



HHS Public Access

Author manuscript

J Occup Environ Med. Author manuscript; available in PMC 2024 July 29.

Published in final edited form as:

J Occup Environ Med. 2024 May 01; 66(5): e160–e175. doi:10.1097/JOM.0000000000003067.

Mining Injuries 2012–2019: Using Workers' Compensation Claims Data from 35 States to Identify Rates and Costs associated by Nature of Injury, Event/Exposure, and Body Part Affected

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Abstract

Objective: This study summarized the frequency and cost of mining-related injuries.

Methods: Mining-related workers' compensation (WC) claims data from 35 states were summarized to report counts, claim rates, and costs for 2012–2019. These data were compared with Mine Safety and Health Administration (MSHA) injury and employment data for the same period.

Results: Despite system differences, both WC and MSHA counts and rates declined over time and injury patterns were similar. Total WC costs were ~\$2.325B. Medical-only claims represented 59.4% of the claims by count, but only 3.3% of costs. Lost-time non-fatal claims represented 40.2% of the claims by count, but 90.2% of costs. Claims frequency and costs varied greatly by injury event/exposure, part of body, and nature.

Conclusions: Injury frequency has declined but costs remain high. The most costly and disabling cases were identified.

Graphical Abstract

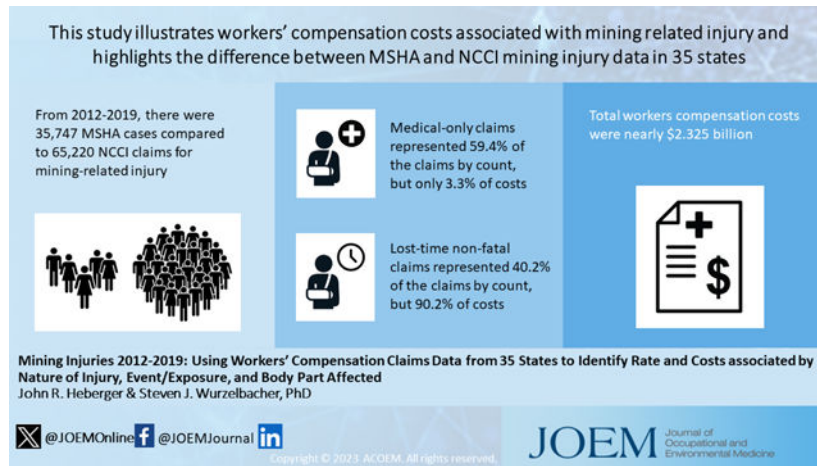
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Conflict of Interest

None Declared

Ethical Approval of Studies/Informed Consent

This study was internally reviewed by NIOSH, and it was determined that it did not constitute human subjects' research. Rather, the study is considered surveillance because it involved the analysis of coded and previously collected WC administrative claims data.



Keywords

mining; workers' compensation; injury; OIICS; injury costs; MSHA

Introduction

The United States mining industry employs approximately 300,000 workers in all 50 states (1). Mining is known for its physical, chemical, noise, whole body vibration, respiratory, ergonomic, thermal, and psychosocial occupational hazards (2) and its dangerous work situations (3) due to the nature of the work and the work environment. Recent injury trends in mining show a gradual decline of injury rates since 2010 (4). This has been attributed to improved rule enforcement, automation, increased safety awareness, and implementations of new safety technologies (5, 6). Even with the decreasing injury rates, mining-related injuries tend to be more severe as they average more days away from work compared to other industries (7).

Understanding occupational injury burden in the mining industry is critical for setting priorities for research and intervention development. The National Institute for Occupational Safety and Health (NIOSH) uses an evidence-based method that employs the criteria of "burden, need, and impact" to identify research priorities and aid in the evaluation of the taxpayers' investment in research (8). The burden of work-related injuries is the impact of injury as measured by injury rates/counts, functional impairments, economic costs, and other indicators. The true burden of occupational and work-related diseases and injuries is unknown, and what is reported as burden is significantly underestimated (9). Occupational injuries and illnesses are underreported in the U.S., including the U.S. mining sector (10–12). A study from Illinois found that 66% of mining workers' compensation (WC) claims were not reported in the Mine Safety and Health Administration (MSHA) injury data (13), and an MSHA analysis of injuries in Kentucky and California from 2000–2012 estimated that between 23%–46% of mining injuries were unreported (14). This underestimation affects the way decision-makers view investments in research and worker protection, which in turn has a substantial impact on national welfare and public health (9).

Although the MSHA injury and employment datasets are commonly used for mining injury analyses, public health researchers are increasingly using other data sources such as WC systems to address the underreporting issue as well as provide prevention insights. Additionally, the current National Mining Agenda includes a surveillance objective which incorporates a need for utilizing existing state WC data to supplement the Mine Safety and Health Administration's injury reports (15). In the U.S., WC involves state-regulated systems designed to provide medical care and partial wage replacement (i.e. indemnity) for injured and ill workers. All states except Texas require private and state/local public employers to offer WC coverage, which is provided by a range of private and state-based carriers depending upon the state (16). Large employers in most states can also self-insure if they demonstrate sufficient fiscal resources (17). Recently, several states have published WC data, and the mining industry in these states has been highlighted as having relatively high rates of injury. For example, mining had one of the highest rates of injury among private employers in Ohio from 2007–2017, especially for traumatic injuries related to contact with objects and equipment (18).

While there are no national WC data sources, there are some organizations that collect multi-state data. The National Council on Compensation Insurance (NCCI) is a licensed rating and statistical organization providing to 35 states (and the District of Columbia) and collects a set of WC claims data from carrier-insured (private and state-funded) employers in these states. The NCCI data does not include claims from self-insured employers (19). NCCI provides analysis of WC claim costs to guide the setting of rates/loss costs by insurance companies (20). One of the two principal data sets used in this research article has been provided by NCCI to NIOSH in support of NIOSH research initiatives. The views and conclusions contained in this article are those of the authors and should not be interpreted as representing the opinions of NCCI and NCCI makes no guarantees nor assumes responsibility for the accuracy of any results obtained through the use of the NCCI data.

The primary aim of this study is to summarize aggregate NCCI mining-related injury WC data by state, injury event/exposure, part of body, and nature to identify counts, claim rates, and incurred costs for 2012–2019. A secondary aim is to compare the NCCI data with MSHA injury and employment data from the same states for 2012–2019.

Methods

Data Sources

NCCI agreed to share with NIOSH aggregated mining-related WC claims data from 2012–2019 for 35 states. The dataset grouped claims by type: Medical-Only, Lost-Time Non-Fatal, or Lost-Time Fatal. It is noteworthy that the definition of Lost-Time varies from four or more to eight or more days away from work in U.S. state WC systems (21). Medical-Only claims include only medical costs, while Lost-Time claims normally include both medical and indemnity costs. The NCCI dataset only includes claims that have been accepted for payment.

The NCCI dataset included information on claims aggregated by state, by year, and by manual class code. Manual class codes group employees at a given employer into distinct classes that are similar in injury risk and type of work performed. Manual class codes are defined by industry or occupation, or a combination of industry and occupation. Employers report yearly payroll and claims separately by each class code. These data are then used as part of a system to adjust WC insurance premium rates based on prior employer loss history. For example, if the class code claim rates per unit of payroll in prior years for the employer are higher than other employers in the same state and class code, WC insurance premiums may be set higher than the premiums for other employers in the same class code.

The NCCI dataset also included total payroll (which may include some overtime but excludes most benefits) reported by employers in each manual class code by state and year (19). NCCI data also includes specific WC codes developed by the Workers' Compensation Insurance Organizations (WCIO) that are used by many state WC systems to describe the cause, nature, and part of body associated with each WC claim (22). Bureau of Labor Statistics' Occupational Employment and Wage Statistics (OEWS) data (23, 24) for years 2012–2019 was used to obtain median annual wages by state for the mining industry (NAICS=212000), which was later used with the NCCI payroll data to estimate employee counts as described below.

To compare the NCCI mining claim data to standard mining injury surveillance data, we used public domain datasets provided by the Mine Safety and Health Administration (MSHA). Under the U.S. Code of Federal Regulations 30 CFR Part 50—Notification, Investigation, Reports and Records of Accidents, Injuries, Illnesses, Employment, and Coal Production in Mines, MSHA maintains databases of reported employment and reported cases of accident/injury/illness to provide mandated surveillance information. This reporting requirement applies to mine operators as well as to contractors working on mine property. A Mine Accident, Injury, and Illness Report (MSHA Form 7000–1) must be completed for *all* reportable accidents, injuries, or illnesses occurring at U.S. mining facilities. Reportable occupational injuries include all incidents that require medical treatment or result in death, loss of consciousness, inability to perform all job duties on any workday after the injury, or temporary assignment or transfer to another job. MSHA defines Lost-Time cases as those with 1 or more days away from work. The injury data captures the accidents, injuries, and illnesses reported in the U.S. mining industry from 1983–2022.

Mine operators and contractors whose employees perform mining work on mine property are also *required* to file a Quarterly Mine Employment and Coal Production Report (MSHA Form 7000–2) within 15 days after the end of each calendar year quarter. This information becomes a part of MSHA's address and employment files and includes contact information, production of clean coal tonnage, average number of persons employed during the reporting period, and the corresponding number of employee hours worked. The employment data captures all the mines and mine workers in the U.S. and provides the denominator data for rate calculations.

The annual records of accidents, injuries, or illnesses and employment records are publicly available through MSHA's open government data portal. The National Institute

for Occupational Safety and Health's Mining Program (NIOSH Mining) adds several recoded and computed variables to the accident, injury, or illness records and publishes these along with the employment records as Microsoft Assess and SPSS (IBM SPSS Inc., Chicago, IL) datasets, details of which can be accessed at www.cdc.gov/niosh/mining/data/default.html. The two separate MSHA datasets—the accident, injury, or illness dataset and the employment dataset—published by NIOSH Mining were also used for this analysis.

Case Selection

To identify mining-related WC cases in the NCCI data, two NIOSH researchers familiar with WC systems mapped NCCI manual class codes to the North American Industry Classification System (NAICS) codes to identify class codes related to the mining industry. This was based on the 2022 NAICS definition for subsector 212 Mining (except oil and gas) which includes mining, mine development, and mineral/material preparation (25). The mapping was accomplished by consulting NCCI manual class code descriptions, a published class code/NAICS code crosswalk (26), and data from the Ohio Bureau of Workers' Compensation that described the distribution of class codes within NAICS code 212. Class codes that could be commonly found in other industries, such as office/clerical and general construction workers, were excluded. NCCI then provided NIOSH aggregated data for the chosen mining-related class codes shown in Table 1. From the NCCI data, 65,220 WC claims from 35 states for 2012–2019 were aggregated and analyzed to characterize occupational injury and illness incidents. The District of Columbia was excluded from rate calculations due to very few claims and limited payroll data available.

