

Temporal Trends in Workers' Compensation Claims by Industry and Occupation in Pennsylvania (2014–2023)

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Funding Sources: The Pennsylvania Occupational Health and Safety Surveillance (PennOSHS) Program is funded by the National Institute of Occupational Safety and Health (NIOSH)

Conflicts of Interests: None Declared

Acknowledgements: The authors gratefully acknowledge the Pennsylvania Department of Labor and Industry for providing access to the workers' compensation claims data used in this analysis. Ethical Considerations & Disclosure(s): not applicable. Author Contributions: James Marks - Conceptualization, Methodology, Formal Analysis, Writing – Original Draft; Remy Babich - Conceptualization, Review and Editing; Anil Nair - Supervision. The data used for this analysis is confidential and will not be made available. AI was not utilized at any stage during data analysis or manuscript development.

Short Title (≤50 characters): PA Workers Compensation Claims Trends (2014-2023)

ABSTRACT

Objective: Examine trends in Pennsylvania workers' compensation (WC) claims by industry and occupation, 2014–2023.

Methods: WC claim rates (per 1,000 jobs held) were calculated using the Quarterly Census of Employment and Wages as the denominator. Multiple linear regression estimated temporal trends across industry-specific WC claim rates, pre-pandemic (2014–2019) and post-pandemic (2020–2023). Negative binomial models estimated risk ratios (RR) across occupation groups, with Office and Administrative Support as reference.

Results: Rates declined in most industries, including Public Administration and Construction. Transportation, Retail, and Management of Companies remained high without long-term declines. Elevated RRs were identified in Transportation and Material Moving (RR=3.11), Production (RR=1.70), and Healthcare Practitioners (RR=1.31) occupations.

Conclusions: Despite overall declines, industry- and occupation-specific risks persist in Pennsylvania. High-risk industries and occupations need targeted prevention and continued surveillance.

KEYWORDS

- Workers' Compensation
- Occupational Injury
- Temporal Trends
- Industry & Occupation
- Pennsylvania

Learning Outcomes

- Nationally, workers' compensation claim rates have declined overall but essential and public-facing industries particularly during the COVID-19 pandemic—have continued to show elevated injury risks.
- From 2014 to 2023 in Pennsylvania, Management of Companies and Enterprises, Transportation and Warehousing, and Retail Trade emerged as the highest-risk industries. Among occupations, Transportation and Material Moving, Production, and Healthcare Practitioners exhibited the greatest relative risks.
- By pinpointing these high-risk industries and occupations, stakeholders can tailor injury-prevention strategies, prioritize resource allocation, and strengthen ongoing surveillance to address evolving workplace hazards.

INTRODUCTION

Workplace hazards are a critical public health concern, as the average employed American spends nearly 20% of their annual hours at work¹. Pennsylvania is an ideal setting to investigate workplace safety due to its diverse economy and substantial workforce of nearly 6 million people employed across all major industries². Workplace injuries and illnesses in Pennsylvania have substantial health and economic implications, which is partly addressed by the state-mandated Workers' Compensation (WC) insurance program.

WC provides workers with medical care and wage compensation while limiting employers' direct legal liabilities³. State governments alone oversee its operation, with no federal authority or mandate establishing baseline requirements. Consequently, states vary widely in both the scope of coverage and benefits. Analyzing WC data helps policymakers, businesses, and researchers evaluate workplace safety and the effectiveness of injury prevention efforts. However, changes in WC claim incidence over time can reflect not only underlying shifts in occupational exposures and workforce composition, but also evolving enforcement and prevention initiatives (e.g., OSHA emphasis programs and state-specific safety campaigns). WC data serves as a valuable epidemiologic resource for acute workplace injury research, though it underestimates chronic occupational diseases^{4,5}.

Workplace conditions across nearly all sectors were reshaped during the COVID-19 pandemic, altering occupational risks through the expansion of remote work, intensifying demands on essential workers, and shifting economic pressures⁶. Although employment across the U.S. eventually recovered to pre-pandemic levels by late 2022, the workforce composition remained changed, with widespread adoption of remote and hybrid arrangements likely reducing physical hazard exposure in many occupations during that time^{7,8}. Concurrently, a surge in

demand for home delivery services drove substantial employment growth in the transportation and warehousing industry; particularly in local messenger, private postal, and delivery roles, which experienced a 75% increase between February 2020 and June 2022⁹. These shifts may have redistributed occupational risks across sectors, with some industries rapidly adapting and others retaining traditional work models. Previous studies have primarily used workers' compensation (WC) data to examine occupational COVID-19 infection claims, showing that healthcare and other public-facing occupations accounted for the majority of cases^{10,11}. Large-scale industry-level impacts of the pandemic remain underexplored. However, preliminary evidence shows increased injury rates in Montana's Transportation and Warehousing sector and rising WC claim costs in other states suggesting that COVID-19 may have altered not only the structure of employment but also the distribution of occupational risk^{12,13}.

