

# Traumatic Injury Hospitalizations Among Louisiana Workers, 2006-2014: Results of a Severity Threshold Analysis

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Work-related injuries are costly to employers, employees, and society. As many injured workers are employed in physically demanding occupations such as construction, a severe injury can negatively impact and, at times, completely impair an injured worker's future ability to work. In addition to these high human costs, economists estimate that the United States' economy loses \$192 billion annually as a result of injuries in the work place, including direct payments for medical workers' compensation (WC) and other insurance costs as well as indirect costs, such as lost wages and productivity.

State-level surveillance can improve workplace safety and worker health via the identification of high-risk industries and occupations and the development of educational and prevention programs and policies. Louisiana is one of 25 states that annually calculates a set of occupational health indicators (OHIs) developed by the National Institute for Occupational Safety and Health and Council of State and Territorial Epidemiologists' (CSTE) Occupational Health Surveillance Work Group.

Similar to other states, Louisiana has observed an ongoing decline in the rate of work-related hospitalizations. However, recent analysis reveals that the hospitalization rate for work-related severe traumatic injuries has, in many cases, remained unchanged. This finding has important implications for worker safety and the prevention of severe injuries, such as spinal cord and intracranial injuries that can result in death or lifelong disability and pain.

There are several potential reasons for the observed decrease in work-related hospitalizations including the treatment of injuries on an outpatient basis that several years ago would have been admitted to the hospital for treatment, constriction of WC coverage due to introduction of laws or regulations that reduce benefits or make it more difficult for those with certain injuries to qualify for benefits, and the increased use of contingent workers who may not receive WC coverage. Together these changes may result in a downward trend in observed hospitalizations, particularly since WC as payer is typically used to identify occupational injuries in hospital discharge data. However, observed decreases in hospitalization rates may not necessarily correlate with a decreased incidence of worker injuries.

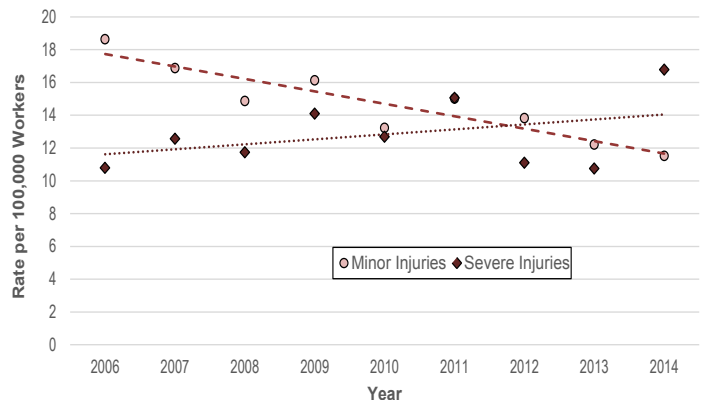
This data review examines characteristics of work-related severe traumatic injury hospitalizations in Louisiana from 2006 to 2014 using injury severity restriction guidelines to reduce the bias encountered from changing healthcare delivery and WC coverage/reporting patterns. Hospitalization records were obtained from the Louisiana Hospital Inpatient Discharge Database (LAHIDD). Work-relatedness was determined by expected primary payer of the hospital bill being WC, and injury cases were selected if the primary diagnosis was an injury. Injuries were categorized as minor/indeterminate or severe based on the severe injury list included in CSTE's OHI guidance document. This list includes injury diagnostic codes in the range of 800.0 - 959.9 that have been estimated to have an Abbreviated Injury Scale (AIS)

severity of three or above or that have a high probability of hospital admission, excluding the following diagnostic codes: 905.x - 909.x (late effects of injury), 910.x - 924.x (superficial injuries), 930.x - 939.x (foreign bodies), 940.x - 949.x (burns, which are not well-characterized by AIS-based severity measures), and 958.x (traumatic complications).

Hispanic ethnicity is not captured in LAHIDD. As a proxy measure, Hispanic ethnicity was coded by matching last names with a U.S. Census Spanish surname list, which contains surnames most commonly associated with self-reported Hispanic ethnicity from census data. While this method may select some cases with Spanish ancestry dating back centuries, it more importantly assists in identifying Louisiana's growing Hispanic population. Rates were calculated using Louisiana employment counts by year, age, sex, race, and Hispanic ethnicity.

For the years from 2006 to 2014, there were a total of 4,531 work-related injury hospitalizations; 1,937 of these (an average of 215 per year) were considered severe. Figure 1 displays age-adjusted\* rates and linear trend lines for work-related minor/indeterminate and severe injury hospitalizations.

Figure 1: Age-Adjusted Rates for Work-Related Hospitalizations Louisiana, 2006-2014



\* Adjusted to the U.S. 2000 Census

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Negative binomial regression was used to compare trend lines by adding an interaction term to the model representing the ratio of the trend in severe injuries to the trend in minor/indeterminate injuries. Over the nine-year period, there was a statistically significant mean annual decrease of 5.1% in minor/indeterminate work-related injury hospitalizations, while there was a 2.4% mean annual increase (nonsignificant, i.e., statistically flat trend) in severe work-related injury hospitalizations. The trend line for severe injuries significantly increased relative to that for minor/indeterminate injuries (trend ratio=1.078, 95% CI: 1.039-1.120), which supports tracking severe injuries separately from all hospitalizations in order to avoid obscuring these important trend differentials.