The cases selected from MSHA data included injury/illness cases reported for the years 2012–2019 from the 35 states that use NCCI. Contractors were excluded, as contractors generally perform work related to construction, demolition, equipment installation/service/repair, mine development, and drilling/blasting. Additionally, contractors do not report hours by state, so they cannot be matched to the NCCI states. Office employees were also excluded as they do not have similar job hazards as mine workers and they were not included in the mining related NCCI class codes. Injury/illness classified as natural causes, non-employee (e.g. delivery drivers), and non-chargeable cases (including first aid only) were excluded to align with the NCCI WC cases.

Case Coding

The NCCI data uses WCIO codes and the MSHA data uses its own coding scheme. To make comparisons, both NCCI and MSHA data for nature of injury, part of body, and event/exposure/cause were converted to the Bureau of Labor Statistics' (BLS) Occupational Injury and Illness Classification System (OIICS) (27). NIOSH refined a crosswalk from the WCIO nature of injury, part of body, and cause of injury codes to the BLS OIICS as provided in Tables S1a-c in the online Appendix (Supplementary Digital Content). The WCIO codes are not as detailed as BLS OIICS codes and do not have a defined coding hierarchy or instructions. NIOSH, the Massachusetts Department of Public Health, and others have developed past crosswalks between WCIO cause and BLS OIICS event/exposure codes at the basic 1-digit and 2-digit levels (28). Two NIOSH researchers familiar with WC systems first reviewed the code sets and developed two independent draft crosswalks based on the

descriptions and coding rules associated with each code set. Researchers then utilized a dataset from the state of Alaska from an unrelated NIOSH study that included WCIO class codes and NIOSH-coded OIICS codes for nearly 30,000 claims to develop distributions that showed how the WCIO and OIICS codes were associated. The two NIOSH researchers then used this distribution information from Alaska to review the two independent draft crosswalks to develop a final consensus crosswalk at the 1-digit OIICS level for body part and event/exposure and at the 2-digit level for nature of injury. More detailed crosswalks between WCIO and OIICS are problematic because the WCIO codes are not hierarchal, are less detailed, and may map to more than one OIICS code even at the 2-digit level (18).

NIOSH researchers then developed a crosswalk from the MSHA injury codes for part of body, nature of injury, and accident type/event to the associated BLS OIICS codes. The MSHA part of body was coded to OIICS one-digit level part of body. The nature of injury was coded to the OIICS two-digit level nature of injury, and the MSHA accident type coded to OIICS one-digit level event/exposure. NIOSH attempted to obtain the BLS coding scheme to recode the MSHA variables into the OIICS, as used in the BLS Resource Tables (29), but the BLS was unable to share it due to confidentiality reasons. However, the coding was relatively straightforward, and the authors were able to develop a final consensus crosswalk for classifying MSHA data by OIICS code so that it could be compared to NCCI data.

Rate Development

NIOSH utilized the NCCI data to calculate the number of claims per unit of payroll by state and year. NIOSH used BLS Occupational Employment and Wage Statistics (OEWS) data on the median annual wage of mining occupations by each NCCI state for each year from 2012–2019 (24) to estimate employee counts from the NCCI payroll. Median wages were used instead of mean wages because wage estimates are right skewed, mostly due to office- and management-related occupations, which increases the mean of all mining occupations. OEWS wages are defined as base pay which excludes overtime, bonuses, and benefits. Mining is defined as having a North American Industry Classification System (NAICS) code 212000, which is *Mining (excluding oil and gas)*, and all occupations were used (Standard Occupation Code 00–0000). These annual median wage estimates are based on assuming 2,080 hours of work per year (52 weeks x 40 hours per week) of (23). To estimate the annual number of mine employees for each state, total annual NCCI state payroll was divided by the state median annual mining wage. These data were then applied to the NCCI injury count data to estimate the number of WC claims per 100 full year, full time equivalent workers. See Equation 1 below. The authors want to note that this is not an NCCI calculation. Payroll was used to estimate employees based on average mining wages. This is not an official NCCI claim incidence.

$$\text{NCCI claim incidence rate per 100 mine employees}$$

Equation 1

$$= \frac{\text{total number of injuries}}{\frac{\text{total NCCI payroll}}{\text{median annual mining wage}}} \times 100$$

For the MSHA data, injury rates were calculated for each state and by the OIICS codes for injured body region, nature of injury, and event. Injury incidence rates were calculated per 100 full time equivalent (FTE) mine workers per year using Equation 2 (below). This equation assumes that miners work on average 2,000 hours annually. Total employment hours are reported by each mine in the employment dataset.

$$\text{MSHA injury incidence rate per100 FTE} = \frac{\text{total number of injuries}}{\text{total employment hours}} \times 200,000$$

Equation 2

Cost Valuation

The NCCI dataset provided incurred costs of medical treatments and indemnity for lost wages due to temporary and permanent disability. These include both paid costs and reserves for anticipated future costs. Costs were valued as of the fifth report, which is provided approximately 5.5 years after the policy year of injury. Not all 2012–2019 WC cases were closed, which means additional costs will continue to accrue. At the time of data receipt from NCCI, only 2012–2015 data had full fifth report development. For this reason, calculations of mean and median costs per claim were limited to 2012–2015 claims. All costs are adjusted for inflation to 2022 dollars using the gross domestic product (GDP) deflator published by the U.S. Department of Commerce's Bureau of Economic Analysis (30).

Institutional Review Board (IRB) statement

This study was internally reviewed by NIOSH, and it was determined that it did not constitute human subjects research. Rather, the study is considered surveillance because it involved the analysis of coded and previously collected WC administrative claims data. The study design adhered to STROBE guidelines and the checklist can be found in the Supplementary Digital Content.

Results

Overall

Yearly mining-related estimated FTE employee counts, WC claim counts, rates, and costs from the 2012–2019 NCCI data are provided in Table 2a. State-level data are provided in Tables S2a-b in the online Appendix (Supplementary Digital Content). There were 65,220 mining-related WC claims during this period, with an annual mean of 8,153 claims. The number of estimated FTE employees per year was 214,676 and FTE employees declined 6% from 2012 to 2019, with 54% of states experiencing declines. The total number of claims per year declined 30% from 2012 (9,880) to 2019 (6,916). This varied by state, with the

majority (72%) experiencing declines. The overall claim rate also declined of 25% from 2012 (4.40) to 2019 (3.28), with 78% of states having declines.

The number of Lost-Time Non-Fatal claims also declined, but to a lesser degree, 19% from 2012 (3,636) to 2019 (2,952), with 72% of states having declines. The rate of Lost-Time Non-Fatal claims declined 13.5% from 2012 (1.62) to 2019 (1.40), with 72% of states showing declines.

The total mining-related WC costs (Table 2a) during this 8-year period were over \$2B (\$2,325,206,206). Medical-Only claims represented 59.4% of the claims by count, but only 3.3% of costs. Lost-Time Non-Fatal claims represented 40.2% of the claims by count, but 90.2% of costs. Lost-Time Fatal claims represented 0.3% of the claims by count, but 6.4% of costs.

Table 2b provides mining-related costs per WC claim for 2012–2015. Costs differed dramatically by claim severity type. Mean cost per Medical-Only claim was \$1,925 (median \$798). Mean cost per Lost-Time Non-Fatal claim was \$79,798 (median \$27,368). Mean cost per Lost-Time Fatal claim was \$683,944 (median \$511,704).

Annual MSHA count and rate data for the 35 NCCI states from 2012–2019 are provided in Table 3. During this period, the estimated number of FTEs declined 12% with 40% of states experiencing declines, and there was an annual average of 150,778 FTE mine workers. In the same period, an average of 4,468 injuries/illnesses were reported. Most states (85%) had decreasing or steady counts and rates. The number of all reported injuries/illnesses per year declined 30% from 2012 (5,436) to 2019 (3,840). The rate of all injuries/illnesses declined 20% from 2012 (3.26) to 2019 (2.61). The count and rates for Medical-Only and of Lost-Time Non-Fatal claims also declined with similar trends as the overall injury/illness data.

Event/Exposure

Table 4a presents NCCI mining-related WC claim counts, rates, and costs by event/exposure, along with MSHA data on injury counts and rates by event/exposure. Nearly 39% of the WC claims by count had an event/exposure classified as Contact with Objects and Equipment, representing 30% of total costs. This was followed by Overexertion and Bodily Reaction with 27% of claims by count and 24% of costs. Across all event/exposure types, 59% of costs were due to indemnity payments and 41% due to medical payments. Indemnity payments as a share of total claim cost varied by event/exposure type, ranging up to 69% of all costs for Exposure to Harmful Substances or Environments claims.

The distribution of injuries/illnesses by event/exposure in the MSHA data was similar to the distribution in the NCCI data, with nearly 39% classified as Contact with Objects and Equipment and 27% classified as Overexertion/Bodily Reaction, 8% classified as Exposure to Harmful Substances and 2.4% classified as other/not classified. The 25% classified in MSHA data as Falls, Slips, Trips was much larger than the 14% found in the NCCI claims. While Transportation Incidents, Violence, and Fires and Explosions only made up 5% of the NCCI claims, note that the injury classification scheme used in the MSHA data did not use

these injury categories. This means that injuries that might have belonged to these categories were instead classified elsewhere.

Table 4b presents NCCI mining-related WC claim counts and costs by event/exposure by claim severity type. Claim counts and costs varied considerably by event/exposure and claim severity. Among Medical-Only claims, Contact with Objects and Equipment led with 47% of claims by count and 43% of costs, followed by Overexertion/Bodily Reaction (23% of claims; 22% of costs) and Falls, Slips, Trips (14% of claims; 16% of costs). Fires and Explosions represented the highest cost per Medical-Only claim (\$5,243 mean, \$663 median) followed by Transportation Incidents (\$3,536 mean, \$923 median), and Falls, Slips, Trips (\$2,350 mean, \$805 median).