To our knowledge, no comprehensive analysis has yet examined Pennsylvania's WC claim trends across industries and occupations over the past decade, including the pandemic. This study aims to address these gaps by: (1) analyzing industry-specific trends in WC claim rates in Pennsylvania from 2014–2023, (2) comparing trends before and after the onset of the COVID-19 pandemic, and (3) evaluating occupational risks associated with claim frequency. These findings aim to inform policymakers and workplace safety professionals in developing more targeted injury prevention efforts and optimizing resource allocation.

METHODS

Data Sources

Annual WC data from the Pennsylvania Department of Labor and Industry (2014–2023) and employment data from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) were used in this analysis¹⁴. All claim types were included (e.g., medical-

only and lost-time/indemnity claims). WC variables included injury date, age, gender, industry (NAICS coded), and occupation (free text). QCEW provided the annual average of monthly employment levels, serving as the denominator, and includes workers covered by state unemployment insurance and unemployment compensation for federal employee programs, making it one of the most comprehensive labor market data sources available. Importantly, QCEW reports employment as the number of covered jobs (positions) rather than unique individual workers; for that reason, we expressed incidence as claims per 1,000 jobs held to align with the QCEW denominator.

For each WC claim, industry descriptions were categorized using the 2017 North American Industry Classification System (NAICS)¹⁵. Free-text occupations were categorized using the 2018 Standard Occupational Classification (SOC) system¹⁶. The National Institute for Occupational Safety and Health Industry and Occupation Computerized Coding System (NIOCCS) was used to categorize free-text industry and occupation variables into their respective NAICS and SOC categories. The NAICS coded industry variables were included in the NIOCCS coding to improve the occupation variable coding accuracy¹⁷ and served to ensure each NAICS code was cross-walked correctly to the 2017 version. NIOCCS is a web-based tool employing machine learning to convert free-text industry and occupation descriptions into standardized codes¹⁷.

Statistical Analysis

Claim rates were calculated using WC claims as the numerator and QCEW employment data as the denominator. Annual WC claims and QCEW employment data were categorized based on 2-digit NAICS industries, which group industries of employment into twenty broad sectors. WC claim rates are expressed as per 1,000 jobs held.

To evaluate trends in WC claim rates across PA industries, multiple ordinary least squares (OLS) linear regression models were fit with annual industry-specific WC claim rates (per 1,000 jobs held) as the dependent variable¹⁸. Rates were analyzed for each industry-year combination (2-digit NAICS industry by calendar year). Independent variables included calendar year (centered within each analytic period), industry (2-digit NAICS levels), and a year×industry interaction to allow annual trends to vary by industry (i.e., $\text{rate} \sim \text{year}(\text{centered}) \times \text{industry}$). Three separate interaction models were estimated for the full period (2014–2023), the pre-COVID-19 period (2014–2019), and the post-COVID-19 period (2020–2023). Year was centered by subtracting the mean year within each period so that the model intercept represents the estimated claim rate at the period's average year¹⁹. The reference industry was Other Services (except Public Administration). Statistical significance was evaluated using two-sided t-tests with $\alpha = 0.05$.

Two complementary trend summaries were derived from the same interaction model. First, the year×industry interaction terms were used to test whether each industry's annual trend differed from the reference industry²⁰. Second, industry-specific annual changes were estimated as linear combinations of model coefficients (the year term plus the relevant year×industry interaction term) and tested against zero to determine whether each industry exhibited a statistically significant increase or decrease over time. For these industry-specific slopes, 95% confidence intervals were calculated using the model variance–covariance matrix.

To evaluate whether claim-rate trends exhibited a structural break at the onset of the COVID-19 pandemic and to support the pre/post stratification, we fit an interrupted time-series (segmented) regression with a breakpoint at 2020^{21,22}. The model included: time (years since 2014), post-2020 (binary indicator for years ≥ 2020 , representing an immediate level change at

2020), and time-after-2020 (0 for years before 2020 and increasing by 1 each year thereafter, representing a change in slope after 2020). Each term was interacted with industry to allow industry-specific changes in level and slope at 2020. Evidence for discontinuity was assessed using a partial F-test comparing nested models with versus without the post-2020 terms^{21,22}.

Negative binomial regression was used to assess the occupational count data, due to overdispersion²³. Occupational variables from each WC claim were categorized using SOC major codes, which are made up of 23 broad occupational groups. The occupation Office and Administrative Support was chosen as the reference group due to its large workforce, moderate risk profile, and prevalence across all industries. To assess temporal trends across occupations, two categorical variables compared WC claims in pre-COVID-19 (2015–2019) and post-COVID-19 (2020–2023) periods against a baseline of 2014, selected due to its role as the initial year of complete data availability. The resulting risk ratios allow for comparison of pre- and post-pandemic trends while controlling for occupation. To interpret the results of the negative binomial regression, model coefficients were exponentiated to derive risk ratios (RR).

All analyses were conducted using R statistical software (version 4.4.2), employing Tidyverse, MASS, and Janitor packages. Patients and members of the public were not involved in the design, conduct, reporting, or dissemination plans of this research.

