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ORIGINAL ARTICLE

# Frequency and Cost of Claims by Injury Type From a State Workers' Compensation Fund From 1998 Through 2008

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**Abstract**

**Objective:** To determine which work-related injuries are the most frequent and costly.

**Design:** Secondary analysis of workers' compensation claims data.

**Setting:** Data were provided by a large, Maryland workers' compensation insurer from 1998 through 2008.

**Participants:** Not applicable.

**Interventions:** None.

**Main Outcomes Measures:** For 45 injury types, the number of claims and compensation amount was calculated for total compensation and for medical and indemnity compensation separately.

**Results:** Back and knee injuries were the most frequently occurring single injury types, whereas heart attack and occupational disease were the most expensive in terms of mean compensation. When taking into account both the frequency and cost of injury (mean cost × number occurrences), back, knee, and shoulder injuries were the most expensive single injury types.

**Conclusions:** Successful prevention and management of back, knee, and shoulder injuries could lead to a substantial reduction in the burden associated with work-related injuries.

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Work-related injuries cause a considerable burden to society because of both direct medical costs and indirect costs (eg, lost productivity). Annual losses caused by work-related injuries cost the United States an estimated $140 to $145 billion.[1,2] In 2006, the estimated national cost of workers' compensation was approximately $54.7 billion total, with 48.4% of costs related to medical and 51.6% of costs related to indemnity benefits.[3] Understanding the types of injuries that occur most frequently and the types that result in the highest costs is critical for targeting primary and secondary prevention efforts.

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The U.S. Bureau of Labor Statistics (BLS) provides annual estimates of work-related injuries by injury type. Of the approximately 4.4 million work-related injuries in the United States in 2008,[4] back, finger, knee, and shoulder injuries were the most common nonfatal single injury types resulting in days lost from work for both private industry and state and local government workers.[4-6] However, the BLS provides statistics on only a limited number of injury types, and cost data are not available.

Previously published studies on the frequency and/or cost of work-related injuries by injury type tend to focus on a single injury type or a narrow range of injury types[7-18] and/or injuries within specific industrial sectors or for specific occupations.[19-28] Although useful to understand frequency and costs of specific injury types and of typical injuries within an industrial sector, workers' compensation insurers and employers whose workers

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span multiple occupations would benefit from a broader perspective on injury types across all industries. Promising interventions addressing both injury prevention and rehabilitation exist,[29-33] but better research is needed to identify the epidemiology of occupational injuries in order to target these programs.

The study by Dunning et al[34] provides a comprehensive look at work-related injuries across multiple industries using claims data from the Ohio Bureau of Workers' Compensation. Results identified lumbar spine, hand/wrist, and knee injuries as the most common injury types; lumbar spine, shoulder, and knee injuries were identified as the most expensive injury types in terms of total costs (average cost per claim × number of claims). However, this study includes only musculoskeletal disorders, groups multiple injury types, and excludes claims associated with trauma or fractures. Though average per claim medical, indemnity, and total costs in addition to total costs across all claims by injury type are reported, little information regarding the distribution of compensation across claims is provided.

The present study was made possible through data provided by a large workers' compensation provider. The goals of the present study were to replicate and expand the findings of Dunning[34] by providing evidence on the frequency and the average cost of workers' compensation claims across a wider variety of injury types and provide more detailed information about the distribution of costs both within an injury type and across all injury types.

# Methods

## Data

This study was a secondary analysis of claims data from the Injured Workers' Insurance Fund (IWIF), the leading writer of workers' compensation insurance in the state of Maryland. In 2009, the IWIF share of the workers' compensation market in Maryland was 25%. The IWIF provides insurance regardless of company size or past claims experience; therefore, it serves many small businesses and businesses that cannot otherwise obtain coverage. Data for all claims from a 10-year period between June 1, 1998, and May 31, 2008, were obtained from the IWIF's claims database and contains detailed information about the worker, accident and associated injuries, and compensation paid. This database is populated with data from several sources. The first report of injury (FROI) opens the claim through an employer submission to an injury-reporting hotline, fax, or website. A claims adjuster follows up on each FROI and is responsible for entering additional information from the employer and injured worker and estimated and actual compensation as it accumulates. Information from precertification nurses, independent medical examiners, treatment providers, nurse case managers, and attorneys is added when applicable.

Key variables for this analysis included type of injury, age, and sex of the worker and both medical and indemnity compensation. Injury type from the FROI was categorized into 45 single injury types. Any injury with >1 injury type listed was considered a multiple injury. Similar injury types were grouped together (eg, skin injuries include dermatitis, rash, poison ivy and sumac, and other skin conditions; oral injuries include injuries to the mouth, teeth, and tongue). Claims were excluded from analysis if the type of injury was missing, the injury resulted in the death of the worker, or the injury was related to a nonbiologic exposure (eg, asbestos, lead). Injuries resulting in the death of the worker were excluded because they are very rare and can be considered catastrophic outliers. Injuries related to nonbiologic exposures were excluded because of a very limited representation in this dataset. Because the study involved analyses of large, deidentified claims data, it was categorized as exempt by the local institutional review board.

***List of abbreviations:***

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| **BLS** | **Bureau of Labor Statistics** |
| **FROI** | **first report of injury** |
| **ICD-9** | ***International Classification of Diseases, 9th Revision*** |
| **IWIF** | **Injured Workers' Insurance Fund** |

## Data analysis

For the 12 injury types with the largest number of claims, mean age and percentage of men were calculated. To provide information on the distribution of compensation for each injury type, the number of claims, mean, SD, and 25th, 50th, 75th, and 95th percentiles of compensation amount and the percentage of overall compensation across all claims were calculated for total compensation and for medical and indemnity compensation separately. Because a large proportion of claims do not result in any compensation, the number and percentage of claims with nonzero compensation and the mean, SD, and 25th, 50th, 75th, and 95th percentiles of nonzero compensation claims were also calculated for each injury type. Number of claims and nonzero claims, mean total compensation across all claims and across nonzero claims only, and contribution of injury type to total injury costs were also calculated by each year separately to examine stability of injury frequency and compensation over time. Compensation was adjusted to 2010 U.S. dollars using the mean annual consumer price index from the BLS based on the year the injury occurred.[35]

# Results

A total of 232,399 unique claims were identified. Three hundred twenty-seven claims were then excluded because of missing injury type (n=28), injury resulting in death (n=255), and injury resulting from nonbiologic exposure (n=44). Therefore, the final sample included 232,072 unique claims; of these, 163,864 (71%) were associated with a single injury type, and 68,208 (29%) were associated with multiple injury types.

Back, knee, and hand injuries were the most commonly occurring single injury types accounting for 10.5%, 5.7%, and 5.6% of all claims, respectively. Demographic characteristics for the top 12 most expensive injury types by percent contribution to total compensation across all claims are presented in table 1. Data on age and sex were missing for 2.7% and 0.8% of all claims, respectively.

For all claims across all injury types, the mean total compensation was $6785. Approximately 68% of all claims involved some monetary compensation, and the mean total compensation for these nonzero claims was $9995. The most expensive 5% of claims accounted for approximately 75% of all compensation. Mean medical compensation across all injury types was $2713 for all claims and $4038 for the 67% of claims that had nonzero medical compensation. The most expensive 5% of medical claims