smith, 2001]. Interventions customarily involve on-site training of workers exposed to well-identified risks, engineering modifications to mitigate the danger of potentially risky tasks, and compensation for workers whose injuries require medical care or lost work time. The employer is the accountable party and its behavior is monitored by the state and federal agencies that are empowered by decades of legal precedent, statute, and regulation to penalize inappropriate exposure of workers to hazards. However, in the post-industrial era, the shop-floor model of occupational health and safety has often been a poor fit. The traditional regulatory regime focuses attention on a shrinking proportion of the labor force [Laflamme, 2001]. Manufacturing work is increasingly automated, and it continues to move outside the

Kentucky Injury Prevention and Research Center, College of Public Health, University of Kentucky, Lexington, Kentucky

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*Correspondence to: Julia F. Costich, Director, Kentucky Injury Prevention and Research Center, College of Public Health, University of Kentucky, 333 Waller Ave., Suite 206, Lexington, KY 40504. E-mail: julia.costich@uky.edu

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U.S. Labor market restructuring is a global phenomenon that has led to the loss of 11% of U.S. manufacturing jobs in the period 1998–2002 [Friedman, 2003], including 642,000 in 2002 and approximately twice this number in 2001 [McMenamin et al., 2003]. As US workers lose the opportunity to work in large, well-organized manufacturing enterprises, many migrate to small businesses or self-employment, thereby further weakening the traditional link between the employer and occupational safety [Hamermesh, 1999; NIOSH, 1999; Quinlan, 1999, 2001].

''Alternative work arrangements,'' an employment category that includes independent contractors, on-call workers, workers paid by temporary help firms, and workers whose services are provided through contract firms [Polivka, 1996], often preclude access to workers' compensation, employer-sponsored health or disability insurance, and safety training or personal protective equipment [Stephen et al., 1994; Mirabelli, 2003; DeNavas-Walt et al., 2006; Dong et al., 2007]. Because the employment relationship is generally that of an independent contractor or temporary at-will employee, the employer's legal responsibility for employee safety is minimal or nonexistent. In Kentucky law, the employer's responsibility for worker's compensation is further limited by the exemption of all agricultural employees [Ky. Revised Statutes 342.630(1)] and those who work for building contractors for fewer than 20 consecutive work days, provided that the contractor has no employees subject to worker compensation coverage [Ky. Revised Statutes 342.650(2)].

Given the convergence of these factors, worker compensation claims and reports address a shrinking proportion of occupational injury and exposure [Leigh, 2004]. Rosenman et al. [2006] found that current national surveillance systems failed to capture about two-thirds of occupational injuries in Michigan. Similarly, the Centers for Disease Control and Prevention (CDC)'s analysis of work-related injury in the National Electronic Injury Surveillance System (NEISS) must rely on medical record review to identify cases [CDC, 2006]. The Bureau of Labor Statistics annual reports of work-related injuries, which rely on employer reports, typically find a decrease in injured workers every year [BLS, 2006], while the NEISS analysis shows no such trend [CDC, 2006]. Clearly, such contradiction between reporting systems requires clarification for capture of both insured and uninsured occupational injuries [Stout, 2002].

Emergency departments (EDs) routinely identify work-relatedness in their intake documentation. Narrative data recorded in the patient records can support identification of work-relatedness and characterization of work-related injuries. EDs can therefore bridge the current surveillance systems to capture data on occupational injuries for the self employed, independent contractor.

This exploratory study addresses patterns of injury in an emerging population of workers who do not self-identify as being covered by either Worker's Compensation (WC) or health insurance. Our primary purpose is to improve the information base on the entire population of injured workers, both uninsured and insured. Because Latino workers are over-represented in our uninsured group, we include additional characterization of their patterns of injury. The Latino workforce in the region is predominantly employed in agriculture, residential construction trades, and the hospitality industry, and nearly all these workers are uninsured for both general health care and work-related injuries [NCIOM, 2003].

METHODS

Data on self-reported work-related occupational injury patient encounters (n = 1,023) at an academic health center's ED for the full fiscal year 2005 were reviewed for third-party coverage status, demographic variables, mechanism of injury (e-code), comorbidities, and industry. As in the CDC analysis of NEISS data, we used self-report or work-relatedness as determined by ED staff at patient intake to identify relevant cases [Jackson, 2001; CDC, 2006]. The work-relatedness indicator, while routinely collected, is not part of routine administrative reports, so additional data retrieval and medical record review by a board-certified emergency medicine physician were required to obtain this critical data element.

Descriptive statistics and a nonparametric analysis of factorial data were performed using a stepwise selection of variables. The dependent variables were total charges and injury severity; the independent variables were age, race, ethnicity, e-code, and insured status.

Injury severity was determined by detailed analysis of patient records by one of the authors, a board certified emergency physician. Injury severity was categorized as mild, moderate or severe. A mild injury was defined as involving a single organ system without associated morbidity that required work restriction or work loss. Examples of mild injuries were back strains and simple lacerations involving only skin and subcutaneous tissues. Moderate injuries included isolated one- or two-organ injuries with patients requiring some lost work time for rehabilitation. Severe injuries included patients with multiple organ injuries with significant morbidity or mortality, with extended lost time from work and prolonged rehabilitation.