RESULTS

Demographics

From 2014-2023, the demographic profile of the 1,848,006 workers' compensation (WC) claimants varied by industry and occupation (Table 1). Overall, claimants were majority male (52%), though industries like Health Care and Social Assistance (64%) and Educational Services (57%) had higher proportions of female claimants. Younger claimants (ages 16–24) were

prominent in Accommodation and Food Services (30%) and Arts, Entertainment, and Recreation (28%), whereas older workers (ages 45–64) were most represented in Utilities (52%) and Educational Services (54%). Occupationally, female claimants dominated in Healthcare Support (80%) and Educational Instruction and Library (80%), while Installation, Maintenance, and Repair (92%) and Construction and Extraction (90%) occupations were largely male. Younger workers were common in Food Preparation and Serving (28%), whereas older workers frequently appeared in Management (52%) and Building and Grounds Maintenance (51%). Workers aged 65 and older consistently represented about 5% across all categories.

Industry Specific WC Claim Trends (2014-2023)

To address the first study aim, we examined long-term trends in WC claim rates across Pennsylvania industries between 2014 and 2023, identifying industries with persistently high rates and evaluating whether claim rates change over time.

Overall, WC claim rates varied substantially across industries over the study period. Public Administration reported the highest overall WC claim rate (59.6 claims per 1,000 jobs held) and declined from 68.5 in 2014 to 50.2 in 2023. Other high-rate industries included Management of Companies and Enterprises (56.2 per 1,000 jobs held), Transportation and Warehousing (45.7), Agriculture, Forestry, Fishing, and Hunting (41.6), and Retail Trade (39.8) (Table 2).

In the multiple linear regression models, industry-specific annual WC claim rate changes were estimated and tested against 0 (Table 3). Several industries demonstrated statistically significant declines in WC claim rates over time, including Public Administration (−2.22 claims per 1,000 jobs held; 95% CI: −2.88, −1.56), Construction (−1.41; 95% CI: −2.07, −0.75), Utilities (−1.34; 95% CI: −2.00, −0.68), Agriculture, Forestry, Fishing and Hunting (−1.35; 95%

CI: -2.01, -0.69), Health Care and Social Assistance (-1.13; 95% CI: -1.80, -0.47), and Manufacturing (-0.84; 95% CI: -1.50, -0.18). The reference industry, Other Services (except Public Administration), also declined over time (-1.26; 95% CI: -1.92, -0.60).

In contrast, several high-rate industries did not exhibit statistically significant change in WC claim rate from 2014–2023, including Retail Trade (0.24; 95% CI: -0.42, 0.90), Transportation and Warehousing (0.43; 95% CI: -0.24, 1.09), and Management of Companies and Enterprises (0.37; 95% CI: -0.29, 1.03). Full model coefficients, including *Year*×*industry* interaction terms comparing each industry's trend to the reference industry, are provided in the Supplement (Supplement Table S1, <http://links.lww.com/JOM/C506>).

Changes in Industry Trends Before and After COVID-19

To evaluate how the COVID-19 pandemic may have influenced industry-specific WC claim trends, we compared annual trends before (2014–2019) and after (2020–2023) the onset of the pandemic. This stratification was supported by an interrupted time-series model with a breakpoint at 2020, where adding post-2020 level and slope-change terms significantly improved model fit (partial F-test: $F(40, 120) = 10.63, p < 3.13 \times 10^{-24}$).

Pre-COVID-19 (2014–2019), WC claim rates declined significantly in many industries (Table 3). The steepest declines were observed in Public Administration (-2.44 claims per 1,000 jobs held; 95% CI: -3.05, -1.83), Agriculture, Forestry, Fishing and Hunting (-1.91; 95% CI: -2.53, -1.30), and Real Estate and Rental and Leasing (-1.76; 95% CI: -2.37, -1.14). Several other industries also showed statistically significant downward trends during this period, including Construction (-1.36; 95% CI: -1.97, -0.74) and Utilities (-1.44; 95% CI: -2.05, -0.82). In contrast, Management of Companies and Enterprises showed a significantly increasing

trend pre-pandemic (3.50; 95% CI: 2.88, 4.11), and Retail Trade also increased modestly (0.81; 95% CI: 0.20, 1.43).

Post-COVID-19 (2020–2023), fewer industries exhibited statistically significant changes (Table 3). The strongest change was observed in Management of Companies and Enterprises, which reversed direction and declined sharply (−10.90; 95% CI: −12.88, −8.92). Significant declines were also observed in Health Care and Social Assistance (−2.85; 95% CI: −4.83, −0.87) and Administrative and Support and Waste Management and Remediation Services (−2.01; 95% CI: −3.99, −0.03). Educational Services demonstrated a statistically significant post-2020 increase in claim rates, with rates in 2022 and 2023 comparable to pre-COVID-19 levels (4.41; 95% CI: 2.43, 6.39). Several industries that declined pre-pandemic did not show statistically significant trends post-pandemic, including Public Administration (−1.09; 95% CI: −3.07, 0.89) and Agriculture, Forestry, Fishing and Hunting (−0.72; 95% CI: −2.70, 1.26).

Full model coefficients (including year×industry interaction terms comparing each industry's trend to the reference industry) are provided in the Supplement (Supplement Table S1, <http://links.lww.com/JOM/C506>).