Among Lost-Time Non-Fatal claims, Overexertion and Bodily Reaction led with 32% of claims by count and 26% of costs, followed by Contact with Objects and Equipment (26% of claims; 28% of costs) and Exposure to Harmful Substances or Environments (16% of claims; 18% of costs). Fires and Explosions again represented the highest cost per Lost-Time Non-Fatal claims (\$139,152 mean, \$38,603 median) followed by Transportation Incidents (\$119,287 mean, \$36,572 median) and Exposure to Harmful Substances or Environments (\$90,175 mean, \$23,363 median).

Among Lost-Time Fatal claims, Contact with Objects and Equipment led with 35% of Lost-Time Fatal claims by count and 38% of costs, followed by Transportation Incidents (29% of claims; 30% of costs) and Exposure to Harmful Substances or Environments (11% of claims; 8% of costs). Fires and Explosions again represented the highest cost per Lost-Time Fatal claims (\$1,598,373 mean, \$1,337,700 median) followed by Contact with Objects and Equipment (\$791,419 mean, \$655,252 median) and Falls, Slips, Trips (\$621,710 mean, \$460,923 median).

Part of Body

Table 5a presents NCCI mining-related WC claim counts, rates, and costs by part of body, along with MSHA data on injury counts and rates by part of body. A total of 32% of the WC claims had a part of body classified as Upper Extremities, representing 21% of total costs. This was followed by Trunk with 25% of claims and 35% of costs. Indemnity payments varied by part of body, ranging up to 72% of all costs for Body Systems claims. The distribution of injuries/illness by part of body in the MSHA data was similar to the NCCI data. Upper Extremities made up 39% of the MSHA data, followed by Trunk (21%) and Lower Extremities (20%).

Table 5b presents NCCI mining-related WC claim counts and costs by part of body by claim severity type. Claim counts and costs varied considerably by part of body and claim severity. Among Medical-Only claims, Upper Extremities led with 36% of claims by count and 34% of costs, followed by Trunk (21% of claims; 20% of costs) and Lower Extremities (19% of claims; 16% of costs). Neck, including Throat represented the highest cost per Medical-Only claim (\$3,443 mean, \$1,359 median) followed by Multiple Body Parts (\$3,027 mean, \$1,345 median), and Body Systems (\$2,825 mean, \$1,181 median).

Among Lost-Time Non-Fatal claims, Trunk led with 31% of claims by count and 37% of costs, followed by Upper Extremities (27% of claims; 22% of costs) and Lower Extremities (18% of claims; 16% of costs). Neck, including Throat again represented the highest cost per Lost-Time Non-Fatal claim (\$141,782 mean, \$47,355 median) followed by Trunk (\$101,579 mean, \$28,443 median) and Body Systems (\$97,561 mean, \$33,764 median).

Among Lost-Time Fatal claims, Multiple Body Parts led with 40% of claims by count and 45% of costs, followed by Trunk (24% of claims; 21% of costs) and Body Systems (21% of claims; 19% of costs). Among body part claims with at least 5 claims, Multiple Body Parts represented the highest cost per Lost-Time Fatal claim (\$777,448 mean, \$625,308 median) followed by Trunk (\$644,254 mean, \$506,718 median) and Body Systems (\$572,383 mean, \$413,302 median).

Nature of Injury

Table 6a presents NCCI WC claim counts, rates, and costs by nature of injury, along with MSHA data on injury counts and rates by nature of injury. A total of 35% of the WC claims had a nature of injury classified as Traumatic injuries to Muscles, Tendons, Ligaments, and Joints, representing 32% of total costs. This was followed by Surface Wounds and Bruises with 16% of claims and 5% of costs. Indemnity payments varied by part of body, ranging up to 81% of all costs for Nervous System and Sense Organs Diseases. The classification for nature of injury in the MSHA data generally followed the same pattern as the nature of injury reported in the NCCI data, with 34% classified as Traumatic Injuries to Muscles, Tendons, Ligaments, and Joints, 22% classified as Open Wounds, 15% classified as Traumatic Injuries to Bones, Nerves, Spinal cord, and 10% classified as Surface Wounds and Bruises.

Table 6b presents NCCI mining-related WC claim counts and costs by nature of injury by claim severity type. Claim counts and costs varied considerably by nature and claim severity. Among Medical-Only claims, Traumatic Injuries to Muscles, Tendons, Ligaments, and Joints led with 34% of claims by count and 34% of costs, followed by Surface Wounds and Bruises (23% of claims; 18% of costs) and Open Wounds (18% of claims; 15% of costs). Circulatory System Diseases represented the highest cost per Medical-Only claim (\$5,074 mean, \$2,351 median) followed by Intracranial Injuries (\$4,363 mean, \$2,040 median), and Traumatic Injuries to Bones, Nerves, Spinal Cord (\$3,847 mean, \$1,585 median).

Among Lost-Time Non-Fatal claims, Traumatic Injuries to Muscles, Tendons, Ligaments, and Joints led with 36% of claims by count and 35% of costs, followed by Respiratory System Diseases (13% of claims; 16% of costs) and Traumatic Injuries to Bones, Nerves, Spinal Cord (12% of claims; 14% of costs). Mental Disorders and Syndromes represented the highest cost per Lost-Time Non-Fatal claim (\$154,508 mean, \$56,330 median) followed by Multiple Traumatic Injuries and Disorders (\$141,299 mean, \$37,549 median), Intracranial Injuries (\$108,285 mean, \$37,869 median), and Circulatory System Diseases (\$106,837 mean, \$41,014 median).

Among Lost-Time Fatal claims, Traumatic Injuries and Disorders, unspecified with 33% of Lost-Time Fatal claims by count and 43% of costs, followed by Other Traumatic

Injuries and Disorders (26% of claims; 25% of costs) and Multiple Traumatic Injuries and Disorders (22% of claims; 18% of costs). Among nature claims with at least 5 claims, Traumatic Injuries and Disorders, Unspecified represent the highest cost per Lost-Time Non-Fatal claim (\$926,505 mean, \$806,271 median) followed by Other Traumatic Injuries and Disorders (\$768,395 mean, \$712,591 median) and Multiple Traumatic Injuries and Disorders (\$493,234 mean, \$407,052 median).

Discussion

Comparisons of NCCI mining-related claims to MSHA injury/illness cases

From 2012–2019, there were 35,747 MSHA cases compared to 65,220 NCCI claims for mining-related class codes in the same states (82% higher in the NCCI data). During this period, the total case rate for MSHA was 2.96 per 100 workers, while the NCCI claim rate (based on payroll) for the same states was 3.80 per 100 workers (28% higher). The MSHA number of annual full-time equivalent miners employed from 2012–2019 averaged 150,778. The NCCI estimated annual mining-related employees from 2012–2019 for the same states averaged 42% higher at 214,676. This differed by state and year. This difference was driven in part by Texas, for which there are 15,432 average annual employees in 2012–2019 according to MSHA and 94,777 NCCI estimated mining-related employees. Excluding Texas, the numbers are closer with 135,345 (MSHA) versus 119,899 (NCCI), which is a –11% difference.

The large difference between the NCCI mining-related cases, estimated employment from payroll and MSHA cases and reported employment data was unexpected. A previous study comparing WC to MSHA data in Illinois for 2001–2013 found that MSHA had 1.5 times the reported injuries/illnesses as the Illinois WC program and only 23% of the WC cases were captured by the MSHA Part 50 program (13).

These differences between NCCI and MSHA data could be due to several factors. Clearly, the large difference in number of cases is in part due to the larger FTE employee count estimated from the NCCI payroll data. The NCCI class codes that we have chosen to represent mining-related claims represent a somewhat different population than does the MSHA data because NCCI class codes do not exactly map to NAICS industry codes. Rather, class codes are often a mix of occupation and industry. This is an inherent limitation of using class codes to identify specific industries. Therefore, the chosen mining-related class codes may have captured some occupations not directly included within MSHA data.

Class codes also affect how office workers and contract workers are categorized. Due to how data is collected and coded, we were able to exclude office workers from both MSHA and NCCI data. However, while we can easily exclude contract workers from MSHA data, they may be included in NCCI data. NCCI data only includes data for workers required to be covered by WC and in many cases excludes independent contractors. NCCI data may still include specialist contractors who perform specific tasks at mine sites if their work was classified using the chosen mining-related class codes.

By contrast, contractors do not report hours by state to MSHA. MSHA collects much less information from contractor employers than operator employers, yet contractor employees make up 30% of the mining workforce (1). We do know for all states, contract miners account for about 10–15% of nonfatal lost time injuries and have an average injury rate of about 1 per 100 FTEs, which is much lower than mine operators (1). If we were able to include contractors in the MSHA rate calculations, it is likely the rates would decrease.

MSHA data also only captures “on-site” injuries and excludes off site injuries/employees. This could be another reason why MSHA captures fewer injury cases and employee counts. A driver delivering material to a customer or off-site location would not be captured by MSHA but could be captured by NCCI’s class codes.

Another factor is related to denominator information – MSHA rates were calculated using hours reported by mines while WC claim rates were calculated by dividing NCCI payroll information by OEWS median wages. We used OEWS median wages for all mining occupations since mining wages in BLS data were right skewed, as they included the most highly paid, white-collar workers which are not included in the mining related class codes. If wages are overestimated, there would be fewer miners which would lead to overestimating injury rates in the NCCI data. OEWS wage information and WC payroll reports also differ slightly in inclusion criteria as payroll can include some overtime.

Moreover, the NCCI data generally does not include mines that self-insure, meaning that the mine would provide its own WC insurance coverage independently and not obtain coverage through a private insurance company or state fund. While mining-specific information on self-insurance is unavailable, for all industries, self-insured employers represented approximately 25% of WC benefits paid in the U.S. from 2016–2020 (17). This suggests an even larger discrepancy between the MSHA and NCCI data, since if the NCCI data were to include self-insured employers, the injury counts and FTE estimates from NCCI would exceed those from MSHA by a much greater amount.

Additionally, not all injury/illness cases are reported to WC. We would expect MSHA to have a higher number of reported injuries since not all injuries reported to MSHA are reportable to WC and not all mines have WC insurance. The Illinois study also pointed out that the MSHA data did not capture 66% of the WC cases. A majority of mining-related injuries and illnesses that were severe enough to result in a WC claim were not captured by MSHA (13). The MSHA data underreports mining related illnesses and chronic injuries (10, 31, 32), which is likely also true for the NCCI data. Table 6a supports this statement as respiratory diseases, nervous system diseases, and cumulative disorders (including carpal tunnel syndrome) had higher percents of total NCCI claims than the same categories had as percents of total MSHA cases.

