CPWR TECHNICAL REPORT

Construction Injury Surveillance In Illinois

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Key Findings

- There were 4,058 First Reports of Injury filed in 2005, and 19,734 Claims filed between 2000 and 2005 with the Illinois Workers Compensation Commission for construction injuries. “Claims filed” only pertains to compensation not settled between the worker and employer, which is sent to arbitration for a decision.

- The majority of injuries were for males between 25 and 54 years of age; sprains/strains, open wounds and fractures were the most common injuries, and overexertion, falls and struck by the most common causes.

- The cumulative cost of claims for construction injuries from 2000-2005 was $580,405,416. The mean cost of a claim was $35,834; the median level of financial compensation of decided claims (N=15,898), which excluded claims in progress and dismissed claims, was $16,705.

- Workers filing a claim with attorney representation received $1,210 higher compensation than those representing themselves when controlling for other covariates. This finding contrasts significantly with previous models published in the literature.

- The system for submitting First Reports in Illinois must be changed to make this a useful source for occupational injury and illness surveillance.

- To be useful for occupational surveillance, Claims data would need to require NAICS/SIC codes.

- Extensive paper Claims files are kept and could be useful for more detailed research than is possible using the database alone.

- Legal fees don’t drive the high costs of paying workers’ compensation claims. It’s the severity of the injury and the assessed level of impairment that have the most effect on the payout to the worker.

$ E V W U D F W

Construction is one of the most hazardous economic sectors in the U.S. Although the federal government collects data on occupational injuries, there is growing evidence that the Bureau of Labor Statistics substantially underreports injuries and illnesses. There is a need for alternative data sources to help provide a better picture of the pre-event and event factors, as well as the magnitude and trend of injuries in the construction industry. We conducted a study of workers compensation data to determine the magnitude and nature of injuries among construction workers in the State of Illinois. The specific aims were to: 1) establish a dataset of construction injuries that were reported to the Illinois Workers Compensation Commission in 2005 via First Reports of Injury; 2) establish a dataset of construction injuries between 2000-2005 from the IWCC "Claims" database; 3) assess the quality of IWCC datasets; 4) increase knowledge about occupational construction injuries in Illinois. For 2005, we found 4058 First Reports; approximately 40% were submitted on paper. We found that many did not need to be filed and there was much missing data. The majority of First Reports were for males between 25 and 54 years of age, with sprains/strains, open wounds and fractures the most common injuries. There were 19,734 Claims between 2000 and 2005. The cumulative cost of Claims was $580,405,416. The cost of compensation for construction injuries represented approximately 4.5% of the total payments for workers compensation Claims, whereas construction injuries represented 5.0% of all Claims during the same period. The mean cost of a construction Claim was $35,834. In a robust regression model, we found that Claims involving legal counsel retained by the worker cost approximately $1200 in increased payment to the worker; this is in contrast to other studies that used lost time as a proxy of severity. The system for submitting First Reports needs to be changed in Illinois in order to make it a good source of occupational injury surveillance. Claims data should have SIC (NAICS) codes entered for each case. Construction claims made up 5% of total claims, but only 4.5% of the total workers compensation payments. More complex regression models for research using workers compensation data are necessary in order to fully exploit the value of workers compensation data for surveillance.

death?, 16) on employer's premises?, 17) what employee was doing, 18) how did it occur,19) what was the injury or illness, 20) what body part, 21) what object or substance harmed employee, 22) treating health care professional, 23) employee treated in ER, 24) employee hospitalized overnight.