Occupational Risk Ratios and Trends

As part of the third study aim, we used negative binomial regression to assess variation in WC claim risk by occupation, estimating risk ratios (RR) relative to a reference group while controlling for time. Compared to 2014, the pre-COVID-19 years (2015–2019) showed a small and non-significant increase in claims (RR = 1.02; 95% CI: 0.98–1.07), while the COVID-19 period (2020–2023) exhibited a significant 14% reduction in expected claims (RR = 0.86; 95% CI: 0.82–0.90), after adjusting for occupation category (Figure 1).

Several occupational categories had risk ratios significantly greater than 1.0 compared to Office and Administrative Support. The most notable categories included Transportation and Material Moving (RR = 3.11, 95% CI: 2.84–3.40), Production (RR = 1.70, 95% CI: 1.55–1.86), and Healthcare Practitioners and Technical (RR = 1.31, 95% CI: 1.20–1.44). A modest elevation was seen for Healthcare Support occupations (RR = 1.08, 95% CI: 0.99–1.19), although this result should be interpreted cautiously due to the borderline confidence interval. See Supplement Table S2, <http://links.lww.com/JOM/C506> for details on negative binomial regression results.

DISCUSSION

This analysis offers valuable insights into occupational injury trends in Pennsylvania from 2014 to 2023, revealing substantial variations across industries and occupations, as well as notable shifts linked to the COVID-19 pandemic. These findings highlight the need for targeted industry-specific prevention strategies and informed workplace safety initiatives to address evolving workplace risks.

Consistent with national trends, we found significant reductions in WC claim rates across many Pennsylvanian industries¹³. Public Administration had the highest overall claim rate but also one of the steepest estimated annual declines. These declines may reflect improvements in workplace safety standards or the broader adoption of automation and safer technologies²⁴. Prior to 2020, the number of jobs in Pennsylvania covered by workers' compensation increased steadily. After the onset of the COVID-19 pandemic, coverage declined substantially in Pennsylvania and nationwide²⁵. It remains unclear whether coverage will return to its pre-pandemic trajectory. In the context of our findings, declining WC coverage could bias claim rates downward and may partially explain the observed reductions observed in several industries.

Additional research is needed to assess how COVID-19 affected WC coverage across industries and whether some worker populations became less likely to be captured in WC claims data.

Post-COVID-19 (2020–2023), significant declines were observed for Management of Companies and Enterprises, Health Care and Social Assistance, and Administrative and Support and Waste Management and Remediation Services. The pronounced decline in Management of Companies and Enterprises likely reflects pandemic-related volatility (e.g., a 2020 spike followed by a rapid return toward baseline); consistent with this pattern, the industry showed a positive linear slope in the pre-COVID-19 period and a negative slope in the post-COVID-19 period, suggesting greater year-to-year variability than its non-significant p-value implies in the 2014–2023 model and indicating fluctuations not fully captured by a single linear trend.

The Health Care & Social Assistance industry was the only industry which decreased significantly in each of our models, despite the spike in rates during 2020. While essential sectors such as healthcare experienced elevated claim volumes related to COVID-19 illness, most industries saw declines, contributing to cost savings^{26,27}. Although all industries were affected by the pandemic, the pace and extent of recovery varied, with some returning quickly to baseline and others undergoing more lasting shifts in occupational risk^{28,29}. Some sectors have yet to return to pre-2019 employment levels, suggesting potential long-term structural changes in the composition of certain industries²⁹.

Not all industries experienced substantial reductions in WC claim rates over the ten-year period. Retail Trade, Management of Companies and Enterprises, and Transportation and Warehousing maintained relatively stable rates and ranked among the top five industries for WC claims from 2014-2023. These findings mirror national patterns where these supply chain–dependent sectors were less affected by shutdowns and instead saw sustained or increased

workloads³⁰. In the Management and Retail Trade industries, overexertion and contact with objects and equipment have been identified as the leading causes of injury and illness; accounting for more than 50% of reported cases^{29,31}. In the Transportation and Warehousing sector, bodily reaction and exertion injuries have remained the primary cause of injury and illness³². These persistent trends suggest ongoing risks related to overexertion across these industries, potentially reflecting the physical demands of work or insufficient adoption of effective safety practices. These findings underscore the need for industry-specific safety interventions.

Retail Trade and Transportation and Warehousing industries are interconnected through supply chain and the distribution of goods, with the growth of e-commerce further strengthening their integration^{33,34}. Home-delivery services, which experienced a substantial increase in demand during the COVID-19 pandemic, have since become a routine feature of the retail and service economy^{35,36}. One potential explanation for the stable WC claim rates in these sectors may be the rapid expansion of home-delivery services and e-commerce activity, which likely sustained demand for labor in retail and transportation roles³⁷. Within these industries, Couriers & Messengers and Food & Beverage Retailers have reported increases in work-related injury and illness rates since 2020³⁷.