The table compares the age-adjusted rates of work-related severe traumatic injury hospitalizations by race, ethnicity, sex, and age.

Table: Distribution and Rate of Severe Work-Related Injury Hospitalizations by Race, Sex, and Age - Louisiana, 2006-2014 (N=1,937)

	Number	Percentage	Rate/100,000 Workers	RR (95% CI)*
<b>Race**</b>				
White	1,300	67.1	10.50	reference
Black	365	18.8	7.90	0.75 (0.53, 1.06)
<b>Ethnicity</b>				
Non-Hispanic	1,768	91.3	10.58	reference
Hispanic	169	8.7	25.00	2.36 (1.48, 3.78)
<b>Sex</b>				
Male	1,623	83.8	17.60	reference
Female	314	16.2	3.80	0.22 (0.15, 0.31)
<b>Age (years)</b>				
16-24	214	11.0	9.26	reference
25-34	349	18.0	9.10	0.98 (0.59, 1.63)
35-44	311	16.1	8.00	0.86 (0.51, 1.45)
45-54	465	24.0	11.71	1.27 (0.78, 2.05)
55-64	382	19.7	15.08	1.63 (0.99, 2.69)
65+	216	11.2	26.63	2.88 (1.63, 5.07)

\*RR=Rate Ratio, CI= Confidence Interval; \*\*Missing/Other Races n=272

Some studies have reported higher rates among Hispanic and black workers as these workers are often more likely than their white counterparts to be employed in risky industries and occupations. Our analysis found that black workers have lower rates than white workers, although the difference was not statistically significant. Rates for Hispanics were significantly greater than for non-Hispanics (25.0/100,000 vs. 10.6/100,000, respectively). This finding likely reflects the growing Hispanic population in Louisiana. Hispanic employment counts have more than doubled over the nine-year study period from 49,941 to 113,685.

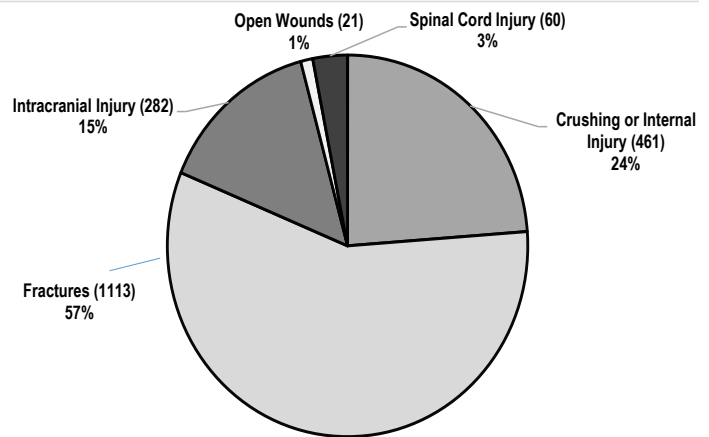
The rate of severe injury among females (3.8 per 100,000 workers) was significantly lower than the rate for males (17.6 per 100,000 workers). Female workers were 78% less likely to experience a severe work-related injury than male workers (RR=0.22, 95% CI: 0.15-0.31).

Overall, rates increase with increasing age. However, aside from those aged 65 and older, the rates of severe injury among workers of other age groups (25- 34, 35- 44, 45-54, and 55-64 years of age) were not significantly different when compared to the youngest workers in the state (16-24 year-olds). Workers 65

years or older were nearly twice as likely to experience a severe work-related injury as workers who were 16 to 24 years-old (RR=2.88, 95% CI: 1.63-5.07).

Figure 2 shows work-related severe traumatic injury hospitalizations by type of injury. The majority of injuries were fractures (57%), followed by crushing or internal injuries (24%) and intracranial injuries (15%). Less than 5% of injuries were spinal cord injuries or open wounds. The ICD-9-CM external cause of injury codes (Ecodes) were evaluated. Ecodes with information about the cause of injury were available for 67.3% of the records. Of these records, the most commonly reported Ecodes were falls (55.1%), motor vehicle accidents (20.9%), struck by or against objects (12.3%), and machinery accidents (11.7%).

Figure 2: Work-Related Severe Traumatic Injury Hospitalizations by Injury Type- Louisiana, 2006-2014 (N=1,937)



This preliminary review of Louisiana’s severe traumatic injury data has important implications for worker safety professionals and warrants ongoing tracking and analysis by occupational health programs. Work-related traumatic injury is a leading cause of death and disability for workers, and our data indicate that hospitalization rates for severe injuries have remained steady over the nine-year period.

As we engage our partners on outreach and prevention efforts targeting severe injuries, there are important data limitations that must also be addressed. LAHIDD does not collect needed detail about worker activities, occupation, or industry. Addressing these data gaps requires use of other data sources, such as WC claims, medical records, and direct worker reports. Additionally, LAHIDD does not reliably code Hispanic ethnicity. While the Spanish surname list helped to address this limitation, Louisiana’s growing Hispanic population makes it increasingly important that all healthcare data reliably and systematically capture information on Hispanic ethnicity.

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