

# Work-related Musculoskeletal Disorders of the Neck, Back, and Upper Extremity in Washington State, 1990-1998

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Barbara Silverstein, PhD, MPH  
Eira Viikari-Juntura, MD, DMedSci  
John Kalat, BA  
Safety and Health Assessment and Research for Prevention (SHARP)  
Washington State Department of Labor and Industries

SHARP Program  
P.O. Box 44330  
Olympia, WA 98504-4330  
[www.wa.gov/lni/sharp](http://www.wa.gov/lni/sharp)

Telephone: (360) 902-5669  
Fax: (360) 902-5672  
E-Mail: [silb235@lni.wa.gov](mailto:silb235@lni.wa.gov)

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# Work-related Musculoskeletal Disorders of the Neck, Back and Upper Extremity

## Washington State Worker's Compensation Claims, 1990-1998

### Summary

**Objectives:** This study examines the frequency, incidence rate, severity rate, cost and industry distribution of non-traumatic soft tissue musculoskeletal disorders in Washington State in order to 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 and back disorders in 1990-1998. We examined the Self-Insured compensable (four or more lost workdays) claims data for general categories because diagnostic codes (ICD-9) were unavailable and calculated rates for 1992-1998 because hours for the Self-Insured were unavailable prior to 1992. We used a prevention index (PI) to rank industries by averaging the ranks of their number of claims and their claims incidence rate. The focus was on non-traumatic soft tissue musculoskeletal disorders (NTST-MSDs). In previous reports, we referred to these as gradual onset MSDs. These NTST-MSDs, 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. There were some changes in the coding criteria (see methods section) from earlier reports. The lower extremity is not included in this report.

**Results:** Between 1990-1998, there were 392,925 State Fund accepted claims for non-traumatic soft tissue (NTST) musculoskeletal disorders (MSD) of the neck, back and upper extremity resulting in:

- \$2.6 billion in direct costs
- 20.5 million lost workdays

- 26.4% of all State Fund accepted claims
- More than 36% were compensable (four or more lost workdays) compared to 23.5% of all claims
- Average claims incidence rate (CIR) of 355 per 10,000 full-time equivalent employees (FTEs)
- Average compensable claims incidence rate of 129 per 10,000 FTEs
- 54.4% were claims for back disorders, 34% were for upper extremity disorders

The average number of State Fund NTST-MSD claims for the neck, back and upper extremity was 43,658 per year.

- Average of \$5,923 per claim
- 146 lost workdays per compensable claim

Although the claims incidence rate for NTST-MSDs decreased over the study period (approximately 5% per year), it decreased significantly less than for all other claims ( $p=0.05$ ). The CIR for upper extremity NTST-MSDs did not significantly decrease over the study period.

For the Self-Insured, coded data was available only for compensable Self-Insured accepted closed claims. While the number of claims was available from 1990-1998, data on hours worked were only available since 1992 so rates reflect 1992-1998. Therefore the analysis is limited to compensable claims (four or more lost workdays). There were 80,230 compensable closed NTST-MSD claims resulting in estimated:

- \$572 million in costs
- Approximately 46.5% of all compensable claims

- Average compensable CIR of 164.1 per 10,000 FTEs
- 53% were back disorders and 33.4% were upper extremity disorders

The compensable claims incidence rate for the Self-Insured decreased only slightly, averaging 2.3% per year.

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

For sciatica there were 5,468 accepted claims and while infrequent (608 per year, CIR of 4.9 per 10,000 FTEs), they were extremely costly:

- \$39,371 per claim on average
- 421 lost work days on average
- 80% were compensable
- The CIR did not significantly change over the study period

For rotator cuff syndrome, there were 17,030 accepted claims (1,898 per year) with:

- An average CIR of 15.3 per 10,000 FTEs
- Severity rate of 1,436 lost work days per 10,000 FTEs
- Average cost of \$15,226 per claim
- 59% were compensable, averaging 236 lost workdays
- The CIR did not change over the study period

For epicondylitis, there were 11,897 claims (1,322 per year) with:

- An average CIR of 10.6 per 10,000 FTEs
- Severity rate of 499 lost work days per 10,000 FTEs
- Average cost of \$6,959 per claim
- 43% were compensable, averaging 208 lost workdays
- A significant increase in the CIR over the study period.

For carpal tunnel syndrome, there were 27,148 claims (3,016 per year) with:

- An average CIR of 24.5 per 10,000 FTEs
- Severity rate of 2,524 lost work days per 10,000 FTEs

- Average direct cost of \$12,627 per claim
- 66% were compensable, averaging 209 lost workdays
- A significant decrease in the CIR over the study period

We used the Prevention Index 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 Prevention Index is the average of the two ranks for each industry. An industry therefore is high on the prevention Index if it has a relatively high number of claims and a relatively high claims rate. In the State Fund, Construction, Manufacturing and Transportation sectors ranked first, second and third on the Prevention Index. Among the Self-Insured, Transportation ranked first, followed by Retail Trade and Manufacturing, whereas construction ranked 8<sup>th</sup>. The CIR for Transportation appears to have increased over the study period among the Self-Insured.

We calculated the Prevention Index for industries classified by their 3-digit SIC codes. We 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 10 industries for combined State Fund and Self-Insured Compensable NTST-MSDs were:

1. Trucking and Courier Services (SIC 421) RR=3.0
2. Nursing and Personal Care Services (SIC 805) RR=3.0
3. Masonry, Stonework, Tile Setting and Plastering (SIC 174) RR=3.4
4. Air Transportation Scheduled, and Air Courier Services (SIC 451) RR=2.8
5. General Building Contractors-Residential Buildings (SIC 152) RR=2.1
6. Roofing, Siding and Sheet Metal Work (SIC 176) RR=3.3

7. Carpentry & Floor Work (SIC 175)  
RR=2.4
8. Residential Care (SIC 836) RR=2.2
9. Grocery Stores (SIC 541) RR=1.8
10. Concrete Work (SIC 177) RR=2.9

We also looked at industry by using the Washington Industrial Risk

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 SIC analysis, there are some high risk industries that do not show up in the SIC analysis.