The Illinois Workers Compensation Commission (IWCC) receives approximately 100,000 First Reports of Injury (Illinois Form 45) each year. An employer is obligated to report an injury if it resulted in three or more lost workdays. Forty five percent of the forms are transmitted electronically, and the remainder are mailed in as single pieces of paper. The paper forms are copied for use in administrative matters only in contested cases, and then filed in boxes; the paper-report data is not extracted and is, therefore, not readily available for surveillance. The Co-PIs (Forst and Friedman) and UIC have recently signed an agreement with the Illinois Workers Compensation Commission to receive all of the First Reports of Injury (Form 45) from the year 2000-2011. Currently, UIC has received and stored all the First Reports of Injury

The principal findings from the analysis of the Claims data is as follows: The cumulative cost of Claims between 2000 and 2005 for injured construction workers in Illinois was $580,405,416. The cost of compensation for construction injuries represented approximately 4.5% of the total payments for workers compensation Claims made in Illinois between 2000 and 2005, whereas construction injuries represented 5.0% of all Claims during the same period. In this study, the mean cost of a construction Claim was $35,834 compared to a mean cost of $10,084 for construction injuries in Oregon (Horowitz, 2004).

In the literature there have been studies showing that use of attorneys by injured workers is associated with higher compensation costs (Bernacki, 2007; Bernacki, 2008). These studies have explained the higher costs associated with attorneys in that they delay the process and incur higher processing fees. These arguments focus solely on the legal counsel retained by the worker, however, nearly all the employers and insurers use attorneys. These studies controlled for lost time as a proxy of severity. In addition, these studies used logistic models so that they were unable to directly quantify the cost of using attorneys by an injured worker. In our analysis, before we added percent disability into the multivariable model during the stepwise model selection process, Claims involving legal counsel retained by the worker

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For the analysis of the First Reports of injury, we identified construction worker injuries in the year 2005 through two methods, (1) for the First Reports filed by paper we hired several graduate students to go through every paper First Report of Injury to look for company names and/or SIC codes that indicated a construction company, (2) for the First Reports filed electronically we filtered the data by industrial classification coded “construction”. The number of paper based First Reports identified manually was 1,339 and the number identified electronically was 2,719.

There were major differences between the reports of injuries filed electronically and by paper. It is unclear if the observed differences result from differences in missing information or whether the differences reflect distinguishing characteristics of companies filing by paper vs. those filing electronically. Companies filing by paper were more likely to omit information as seen in the table below. An important finding is that the mean interval from the time an employer is notified until the time the First Report of Injury was filed was extensive (37 days for paper filings and 55 for electronic filings). The large proportion of injuries occurred during standard business hours of 600am and 600pm. In addition the largest proportion of construction workers injured were between the ages of 25 and 54 years.

The distribution of injuries by body part were nearly identical for paper and electronic filings of First Reports of injury. However, there were more injuries coded as internal in the electronic filings. In both datasets, injuries to the upper and lower extremities predominated. The electronic filings showed a greater proportion of concussions, contusions, sprains and strains than reported in the paper filings, but the paper filings also had substantially more unspecified types of injuries. The three most common types of injuries reported both electronically and by paper were sprains/strains, open wounds and fractures. The most frequent causes of accidents were overexertion/movement related, falls and slips and being struck by an object.

The First Reports of injury, on the other hand, suffer from several major limitations. First, most employers filed First Reports of injury incorrectly. Although, the law stipulates that only injuries resulting in 3 or more days away from work are to be reported, the majority of First Reports of injury involve minor injuries that do not result in any lost work. Second, there is no uniform reporting form or tool. Employers have the option to report online or by paper form. Those that use the paper form submit a variety of different forms from insurance agencies and older First Reports of injury forms. Third, it is very likely that the First Reports of injury are not filed for every injury resulting in three or more lost work days. There is no clear data to help us determine the level of underreporting. Although First Reports of injury do include narratives on the cause of injury, in most cases the employer does not provide enough detail or simply omits the information. We have provided guidelines to IWCC as to how to improve the First Reports of injury data system.