The proportions by OIICS event/exposure were highly correlated in the NCCI and MSHA datasets, but there were several noticeable differences. Falls, Slips, Trips represented 25% of MSHA cases compared to 14% of NCCI claims. MSHA had a lower percentage (7.7%) of Exposure to Harmful Substances or Environmental compared to NCCI (10.2%). These differences could be due to limitations with the crosswalk between WCIO codes and OIICS

codes. MSHA's categories for part of body and nature of injury did seem to match well to their OIICS counterparts, but not all the OIICS event/exposure values matched with values of MSHA's event/exposure variable. MSHA does not have separate event/exposure codes for *Fires and Explosions, Violence, or Transportation Incidents* – and as previously noted above, MSHA does not include off-site driving.

Cross walking the MSHA data to OIICS nature of injury, part of body, and event/exposure was validated by comparing to the BLS “Case and Demographic Characteristic for Work-related Injuries and Illnesses involving Days Away from Work” resource tables for each year from 2012–2019. After matching the inclusion criteria, the pattern and distributions of counts and rates for OIICS event/exposure (BLS tables R4 and R8), part of body (BLS tables R2 and R6), and nature of injury (BLS tables R1 and R5) were very similar. The BLS data did not have any cases with OIICS event/exposure of *Fires and Explosions nor Violence and Other Injuries by Person or Animals* and only 20 cases of *Transportation Incidents* for 2017 and 2018. The BLS nature of injury tables only included seven of the 20 natures of injury OIICS groupings developed from the WCIO codes. Even with the limited comparisons, the distributions were similar, except for *Open Wounds* and *Other* categories, but it is likely the BLS *Other* category captured all the other OIICS nature of injury variables.

Both MSHA and NCCI data point to declining mining-related injury counts and rates in most states. However, some individual states did experience increases. The same general types of injuries continue to drive overall frequency, pointing to the need for continued prevention improvements.

Cost Data

These analyses indicate a high financial burden of mining-related injuries and illnesses, totaling \$2.325 billion in WC costs from 2012–2019. The NCCI data generally does not include self-insured employers, so this is just a partial impact for the mining industry.

Costs differed dramatically by claim severity type, providing insights into prevention strategies. Medical-Only claims represented almost 60% of the claims by count, but only 3% of costs. Lost-Time Non-Fatal claims represented 40% of the claims by count, but 90% of costs, while Lost-Time Fatal claims represented 0.3% of the claims by count, but 6.4% of costs. This is consistent with prior studies that have shown the vast majority of total WC costs for states and large organizations are due to a relatively small number of particularly high cost claims (33, 34). All injuries/illnesses must be prevented, but additional focus must be applied to those with the most severe outcomes. Relatively minor cases can also become more severe without early reporting and proper medical treatment. The cost and severity of claims varied by event/exposure, part of body, and nature of injury.

Among Medical-Only claims, the mean cost per claim was \$1,952 (median \$798). Contact with Objects and Equipment was by far the primary event/exposure (47% of claims; 43% of costs) driving Medical-Only claims. This was followed by Overexertion and Bodily Reaction (23% of claims; 22% of costs) and Falls, Slips, Trips (14% of claims; 16% of costs). The majority of these injuries were Traumatic Injuries to Muscles, Tendons,

Ligaments, and Joints (34% of claims; 34% of costs) or Surface Wounds and Bruises (23% of claims; 18% of costs) and Open Wounds (18% of claims; 15% of costs). Most Medical-Only claims involved the Upper Extremities (36% of claims; 34% of costs), Trunk (21% of claims; 20% of costs), or Lower Extremities (19% of claims; 16% of costs).

Among Lost-Time Non-Fatal claims, the mean cost per Lost-Time Non-Fatal claim was \$79,798 (median \$27,368), which was over 40 times the cost per Medical-Only claim. In contrast to Medical-Only claims, the main event/exposure for Lost-Time Non-Fatal claims was Overexertion and Bodily Reaction (32% of claims; 26% of costs), followed by Contact with Objects and Equipment (26% of claims; 28% of costs). Exposure to Harmful Substances or Environments was the leading event/exposure, representing 16% of claims (18% of costs) of Lost-Time Non-Fatal compared to only 6.5% of Medical-Only claims. Like Medical-Only claims, Falls, Slips, Trips remained a main driver of Lost-Time Non-Fatal claims (15% of claims; 15% of costs). Among Lost-Time Non-Fatal claims, claim natures were still dominated by Traumatic Injuries to Muscles, Tendons, Ligaments, and Joints (36% of claims; 35% of costs) and Traumatic Injuries to Bones, Nerves, Spinal Cord (12% of claims; 14% of costs), but Respiratory System Diseases (13% of claims; 16% of costs) became a greater part of the case nature of injury mix. The main part of body changed to Trunk injuries (31% of claims; 37% of costs), followed by Upper Extremities (27% of claims; 22% of costs) and Lower Extremities (18% of claims; 16% of costs).

Among Lost-Time Fatal claims, the mean cost per Lost-Time Fatal claim was \$683,944 (median \$511,704), which was 350 times the cost per Medical-Only claim and 9 times the cost per Lost-Time Non-Fatal claim. Like Lost-Time Non-Fatal claims, the main event/exposure for Lost-Time Fatal claims was Contact with Objects and Equipment (35% of claims; 38% of costs). However, a new main driver for Lost-Time Fatal claims was Transportation Incidents (29% of claims; 30% of costs) followed by Exposure to Harmful Substances or Environments (11% of claims; 8% of costs). Claim natures of injury were dominated by different types of traumatic injuries including Traumatic Injuries and Disorders, Unspecified (33% of claims; 43% of costs), and Other Traumatic Injuries and Disorders (26% of claims; 25% of costs). Lost-Time Fatal claims also tended to involve Multiple Traumatic Injuries and Disorders (22% of claims; 18% of costs). Unlike Medical-Only and Lost-Time Non-Fatal claims that tended to be associated with specific parts of the body, Lost-Time Fatal claims were associated most with Multiple Body Parts (40% of claims; 45% of costs) and Body Systems (21% of claims; 19% of costs). The specific part of body associated most with fatalities was the Trunk (24% of claims; 21% of costs), which includes the spine.

Limitations

There were limitations associated with this study. The use of WC data for occupational injury/illness surveillance has several general limitations, which include under-reporting, especially for work-related illnesses (11, 35, 36), and state WC differences in reporting requirements for WCIO injury codes, compensability, and lost-time definitions (21). Other limitations specific to this analysis are that the NCCI dataset did not include WC claims from self-insured employers, such that findings may not be generalized to all mining

employers. Also, NCCI class codes for mining-related work may not correspond exactly to MSHA and NIOSH data that use mining industry NAICS codes. Further, the methods used for estimating FTEs from the NCCI payroll data differed from MSHA FTE estimates. MSHA based its FTE estimates on direct reports from employers, while FTEs associated with the NCCI data were based on dividing total payroll taken from employer reports to WC insurers by the annual median mining wage estimates from OEWS data. Furthermore, worker pay is not calculated in exactly the same way in OEWS and WC payroll reports. The comparison to MSHA and NIOSH mining state data are also limited since contract workers are excluded from MSHA data, even though contractors represent 30% of the mining workforce. Also, both NCCI and MSHA data had to be cross walked to the BLS OIICS system and MSHA data did not easily match to OIICS event/exposure codes, especially for fires/explosions and transportations, which limited comparisons.

Strengths

There are also several strengths associated with this study. Although other studies evaluated mining claims in single states, we utilized NCCI WC data from 35 states to perform the largest analysis to date of WC claims, counts, and costs among a mining-related population. The main contribution of this work is to provide detailed medical and indemnity cost estimates associated with various injury categories as defined by the OIICS part of body, nature of injury, and event/exposure codes for the mining industry. These costs can be used to understand how costs differ dramatically by levels of severity (Medical-Only, Lost-Time Non-Fatal, Lost-Time Fatal) and injury event/exposure, nature, and part of body. NIOSH worked previously to provide similar costs in partnership with the Ohio WC Bureau using a smaller dataset and develop the *Safety Pays in Mining* web application (34). As next steps, we plan to utilize the larger NCCI dataset from the current analysis to update the *Safety Pays in Mining* web application.

Conclusions

This study demonstrated that WC data could be used to augment traditional MSHA data to summarize the frequency and cost of mining-related injuries in 35 states. Despite differences in covered populations, injury classification systems and analysis methods, both mining-related WC claim counts and MSHA case counts declined 30% from 2012–2019 while claim/case rates declined 25% and 20% under each system respectively. After matching the inclusion criteria, the pattern and distributions of counts and rates for OIICS event/exposure, part of body, and nature of injury were fairly similar in both datasets. Contact with Object and Equipment and Overexertion/Bodily Reaction, and Falls, Slips, Trips were leading events/exposures, while Upper Extremities, Trunk and Lower Extremities were the most frequent parts of body injured in both datasets. There was a huge difference in the number of injuries identified in each dataset, and while the data sources are not comparable, additional investigation is warranted. Traumatic Injuries to Muscles, Tendons, Ligaments, and Joints were the leading nature of injury in both datasets. Although claim count and rates declined, the WC data indicated a high financial burden of mining-related injuries and illnesses, totaling \$2.325 billion in WC costs from 2012–2019. Costs were particularly concentrated in more severe claims, as medical-only claims represented 59.4% of the claims by count, but

only 3.3% of costs. Costs varied greatly by injury cause, nature, part of body and severity. These data can be used by insurers and occupational clinicians to focus workplace and medical care improvements on the most costly and disabling cases within mining-related operations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

The authors would like to acknowledge P. Tim Bushnell for his reviews of the manuscript and Tim Tucker and his team from NCCI for providing aggregated data and for their reviews. JRH and SJW are responsible for the reported research and participated in manuscript conceptualization and design, analysis, data interpretation, and drafting. Both authors have approved of the submitted manuscript. MSHA employment and injury/illness data is available online here: CDC - Mining - MSHA Data File Downloads - NIOSH. The workers' compensation claims data is not available to the public, but the summarized data is included in the Supplementary Tables.

EQUATER Network Reporting Guidelines: This study adhered to STROBE Guidelines for observational studies.