Occupational risk analysis highlighted Transportation and Material Moving occupations as having significantly higher risk ratios relative to Office and Administrative Support occupations, aligning with known occupational health literature^{38,39}. Workers in these roles often face strenuous physical demands, repetitive tasks, and a higher likelihood of workplace accidents due to machinery or vehicle operation^{38,39}. Similarly, elevated risk was identified among

Production and Healthcare Practitioners and Technical occupations, emphasizing persistent workplace hazards that require focused mitigation strategies.

These findings expand upon existing research by offering a more detailed, Pennsylvania-specific perspective on how occupational risks and claim patterns evolved during and after the COVID-19 pandemic. The observed decline in claims across healthcare and management industries post-2020 contrasts with continued elevation following the initial outbreak seen in California and Wisconsin^{10,11}, suggesting varied recovery trajectories that warrant ongoing state-level surveillance.

Structural changes in the labor market that may have lasting implications for WC systems were catalyzed during the COVID-19 pandemic⁴⁰. As industries adapted to remote work, shifting consumer demand, and persistent labor shortages, exposure to injury and illness changed as well. Remote work increased substantially during the pandemic; for example, the share of employed people who did some or all work at home on days worked rose from 24% in 2019 to 38% in 2021⁴¹. Similarly, employment growth in delivery and warehousing (driven by the expansion of e-commerce) likely increased the number of workers at risk in those industries^{42,43}. Additionally, rising claim costs during this period likely reflect not only general inflation and wage growth, but also medical inflation, an important driver of WC medical costs that has historically outpaced overall consumer inflation⁴⁴.

WC data provides a robust resource for examining trends in reported, compensated workplace injuries, but several limitations apply. Our dataset includes injury/illness type, affected body part, and cause/mechanism; however, these elements were outside the scope of the present study aims, limiting our ability to characterize injury circumstances and severity. WC claims may also under-report the true burden of work-related injury and illness due to non-

reporting (e.g., fear of retaliation or job insecurity) and incomplete coverage (e.g., exemptions) that is known to vary by industry⁵. In addition, we could not evaluate trends in claim acceptance/denial or adjudication; increases in denials could contribute to apparent declines through changes in processing or discouragement from filing rather than true reductions in risk. Finally, although we used 2020 as a pragmatic breakpoint, the 2020–2023 period reflects a mix of pandemic and later-phase conditions (including 2023) rather than a clearly defined “post-COVID” period.

CONCLUSIONS

This study highlights both significant advancements and persistent challenges in workplace safety across Pennsylvania’s diverse economic sectors. Policymakers, business leaders, and safety professionals should note the substantial number of WC claims within the Transportation and Warehousing, Retail Trade, and Management of Companies and Enterprises industries, as well as the heightened risks facing workers in Transportation and Material Moving, Production, and Healthcare-related occupations. To effectively protect worker health, ensure sustained economic productivity, and minimize the financial burden of injury-related claims, it is essential to continuously invest in targeted occupational health initiatives, proactive policy development, and comprehensive workplace injury surveillance.

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FIGURE LEGENDS

Figure 1. Risk ratios of WC claims by occupation in Pennsylvania (2014–2023). Points and whiskers show the model-based risk ratio estimates with 95% confidence intervals. The occupation reference group is Office & Administrative Support, and 2014 is the reference year for the pre/post COVID-19 categories.

Supplemental Digital Content S1 & S2

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Table 1. Demographic Profile of Workers' Compensation Claimants (2014-2023) by Industry (2-digit NAICS) and Occupation (Major SOC Group): Gender and Age Distribution

Claimant Industry (2-digit NAICS)	Total Claims	Gender			Age at Time of Claim (years)						
		Female	Male	Not Reported	16-20	21-24	25-34	35-44	45-54	55-64	65+
Agriculture, Forestry, Fishing and Hunting	10,532	25%	69%	6%	5%	9%	24%	21%	20%	15%	5%
Mining	9,054	3%	92%	5%	2%	7%	25%	23%	21%	19%	4%
Utilities	9,032	9%	85%	7%	1%	3%	20%	20%	24%	28%	4%
Construction	89,790	3%	88%	8%	4%	9%	23%	21%	23%	17%	3%
Manufacturing	222,488	21%	73%	6%	3%	7%	20%	19%	24%	22%	4%
Wholesale Trade	74,423	17%	78%	5%	3%	7%	22%	21%	22%	20%	5%
Retail Trade	244,215	43%	51%	6%	8%	12%	22%	16%	17%	17%	7%
Transportation and Warehousing	139,635	27%	67%	7%	4%	8%	23%	20%	22%	18%	5%
Information	14,510	24%	73%	3%	3%	5%	19%	23%	26%	21%	4%
Finance and Insurance	23,062	61%	33%	6%	1%	5%	20%	18%	24%	26%	6%
Real Estate Rental and Leasing	17,713	20%	73%	7%	2%	8%	21%	18%	21%	22%	7%
Professional, Scientific, and Technical Services	35,089	54%	42%	4%	3%	11%	29%	19%	18%	16%	4%
Management of Companies and Enterprises	76,842	55%	39%	6%	4%	8%	25%	19%	21%	18%	4%
Administrative and Support and Waste... Services	101,889	31%	64%	6%	5%	11%	27%	21%	19%	14%	4%
Educational Services	124,900	57%	27%	16%	1%	4%	16%	19%	26%	28%	7%
Health Care and Social Assistance	315,726	64%	16%	20%	2%	8%	25%	19%	21%	19%	5%
Arts, Entertainment, and Recreation*	25,644	34%	58%	8%	12%	16%	29%	12%	12%	13%	6%