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Head and Neck	226 (8.31%)	139 (10.38%)
Back and Spine	477 (17.54%)	201 (15.01%)
Upper Extremities	871 (32.03%)	408 (30.47%)
Torso	105 (3.86%)	100 (7.47%)
Lower Extremities	656 (24.13%)	262 (19.57%)
Internal	104 (3.82%)	2 (0.15%)
Multiple Extremeties		
Unspecified	202 (7.43%)	120 (8.96%)
Unclassified	78 (2.87%)	107 (7.99%)
1DWXUH RI ,QMXU\		
Amputation	20 (0.74%)	9 (0.67%)
Burn	34 (1.25%)	20 (1.49%)
Concussion/ Contusion	253 (9.30%)	0 (0.00%)
Crush	20 (0.74%)	25 (1.87%)
Disclocation	23 (0.85%)	14 (1.05%)
fracture	304 (11.18%)	126 (9.41%)
Internal	101 (3.71%)	35 (2.61%)
Nerve Damage	32 (1.18%)	7 (0.52%)
Open wound	312 (11.47%)	212 (15.83%)
Sprain / Strain	1020 (37.51%)	359 (26.81%)
Superficial	56 (2.06%)	69 (5.15%)
Unspecified/Other	498 (18.32%)	463 (34.58%)
&DXVH RI ,QMXU\		
Absorbtion/ingestion/inhalation	19 (0.70%)	na
Animal or Insect	29 (1.07%)	na
Chemical	17 (0.63%)	na
Collisions/ struck by object	91 (3.35%)	na
Electrocution	12 (0.44%)	na
Falls/ slips	452 (16.62%)	na
Fire/Flames/Heat	42 (1.54%)	na
Homicide / Assault	62 (2.28%)	na
Machinery	133 (4.89%)	na
Overexertion/Movement		
Related	1024 (37.66%)	na
Road Accidents/ vehicle related	76 (2.80%)	na
Struck by Object	241 (8.86%)	na
Sharp Objects/ Cuts	56 (2.06%)	na
Other	465 (17.10%)	na

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The construction industry has continuously been one of the most hazardous industries in the U.S. Each year several hundred thousand construction workers become ill or are injured as a result of on-the-job hazards (BLS, 2007). The estimated rates for injuries, illnesses and fatalities among construction workers are consistently among the highest of any economic sector (BLS, 2007). In 2007, the most recent year of reported national data, the estimated incidence rate for recordable injuries and illnesses among construction workers was the second highest, only slightly lower than the manufacturing industry (BLS, 2007).

As a result of the large number of injuries and illnesses, the cost of construction injuries and illnesses is immense. Several studies have estimated the annual comprehensive cost due to injuries and illnesses among construction workers in the U.S. to be as high as $12.7 billion dollars (Waehrer, 2007a; Waehrer, 2007b; Leigh, 2004). The comprehensive cost for non-fatal injuries in the construction industry is estimated to be nearly twice as high as all other industries (Waehrer, 2007a). These are comprehensive cost estimates, which provide macro-level estimates of the total cost of injuries and illnesses.

Workers compensation data, in contrast, provide detailed direct costs paid for Claims that are not based on estimates. Workers compensation data has the potential to be used to identify factors associated with increasing or reducing compensation costs. Workers compensation was first introduced in the U.S. in the State of Maryland in 1902. By the year 2000, the national average of covered employees under workers compensation was 87.5% (NASI, 2002). Workers' compensation is a no-fault system except in extreme cases of employer negligence. The workers' compensation system was designed primarily to protect employers from excessive damage awards and to provide a more reliable system of compensation for injured workers. Most employers are required by law to purchase workers' compensation policies. During the 1980s, workers' compensation costs incurred by employers rose dramatically, but later decreased during the 1990s. In 1984, workers' compensation costs comprised 1.66% of total payroll costs, but had risen to 2.16% by 1991. By 1998, the program costs dropped to 1.35% of total employee payroll costs (Burton, 2001). The cost of maintaining workers compensation systems has fueled numerous studies evaluating compensation costs (Horwitz, 2004; Bernacki, 2007; Bernacki, 2008; Shah, 2003; Lipscomb, 2003; Foley, 2007; Hoffmann, 2006; Horwitz, 2005).

Workers compensation data are useful for occupational surveillance because most workers compensation datasets provide information about the employee, employer, level of impairment following an injury or illness, and the direct costs associated with an injury/illness. Studies evaluating workers compensation data have reported that industry (Waehrer, 2007a; Leigh, 2004), occupation (Horwitz, 2004; Waehrer, 2007a; Shah, 2003; Lipscomb, 2003), legal counsel (Bernacki, 2007; Bernacki, 2008), union membership (Lipscomb, 2003), and health care costs (Appel, 1993) are associated with claim costs. However, none have used regression models to directly quantify the predictors of cost. The majority of past studies have relied solely on descriptive analyses and stratification. A few studies have used logistic regression models. None of these methods provides direct estimates of costs associated with predictors while simultaneously controlling for confounding.