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Bulleled Learning Outcomes

- Describe how costs differ dramatically by levels of severity (Medical-Only, Lost-Time Non-Fatal, Lost-Time Fatal) and injury event/exposure, nature, and part of body in mining related injuries
- Differentiate between the NCCI mining related workers' compensation claims data and the MSHA accident/injury/illness data
- Illustrate how workers' compensation claims data can supplement existing mining occupational surveillance data

Table 1:

NCCI Mining-Related Class Codes

| NCCI Class Code | Title | Description |
|-----------------|---|--|
| 0156 | Disease experience in connection to coal mining | |
| 0157 | Disease experience in connection to coal mining | |
| 0158 | Disease experience in connection to coal mining | |
| 0159 | Coal workers pneumoconiosis | |
| 0161 | Coal workers pneumoconiosis | |
| 0162 | Coal workers pneumoconiosis | |
| 0164 | Disease experience related to mining | |
| 1019 | Coal Mining | |
| 1005 | Coal mining, surface and drivers | This code applies to employers that perform surface coal mining. |
| 1016 | Coal mining – Not otherwise classified | This code applies to employers that perform coal mining, only if no other classification more specifically describes the employer's business. This code includes excavation and tunneling. |
| 1164 | Mining - not coal, underground and drivers | This code applies to employers that perform underground mining, only if no other classification more specifically describes the employer's business. |
| 1165 | Mining - not coal, surface and drivers | This code applies to employers that perform surface mining of all types of ore and certain minerals, only if no other classification more specifically describes the employer's business. |
| 1624 | Quarry not elsewhere classified | This code applies to employers that quarry various rock materials, only if no other classification more specifically describes the employer's business. This code includes open pit-type quarrying, and the stripping of surface material (overburden) covering the minerals or rocks to be quarried. Important: This code does not include underground mining operations. |
| 1654 | Quarry, cement rock, surface, and drivers | This code applies only to cement rock surface quarries operated by cement manufacturers provided that 75% or more of the stone quarried is used in their manufacturing of cement. This code includes all operations to excavate the cement rock. |
| 1655 | Lime manufacturing, quarry, and surface | This code applies to surface quarries operated by lime manufacturers, provided that at least 75% of the stone quarried is used in the actual lime manufacture. If more than 25% of the quarry output is used for other than lime manufacture, such operations shall be classified under 1624—Quarry NOC. The crushing of the limestone at the quarry site prior to processing at the plant is included within this classification. |
| 1710 | Stone crushing and drivers | This code applies to employers that crush a wide variety of gravel, rock, or stone as a separate and distinct business. |
| 4000 | Sand or gravel, digging and drivers | This code applies to employers that dig and strip clay and shale. This code also applies to the digging and the stripping of diatomite, marl, overburden, peat moss or humus, and shale from strip mines. |
| 1169 | Kaolin mining--surface--& drivers (GA, SC only) | Kaolin is a sedimentary clay, which is a secondary mineral of the earth's crust resulting from the decomposition of feldspar and other aluminous materials. |
| 1218 | Phosphate mining & drivers (FL only) | This code applies to insureds who mine phosphate rock using electric dragline. |

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| NCCI Class Code | Title | Description |
|-----------------|---|---|
| 1219 | Potash mining & drivers (NM) | |
| 1321 | Uranium extraction-mining process & drivers (TX only) | No more information other than title. |
| 1604 | Quarry--dimension stone & drivers (GA, IN, TN, VT only) | This code applies to employers that exclusively operate open-pit quarries that produce dimension stone for use by others. |
| 6204 | Drilling and drivers, not elsewhere classified. | This code applies to specialist contractors who perform drilling operations, only if no other classification more specifically describes the employer's business. |

Table 2a: NCCI Mining-Related Employee Counts, Claim Counts, Claim Rates (and percent), and Claim Costs (and percent) by Year

| Year | Employee Count* | Medical-Only Claim Count (Row %) | Medical-Only Claim Rate** | Medical-Only Claim Costs (All claim costs) | Lost-Time Non-Fatal Claim Count(Row %) | Lost-Time Non-Fatal Claim Rate** | Lost-Time Non-Fatal Claim Costs (All claim costs) | Lost-Time Fatal Claim Count (Row %) | Lost-Time Fatal Claim Rate** | Lost-Time Fatal Claim Costs (All claim costs) | All Claims Count | All claims Rate** | All Claims Costs |
|--------------|---------------------|----------------------------------|---------------------------|--|--|----------------------------------|---|-------------------------------------|------------------------------|---|--------------------------|-------------------|------------------------|
| 2012 | 224,478 | 6,204 (62.8%) | 2.76 | \$12,107,509 (3.3%) | 3,636 (36.8%) | 1.62 | \$321,585,631 (88.3%) | 40 (0.4%) | 0.02 | \$30,593,587 (8.4%) | 9,880 | 4.40 | \$364,286,727 |
| 2013 | 220,878 | 5,323 (61.4%) | 2.41 | \$10,020,608 (3.1%) | 3,322 (38.3%) | 1.50 | \$295,217,046 (91.7%) | 27 (0.3%) | 0.01 | \$16,527,692 (5.1%) | 8,672 | 3.93 | \$321,765,347 |
| 2014 | 217,507 | 5,129 (57.3%) | 2.36 | \$9,658,628 (3.0%) | 3,776 (42.2%) | 1.74 | \$282,200,169 (86.3%) | 44 (0.5%) | 0.02 | \$35,111,873 (10.7%) | 8,949 | 4.11 | \$326,970,670 |
| 2015 | 209,880 | 4,567 (53.1%) | 2.18 | \$9,648,084 (3.2%) | 4,010 (46.6%) | 1.91 | \$277,532,275 (93.4%) | 24 (0.3%) | 0.01 | \$10,099,237 (3.4%) | 8,601 | 4.10 | \$297,279,596 |
| 2016 | 199,745 | 4,374 (59.7%) | 2.19 | \$8,737,038 (3.3%) | 2,925 (39.9%) | 1.46 | \$238,050,605 (90.2%) | 24 (0.3%) | 0.01 | \$17,079,830 (6.5%) | 7,323 | 3.67 | \$263,867,473 |
| 2017 | 209,448 | 4,474 (61.1%) | 2.14 | \$8,713,318 (3.7%) | 2,834 (38.7%) | 1.35 | \$214,393,515 (90.8%) | 19 (0.3%) | 0.01 | \$13,131,112 (5.6%) | 7,327 | 3.50 | \$236,237,945 |
| 2018 | 224,782 | 4,753 (62.9%) | 2.11 | \$9,548,581 (3.5%) | 2,769 (36.7%) | 1.23 | \$241,863,510 (89.8%) | 30 (0.4%) | 0.01 | \$17,971,177 (6.7%) | 7,552 | 3.36 | \$269,383,267 |
| 2019 | 210,688 | 3,949 (57.1%) | 1.87 | \$8,835,838 (3.6%) | 2,952 (42.7%) | 1.40 | \$226,690,793 (92.4%) | 15 (0.2%) | 0.01 | \$9,888,550 (4.0%) | 6,916 | 3.28 | \$245,415,181 |
| Total | Avg: 214,676 | 38,773 (59.4%) | 2.26 | \$77,269,603 (3.3%) | 26,224 (40.2%) | 1.53 | \$2,097,533,545 (90.2%) | 223 (0.3%) | 0.01 | \$150,403,058 (6.5%) | 65,220 Avg: 8,153 | 3.80 | \$2,325,206,206 |

* Estimated counts based on NCCI payroll,

** Claim rates per 100 employees. The definition of Lost-Time varies from 4 to 8 days away from work in US state WC systems.

Table 2b:

NCCI Mining-Related Costs per Claim 2012–2015

| Claim Type* | Count (% of claims) | Mean | Median |
|---------------------|---------------------|-----------|-----------|
| Medical-Only | 21,223 (58.8%) | \$1,952 | \$798 |
| Lost-Time Non-Fatal | 14,744 (40.8%) | \$79,798 | \$27,368 |
| Lost-Time Fatal | 135 (0.4%) | \$683,944 | \$511,704 |

*The definition of Lost-Time varies from 4 to 8 days away from work in US state WC systems.

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Table 3:

MSHA Employee Count, Injury/Illness Counts and Rates *

| Year | Employee Count* | Medical-Only Injury/Illness Count (Row %) | Medical-Only Rate** | Lost-Time Non-Fatal Injury/Illness Count (Row %) | Lost-Time Non-Fatal Rate** | Lost-Time Fatal Injury/Illness Count (Row %) | Lost-Time Fatal Rate** | All Injuries/Illnesses Count | All Injury/Illness Rate** |
|--------------|---------------------|---|---------------------|--|----------------------------|--|------------------------|------------------------------|---------------------------|
| 2012 | 166,871 | 2912 (54%) | 1.75 | 2498 (46%) | 1.50 | 26 (0.5%) | .02 | 5436 | 3.26 |
| 2013 | 161,379 | 2824 (54%) | 1.75 | 2338 (45%) | 1.45 | 28 (0.5%) | .02 | 5190 | 3.22 |
| 2014 | 158,782 | 2702 (53%) | 1.70 | 2357 (46%) | 1.48 | 28 (0.6%) | .02 | 5087 | 3.20 |
| 2015 | 149,472 | 2472 (54%) | 1.65 | 2061 (45%) | 1.38 | 13 (0.3%) | .01 | 4546 | 3.04 |
| 2016 | 135,508 | 2222 (56%) | 1.64 | 1730 (44%) | 1.28 | 17 (0.4%) | .01 | 3969 | 2.93 |
| 2017 | 140,891 | 2019 (51%) | 1.43 | 1883 (48%) | 1.34 | 21 (0.5%) | .01 | 3923 | 2.78 |
| 2018 | 146,080 | 1990 (53%) | 1.36 | 1750 (47%) | 1.20 | 16 (0.4%) | .01 | 3756 | 2.57 |
| 2019 | 147,242 | 2038 (53%) | 1.38 | 1787 (47%) | 1.21 | 15 (0.4%) | .01 | 3840 | 2.61 |
| Total | Avg: 150,778 | 19,179 (54%) | 1.59 | 16,404 (46%) | 1.36 | 164 (0.5%) | .01 | 35,747 Avg: 4,468 | 2.96 |