Top 10 Industries for NTST-MSDs by  
Prevention Index and Washington Industrial Risk Classification (WIC)

Rank	State Fund WIC	Rate Ratio	Self Insured Compensable WIC	Rate Ratio
1	Nursing Homes	3.8	Parcel Package Delivery	5.0
2	Wood Frame Building Construction	3.0	Bus Companies	3.4
3	Wood Products Manufacturing	3.0	Airlines, Ground Crew	4.7
4	Roofing	5.2	Trucking	3.2
5	Wallboard Installation	6.3	Schools, All Other Employees	2.4
6	Temporary Help-Assembly	5.6	Warehouses NOC	2.6
7	Sawmills	3.3	Cities-All Other Employees	2.5
8	Building Construction NOC	2.8	Airlines, Flight Crews	4.7
9	Garbage Collection	3.7	Temporary Help-Administrative Staff*	21.0
10	Moving Companies	4.5	Wholesale Stores	1.8

*Note: NOC=Not otherwise classified, All Other Employees=groundskeeping, maintenance, etc.*

*\*Temp Help Administrative in Self Insured also has temporary assembly and machine operator claims*

As the report details, temporary help workers were at increased risk compared to overall industry for all NTST-MSDs, back and upper extremity NTST-MSDs, particularly temporary workers in assembly, vehicle operation, construction and machine operation (and in food processing for upper extremity NTSTs) and for the Self-Insured, temporary help-administrative.

**Conclusions:** Non-traumatic soft tissue musculoskeletal disorders continue to be a large and costly problem in Washington State. While the incidence rates for some NTST-MSDs are decreasing, the overall rate is not

decreasing as fast as the rate for all other claims. In some cases, the rate is stable (sciatica, rotator cuff syndrome) or increasing (epicondylitis). The highest risks are in industries characterized by manual handling and forceful repetitive exertions. The contingent workforce appears to be at particularly high risk. These overall estimates of the burden of NTST-MSDs 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.



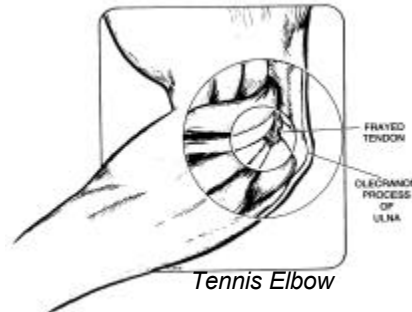
## 1.0 Introduction

This study uses workers' compensation claims data from Washington State to examine the frequency, incidence, cost, and industry distribution of new neck, back and upper extremity (hand/wrist, elbow, and shoulder) disorders, and respectively sciatica, carpal tunnel syndrome (CTS), epicondylitis and rotator cuff syndrome (RCS) as examples of more specific diagnoses within these body region categories.

Sciatic pain is manifested as radiating back pain that goes below the knee. This very sensitive (95%) indicator of lumbar disc herniation<sup>i</sup> has been associated with manually handling heavy loads.

Carpal tunnel syndrome (CTS) is the compression of the median nerve at the wrist, due to ischemia or inflammation. CTS is characterized by numbness, tingling, or pain in the median nerve distribution of the hand (first 3 1/2 fingers), frequently with nocturnal worsening of symptoms. Work-related CTS has been associated with high repetition, force, awkward wrist postures and segmental vibration<sup>ii iii</sup>.

Epicondylitis is an inflammation of the tendon at the elbow (lateral epicondylitis or tennis elbow is most common). Epicondylitis is characterized by pain during



resisted maneuvers that load the tendons and by tenderness on tendon palpation.

### **KEY TERMS**

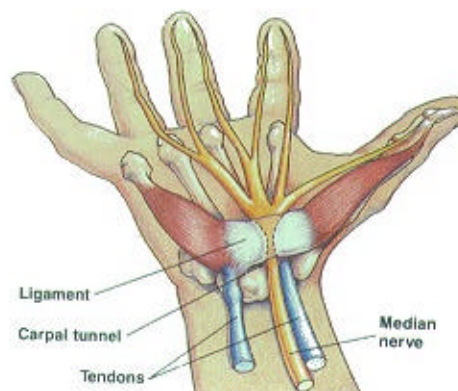
*Incidence rate: number of new cases per 10,000 full-time equivalent (FTE) workers per year.*

*Relative risk: Incidence rate of specific industry divided by incidence rate for all industries. Relative risk of more than 1 indicates risk in that industry is more than for all industries combined.*

*WIC: Washington Industrial Classification equals the 4-digit "Risk Class" in the State Fund.*

Repetitive forceful postures such as twisting or pronation of the forearm combined with extension of the wrist while gripping have been associated with epicondylitis.

Rotator cuff syndrome involves inflammation,

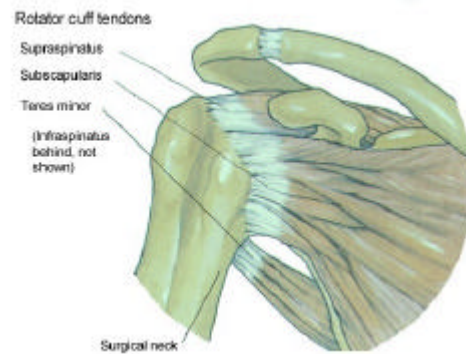


degeneration and tear of the tendons about the shoulder (with the supraspinatus tendon most frequently involved). Pain with certain motions is common, particularly against resistance. Tearing usually results in weakness. Work-

related shoulder disorders have generally been attributed to high static or repetitive loads on the shoulder girdle, particularly in combination with abduction, rotation or flexion<sup>iv</sup>.

Each of these specific conditions has also been associated with an acute traumatic onset (e.g., falls).

The objectives in this study were to estimate the overall and yearly trends in claim incidence rates, costs and days lost from work over the period 1990-1998, for general and specific work-related musculoskeletal disorders. Additionally, we wanted to identify high-risk industries for these disorders so both research and prevention efforts can be more focused.



## **2.0 Methods**

### **2.1. Workers' Compensation System**

In Washington State, employers (except the self-employed) are required to obtain workers' compensation insurance through the Department of Labor & Industries' (L&I) industrial insurance system unless they are able to self-insure. L&I's State Fund covers approximately two-thirds of the workers in Washington State (the remainder works chiefly for the approximately 400 largest employers and is covered by their self-insured employers). Washington is the only state in which workers contribute a portion of their income to the medical aid portion of the State Fund.

#### **2.1.1. Claims Management Data Base**

Workers' compensation claims data and employment data for the years 1990-1998 were obtained from L&I 's files. The L&I claims management data base consists of two major data processing systems. The Medical Information and Payment System (MIPS) receives all billing information generated by provider medical bills. This system records such relevant items as

dates of service, all associated procedure and treatment (CPT) codes, and physician diagnosis by International Classification of Disease (ICD) version 9 code for each provider visit. The Labor and Industries' Industrial Insurance System (LINIIS) contains all data necessary for the administration of State Fund claims (e.g. claim type and nature, occupation, employer information, lost time, status, progress). Only those Self-Insured claims resulting in more than 3 days of lost time are coded in the LINIIS system. Rarely are there ICD9 codes or medical billing information in the MIPS database for the Self-Insured claims. Thus, the self-insured data in this report is not comparable to the State Fund data in terms of magnitude or cost.