In this study, we describe the characteristics of injured construction workers filing Claims with the Illinois Worker Compensation Commission (IWCC) between 2000 and 2005. We also identify factors associated with compensation costs using a robust regression model.

search utility (US Postal Service, 2009) to identify the city for the unmatched ZIP codes for place of accident. We matched the identified city where the accident occurred with a second population density file using cities. At the end of the matching procedure, 306 (1.6%) Claims remained unmatched, of which the majority were outside Illinois.

To calculate rates, we used data regarding employment in the construction sector from the Current Employment Statistics (CES) survey (USBLS, 2009b). The CES surveys approximately 150,000 private and public sector employers per month, however it does not include farm payrolls. The survey focuses on estimating the number of employed, hours worked and earnings. The data is abstracted from employer payroll records. The CES survey counts full time, part time, temporary, and intermittent employees, in addition, the survey counts employees on sick leave, vacation or on strike / work slow down. Final rates did not include workers who reported their place of residence to be outside Illinois.

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We used SAS software for all statistical analyses (v.9.1; Cary, NC). The rate of Claims per 100 construction employees was calculated and the 95% confidence intervals were estimated using Fisher's exact method. For all statistical test, a two-sided p-value less than 0.05 was considered statistically significant.

For the regression analysis, the dependent variable (compensation cost) was heavily skewed to the right in a fashion similar to income (skewness = 52.7). In scenarios with extreme or many outliers causing the data to be skewed, ordinary least squares (OLS) regression will produce biased parameter estimates. This is because in OLS the parameter estimates will be weighted towards the outliers, which also inflates the variance. However, we did not transform the dependent variable because back transformation of log transformed data leads to biased

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The cumulative cost of Claims between 2000 and 2005 for injured construction workers in Illinois was $580,405,416. The cost of compensation for construction injuries represented approximately 4.5% of the total payments for workers compensation Claims made in Illinois between 2000 and

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Our method for identifying construction cases may have missed companies that were not on the

injuries are not reported to an employer or are settled between the employer and employee external of the workers compensation system.

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We found no other published study that quantifies the cost of compensation using a regression model that is appropriate for skewed data. The model used in this study clearly indicates that percent disability is the most important determinant of cost, though the method and uniformity of percent impairment allocation could be better elucidated. Retention of legal counsel by the worker is associated with a modest increase in cost when controlling for important covariates. There is a need to integrate analytical methods that are suitable for skewed data when analyzing claim costs. Both robust regression and nonparametric tests should be further used in this field. The field of econometrics has developed a wide array of analytical tools that address heavy right tailed data similar to claim costs. Further research is needed that evaluates the determinants of compensation costs for other industries, in order to etricsa3(intthis hp)5(e)5(t)2(her thepredri)7(tors widantifie)5de in