Accommodation and Food Services	81,240	51%	42%	6%	15%	15%	23%	15%	15%	12%	4%
Other Services (except Public Administration)	45,376	36%	56%	8%	6%	10%	22%	18%	20%	18%	6%
Public Administration	139,527	27%	64%	8%	1%	4%	24%	23%	26%	18%	3%
Insufficient Information*	47,319	27%	54%	19%	5%	8%	21%	19%	21%	18%	6%
Total	1,848,006	39%	52%	10%	4%	9%	23%	19%	21%	19%	5%

Table 1. Continued

Claimant Occupation (Major SOC Group)	Total	Gender			Age at Time of Claim (years)						
		Female	Male	Not Reported	16-20	21-24	25-34	35-44	45-54	55-64	65+
Management	56,485	46%	49%	5%	1%	4%	17%	21%	27%	25%	6%
Business and Financial Operations	14,203	57%	40%	4%	2%	5%	19%	18%	24%	25%	7%
Computer and Mathematical	4,309	37%	60%	3%	1%	5%	21%	21%	25%	24%	4%
Architecture and Engineering	7,228	15%	83%	2%	1%	7%	23%	19%	22%	23%	5%
Life, Physical, and Social Science	8,102	54%	39%	7%	2%	11%	34%	19%	17%	14%	3%
Community and Social Service	19,824	69%	25%	5%	3%	9%	28%	21%	19%	15%	4%
Legal	1,228	73%	23%	4%	1%	4%	18%	19%	22%	27%	9%
Educational Instruction and Library	47,596	80%	15%	5%	1%	5%	20%	22%	24%	22%	5%
Arts, Design, Entertainment, Sports, and Media	13,822	33%	62%	4%	4%	16%	39%	13%	12%	12%	4%
Healthcare Practitioners and Technical	113,625	75%	16%	9%	1%	7%	29%	21%	20%	18%	4%
Healthcare Support	94,113	80%	10%	10%	4%	11%	26%	20%	20%	16%	4%

Protective Service	56,936	20%	76%	4%	4%	6%	28%	24%	22%	12%	4%
Food Preparation and Serving Related	70,843	57%	40%	3%	14%	14%	22%	14%	16%	15%	5%
Building and Grounds Cleaning and Maintenance	71,682	36%	59%	5%	3%	6%	17%	17%	24%	27%	7%
Personal Care and Service	21,202	65%	26%	9%	8%	13%	24%	15%	17%	16%	7%
Sales and Related	72,126	57%	39%	4%	8%	10%	20%	16%	18%	19%	8%
Office and Administrative Support	86,756	54%	43%	3%	3%	7%	20%	18%	23%	23%	7%
Farming, Fishing, and Forestry	8,163	25%	68%	7%	6%	10%	26%	22%	19%	13%	4%
Construction and Extraction	83,053	3%	90%	7%	4%	8%	23%	21%	23%	18%	3%
Installation, Maintenance, and Repair	71,601	4%	92%	4%	3%	7%	21%	20%	23%	23%	4%
Production	147,192	26%	71%	4%	3%	8%	21%	19%	23%	21%	4%
Transportation and Material Moving	268,507	23%	74%	3%	5%	10%	23%	19%	21%	17%	5%
Insufficient Information	509,410	33%	45%	22%	5%	9%	22%	19%	21%	19%	5%
Total	1,848,006	39%	52%	10%	4%	9%	23%	19%	21%	19%	5%

*Only industries that had more 2% > 1% unreported. All other industries and occupations had <1% N/As for age.

Table 2. Workers Compensation Claim Rate (per 1,000 jobs held) for Pennsylvanian Industries,
2014-2023

