

# Work-related Musculoskeletal Disorders of the Neck, Back, and Upper Extremity in Washington State, 1996-2004

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# WORK-RELATED MUSCULOSKELETAL DISORDERS OF THE NECK, BACK, AND UPPER EXTREMITY IN WASHINGTON STATE, 1996 - 2004

## REPORT SUMMARY

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**OBJECTIVES** We report the frequency, incidence rate (number of new claims per 10,000 full-time equivalent employees FTEs, CIR), severity rate (number of lost days per 10,000 FTEs, SR), cost, lost time and industry distribution of work-related musculoskeletal disorders (WMSDs) in Washington State in order to monitor and help focus prevention efforts by business, labor and government.

**METHODS** In the current study we examined State Fund workers' compensation claims for general and selected specific hand/wrist, elbow, shoulder, neck and back disorders in 1996-2004. We examined the Self-Insured closed compensable (four or more lost time days) claims data for general categories because diagnostic codes (ICD-9) were unavailable. We used a prevention index (PI) to rank industries by taking the average rank by incidence rate and rank by number of claims. We used the North American Industrial Classification System (NAICS) codes for industry for national comparison purposes. We used the Washington State Industrial Risk Classes (WIC) to reflect workers' compensation classes.

The focus was on non-traumatic soft tissue musculoskeletal disorders. These musculoskeletal disorders, when caused or aggravated by work activities (for example, exposures to frequent or heavy manual handling, awkward postures, forceful or repetitive exertions) are referred to as Work-related MSDs or WMSDs. The lower extremity is not included in this report. We also included individual characteristics of gender, age and body mass index identified in the claims data to explore potential interactions with industry and WMSDs.

**RESULTS** Between 1996 and 2004 there were more than 50,000 State Fund and Self-Insured workers' compensation accepted claims for WMSDs per year in Washington State.

There were 345,923 State Fund accepted claims for WMSDs of the neck, back and upper extremity resulting in:

- \$3.8 billion in direct costs
- 27% of all State Fund-accepted claims
- 36% were compensable (four or more timeloss days) versus 24% of all claims
- Average claims incidence rate (CIR) of 270.4 claims and severity rate (SR) of 18,010 days per 10,000 full-time equivalent employees (FTEs)
- Average compensable claims incidence rate of 96.5 per 10,000 FTEs
- Average of 208 timeloss days per compensable claim
- 52.2% of claims involved back disorders, 37.5% involved upper extremity disorders

The average number of State Fund WMSD claims for the neck, back and upper extremity was 38,436 per year and averaged \$ \$11,334 per claim.

There was a significant decrease in accepted State Fund CIR for all claims, -5.5% per year over the study period ( $p<0.0001$ ). The CIR for WMSDs decreased -4.7% per year, significantly slower than the -5.7% for all non-WMSD claims ( $p<0.02$ ). Decreases in neck (-6.3% per year), and back (-5.7% per year) WMSDs decreased significantly but not differently than for all other claims. Upper extremity WMSD claims rate (-3.6% per year) decreased significantly slower than all

other claims ( $P<0.001$ ). There was no difference in median body mass index (BMI) for all compensable WMSD claims compared to all claims ( $BMI=27.1$ ). Those with WMSDs tended to be on the job about a month longer than those with other claims (13.2 versus 12.2 months).

For the Self-Insured, coded data was available only for compensable closed claims (four or more lost time days). There were 73,380 compensable closed WMSD claims (8,153 per year) resulting in:

- 45.6% of all self-insured compensable closed claims
- Average compensable CIR of 140 per 10,000 FTEs
- 47.5% were back disorders and 38.3% were upper extremity disorders

Since 30% of Self Insured claims are compensable, the estimated number of accepted WMSD claims per year would be approximately 22,000.

The CIR for all compensable claims decreased -4.6% per year ( $p<0.0001$ ). The WMSD compensable CIR decreased -4.9 % per year ( $p<0.0001$ ) from 1996-2004. This was not significantly different from all other claims combined (-4.3%).

We looked at several specific diagnostic codes (ICD-9) for WMSDs in the State Fund and found:

For **sciatica**, there were 7,275 accepted claims (808 per year), with a CIR of 5.7 and a severity rate (SR) of 1,871.8 days per 10,000 FTEs, they were extremely costly:

- \$64,719 per claim on average
- 77.6% were compensable with an average time loss of 528 days
- The CIR decreased 0.4% per year, differing from all other claims rates by 5.4% per year ( $p<0.06$ )

For **rotator cuff syndrome**, there were 21,923 accepted claims (2,436 per year) with:

- An average CIR of 17.0 claims and SR of 2,242 days per 10,000 FTEs
- Average cost of \$29,877 per claim
- 62% were compensable with an average time loss of 323 days
- The CIR increased 1.4% per year over the study period ( $p<0.002$ ), differing from all other claims rate by 7.4% per year ( $p<0.0001$ ).

For **epicondylitis**, there were 14,334 claims (1,593 per year) with:

- An average CIR of 11.2 claims and severity rate of 538.8 per 10,000 FTEs
- Average cost of \$11,382 per claim
- 41.7% were compensable with an average time loss of 263 days
- There was a significant decrease in CIR, -2.7% per year, over the study period, not significantly different than other claims.