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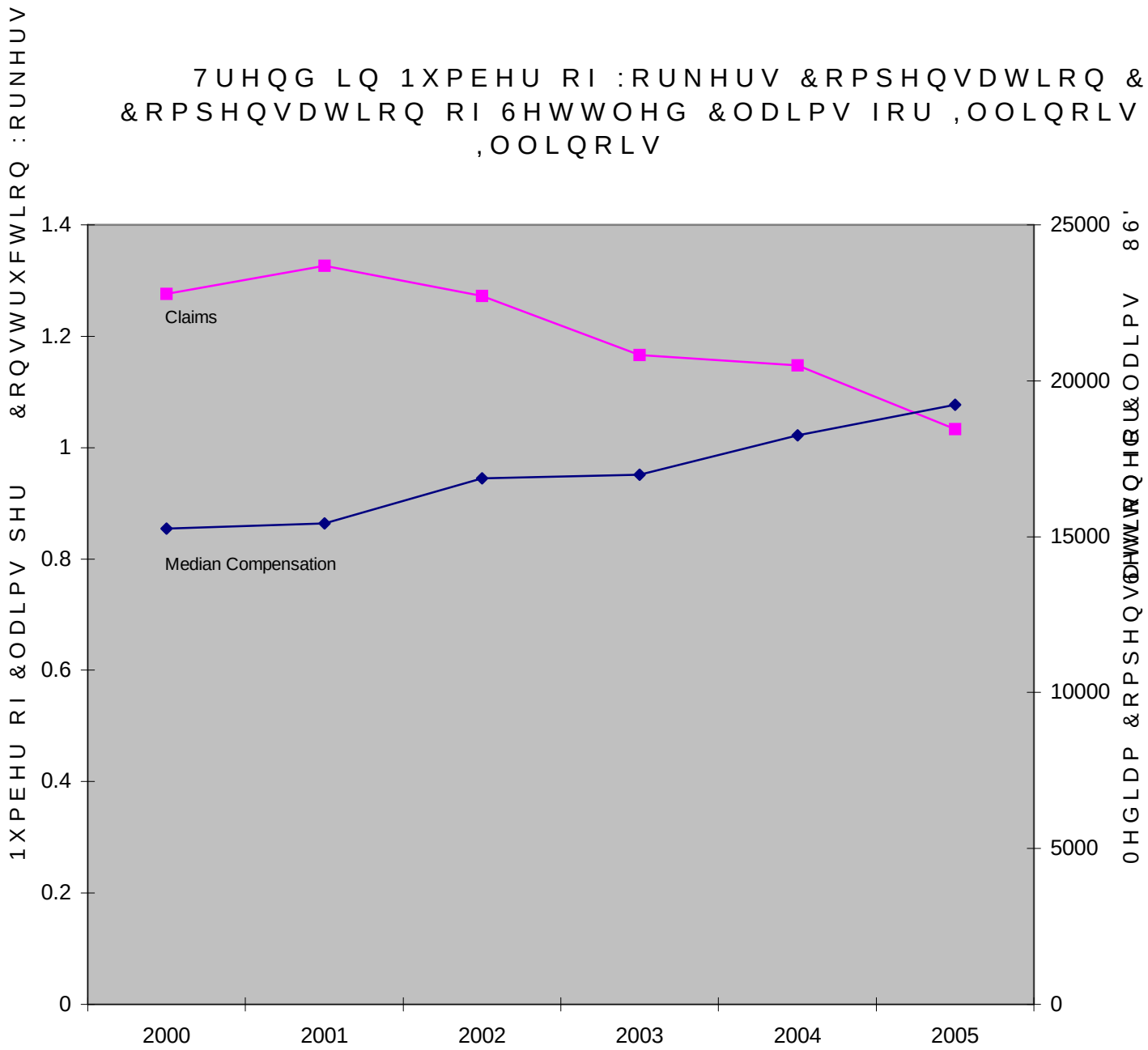
7UHQG LQ 1XPEHU RI :RUNHUV &RPSHQVDWLRQ &ODLPV DQG 0HGLDQ &RPSHQVDWLRQ RI 6HWWOHG &ODLPV IRU ,OOLQRLV &RQVWUXFWLRQ :R ,OOLQRLV
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9DULDEOH	3DUDPHWHU (VWLPDWH	&RQILGHQFH ,QWHUYDO	3 YDOXH
Marital Status: Married	332	96, 569	0.006
Age at Accident	52	40, 63	<0.001
Weekly wage	10	9, 10	<0.001
Fatality	63329	61610, 65049	<0.001
Attorney Representation	1210	949, 1470	<0.001
Number of Body Parts Injured	800	428, 1172	<0.001
Cumulative Temporary Disability	2462	2451, 2473	<0.001
Cumulative Permanent Disabiltiy	883	876, 890	<0.001

[a]Global Robust M-Estimation Regression Model: R2=41.9%; age, wage, body parts, and percent disability are continuous variables; Marital status, fatality, attorney representation are dichotomous variables. Regression model does not include Claims in progress or dismissed Claims.