#### **2.1.2. Definition of Outcome**

We used accepted State-Fund claims (for the 1990-1998 period, approximately 10% of the State Fund claims were rejected, Figure 1). Further, we only included claims with authorized or allowed bills for specific diagnoses codes or appropriate CPT procedure codes respectively. The final number of claims extracted from the MIPS database was comprised of claims that

had either authorized or allowed CPT codes, or both. In addition, we extracted any claim that had a wrist or hand condition (or both) from the LINIIS claim history dataset by using the ANSI z16.2 code for body area. Similar methods were used to extract claims for general back, elbow and shoulder disorders. The specific disorders were defined as accepted claims based on claims with codes and/or CPT procedure codes (see Table 1 for codes).

Since a workers compensation claim in Washington State may include disorders in more than one body part, only the primary site is assigned a z16.2 code. When specific disorders (like CTS for hand/wrist disorders) were examined in detail to determine type of onset, disorders were required to match the appropriate body area code (since type and nature of disorder are only specified for the primary site of disorder).

Information collected for each claim included: claim status ("compensable" lost time claim of 4 or more days or medical treatment claim only codes); z16.2 codes for body area; nature; and type of disorder; 1 and 3-digit Standard Industrial Code (SIC); 4-digit Washington Industrial Code (WIC); claim identification number; social security number; date of injury; birth date; gender; total cost of claim; days of

time loss; dollar amount of time loss payments; and dollar amount of medical aid payments. Using first date of injury allows us to estimate claims incidence. For example, if in LINIIS, a first date of injury year is 1990 and recorded for body area of hand/ wrist, but the first MIPS allowed bill with a CTS code is in 1991, for purposes of this analysis, this is a 1990 CTS claim.

We categorized non-traumatic and traumatic onset to differentiate "cumulative" trauma exposures from acute exposure, such as falls. A combination of BODY PART and NATURE and TYPE was required. Non-traumatic onset, *TYPE* codes (z16.2 code) included: rubbed or abraded (080), further restricted to disorders caused by leaning, kneeling, or sitting on objects (not vibrating) (081), those caused by objects being handled (not vibrating) (082), those caused by vibrating objects (083), those caused by repetition of pressure (085) and those caused by repetitive motion (086); overexertion (120); bodily reaction (100); and unknown (primarily strain, muscle soreness, pain with lifting etc.) (899-999). These *TYPE* codes were combined with the following *NATURE* codes: dislocation or herniation (190 for neck and back only); inflammation or irritation of the joints, tendons or muscles (260), including bursitis, tendinitis, synovitis

and tenosynovitis; sprains and strains (310); multiple injuries (400 for upper extremity only); diseases of the nervous system (560), nerves and peripheral ganglia (562); symptoms and ill-defined conditions (580); and unclassified (999). Disorders not fulfilling the criteria for non-traumatic onset were considered traumatic (e.g., *type* was slips, trips, falls, struck by).

Data were extracted from L&I databases as of October, 1999. Claim costs and time loss days reported here reflect actual totals for closed claims. For claims that were not closed, costs and time loss days reflect actual totals to this date *plus* total future estimated costs and time loss days, as calculated by agency actuarial staff. Cost and lost time data are expected to develop further for the most recent years. For example, as of October 1999, approximately 11% of all 1996 carpal tunnel syndrome claims and 19% of 1997 and 40% of 1998 carpal tunnel syndrome claims were still open. For non-traumatic soft tissue disorders, approximately 10% of 1998 claims were still open (Figure 1).

For Self-Insured compensable claims, we abstracted body part, nature, and *type*. We are less confident about the distinction between non-traumatic and traumatic onset status with the self-

insured data because of more incomplete information in these data. We estimated the costs as a fraction of the State Fund costs and assumed a 25% lower compensable cost, because we considered the larger employers to be able to return workers to work more quickly than the small employers in the State Fund.

### 2.1.3. Validity of Codes

Numerous medical records abstraction exercises were conducted to evaluate the coding schemes used for both onset type (traumatic or non-traumatic) and specific diagnosis of upper extremity claims. In the first exercise, we took a random sample of 96 Washington State Fund compensable claims coded as CTS (N=56), epicondylitis (N=15) and rotator cuff disorders (N=25). One of the three diagnoses was recorded in each of the medical records. This exercise demonstrated that the physician's statement on the medical records is fairly accurately translated into the coding system of the L&I claims management data base. We also observed that CTS and epicondylitis are often mentioned together in a single claim, and that CTS is usually filed as the main disorder. Thus, the incidence of "elbow" disorders would be underestimated because the epicondylitis case would be identified

under “hand/wrist.” Additionally, the cost and lost time information for that epicondylitis case would be lost because we required body part be elbow and diagnosis be epicondylitis in order to avoid overestimation of costs for specific conditions.

Electrodiagnostic studies were used to confirm the diagnosis of CTS in 77% of cases.

We also checked whether our definition for a traumatic or non-traumatic onset disorder, based on our selected codes, agreed with information from the medical records, in which it was very clear whether the onset was traumatic or non-traumatic. There was 76% agreement for the hand/wrist 77% for elbow disorders and 64% for the shoulder disorders.

The second exercise involved abstracting medical records from 100 random claims from 1995 that were coded “traumatic carpal tunnel syndrome” and 98 “non-traumatic onset hand/wrist disorders”. The case definition for carpal tunnel syndrome included symptoms in the median nerve distribution, and one of the following: positive electrodiagnostic study, carpal tunnel release surgery or positive physical examination. Eighty-one percent of the first group met the case

definition for carpal tunnel syndrome and 43% of the second group met the case definition for CTS. All of those coded as non-traumatic onset met the definition of non-traumatic onset. Of those that were coded traumatic onset, 64% were actually non-traumatic onset. This suggests that the incidence rate for non-traumatic onset hand/wrist disorders may be underestimated. For rotator cuff disorders, about 30% of the claims coded as traumatic were non-traumatic.

Of the traumatic onset upper extremity claims, 50.8% were due to being struck against or struck by, whereas 42% of the traumatic onset back disorders were coded as fall related.