* For the 35 NCCI states, excludes contractors and office workers,

** Claim rates per 100 employees. MSHA defines Lost-Time as 1 or more days away from work.

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Table 4a: Miming-Related Counts, Rates and Costs ^{***} by Event/Exposure for MSHA injury/illness data and NCCI Claims, 2012–2019

| Event/Exposure Type | MSHA Injury/illness Count 2012–2019* (% of total) | MSHA Rate ^{**} | NCCI Claim Count 2012–2019 (% of total) | NCCI Claim Rate ^{***} | Total Cost 2012–2019 (% of total) | Indemnity Cost 2012–2019 | Indemnity Cost % of Total Cost | Medical Cost 2012–2019 | Medical Cost % of Total Cost |
|---|---|-------------------------|---|--------------------------------|-----------------------------------|--------------------------|--------------------------------|------------------------|------------------------------|
| Contact with Objects and Equipment | 13,692 (38.3%) | 1.14 | 25,195 (38.6%) | 1.47 | \$687,080,496 (29.5%) | \$368,121,437 | 53.6% | \$318,959,060 | 46.4% |
| Overexertion and Bodily Reaction | 9,428 (26.4%) | 0.78 | 17,257 (26.5%) | 1.00 | \$559,434,824 (24.1%) | \$347,890,555 | 62.2% | \$211,544,269 | 37.8% |
| Falls, Slips, Trips | 9,018 (25.2%) | 0.75 | 9,291 (14.2%) | 0.54 | \$341,881,283 (14.7%) | \$178,649,860 | 52.3% | \$163,231,424 | 47.7% |
| Exposure to Harmful Substances or Environments | 2,768 (7.7%) | 0.23 | 6,648 (10.2%) | 0.39 | \$388,269,181 (16.7%) | \$270,047,864 | 69.6% | \$118,221,318 | 30.4% |
| Other—Miscellaneous, Not Classified | 841 (2.4%) | 0.07 | 3,454 (5.3%) | 0.20 | \$120,856,575 (5.2%) | \$83,414,887 | 69.0% | \$37,441,688 | 31.0% |
| Transportation Incidents | - | - | 2,562 (3.9%) | 0.15 | \$190,019,323 (8.2%) | \$104,600,006 | 55.0% | \$85,419,317 | 45.0% |
| Violence and Other Injuries by Persons or Animals | - | - | 520 (0.8%) | 0.03 | \$4,309,308 (0.2%) | \$1,468,616 | 34.1% | \$2,840,692 | 65.9% |
| Fires and Explosions | - | - | 290 (0.4%) | 0.02 | \$32,652,380 (1.4%) | \$18,828,411 | 57.7% | \$13,823,969 | 42.3% |
| Total | 35,747 | 2.96 | 65,220 | 3.80 | \$2,325,206,206 | \$1,373,549,488 | 59.1% | \$951,656,718 | 40.9% |

* For the 35 NCCI states, excludes contractors and office workers.

** Rate per 100 workers.

*** All costs in this table include both paid and reserves. NR means “Not Reported” and indicates fewer than five case counts.

Table 4b: Event/Exposure by Claim Severity Type
 Event/Exposure by Claim Severity Type

| | Medical-Only Claims | | | | | Lost-Time Non-Fatal Claims | | | | | Lost-Time Fatal Claims | | | | |
|-------------------|-------------------------|-------------------------------|---|---|---------------------------|----------------------------|---|---|---------------------------------|-------------------------------|-------------------------|-------------------------|---|---|---------------------------------|
| | Count 2012-2019 | Medical Cost 2012- 2019 | Mean Claim Cost **** 2012- 2015 | Median Claim Cost **** 2012- 2015 | Count 2012- 2019 | Total Cost 2012-2019 | Mean Claim Cost **** 2012- 2015 | Median Claim Cost **** 2012- 2015 | Indemnity Cost 2012- 2019 | Medical Cost 2012- 2019 | Count 2012-2019 | Total Cost 2012-2019 | Mean Claim Cost **** 2012-2015 | Median Claim Cost **** 2012-2015 | Indemnity Cost 2012- 2019 |
| 18,337 (47.3%) | \$33,259,427 (45.9%) | \$1,770 | \$846 | 6,780 (25.9%) | \$596,312,619 (28.4%) | \$85,589 | \$24,365 | \$312,301,725 | \$284,010,894 | 78 (35.0%) | \$57,508,451 (38.2%) | \$791,419 | \$655,252 | \$55,819,711 | \$1,688,739 |
| 8,859 (22.8%) | \$17,257,262 (22.8%) | \$1,966 | \$805 | 8,392 (32.0%) | \$539,225,196 (25.7%) | \$66,047 | \$27,825 | \$344,919,657 | \$194,305,539 | 6 (2.7%) | \$2,982,367 (2.0%) | \$461,856 | \$606,745 | \$2,970,899 | \$11,468 |
| 5,352 (13.8%) | \$12,567,351 (16.8%) | \$2,350 | \$957 | 3,924 (15.0%) | \$319,330,645 (15.2%) | \$85,102 | \$38,810 | \$169,232,101 | \$150,098,544 | 15 (6.7%) | \$9,989,287 (6.6%) | \$621,710 | \$460,923 | \$9,417,758 | \$571,528 |
| 2,515 (6.5%) | \$4,867,086 (6.5%) | \$1,716 | \$506 | 4,108 (15.7%) | \$371,563,900 (17.7%) | \$90,175 | \$23,363 | \$259,570,432 | \$111,993,467 | 25 (11.2%) | \$11,845,195 (7.9%) | \$573,356 | \$342,801 | \$10,477,432 | \$1,367,764 |
| 1,683 (4.3%) | \$3,256,692 (4.3%) | \$1,930 | \$602 | 1,745 (6.7%) | \$105,521,425 (5.0%) | \$62,908 | \$26,443 | \$71,926,261 | \$33,595,164 | 26 (11.7%) | \$12,078,458 (8.0%) | \$532,802 | \$533,991 | \$11,488,626 | \$589,832 |
| 1,395 3.6% | \$4,666,378 (6.3%) | \$3,536 | \$923 | 1,103 (4.2%) | \$140,529,001 (6.7%) | \$119,287 | \$36,572 | \$60,852,209 | \$79,676,792 | 64 (28.7%) | \$44,823,943 (29.8%) | \$526,899 | \$332,461 | \$43,747,797 | \$1,076,147 |
| 460 (1.2%) | \$656,941 (0.9%) | \$936 | \$393 | 60 (0.2%) | \$3,652,366 (0.2%) | \$59,948 | \$31,155 | \$1,468,616 | \$2,183,750 | NR | NR | NR | NR | NR | NR |
| 171 (0.4%) | \$775,383 (1.0%) | \$5,243 | \$663 | 111 (0.4%) | \$21,336,609 (1.0%) | \$139,152 | \$38,603 | \$8,942,922 | \$12,393,687 | 8 (3.6%) | \$10,542,388 (7.0%) | \$1,598,373 | \$1,337,700 | \$9,885,489 | \$656,899 |
| 38,773 (100%) | \$77,269,603 (100%) | \$1,952 | \$798 | 26,224 (100%) | \$2,097,533,545 (100%) | \$79,798 | \$27,368 | \$1,229,266,916 | \$868,266,629 | 223 (100%) | \$150,403,058 (100%) | \$683,944 | \$511,704 | \$144,282,572 | \$6,120,486 |

table include both paid and reserves

Median cost per claim based on 2012-2015 data only NR means "Not Reported" and indicates fewer than five case counts.

Miming-Related Claim Counts, Rates, and Costs*** by Part of Body for MSHA Injury/Illness Data and NCCI Claims, 2012–2019

Table 5a:

| Part of Body | MSHA Injury/ Illness Count 2012–2019* (% of total) | MSHA Count Rate** | NCCI Claim Count 2012– 2019 (% of total) | NCCI Claim Rate** | Total Cost 2012–2019 (% of total) | Indemnity Cost 2012–2019 | Indemnity Cost % of Total Cost | Medical Cost 2012–2019 | Medical Cost % of Total Cost |
|---------------------------|---|-------------------------|---|-------------------------|--------------------------------------|-----------------------------|--------------------------------------|---------------------------|------------------------------------|
| Upper Extremities | 13,686 (38.3%) | 1.14 | 21,083 (32.3%) | 1.23 | \$485,951,767 (20.9%) | \$255,288,190 | 52.5% | \$230,663,576 | 47.5% |
| Trunk | 7,333 (20.5%) | 0.61 | 16,137 (24.7%) | 0.94 | \$821,467,289 (35.3%) | \$547,228,780 | 66.6% | \$274,238,508 | 33.4% |
| Lower Extremities | 7,117 (19.9%) | 0.59 | 11,938 (18.3%) | 0.70 | \$343,669,421 (14.8%) | \$172,396,612 | 50.2% | \$171,272,809 | 49.8% |
| Head | 4,722 (13.2%) | 0.39 | 9,472 (14.5%) | 0.55 | \$179,741,108 (7.7%) | \$103,945,671 | 57.8% | \$75,795,436 | 42.2% |
| Multiple Body Parts | 1,667 (4.7%) | 0.14 | 3,924 (6.0%) | 0.23 | \$306,092,560 (13.2%) | \$182,194,380 | 59.5% | \$123,898,181 | 40.5% |
| Neck, Including Throat | 679 (1.9%) | 0.06 | 1,850 (2.8%) | 0.11 | \$126,946,771 (5.5%) | \$67,196,192 | 52.9% | \$59,750,580 | 47.1% |
| Body Systems | 532 (1.5%) | 0.04 | 599 (0.9%) | 0.03 | \$55,514,839 (2.4%) | \$40,518,007 | 73.0% | \$14,996,832 | 27.0% |
| Non-Classifiable | NR | NR | 216 (0.3%) | 0.01 | \$5,822,019 (0.3%) | \$4,781,655 | 82.1% | \$1,040,364 | 17.9% |
| Other Body Parts | 11 (<0.01%) | <0.01 | NR | NR | NR | NR | NR | NR | NR |
| Total | 35,747 | 2.96 | 65,220 | 3.80 | \$2,325,206,206 | \$1,373,549,488 | 59.1% | \$951,656,718 | 40.9% |

* For the 35 NCCI states, excludes contractors and office workers.