For **carpal tunnel syndrome**, there were 26,828 claims (2,981 per year) with:

- An average CIR of 20.9 claims and SR of 2,422.7 days per 10,000 FTEs
- Average direct cost of \$21,208 per claim
- 65% were compensable
- Average time loss was 250 days
- The CIR decreased significantly (- 3.3% per year,  $P<0.0001$ ), but 2.3% slower than all other claims ( $p<0.11$ ).
- Compensable carpal tunnel syndrome claimants had both higher median BMI (28.3) and almost double the median months on the job (30) than for those with other specific diagnoses examined.

For **hand/wrist tendonitis**, there were 20,287 accepted claims (2,254) per year with:

- An average CIR of 15.8 and SR of 1,169.4 per 10,000 FTEs
- Average cost of \$13,013 per claim
- 40.4% were compensable with an average time loss of 254 days
- The CIR decreased significantly over the study period, -4.4% per year ( $p<0.0001$ ) but not slower per year than all other claims combined.

In some respects, men and women have the same compensable claims incidence pattern by age group for industries where they are likely to be doing similar types of work such as retail, health care and manufacturing. WMSD incidence rates tend to peak in the 35-44 age groups but go down more rapidly for men by the 45-54 age groups. The incidence rate is somewhat higher for men, primarily because they are more concentrated in construction. Mean lost days tend to increase with age for both men and women through 55-64. There are some spikes for women in construction at both the youngest and oldest age group, probably due to the volatility of small numbers of women in these age/industry groups. For both men and women, the longest lost work days are in construction, followed by agriculture.

We used the Prevention Index (PI) to identify industries with the greatest impact of WMSDs. Industries are listed in rank order by the number of claims and by the rate of claims. The PI is the average of the two ranks for each industry. An industry therefore is high on the PI if it has a relatively high number of claims and a relatively high CIR.

In the State Fund, Construction, Manufacturing and Health Care sectors ranked first, second and third on the PI. Among the Self-Insured, Health Care, Transportation and Warehousing, and Public Administration were top sectors.

We calculated the PI for industries classified by their 4-digit NAICS codes and also calculated a rate ratio for each industry by comparing the CIR for each industry with the overall state CIR. A rate ratio of 3, for example, means that the rate for that industry is 3 times the overall state rate. The top 12 industries for combined State Fund and Self-Insured compensable WMSDs were:

1. **Couriers** (NAICS 4921) RR=4.3
2. **Foundation, Structure & Exterior Building Contractors** (NAICS 2381) RR=2.6
3. **Scheduled Air Transportation** (NAICS 4811) RR=3.4
4. **Nursing Care Facilities** (NAICS 6231) RR=2.5
5. **General Freight Trucking** (NAICS 4841) RR=2.4
6. **Building Finishing Contractors** (NAICS 2383) RR=2.3
7. **Residential Building Construction** (NAICS 2361) RR=2.0
8. **Community Care Facilities for Elderly** (NAICS 6233) RR=2.3
9. **Waste Collection** (NAICS 5621) RR=3.5
10. **Grocery Stores** (NAICS 4451) RR=1.8
11. **Services to Buildings & Dwellings** (NAICS 5617) RR=1.9
12. **Specialized Freight Trucking** (NAICS 4842) RR=2.5

We also looked at industry by using the Washington Industrial Classification (WIC) codes. These codes are used for industrial insurance purposes and they code industries by similar processes and exposures. While in general the results are similar to the NAICS analysis, there are some high-risk industries not otherwise identified.

**Top 12 Industries for WMSDs by  
Prevention Index and Washington Industrial Classification (WIC)**

Rank	State Fund WIC	Rate	Rate
		Ratio	Self-Insured Compensable WIC
1	6108 Nursing Homes	3.9	1101 Parcel Package Delivery
2	0507 Roofing	4.8	6802 Airlines, Ground Crew
3	6907 Moving Companies	5.4	6104 Schools, all other Employees
4	0510 Wood Frame Bldg Construct	2.7	0803 Cities – all other Employees NOC
5	2105 Beer Distributors	4.0	1501 Counties – all other Employees NOC
6	2903 Wood Products Mfg	2.8	6402 Supermarkets
7	7114 Temp Help – Assembly	4.4	7104 Temporary Help Admin. Staff
8	0518 Building Const NOC	2.9	6904 Fire Fighters
9	0504* Wallboard Installation	4.7	1102 Trucking, NOC
10	7201 State Health Care Facilities	2.9	6801 Airlines, Flight Crew
11	4305 Garbage Collection	3.9	1405 Ambulance Service
12	0306 Plumbing	2.6	6602 Janitorial Service

NOC = Not Otherwise Classified, All Other Employees = Grounds keeping, Maintenance, etc.

Temp Help – Administrative in Self-Insured also has temporary assembly and machine operator claims.

\* Consolidated Discounted and Undiscounted Classes.

**Conclusions** Work-related musculoskeletal disorders continue to be a large and costly problem in Washington State. The incidence rates for some WMSDs are decreasing; in some cases, the rate is relatively flat (epicondylitis, sciatica) or increasing (rotator cuff syndrome). The highest risks are in industries characterized by manual handling and forceful repetitive exertions. Temporary Agency workers appear to be at particularly high risk.

These overall estimates of the burden of WMSDs are most likely an underestimate because the lower extremity is not included, there is evidence of under-reporting of these kinds of disorders in the literature, and the indirect costs to the employer, employee and society are not included.