In addition to low back and upper extremity disorders, we reviewed neck and lower extremity disorders. For this purpose, the validity of the codes for nature and type was scrutinized. The purpose was to see whether a distinction could be made between non-traumatic soft tissue disorders and other musculoskeletal disorders.

For the neck disorders, the nature coding was in agreement with the information in the medical files in 86% of the cases. Of the types, 88% of the codes were in agreement.

The most common neck disorders were sprain and strain (in 43% of bills), cervicalgia (6%), dislocation (7%), displacement of intervertebral disc (3%), and radicular syndrome or radiculitis (3%). Of these diagnostic groups, radicular syndrome or radiculitis differed from the others in that about half of the cases were non-traumatic, whereas the proportion of non-traumatic cases for the other neck disorders was about 30%. The too small number of cases consistently diagnosed with radiculitis precluded, however, the consideration of this diagnostic group separately in the analysis.

## 2.2. Washington State Employment by Industry and Region

Employment Information is reported to L&I by State Fund employers as the number of hours worked by employees. However, hours

by age and gender are not available. Numbers of employees working per year were calculated assuming that each full-time employee works 2,000 hours per year (40 hours per week for 50 weeks per year). Hours were converted to full time equivalent workers (FTEs) as  $FTEs = \text{total hours reported} / 2,000$ . In those industries where there is a high proportion of part-time workers, the denominator may be an underestimate, making the incidence rate higher than it would be if there were all full-time workers. An industrial classification is a grouping of industries that share similar workplace exposures. Washington Industrial classifications are more specific than Standard Industrial Classifications (SIC) because employers must subclassify their employees based on type of work. Claim rates are presented also for SICs, because they allow a national comparison. To eliminate unstable rates, only those SIC codes with a minimum of 100 full time

### ***Prevention Index Example:***

*Carpal Tunnel Syndrome in Clerical Office, Not Otherwise Classified*

*FTEs= hrs/2,000 hrs= 1,352,255.7*

*Frequency= Total number of cases=2,209*

*FREQUENCY RANK=1 OUT OF 213 WICs*

*Incidence Rate=*

*2,209\*20,000,000 hours=16.3 cases per 10,000 FTEs*

*2,704,511,448hours*

*Incidence Rank=184 out of 213 WICs*

*Prevention Index = [Frequency rank + Incidence Rank] / 2=[1 + 184] / 2=92.5*

employees per year and those WIC codes with a minimum of 50 employees per year over the 9-year period were included in the industry analyses. The claims data includes the county, but employment information by county is not available. To obtain claims incidence rates for different parts of the State of Washington, we used Washington State Population Survey data from 1998<sup>v</sup>, in which numbers of full time or part time workers are given for eight areas of the State. Self-insured compensable claims are not received and coded by L&I until they have been closed, thus this long lag time underestimates the number of claims in more recent years. Because claims data is incomplete for the self-insured, due to a high proportion of open claims, we used 1997 claims for the analysis.

### **2.3. Statistical Analysis**

Descriptive analyses included a summary of claims by year, direct workers' compensation costs, lost time, age and gender. Claim incidence rates were calculated by year and industry class, and are expressed as number of claims / 10,000 FTEs. Each industry code specific rate was compared to the industry-wide rate and a crude incident rate ratio or relative risk was calculated.

Severity rates were calculated as lost days / 10,000 FTEs for claims matching the appropriate body area code. Test for trend of incidence rates over time was performed using a Poisson regression analysis in SAS Software (SAS Proprietary Software Version 7, SAS Institute Inc. Cary, NC, USA 1998). Differences between rates were tested by Poisson regression with an interaction term for the compared rates. In this comparison, musculoskeletal disorder claims were compared to non-musculoskeletal disorder claims and non-traumatic soft tissue disorder claims were compared to all claims excluding non-traumatic disorders. The different categories within non-traumatic soft tissue disorders were compared to all claims excluding non-traumatic soft tissue disorders.

To prioritize industries for intervention purposes, frequencies of claims within an industry as well as the relative risk compared to all industries are important considerations. We combined the rank orders of both frequency and relative risk to create a "Prevention Index" (PI)<sup>vi</sup>

$$PI = \frac{[Frequency\ Rank + Incidence\ Rank]}{2}$$



## 3.0 Results

### **3.1. Magnitude of Neck, Back and Upper Extremity Disorders in Washington State**

This report describes the distribution of musculoskeletal disorders in Washington State between 1990-1998. The focus of the report is on the neck, back and upper extremity (shoulder-fingers) and more specifically for the soft tissue musculoskeletal disorders of non-traumatic origin. The lower extremity was excluded from this report because of inadequate consistency in coding of traumatic and non-traumatic disorders in the claims database. For the most part, the results will be presented first for the State Fund data (which is more complete) and then the compensable (4 or more days of lost time) Self Insured data, followed by combined State Fund and Self Insured compensable claims. Because we had no medical bill data with ICD-9 codes available for specific diagnoses (such as those in Table 1) for the Self-Insured data, direct comparisons between the two are not really possible. Information is presented by Standard Industrial Classification (SIC) codes so that it can be compared to national data by industry but also by Washington Risk

Classification (WIC) because these codes are more specifically related to workplaces with relatively similar processes and exposures.

#### 3.1.1 Overall Incidence and Cost

##### 3.1.1.1 State Fund

There were 688,795 State Fund accepted musculoskeletal disorder (MSD) claims of the neck, back and upper extremities, costing \$4.0 billion, 33.2 million lost days and representing 46.2% of all State Fund accepted claims over the 9-year period. The average number of these MSD claims was 76,533 per year averaging \$5,941 per claim and 147 lost workdays per compensable claim. (Table 3). The claims incidence rate (CIR) was 622.2 per 10,000 full-time equivalent employees (FTEs).