** Rate per 100 workers.

*** All costs in this table include both paid and reserves. NR means "Not Reported" and indicates fewer than five case

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Table 5b: Injury-Related Claim Counts and Costs^{***} by Part of Body by Claim Severity Type

| | Medical-Only Claims | | | | | | Lost-Time Non-Fatal Claims | | | | | | Lost-Time Fatal Claims | | | | | |
|--|------------------------|--------------------------------------|---|---|--------------------------------|---|---|---|---------------------------------|-------------------------------|-----------------------------|---------------------------------------|---|---|---------------------------------|------------------------------|--|--|
| | Count 2012– 2019 | Medical Cost 2012– 2019 | Mean Claim Cost ^{***} 2012– 2015 | Median Claim Cost ^{***} 2012– 2015 | Count 2012– 2019 | Total Cost 2012–2019 | Mean Claim Cost ^{***} 2012– 2015 | Median Claim Cost ^{***} 2012– 2015 | Indemnity Cost 2012– 2019 | Medical Cost 2012– 2019 | Count 2012– 2019 | Total Cost 2012– 2019 | Mean Claim Cost ^{***} 2012– 2015 | Median Claim Cost ^{***} 2012– 2015 | Indemnity Cost 2012– 2019 | Medical Cost 2012–2019 | | |
| | 13,983 (36.1%) | \$26,162,994 (33.9%) | \$1,813 | \$861 | 7,098 (27.1%) | \$457,879,854 (21.9%) | \$63,106 | \$30,688 | \$253,382,282 | \$204,497,571 | NR | NR | NR | NR | NR | | | |
| | 7,955 (20.5%) | \$15,632,555 (20.2%) | \$1,930 | \$685 | 8,129 (31.0%) | \$773,375,925 (36.7%) | \$101,579 | \$28,443 | \$516,822,820 | \$256,553,105 | 53 (23.8%) | \$32,460,009 (21.1%) | \$644,254 | \$506,718 | \$30,405,960 | \$2,054,049 | | |
| | 7,221 (18.6%) | \$12,722,303 (16.5%) | \$1,750 | \$787 | 4,716 (18.0%) | \$329,739,314 (15.7%) | \$70,140 | \$26,880 | \$171,197,803 | \$158,541,512 | NR | NR | NR | NR | NR | | | |
| | 6,207 (16.0%) | \$12,366,058 (16.0%) | \$1,885 | \$717 | 3,244 (12.4%) | \$155,065,999 (7.4%) | \$43,939 | \$9,522 | \$92,069,347 | \$62,996,652 | 21 (9.4%) | \$12,308,451 (8.2%) | \$478,132 | \$312,895 | \$11,876,324 | \$432,127 | | |
| | 1,765 (4.6%) | \$5,486,227 (7.1%) | \$3,027 | \$1,345 | 2,069 (7.9%) | \$232,438,069 (11.2%) | \$92,174 | \$30,916 | \$116,860,371 | \$115,577,698 | 90 (40.4%) | \$68,168,065 (45.3%) | \$777,448 | \$625,308 | \$65,334,009 | \$2,834,056 | | |
| | 1,049 (2.7%) | \$3,435,170 (4.4%) | \$3,443 | \$1,359 | 799 (3.0%) | \$122,094,220 (5.8%) | \$141,782 | \$47,355 | \$65,781,687 | \$56,312,533 | NR | NR | NR | NR | NR | | | |
| | 424 (1.1%) | \$999,862 (1.3%) | \$2,825 | \$1,181 | 129 (0.5%) | \$25,788,456 (1.3%) | \$97,561 | \$33,764 | \$12,495,260 | \$13,293,195 | 46 (20.6%) | \$28,726,522 (19.4%) | \$572,383 | \$413,302 | \$28,022,747 | \$703,775 | | |
| | 168 (0.4%) | \$465,496 (0.6%) | \$2,354 | \$857 | 40 (0.2%) | \$1,151,709 (0.1%) | \$33,155 | \$14,950 | \$657,346 | \$494,363 | 8 (3.6%) | \$4,204,834 (2.9%) | \$774,688 | \$674,642 | \$4,124,309 | \$80,525 | | |
| | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | | | |
| | 38,773 | \$77,265,003 (100%) | \$1,952 | \$820 | 26,224 (100%) | \$2,097,533,545 (100.0%) | \$79,798 | \$26,191 | \$1,229,266,916 | \$868,266,629 | 223 (100%) | \$150,403,058 (100%) | \$683,944 | \$517,652 | \$144,282,572 | \$6,120,486 | | |

this table include both paid and reserves

median cost per claim based on 2012–2015 data only NR means “Not Reported” and indicates fewer than five case counts

Table 6a: Miming-Related Claim Counts, Rates, and Costs*** by Nature of Injury for MSHA Injury/Illness data and NCCI Claims, 2012–2019

| Nature of Injury Grouping | MSHA injury/illness count 2012–2019* (% of total) | MSHA Rate*** | NCCI Claim Count 2012–2019 (% of total) | NCCI Claim Rate** | Total Cost 2012–2019 (% of total) | Indemnity Cost 2012–2019 | Indemnity Cost (% of Total Cost) | Medical Cost 2012–2019 | Medical Cost (% of Total Cost) |
|---|---|--------------|---|-------------------|-----------------------------------|--------------------------|----------------------------------|------------------------|--------------------------------|
| Traumatic Injuries to Muscles, Tendons, Ligaments, Joints, etc. (Includes Dislocations and Sprain/Strain) | 12,109 (33.9%) | 1.00 | 22,589 (34.6%) | 1.32 | \$754,041,731 (32.4%) | \$442,432,294 | 58.7% | \$311,609,437 | 41.3% |
| Surface Wounds and Bruises (Contusions) | 3,402 (9.5%) | 0.28 | 10,526 (16.1%) | 0.61 | \$125,547,970 (5.4%) | \$64,326,323 | 51.2% | \$61,221,647 | 48.8% |
| Open Wounds (Cuts, Lacerations, Punctures, Amputations) | 7,959 (22.3%) | 0.66 | 8,718 (13.4%) | 0.51 | \$124,296,531 (5.3%) | \$48,240,508 | 38.8% | \$76,056,023 | 61.2% |
| Traumatic Injuries to Bones, Nerves, Spinal Cord (Includes Bone Fractures) | 5,482 (15.3%) | 0.45 | 4,862 (7.5%) | 0.28 | \$309,896,877 (13.3%) | \$141,004,481 | 45.5% | \$168,892,396 | 54.5% |
| All Other Specific Injuries, Not Elsewhere Classified | 1,636 (4.6%) | 0.14 | 4,526 (6.9%) | 0.26 | \$216,386,855 (9.3%) | \$142,944,558 | 66.1% | \$73,442,297 | 33.9% |
| Respiratory System Diseases (Includes Black Lung, Asbestosis, Silicosis, etc.) | 1,093 (3.1%) | 0.09 | 4,515 (6.9%) | 0.26 | \$355,304,967 (15.3%) | \$280,159,627 | 78.9% | \$75,145,339 | 21.1% |
| Nervous System and Sense Organs Diseases (Includes Hearing Loss) | 658 (1.8%) | 0.06 | 2,565 (3.9%) | 0.15 | \$43,942,649 (1.9%) | \$35,578,897 | 81.0% | \$8,363,752 | 19.0% |
| Other Traumatic Injuries and Disorders (Crushing, Dermatitis, Electric Shock, Asphyxiation) | 690 (1.9%) | 0.06 | 1,646 (2.5%) | 0.10 | \$123,710,762 (5.3%) | \$61,567,219 | 49.8% | \$62,143,543 | 50.2% |
| Multiple Physical Injuries | 366 (1.0%) | 0.03 | 1,566 (2.4%) | 0.09 | \$141,311,217 (6.1%) | \$83,014,405 | 58.7% | \$58,296,813 | 41.3% |
| Burns (Scalds) | 1,055 (3.0%) | 0.09 | 1,271 (1.9%) | 0.07 | \$33,770,942 (1.5%) | \$11,189,391 | 33.1% | \$22,581,551 | 66.9% |
| Other Disease/Cumulative Injury (Including Radiation) | 38 (0.1%) | - | 789 (1.2%) | 0.05 | \$39,850,778 (1.7%) | \$29,740,546 | 74.6% | \$10,110,232 | 25.4% |
| Carpal Tunnel Syndrome | NR | NR | 332 (0.5%) | 0.02 | \$17,216,183 (0.7%) | \$10,666,621 | 62.0% | \$6,549,562 | 38.0% |
| Intracranial Injuries (Includes Concussions) | 190 (0.5%) | 0.02 | 318 (0.5%) | 0.02 | \$13,374,146 (0.6%) | \$7,192,146 | 53.8% | \$6,182,000 | 46.2% |

| Nature of Injury Grouping | MSHA injury/illness count 2012–2019* (% of total) | MSHA Rate** | NCCI Claim Count 2012–2019 (% of total) | NCCI Claim Rate*** | Total Cost 2012–2019 (% of total) | Indemnity Cost 2012–2019 | Indemnity Cost (% of Total Cost) | Medical Cost 2012–2019 | Medical Cost (% of Total Cost) |
|---|---|-------------|---|--------------------|-----------------------------------|--------------------------|----------------------------------|------------------------|--------------------------------|
| No Physical Injury (Includes Symptoms, Contact Lenses, Artificial Appliance, Syncope) | 552 (1.5%) | 0.05 | 316 (0.5%) | 0.02 | \$5,694,616 (0.2%) | \$3,939,278 | 69.2% | \$1,755,337 | 30.8% |
| Effects of Environmental Conditions | 221 (0.6%) | 0.02 | 276 (0.4%) | 0.02 | \$1,036,896 (0.0%) | \$154,548 | 14.9% | \$882,348 | 85.1% |
| Infections (Contagious, Bacterial, etc.) | 92 (0.3%) | 0.01 | 167 (0.3%) | 0.01 | \$5,331,138 (0.2%) | \$1,723,718 | 32.3% | \$3,607,420 | 67.7% |
| Poisoning (Systemic, Absorption of Toxic Substances) | 204 (0.6%) | 0.02 | 130 (0.2%) | 0.01 | \$3,434,089 (0.1%) | \$2,691,390 | 78.4% | \$742,699 | 21.6% |
| Circulatory System Diseases (Includes Myocardial Infarctions) | NR | - | 76 (0.1%) | 0.00 | \$5,206,989 (0.2%) | \$3,461,908 | 66.5% | \$1,745,081 | 33.5% |
| Mental Disorders and Syndromes | NR | - | 30 (<0.1%) | 0.00 | \$5,156,119 (0.2%) | \$2,993,777 | 58.1% | \$2,162,341 | 41.9% |
| Total | 35,747 | 2.96 | 65,220 | 3.80 | \$2,325,206,206 | \$1,373,549,488 | 59.1% | \$951,656,718 | 40.9% |

* For the 35 NCCI states, excludes contractors and office workers.