Industry	2014- 2023	20 14	20 15	20 16	20 17	20 18	20 19	20 20	20 21	20 22	20 23
Public Administration	59.6	68. 5	68. 2	67. 3	62. 2	61. 4	56. 6	52. 4	56. 3	52. 2	50. 2
Management of Companies and Enterprises	56.2	47. 9	48. 4	53. 7	58. 6	62. 1	63. 2	72. 8	67. 0	47. 9	42. 9
Transportation and Warehousing	45.7	43. 4	45. 8	44. 0	44. 0	44. 0	44. 1	45. 9	53. 2	47. 9	43. 8
Agriculture, Forestry, Fishing and Hunting	41.6	46. 9	50. 5	44. 2	43. 3	40. 8	39. 5	37. 6	39. 8	39. 1	35. 4
Retail Trade	39.8	36. 4	39. 0	39. 5	40. 3	40. 6	41. 0	40. 1	42. 5	40. 4	37. 9
Manufacturing	39.6	43. 5	43. 9	41. 0	39. 9	40. 4	40. 4	35. 3	37. 1	37. 6	36. 6
Construction	35.0	41. 4	42. 2	37. 9	35. 2	36. 4	35. 9	30. 0	31. 0	30. 1	30. 5
Mining, Quarrying, and Oil and Gas Extraction	34.4	37. 7	36. 0	38. 7	37. 6	36. 4	31. 6	28. 2	34. 6	30. 4	28. 7
Wholesale Trade	34.4	33. 8	35. 4	34. 3	36. 0	36. 8	35. 8	31. 1	34. 7	33. 1	32. 7
Administrative and Support and Waste... Services	33.0	33. 7	37. 3	35. 3	32. 8	35. 4	35. 2	32. 4	31. 3	29. 6	26. 3
Health Care and Social Assistance	30.2	33. 9	34. 4	33. 8	32. 6	30. 4	28. 4	32. 0	28. 3	25. 6	24. 5
Real Estate and Rental and Leasing	27.7	34. 5	33. 2	30. 8	26. 9	26. 3	27. 1	24. 4	24. 4	23. 6	26. 1
Arts, Entertainment, and Recreation	27.3	27. 1	30. 1	29. 4	26. 9	29. 3	28. 1	21. 1	26. 9	26. 7	25. 3
Utilities	26.4	34. 7	29. 1	30. 3	27. 7	27. 1	26. 4	21. 1	23. 5	24. 3	19. 9
Educational Services	26.2	30. 5	28. 7	28. 4	28. 3	26. 9	25. 9	14. 5	23. 0	26. 9	27. 9
Other Services (except Public Administration)	23.3	28. 4	27. 5	26. 5	26. 1	24. 5	23. 9	18. 3	18. 6	19. 2	18. 7
Accommodation and Food Services	18.3	21. 5	21. 6	19. 5	18. 1	17. 7	18. 2	15. 1	17. 1	16. 2	16. 9
Information	16.1	20. 6	21. 4	18. 4	18. 5	17. 5	18. 3	13. 4	12. 6	11. 7	9.8

Professional, Scientific, and Technical Services	9.6	9.7	10. 4	10. 4	10. 1	10. 8	10. 8	8.5	8.8	8.1	8.9
Finance and Insurance	8.8	9.7	10. 0	8.8	8.9	8.6	8.4	7.2	9.1	8.9	8.6

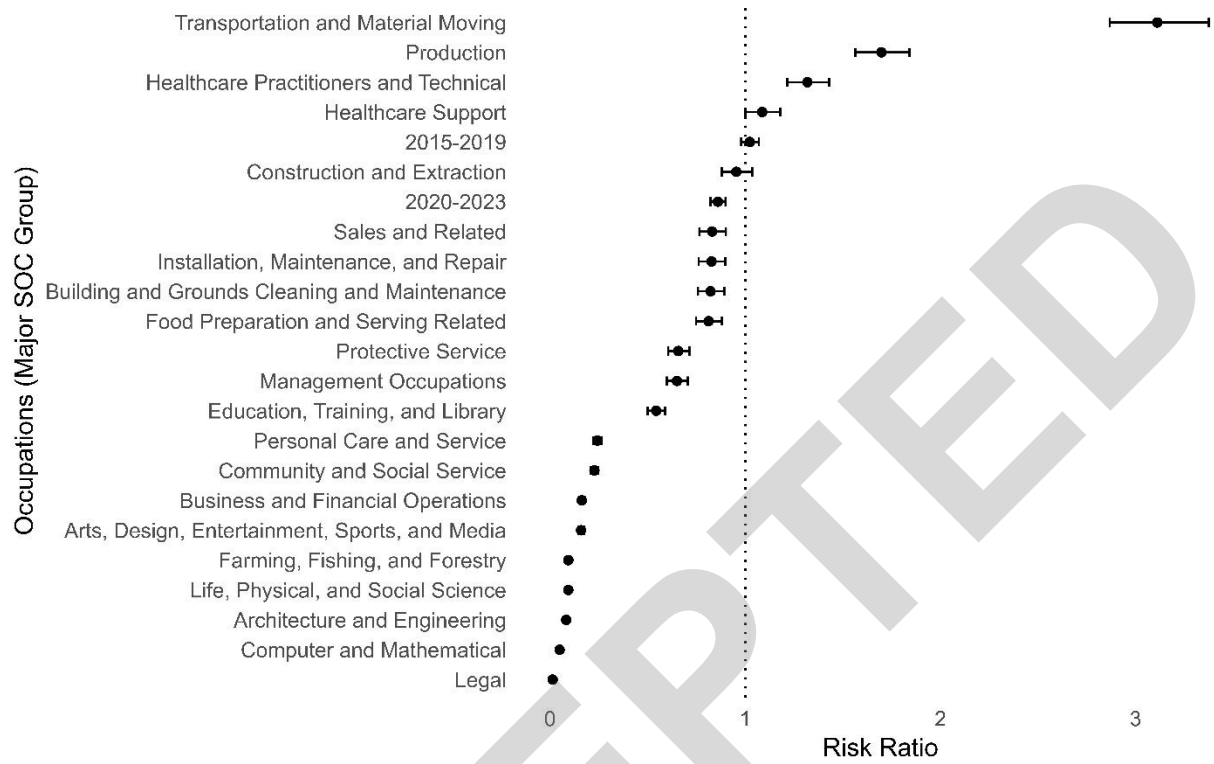
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Table 3. Annual change in workers' compensation claim rates by NAICS industry, Pennsylvania, 2014–2023, with pre-COVID-19 (2014–2019) and post-COVID-19 (2020–2023) comparisons