RESULTS

Descriptive Analysis

Approximately 20% (209/1,023) of patients reporting work-related injuries did not self-report as being covered by WC, according to ED records (Table I). Injured Latino

TABLE I. Demographic Characteristics of Emergency Department Patients With and Without Worker Compensation Coverage, 2005

Characteristic	Insured (n = 814)	Uninsured (n = 209)	*P*-value[a]
(A) Age			$P < 0.05$
0–24 years	161 (20%)	60 (29%)	
25–34 years	263 (32%)	68 (32%)	
35–44 years	186 (23%)	43 (21%)	
45–54 years	140 (17%)	29 (14%)	
Over 54 years	64 (8%)	9 (4%)	
(B) Gender			$P < 0.05$
Male	622 (76%)	175 (84%)	
Female	192 (24%)	34 (16%)	
(C) Race			NS
White	722 (89%)	192 (92%)	
Black	84 (10%)	14 (7%)	
Other	8 (1%)	3 (1%)	
(D) Ethnicity			$P < 0.05$
Latino	75 (9%)	36 (17%)	
Non-Latino	739 (91%)	173 (83%)	

NS, not significant.
[a]Chi-square test.

TABLE II. Admission Characteristics of Emergency Department Patients With and Without Worker Compensation Coverage, July 2005–June 2006

Characteristic	Insured (n = 814)	Uninsured (n = 209)
(A) Admission quarter		
January–March	161 (20%)	43 (21%)
April–June	217 (27%)	70 (33%)
July–September	220 (27%)	59 (28%)
October–December	216 (27%)	37 (18%)
(B) External cause of injury (e-code)		
Accidental falls	87 (11%)	39 (19%)
Accidents caused by cutting and piercing objects or instruments	45 (6%)	24 (11%)
Fire/burn	47 (6%)	5 (2%)
Overexertion	144 (18%)	25 (12%)
Struck by/against	296 (36%)	22 (11%)
Machinery	28 (3%)	6 (3%)
Other	60 (7%)	18 (9%)
Unknown/missing value	107 (13%)	70 (33%)
(C) Primary diagnosis		
Fractures	169 (21%)	13 (6%)
Sprains and strains	84 (10%)	38 (18%)
Open wounds	118 (14%)	21 (10%)
Superficial/contusions	97 (12%)	25 (12%)
Systemwide and late effects	20 (2%)	5 (2%)
Other/unspecified	134 (16%)	16 (8%)
Unknown/missing value	192 (24%)	91 (44%)

workers were more likely to lack WC than non-Latino workers (32% vs. 19%). The large majority (92%) of injured workers without WC also lacked health insurance coverage of any kind.

Employment industry could be determined for 245 of the 814 (30%) insured injury records and for 72 of the 209 (34%) uninsured injury records. For these subsets, injured workers whose records indicated WC coverage were more frequently employed in the agriculture/forestry/fishing (26.5%), health care and social assistance (15.9%), and construction industries (14.7%). Uninsured injured workers were generally employed in the same industries as the insured group but the proportion of construction industry injuries was considerably higher in the uninsured group (54.2% vs. 14.7%).

While there was no significant difference in the average age of the insured and uninsured groups, a larger proportion of the uninsured patients (29% vs. 20%) were under 25 years of age. Compared with insured workers, workers without WC were more likely to seek treatment for injuries from fall (19% vs. 11%), and cutting/piercing (11% vs. 6%), whereas insured workers sought ED treatment more frequently for being struck by or against an object (36% vs. 11%), and overexertion (18% vs. 12%) (Table II). There were fewer ED visits by uninsured patients in the 4th calendar quarter, possibly reflecting unreported or uncounted cases at ED registration intake or a concentration of farm and construction labor in warmer months. The average total ED charge for the uninsured workers was much lower at $1184, compared to $6770 for insured workers. The most common diagnosis was fracture in the insured group and sprains or strains in the uninsured group.

Nonparametric Analysis of Factorial Data

The statistically significant factors included in the final statistical model were insurance status, age, e-code, and ethnicity (Latino vs. non-Latino). When controlling for these variables, total ED charges were significantly lower for the uninsured group compared to the insured group and for younger patients (<25 years) compared to older patients (Table III). Occupational falls incurred the highest costs, followed by machinery-related injuries and being struck by or against an object. Total charges did not change significantly with Latino or non-Latino ethnicity when other factors were held constant.