** Rate per 100 workers.

*** All costs in this table include both paid and reserves. NR means "Not Reported" and indicates fewer than five case counts.

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Table 6b: Fracture-Related Claim Counts and Costs by Nature by Claim Severity Type**

| Nature of Injury | Medical-Only Claims | | | | | | Lost-Time Non-Fatal Claims | | | | | | Lost-Time Fatal Claims | | | | | |
|---|---------------------|------------------------|------------------------------|--------------------------------|-----------------|-----------------------|------------------------------|--------------------------------|--------------------------|------------------------|-----------------|----------------------|------------------------------|--------------------------------|--------------------------|------------------------|--|--|
| | Count 2012-2019 | Medical Cost 2012-2019 | Mean Claim Cost*** 2012-2015 | Median Claim Cost*** 2012-2015 | Count 2012-2019 | Total Cost 2012-2019 | Mean Claim Cost*** 2012-2015 | Median Claim Cost*** 2012-2015 | Indemnity Cost 2012-2019 | Medical Cost 2012-2019 | Count 2012-2019 | Total Cost 2012-2019 | Mean Claim Cost*** 2012-2015 | Median Claim Cost*** 2012-2015 | Indemnity Cost 2012-2019 | Medical Cost 2012-2019 | | |
| Fracture of the hip, femur, tibia, fibula, radius, ulna, humerus, scapula, pelvis, etc. | 13,021 (33.6%) | \$26,312,645 (34.1%) | \$2,052 | \$871 | 9,564 (36.5%) | \$725,622,180 (34.6%) | \$77,762 | \$33,805 | \$440,367,842 | \$285,254,339 | NR | NR | NR | NR | NR | NR | | |
| Fracture of the hand and wrist | 8,735 (22.5%) | \$13,861,166 (17.9%) | \$1,547 | \$675 | 1,791 (6.8%) | \$111,686,803 (5.3%) | \$59,565 | \$18,792 | \$64,326,323 | \$47,360,481 | NR | NR | NR | NR | NR | NR | | |
| Fracture of the shoulder, elbow, forearm, wrist, hand, etc. | 7,089 (18.3%) | \$11,591,355 (15.0%) | \$1,585 | \$890 | 1,627 (6.2%) | \$112,060,205 (5.3%) | \$74,187 | \$16,419 | \$47,616,341 | \$64,443,863 | NR | NR | NR | NR | NR | NR | | |
| Fracture of the spine (vertebrae, cervical, thoracic, lumbar) | 1,792 (4.6%) | \$7,060,116 (9.1%) | \$3,847 | \$1,585 | 3,064 (11.7%) | \$299,263,747 (14.3%) | \$96,468 | \$33,510 | \$138,061,759 | \$161,201,988 | 6 (2.7%) | \$3,573,014 (2.4%) | \$411,174 | \$372,707 | \$2,942,723 | \$630,291 | | |
| Fracture of the skull, facial bones, etc. | 2,943 (7.6%) | \$6,066,470 (7.9%) | \$1,807 | \$680 | 1,509 (5.8%) | \$145,149,945 (6.9%) | \$90,497 | \$32,362 | \$78,577,256 | \$66,572,689 | 74 (33.2%) | \$65,170,440 (43.3%) | \$926,505 | \$806,271 | \$64,367,302 | \$803,137 | | |
| Fracture of the ribs, etc. | 1,011 (2.6%) | \$1,473,104 (1.9%) | \$1,561 | \$229 | 3,482 (13.3%) | \$344,721,070 (16.4%) | \$107,447 | \$27,077 | \$271,655,913 | \$73,065,157 | 22 (9.9%) | \$9,110,793 (6.1%) | \$450,344 | \$300,068 | \$8,503,715 | \$607,078 | | |

**Occup Environ Med. Author manuscript; available in PMC 2024 July 29.

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| Location | Medical-Only Claims | | | | | Lost-Time Non-Fatal Claims | | | | | Lost-Time Fatal Claims | | | | |
|------------|---------------------|------------------------|--------------------------------|----------------------------------|----------------------|----------------------------|--------------------------------|----------------------------------|--------------------------|------------------------|------------------------|----------------------|--------------------------------|----------------------------------|--------------------------|
| | Count 2012-2019 | Medical Cost 2012-2019 | Mean Claim Cost **** 2012-2015 | Median Claim Cost **** 2012-2015 | Count 2012-2019 | Total Cost 2012-2019 | Mean Claim Cost **** 2012-2015 | Median Claim Cost **** 2012-2015 | Indemnity Cost 2012-2019 | Medical Cost 2012-2019 | Count 2012-2019 | Total Cost 2012-2019 | Mean Claim Cost **** 2012-2015 | Median Claim Cost **** 2012-2015 | Indemnity Cost 2012-2019 |
| ... (0.8%) | \$1,366,704 (1.8%) | \$3,781 | \$1,489 | 2,237 (8.5%) | \$42,575,945 (2.0%) | \$20,074 | \$8,394 | \$35,578,897 | \$6,997,048 | NR | \$0 (0.0%) | NA | \$0 | \$0 | \$0 |
| ... (2.6%) | \$1,888,792 (2.4%) | \$1,854 | \$926 | 577 (2.2%) | \$83,499,069 (4.0%) | \$73,723 | \$22,606 | \$25,045,319 | \$58,453,750 | 57 (25.6%) | \$38,322,901 (25.5%) | \$768,395 | \$712,591 | \$36,521,900 | \$1,801,001 |
| ... (3.7%) | \$2,839,233 (3.7%) | \$4,019 | \$1,501 | 769 (2.9%) | \$111,498,615 (5.3%) | \$141,299 | \$37,549 | \$57,432,153 | \$54,066,462 | 49 (22.0%) | \$26,973,369 (17.9%) | \$493,234 | \$407,052 | \$25,582,251 | \$1,391,118 |
| ... (2.2%) | \$1,731,109 (2.2%) | \$1,522 | \$649 | 303 (1.2%) | \$31,119,537 (1.5%) | \$88,103 | \$12,237 | \$10,925,994 | \$20,193,543 | NR | NR | NR | NR | NR | NR |
| ... (0.3%) | \$2,16,178 (0.3%) | \$1,657 | \$932 | 667 (2.5%) | \$39,583,445 (1.9%) | \$62,828 | \$31,422 | \$29,690,061 | \$9,893,384 | NR | NR | NR | NR | NR | NR |
| ... (0.2%) | \$285,564 (0.4%) | \$3,349 | \$2,152 | 265 (1.0%) | \$16,930,619 (0.8%) | \$59,036 | \$48,525 | \$10,666,621 | \$6,263,998 | NR | NR | NR | NR | NR | NR |
| ... (0.5%) | \$811,161 (1.0%) | \$4,363 | \$2,040 | 131 (0.5%) | \$12,289,332 (0.6%) | \$108,285 | \$37,869 | \$6,920,376 | \$5,368,956 | NR | NR | NR | NR | NR | NR |
| ... (0.7%) | \$423,029 (0.5%) | \$1,277 | \$601 | 59 (0.2%) | \$5,147,541 (0.2%) | \$48,530 | \$10,909 | \$3,815,233 | \$1,332,308 | NR | NR | NR | NR | NR | NR |

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| | Medical-Only Claims | | | | | Lost-Time Non-Fatal Claims | | | | | Lost-Time Fatal Claims | | | | | |
|---|----------------------------|----------------------------------|--|--|--------------------------|-------------------------------------|--|--|---------------------------------|-------------------------------|-------------------------|-----------------------------------|--|--|---------------------------------|------------------------------|
| | Count 2012- 2019 | Medical Cost 2012- 2019 | Mean Claim Cost 2012- 2015 | Median Claim Cost 2012- 2015 | Count 2012- 2019 | Total Cost 2012-2019 | Mean Claim Cost 2012- 2015 | Median Claim Cost 2012- 2015 | Indemnity Cost 2012- 2019 | Medical Cost 2012- 2019 | Count 2012- 2019 | Total Cost 2012-2019 | Mean Claim Cost 2012- 2015 | Median Claim Cost 2012- 2015 | Indemnity Cost 2012- 2019 | Medical Cost 2012-2019 |
| Number of occupational injury claims | 248 (0.6%) | \$685,273 (0.9%) | \$3,443 | \$1,794 | 28 (0.1%) | \$351,623 (0.0%) | \$14,576 | \$11,803 | \$154,548 | \$197,075 | NR | NR | NR | NR | NR | NR |
| Number of occupational injury claims with lost-time | 113 (0.3%) | \$175,867 (0.2%) | \$1,148 | \$497 | 54 (0.2%) | \$5,155,271 (0.2%) | \$87,528 | \$33,294 | \$1,723,718 | \$3,431,553 | NR | NR | NR | NR | NR | NR |
| Number of occupational injury claims with lost-time and medical costs | 103 (0.3%) | \$353,432 (0.5%) | \$3,038 | \$825 | 25 (0.1%) | \$1,485,020 (0.1%) | \$73,162 | \$31,036 | \$1,096,647 | \$388,373 | NR | NR | NR | NR | NR | NR |
| Number of occupational injury claims with lost-time and medical costs and reserves | 27 (0.1%) | \$118,000 (0.2%) | \$5,074 | \$2,351 | 48 (0.2%) | \$4,186,080 (0.2%) | \$106,837 | \$41,014 | \$2,565,145 | \$1,620,935 | NR | NR | NR | NR | NR | NR |
| Number of occupational injury claims with lost-time and medical costs and reserves and total costs | 7 (<0.1%) | \$10,405 (0.0%) | \$780 | \$592 | 23 (0.1%) | \$5,145,714 (0.2%) | \$154,508 | \$56,330 | \$2,993,777 | \$2,151,936 | NR | NR | NR | NR | NR | NR |
| | 38,773 (100.0%) | \$77,269,603 (100.0%) | \$1,952 | \$842 | 26,224 (0.1%) | \$2,097,533,545 (100.0%) | \$79,798 | \$28,265 | \$1,229,266,916 | \$868,266,629 | 223 (100.0%) | \$150,403,058 (100.0%) | \$683,944 | \$594,760 | \$144,282,572 | \$6,120,486 |

in this table include both paid and reserves

and median cost per claim based on 2012-2015 data only NR means "Not Reported" and indicates fewer than five case counts

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