There were 392,925 State Fund accepted **non-traumatic soft-tissue (NTST) MSDs** (see Tables 1, 2a-b for criteria) costing \$2.6 billion in 1998 dollars, 20.5 million lost workdays and representing 26.4% of all State Fund accepted claims. The average number of State Fund non-traumatic soft-tissue

MSDs was 43,658 per year averaging \$5,923 per claim and 146 lost workdays per compensable claim. More than 36% of the NTST-MSD claims were compensable (lost time) claims, compared to 23.5% of all claims. The average claims incidence rate (CIR) was 355.0 per 10,000 FTEs for all NTST-MSDs and 129 per 10,000 for compensable claims. The CIRs for all claims, all musculoskeletal claims and all NTST-MSDs have decreased significantly between 1990-1997 (Figure 3). However the rate of decrease was less for the musculoskeletal claims ( $p < 0.01$ ) than for all non-musculoskeletal claims and the rate for the NTST-MSD claims was less than for all other claims including musculoskeletal disorders of traumatic origin ( $p = 0.05$ ), approximately 5.0% per year for compensable claims. The severity rate for NTST-MSDs was 18,403 lost workdays per 10,000 FTEs, representing 47% of all claims' lost workdays. The severity rate for compensable NTST-MSDs decreased about 10.6% per year between 1992-1997 compared to 10.1% for all compensable claims. It should be noted that more recent claims are likely to still be open at the time of the data extract, particularly for NTST-MSDs (10.3% of 1998 claims still open) and, for example carpal tunnel syndrome (40.3% of 1998 claims still open), Figure 1.

#### 3.1.1.2. Self-Insured

There were 533,207 accepted claims between 1990-1998, 32.3% of them were compensable. Among the Self-Insured only compensable (4 or more lost workdays) claims were available for analysis and rate data available only for 1992-1998. Additionally, Self-Insured compensable claims data are not available for analysis until the claim has been closed. This may result in substantial underestimates of rates in the more recent years. There were 111,756 compensable MSD claims of the neck, back and upper extremity, representing 64.8% of all compensable claims. The average compensable CIR was 227.8 per 10,000 FTEs. For compensable NTST-MSDs, there were 80,230 claims, costing estimated \$572 million in 1998 dollars (Table 21), representing approximately 46.5% of all compensable claims. The average compensable CIR was 164.1, with averages of \$6,279 per compensable claim.

Approximately 32% of all Self-Insured claims are compensable. Although the total number (compensable and medical only) of NTST-MSD claims is not available, assuming a percentage between 32.3% and 36.6% (per cent compensable of

State Fund NTST-MSD claims), the total number of NTST-MSD claims would range between 219,208 and 248,390, and the incidence rate would be approximately 570-650 per 10,000 FTEs. The claims incidence rate for compensable NTST-MSDs decreased only slightly, averaging 2.3% per year, compared to 5.0% for the State Fund NTST-MSD claims. On average, the severity rate decreased 9.8% (Table 35).

### 3.1.3. Combined State Fund and Self Insured Compensable Claims

Figure 2 presents the distribution of the 1997 combined State Fund and Self-Insured NTST-MSD compensable (lost time) claims by county and the rates per region. In this instance, the 1998 Washington State Population of working people (number of worker rather than FTEs based on hours) was used as the denominator. The highest rates are in King County and the "West Balance" region, followed by Spokane and Yakima -Tri-Cities county. The lowest rates were in the North Sound, Clark and "Eastern Balance" region.

## **3.2. Magnitude and Cost of Non-Traumatic Soft-Tissue Disorders by Body Region**

### 3.2.1. State Fund

There were 44,767 Neck NTST-MSD claims (49% of all neck MSDs) between 1990-1998 costing \$88.7 million, 0.7 million lost days and 49% of them compensable (4 or more lost workdays). The average claim had direct costs of \$6,536 and compensable claims averaged 162 lost days. The average claims incidence rate was 40.5 and the severity rate was 600 lost workdays per 10,000 FTEs (Table 4).

There were 213,865 Back NTST-MSDs (77% of all back MSDs) with direct costs of \$1.2 billion, 10.6 million lost workdays, and 40% resulting in 4 or more lost workdays. The average direct cost was \$5,897 per claim and resulted in 133 lost workdays per compensable claim. The average claims incidence rate was 193.5 and the severity rate was 9,488 lost workdays per 10,000 FTEs.

There were 46,383 NTST-MSD claims affecting a combination of neck and upper or lower back, (39% of all neck/back MSDs) and 33% were compensable. The average claim had a direct cost of \$6,085 and the average compensable claim resulted in 160 lost workdays. The claims incidence rate was 42.2 and severity rate was 2,196 lost workdays per 10,000 FTEs. A higher percentage of neck and multiple neck/back claimants were female (40-

44%) than back injury claimants (29%) while median age was quite similar (33-35).

There were significant decreases in the claims incidence rates for all three body regions between 1990-1997, with the combined neck/back claims rate decreasing more than all other claims excluding NTST claims, ( $p < 0.001$ ), Figure 4.

The specific diagnosis of sciatica was identified in 5,468 claims (608 per year), Table 6. These claims, while infrequent (claims incidence rate of 4.9 per 10,000 FTEs), were extremely costly, averaging \$39,371 and 421 lost workdays per claim. Almost 80% were compensable. The CIR has not significantly changed over the previous 8 years (Figure 6).

There were 129,656 accepted upper extremity NTST-MSD claims (45% of all upper extremity MSDs) between 1990-1998 resulting in direct costs of \$721.4 million and 6.8 million lost workdays, 36% of these claims compensable. The average claim had a direct cost of \$5,837 and the average compensable claim resulted in 162 lost workdays (Table 5). The claims incidence rate was 116.6 and the severity rate was 6,119 lost workdays per 10,000 FTEs. The majority of these

NTST-MSDs were in the hand/wrist area (65,707), followed by the shoulder (42,715) and then the elbow/forearm area (21,586). The shoulder and hand/wrist areas had a slightly higher proportion of compensable claims compared to the elbow/forearm area (39% and 38% versus 34%). The shoulder and hand NTST-MSD claims resulted in more lost time (161 and 164 lost workdays respectively compared to 155 for compensable claims) and higher direct costs (\$6,661 and \$5,744 compared to \$4,310) than the elbow/forearm area NTST-MSDs. While a greater percentage of hand/wrist NTST-MSD claimants were women (51% compared to 36% for shoulder and 38% for elbow/forearm), they were slightly younger (median of 34 years compared to 35 years for shoulder and 37 years for elbow/forearm). Unlike the back and neck, upper extremity NTST-MSD CIRs did not decrease significantly over the years (Figure 4). There was no significant decrease in CIR for either shoulder or elbow/forearm NTST-MSDs (Figure 5). While hand/wrist NTST-MSD claims decreased significantly over time, they decreased significantly less than the rate for all other claims excluding NTST-MSD claims ( $p < 0.001$ ).