With regard to injury severity, regardless of insurance status, there was a significant positive association between

TABLE III. Total Emergency Department Charges by Insurance Status

	Total emergency department charges[a]	
Factors	**Insured**	**Uninsured**
Age		
24 years or younger	$856	$545
25–34 years	$808	$627
35–44 years	$1056	$530
45 years or older	$1163	$757
Ethnicity		
Latino	$948	$523
Non-Latino	$1182	$757
External cause of injury		
Cut/pierce	$640	$985
Falls	$1629	$1054
Fire/burn	$793	$326
Machinery	$2401	$688
Overexertion	$639	$370
Struck by/against	$1021	$599
Other	$1218	$920

[a]Median charges.

Latino ethnicity and injury severity; over half (51%) of injuries to Latinos were moderate or severe, compared with 40% of injuries to non-Latino patients ($P = 0.0055$) (Table IV).

DISCUSSION

Our methodology is similar to that of the NEISS analysis in using worker reports of injury, rather than the BLS reliance on employer reports. Rosenman et al. [2006] report that BLS data miss two-thirds of work-related injuries and exposures, a finding that suggests that primary surveillance at patient intake may be a more reliable strategy to quantify occupational injuries requiring medical treatment.

Our finding that the large majority of injured workers without WC coverage also lacked health insurance raises a serious policy issue. Hiring practices that allow employers to avoid paying for both WC and health insurance have the effect of shifting the cost of injured workers' care to taxpayer-funded programs such as Medicaid's disproportionate share hospital funding. Workers who lack third-party coverage of any kind may delay seeking care for conditions that could benefit from prompt intervention, thereby adding to both the economic and human cost involved [Harber, 2003]. Although total charges were strikingly lower in the uninsured group ($1184 vs. $6770), the lower charges do not necessarily reflect lower severity levels, given uninsured patients' tendency to decline recommended procedures because of cost.

Our finding that more uninsured than insured workers (29% vs. 20%) were under 25 years of age is in keeping with studies that have highlighted the barriers young US adults face in accessing both health insurance and health care [Callahan and Cooper, 2004, 2005]. The disproportionate number of mild injuries in the uninsured population may reflect a lack of access to more appropriate treatment sites, as described exhaustively in a 2006 Institute of Medicine report [IOM, 2006]. Likewise, the significantly larger proportion of moderate or severe injuries in the Latino workers is in agreement with previous findings of significant correlation between occupational injury severity and race/ethnicity [Anderson et al., 2000; Moure-Eraso and Friedman-Jimenez, 2001; Pransky et al., 2002; Earle-Richardson, 2003; Murray, 2003; Dong, 2004]. The persistent concentration of immigrants in less desirable, more dangerous occupations throughout history would seem to support a call for higher, rather than lower, safety standards for these workers.

TABLE IV. Variation in Injury Severity by Latino Ethnicity and Insurance Status

Injury severity	**Mild**	**Moderate**	**Severe**	***P*-value[a]**
Latino (n = 107)	52 (49%)	47 (44%)	8 (7%)	$P = 0.0055$
Non-Latino (n = 883)	528 (60%)	255 (29%)	100 (11%)	
Insured (n = 789)	437 (55%)	250 (32%)	102 (13%)	$P < 0.0001$
Uninsured (n = 204)	145 (71%)	53 (26%)	6 (3%)	

[a]Chi-square test.

LIMITATIONS

Some relevant data, particularly for uninsured non-English-speaking patients, may not have been captured in the medical record or administrative data. In addition, reliance on self-reported coverage status may have introduced bias into the study data, although the direction of the possible bias is unclear. Immigrant workers may not have understood their right to WC coverage; other studies have found substantial under-reporting even by covered workers [Shannon and Lowe, 2002]. The circumstances we describe fall into a category identified by Azaroff et al. [2002] as "filters to charging medical care to Workers' Compensation." In addition to incomplete information, they find that under-reporting in such cases may be attributable to fear of retribution by the employer, alternative compensation arrangements agreed in advance by employer and worker, or the perception that a WC claim would represent an inordinate investment of time and energy.

Another limitation of this study arises from the difficulty of achieving verification of the accuracy of self reported WC

status. We did not attempt to confirm WC coverage status for specific injury claims because doing so would require matching patient data with worker claims or payments. This strategy is not compatible with timely analysis because workers have 2 years after the injury to file claims, and disputed claims can take years longer to adjudicate (Ky. Revised Statutes 342.185).

CONCLUSIONS

Reliance on WC data alone understates the aggregate incidence of occupational injury, and our exploratory study found this to be particularly true in high-risk populations. Work-relatedness indicators collected routinely in ED and outpatient settings should be incorporated into standard reporting systems to facilitate more accurate and comprehensive surveillance and better-targeted injury prevention interventions. Incorporation of coverage status into the NEISS analysis, while complicated by the issue of timely WC data, would allow for a more definitive assessment of the variation in work-related injury by coverage status.

Further research into occupational injury in uninsured workers is urgently needed. There are serious policy implications when substantial work-related injury costs must be borne by hospitals or government-funded programs. Growth in the volume of uncompensated care for injuries that have historically been part of the WC regime could indicate a need for reexamination of the structure of worker insurance coverage, standards for employer insurance accountability, and the implication of labor market restructuring for employee safety.

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