Industry	2014-2023			2014-2019			2020-2023		
	Slope	95% CI	p-value	Slope	95% CI	p-value	Slope	95% CI	p-value
Public Administration	-2.22	(-2.88, -1.56)	<0.001	-2.44	(-3.05, -1.83)	<0.001	-1.09	(-3.07, 0.89)	0.72
Construction	-1.41	(-2.07, -0.75)	<0.001	-1.36	(-1.97, -0.74)	<0.001	0.05	(-1.93, 2.03)	0.959
Agriculture, Forestry, Fishing and Hunting	-1.35	(-2.01, -0.69)	<0.001	-1.91	(-2.53, -1.30)	<0.001	-0.72	(-2.70, 1.26)	0.465
Utilities	-1.34	(-2.00, -0.68)	<0.001	-1.44	(-2.05, -0.82)	<0.001	-0.28	(-2.26, 1.70)	0.775
Information	-1.27	(-1.93, -0.61)	<0.001	-0.65	(-1.27, -0.04)	0.38	-1.19	(-3.17, 0.79)	0.339
Other Services (except Public Administration)	-1.26	(-1.92, -0.60)	<0.001	-0.91	(-1.52, -0.29)	0.04	0.21	(-1.78, 2.18)	0.837
Health Care and Social Assistance	-1.13	(-1.80, -0.47)	<0.001	-1.15	(-1.76, -0.53)	<0.001	-2.85	(-4.83, -0.87)	0.06
Real Estate and Rental and Leasing	-1.11	(-1.76, -0.44)	0.01	-1.76	(-2.37, -1.14)	<0.001	0.45	(-1.53, 2.42)	0.652
Mining, Quarrying, and Oil and Gas Extraction	-1.06	(-1.72, -0.40)	0.02	-0.88	(-1.49, -0.27)	0.06	-0.27	(-2.25, 1.71)	0.783
Administrative and Support and Waste... Services	-0.86	(-1.52, -0.20)	0.11	-0.01	(-0.62, 0.61)	0.978	-2.01	(-3.99, -0.03)	0.471
Manufacturing	-0.84	(-1.50, -0.18)	0.13	-0.77	(-1.39, -0.16)	0.15	0.44	(-1.54, 2.42)	0.652

Educational Services	-0.64	(-1.30, 0.02)	0.058	-0.82	(-1.44, -0.21)	0.009	4.41	(2.43, 6.39)	<0.001
Accommodation and Food Services	-0.64	(-1.26, 0.06)	0.074	-0.84	(-1.46, -0.23)	0.008	0.44	(-1.54, 2.42)	0.654
Arts, Entertainment, and Recreation	-0.43	(-1.09, 0.23)	0.197	-0.01	(-0.62, 0.60)	0.973	1.26	(-0.72, 3.24)	0.207
Wholesale Trade	-0.24	(-0.90, 0.42)	0.475	0.44	(-0.17, 1.06)	0.154	0.32	(-1.66, 2.30)	0.749
Professional, Scientific, and Technical Services	-0.22	(-0.88, 0.44)	0.516	0.19	(-0.42, 0.81)	0.537	0.07	(-1.91, 2.05)	0.946
Finance and Insurance	-0.13	(-0.79, 0.53)	0.695	-0.31	(-0.92, 0.30)	0.318	0.39	(-1.59, 2.37)	0.692
Retail Trade	0.24	(-0.42, 0.90)	0.481	0.81	(0.20, 1.43)	0.001	-0.87	(-2.85, 1.11)	0.382
Management of Companies and Enterprises	0.37	(-0.29, 1.03)	0.272	3.57	(2.88, 4.11)	<0.001	-10.99	(-12.88, -8.92)	<0.001
Transportation and Warehousing	0.43	(-0.24, 1.09)	0.205	-0.06	(-0.68, 0.55)	0.838	-1.15	(-3.13, 0.83)	0.246

Figure 1



Graphical abstract

Workers' compensation claim rates fell in most Pennsylvania industries (2014–2023), but high-risk industries and occupations persist.

Occupations with Elevated Risk of filing a claim:

Transportation & Material Moving



Production



Healthcare Practitioners & Technical



Industries of Interest*:

Transportation & Warehousing

Retail Trade

Management of Companies



*Industries of interest due to persistently high workers' compensation claim rate and no statistically significant decline from 2014-2023

Overall industry trend (2014-2023): Workers' Compensation claim rates **declined in many Pennsylvania industries**, with notable longer-term decreases in **Public Administration** and **Construction**.

Temporal Trends in Workers' Compensation Claims by Industry and Occupation in Pennsylvania (2014–2023)

Marks, James MPH; Babich, Remy PhD; Nair, Anil PhD



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