We selected several specific diagnoses for closer examination, Table 6. There were 17,083 rotator cuff

syndrome claims between 1990-1998, averaging 1,898 per year, with an average claims incidence rate of 15.3 and severity rate of 1,436 per 10,000 FTEs. The average direct cost was \$15,226. Fifty-nine percent were compensable, averaging 236 lost workdays per claim. Epicondylitis was identified in 11,897 claims, averaging 1,322 per year with a claims incidence rate of 10.6 and severity rate of 499 per 10,000 FTEs. The average direct cost of an epicondylitis claim was \$6,959. Forty-three percent were compensable, averaging 208 lost workdays per claim. There were 27,148 accepted carpal tunnel syndrome (CTS) claims between 1990-1998 averaging 3,016 per year, with an average claims incidence rate of 24.5 and severity rate of 2,524 per 10,000 FTEs. The average direct cost for a CTS claim was \$12,627. Almost 2/3 were compensable and averaged 209 lost workdays per compensable claim. The median age for CTS claimants was 37 compared to 39 for rotator cuff and 40 for epicondylitis claimants.

A much higher percentage of CTS claimants were females (60.9%) than were rotator cuff syndrome (36.8%) or epicondylitis (44.6%) claimants. Claims incidence rates for rotator cuff syndrome did not change over time whereas the rate for epicondylitis

increased ( $p < 0.05$ ) and the rate for CTS decreased ( $p < 0.01$ ) significantly. However the rate for CTS decreased statistically significantly less than for all claims excluding NTST-MSDs ( $P < 0.001$ ), Figure 6. The percent of CTS cases resulting in surgical release has decreased pretty steadily (2.7% per year) between 1990 (47.1%) and 1997 (38.2%), Figure 7. Overlapping diagnoses were identified in 1.3% of the allowed medical bills for the upper extremity claims, 0.6% for both carpal tunnel syndrome and epicondylitis, 0.4% for carpal tunnel syndrome and rotator cuff syndrome, 0.2% for epicondylitis and rotator cuff syndrome and 0.1% for all 3 diagnoses.

### 3.2.2. Self Insured

There were 2,541 compensable (lost time) Neck NTST disorder claims (63% of all neck MSDs). There were an average of 282 compensable claims per year, with a claims incidence rate of 5.1 per 10,000 FTEs. There were 42,592 Back compensable NTST-MSD claims (85.7% of all back MSD claims). The average compensable CIR was 85.9 per 10,000 FTEs. There were 8,283 Neck and Back compensable NTST -MSD claims (46.5% of all neck/back MSDs). There was an average of 920 compensable claims per year, with a compensable CIR of 17 per 10,000

FTEs. As with State Fund claimants, a higher proportion of NTST neck and neck/back claims were among women (55-57%) than NTST back injuries (42%) while age was basically the same (median of 37-38), Table 22.

There were 26,812 compensable Upper Extremity NTST-MSD claims between 1990-1998 (67% of all upper extremity MSDs). There was an average of 2,979 compensable claims per year (average CIR= 56.2 per 10,000 FTEs) (Table 23). Hand/wrist NTST disorders accounted for almost half of these (12,421) and 60% of all hand/wrist MSDs, averaging 1,380 claims per year. The average compensable claims rate was 25.7 per 10,000 FTEs. Approximately 77% of the compensable Shoulder MSD claims (8,642/11,203) were for NTST disorders, averaging 960 per year with an average claims rate of 18.2. Approximately 61% of compensable Elbow/forearm MSDs were NTST disorders, averaging 300 per year with a compensable claims incidence rate of 5.7 per 10,000 FTEs. As with the State Fund claims, approximately 60% of the hand/wrist NTST-MSD claimants were women, compared to 46% for shoulder and elbow/forearm NTST-MSD claims. Claimants were slightly older compared to the State Fund claimants (39-40 years).

### **3.3. Distribution of Non-Traumatic Soft Tissue (NTST) MSDs by Industry**

The workers compensation data were examined by industry sector, 3-digit standard industrial classification (SIC) to compare with national industry estimates and by Washington's specific industrial risk classifications (WIC) which are based on more similar risk of any injury than commercial considerations (SIC). The analysis evaluated both the magnitude (number or count) of claims and the risk (incidence) of claims. The ranks of these two components were averaged into a "Prevention Index (PI)" and all tables were rank ordered by this index. For each table, the count of NTST-MSDs, the incidence rate and 95<sup>th</sup> upper and 95<sup>th</sup> lower bounds are provided along with the rate ratio (the incidence rate for a particular industry divided by the rate for all industries combined). Additionally, the count rank, the rate rank and the prevention index are included. Because the prevention index is an average of two ranks, it is possible that a very small industry (few hours) might have a very high claims incidence rate and thus would not be in the top 25 industries based on the prevention. The same could be true with an industry that has a very large population but a low incidence rate. When either of these

events occurred, the top 3 industries by either count or rate are listed below the line in the table. SIC codes that had less than 200,000 hours per year (equivalent to 100 FTEs per year) were excluded from the more detailed analysis of 3-digit SICs. Similarly, 4-digit WIC classes with less than 50 full-time workers per year were excluded. The difference in exclusion criteria reflects the tradeoff between precision and stability.

### 3.3.1 Overall NTST-MSDs by Industry Sector

Table 7 shows that the State Fund Construction and Manufacturing sector are the first industries based on the prevention index followed by Transportation. Construction is 1<sup>st</sup> on the basis of claims incidence rate (CIR) and 4<sup>th</sup> on the basis of claim count (n= 59,978). The CIR was almost twice that of the overall industry rate. For the Self-Insured compensable claims, Transportation is first on the prevention index, followed by Retail Trade and Manufacturing (Table 24). Transportation has the highest compensable CIR, about 1.8 times that of all Self-Insured industry. Self-Insured construction is 8<sup>th</sup> on the prevention index based on both compensable rate and compensable count with an

incidence rate less than the overall industry rate.

Figures 8 and 9 show State Fund and Self Insured compensable claims incidence rates from 1992-1998. Analysis was for 1992-1997 because Self-Insured hours were not available before 1992 and there are many 1998 Self Insured open claims that are not available for analysis since they are not reported to L&I until they are closed. Although a strict comparison between the Self-Insured and State Fund compensable claims rates is not possible, because we do not have diagnostic (ICD-9) codes for the Self-Insured data, the differences in patterns are interesting. For the State Fund, the highest compensable claims incidence rate is for Construction which decreased dramatically through 1995 and then leveled off. For the Self Insured, Construction rates are considerably lower than other industries whereas Transportation is the highest and appears to be increasing. Finance and Public Administration have had the lowest CIRs and were relatively stable among State Fund employers whereas among the Self -Insured Public Administration employers, CIRs were higher than Services, Agriculture, Construction, Manufacturing, Wholesale Trade, and Finance. The only Self-Insured industries with relatively

consistent downward trends in rates were Manufacturing, Wholesale and Retail Trade. With respect to severity rates (lost workdays per 10,000 FTEs), there was virtually no change over time in Self-Insured Transportation (average yearly decrease of 1.1% and overall change of 5.6%), compared to more than 12% per year for Agriculture, Construction and Manufacturing, Table 35. For the State Fund, severity rates decreased between 9.2 and 11.4% per year.

### 3.3.2. NTST-MSDs by Prevention Index (PI) and 3-Digit SIC Code

#### 3.3.2.1. State Fund

Nursing and Personal Care Services (SIC 805) was the first industry of concern based on the State Fund Prevention Index (PI), Table 8. It was ranked first on claims incidence rate (1,194 per 10,000 FTEs) and second based on count rank (19,045 claims) and 3.4 times the overall industry rate. The top 10 3-digit SIC industries and their claims rate relative to overall industry (RR) were:

1. Nursing and Personal Care Services (SIC 805) RR=3.4
2. Masonry (SIC 174) RR=2.9
3. Millwork (SIC 243) RR=2.5
4. General Building Contractors-Residential (SIC 152) RR=2.1

5. Sawmills (SIC 242) RR=2.7
6. Roofing (SIC 176) RR=3.0
7. Landscape (SIC 078) RR=2.3
8. Trucking (SIC 421) RR=1.9
9. Carpentry (SIC175) RR=2.2
10. Plumbing (SIC 171) RR=1.9

While Eating Places (SIC581) had the most claims, the rate rank was 205th, and less than the overall industry rate (RR=0.8). Table 16 shows the SIC-3 industries for compensable NTST-MSD claims, the top 10 industries by prevention index were:

1. Nursing and Personal Care Services (SIC 805) RR=3.6
2. Masonry (SIC 174) RR=3.7
3. Trucking (SIC 421) RR=2.5
4. General Building Contractors-Residential (SIC 152) RR=2.4
5. Roofing (SIC 176) RR=3.7
6. Carpentry (SIC175) RR=2.7
7. Landscaping (SIC 078) RR=2.7
8. Residential Care (SIC 386) RR=2.4
9. Concrete work (SIC 177) RR=3.2
10. Sawmills (SIC 242) RR=2.5

The top 5 occupations within each of the top 3-digit SICs with rates greater than 2.5 times the overall industry rate (RR.2.5) were examined in more detail in Table 20. With the exception of Converted Paper and Paperboard Products, Except Containers (SIC 267), more than 50% of the claims occurred in these occupations. For example, in



roofing, 80% of the compensable NTST-MSD claims were in the following occupations:

55.4% in roofers

7.7% in supervisors

6.6% in carpenters and apprentices

6.3% in construction laborers

4.1% in sheet metal workers and apprentices

In some of these, more than 50% were concentrated in one job:

- Roofing (SIC 176) 55% of claims were among roofers,
- Nursing Facilities (SIC 805) 70% were in nursing aides and orderlies,
- Intercity & Rural Bus Transportation (SIC 413) 69.1% were in bus drivers
- Landscape & Horticultural Services (SIC 078) 62% were in groundskeepers and gardeners
- Trucking and Courier services (SIC 421) 56% were in truck drivers

It should be noted that there were no occupational codes for 8,424 (5.9%) compensable claims.

Back and Neck NTST-MSDs were congregated in industries characterized by manual handling activities.

For Neck NTST-MSDs, Nursing and Personal Care Services (SIC 805) was first on the PI and had a RR of 4.1 times the overall industry CIR. It was followed by Masonry (SIC 174),

Residential Care (SIC 836), Rooming and Boarding Houses (SIC 702), Trucking (SIC 421), Hospitals (SIC 806), Roofing, Carpentry, Residential General Building Contractors and Millwork.

Although Broadwoven Fabric Mills (SIC 222) had a high rate, it was a small industry with a small number of cases, Table 9. Although Eating Places had almost as many claims as Nursing Facilities, it was ranked 180 by claims rate (RR=0.8).

Back NTST-MSDs had much higher rates but a fairly similar industrial distribution as Neck NTST-MSDs. Nursing and personal care services, Masonry, Residential General Building Contractors, Carpentry and Millwork had the highest prevention indices, and unlike for the Neck NTST-MSDs, Landscape, Sawmills and Plumbing were in the top 10, Table 10. Similar industries were identified for sciatica with the inclusion of Heavy Construction (SIC 162), and Miscellaneous Special Trade Contractors (SIC 179), Table 12.

The distribution of Upper Extremity NTST-MSDs differed from back and neck NTST-MSDs, Table 11. Based on the Prevention Index, the top 10 industries and their rate ratios were:

1. Nursing and Personal Services (SIC 805) RR=2.7
2. Sawmills (SIC 242) RR=3.2

3. Millwork (SIC 243) RR=2.7
  4. Masonry (SIC 174) RR=2.5
  5. Meat Products (SIC 201) RR=3.9
  6. Miscellaneous Food Preparation and Kindred Products (SIC 209) RR=2.5
  7. Groceries (SIC 514) RR=1.9
  8. Roofing (SIC 176) RR=2.6
  9. Residential General Contractors (SIC 152) RR=1.8
  10. Landscaping (SIC 078) RR=2.1.
- Again Broadwoven Fabric Mills and Footwear had high rates but low counts. Eating Places had the highest number of claims (6,960) but ranked 210 based on claims rate.

Based on the Prevention Index, rotator cuff syndrome claims were more likely to be concentrated in the manual handling industries similar to back claims with Masonry (SIC 174) being first on the Prevention Index and rate ratio (RR=3.9), Table 13. Epicondylitis also was primarily concentrated in industries characterized by manual handling activities, Table 14, whereas carpal tunnel syndrome (Table 15) was more focused in industries characterized by repetitive work:

1. Beauty Shops (SIC 723) RR=2.9
2. Sawmills (SIC 242) RR=2.7
3. Grocery Stores (SIC 541) RR=2.1
4. Admin. of Social, Human Resource & Income Maintenance Programs (SIC 944) RR=2.3
5. Meat Products (SIC 201) RR=4.1

6. Masonry (SIC 174) RR=2.0
7. Miscellaneous Food Preparation (SIC 209) RR=2.3
8. Millwork (SIC 243) RR=2.0
9. Groceries & related products (SIC 514) RR=1.6
10. Miscellaneous Plastics Products (SIC 308) RR=2.0

Footwear had the highest CIR and Eating Places had the highest number of CTS claims by SIC

### 3.3.2.2. Self-Insured Compensable NTST-MSDs

Self-Insured compensable claims incidence rates by industry are for years 1992-1998 because hours weren't available to calculate rates prior to 1992. While Hospitals (SIC 806) ranked first based on the number of NTST-MSD compensable claims (Table 25), based on the Prevention Index, the following 3-digit SICs were identified:

1. Trucking & Courier Services (SIC 421) RR=3.9
2. Air Transportation (SIC 451) RR=2.7
3. Grocery Stores (SIC 541) RR=1.7
4. Rolling, Drawing & Extruding Nonferrous Metals (SIC 335) RR=2.2
5. Groceries & Related Products (SIC 514) RR=2.2
6. Variety Stores (SIC 533) RR=1.9
7. Nursing & Personal Services (SIC 805) RR=2.1

8. Personnel Supply Services (SIC 736) RR=1.6
9. Local & Suburban Passenger Transportation (SIC 411) RR=2.6
10. Services to Dwellings & Other Buildings (SIC 734) RR=1.9

Within 3-digit SICs that had compensable NTST-MSD rates greater than 2.5 times the overall industry rate, two thirds or more were in five or fewer occupations, Table 29. For example,

- Trucking (SIC 421): Truck drivers 52.5%, Freight/stock handlers 19.3%
- Miscellaneous Durable Goods: Molding and casting machine operators (SIC 509) 34.1%
- Air Transportation (SIC 451): Freight/stock handlers 43.0%, Public transportation attendants 29.4%
- Local & Suburban Passenger: Bus drivers 40.3%
- Transportation (SIC 411): Health Technicians 24.4%

There were no occupational codes for 4246 (5.3%) claims.

Trucking & Courier Services and Air Transportation were 1<sup>st</sup> and 2<sup>nd</sup> on the PI for all body regions and Grocery Stores were in the top 10 (Tables 26-28). However, with respect to Neck NTST-MSDs, Hospitals (SIC 806) ranked 3<sup>rd</sup> and Executive (SIC 911) and Legislative (SIC 912) were included in the top 10. For Back NTST-MSDs,

Beverages (SIC 208) ranked 9<sup>th</sup> and Hospitals ranked 10<sup>th</sup>.

For Upper Extremity NTST-MSDs, Ship & Boat Building & Repair (SIC 373), Miscellaneous Durable Goods (SIC 509), Dairy Products (SIC 202) and Paperboard Containers & Boxes (SIC 265) were also in the top 10 list (Table 28). The highest rate ratio was for Miscellaneous Durable Goods (RR=5.4).

### 3.3.2.3 Combined State Fund and Self-Insured Compensable NTST-MSDs

The Construction sector was first on the Prevention Index (RR=1.9) followed by Manufacturing (RR=1.1) and Transportation (RR=1.6), Table 30. The top 10 3-digit SICs for all combined compensable NTST-MSDs (Table 31) were:

1. Trucking (SIC 421) RR=3.0
2. Nursing & Personal Care Facilities (SIC 805) RR=3.0
3. Masonry (SIC 174) RR=3.4
4. Air Transportation (SIC 451) RR=2.8
5. General Building Contractors-Residential (SIC 152) RR=2.1
6. Roofing (SIC 176) RR=3.3
7. Carpentry & Floor Work (SIC 175) RR=2.4
8. Residential Care (SIC 836) RR=2.2
9. Grocery Stores (SIC 541) RR=1.8
10. Concrete Work (SIC 177) RR=2.9

Grocery Stores ranked 1<sup>st</sup> based on count while Masonry ranked 1<sup>st</sup> based on CIR. Between 1992-1997, the CIR decreased approximately 4.6% per year.

For compensable Neck NTST-MSDs (Table 32), Nursing Homes ranked 1<sup>st</sup> and had a rate ratio of 4.8 times the overall industry rate, followed by Masonry (RR=5.2). Additionally, Rooming & Boarding Houses (SIC 702) with a RR=3.5, Misc. Special Trade Contractors (SIC 179) with a RR=2.3, and Home Health Care Services (SIC 808) with a RR=3.4, were in the top 10 group. Nursing homes ranked 1<sup>st</sup> in Back NTST-MSDs (RR=3.6), followed by Trucking (RR=3.3), and Masonry (RR=3.7), Table 33. Landscaping (RR=2.7) and Miscellaneous Special Trade Contractors (RR=2.0) were also in the top 10 group for back NTST-MSDs.

With respect to compensable Upper Extremity NTST-MSDs, Masonry (RR=3.0), Air Transportation (RR=2.6) and Trucking (RR=2.3) were the top 3 industries on the PI, followed by Grocery Stores (SIC 541) with RR=2.0 and Meat Products (SIC 201) with RR=3.0 (Table 34). Also included in the Top 10 that were not in the overall list were Sawmills (RR=2.3), Misc. Food Preparation (RR=2.2), Rolling Non Ferrous Metals (RR=2.8), and Millwork (RR=1.9). Very small industries with high CIRs excluded

based on the Prevention Index include Footwear (RR=6.1), Broadwoven Fabric Mills (RR=4.0) and Musical Instruments, SIC 393 (RR=3.3).

### 3.3.3. NTST-MSDs by 4-Digit Washington Industrial Risk Classification (WIC) Code

The WIC codes allow a closer look at industries by similar types of processes or exposures for all injuries, not just MSDs. The utility of this analysis can be seen in the higher rate ratios (RR) than observed for the SICs. While in general, the results are similar to those based on SIC code, there are some high risk industries that do not show up in the SIC analysis.

#### 3.3.3.1. State Fund

Based on the Prevention Index for all NTST-MSDs (Table 36), the top 10 industries were identified by WIC:

1. Nursing Homes (WIC 6108) RR=3.8
2. Wood Frame Bldg Construction (WIC 0610) RR=3.0
3. Wood Products Manufacturing (WIC 2903) RR=3.0
4. Roofing (WIC 0507) RR=5.2
5. Wallboard Installation (WIC 0515) RR=6.3
6. Temporary Help-Assembly (WIC 7114) RR=5.6
7. Sawmills (WIC 1002) RR=3.3

8. Building Construction Not otherwise classified (WIC 0518) RR=2.8
9. Garbage Collection (WIC 4305) RR=3.7
10. Moving Companies (WIC 6907) RR=4.5

Based on CIR, Reinforcing Steel Installation (WIC 0109) was 1<sup>st</sup> (RR=9.7) followed by Shake Mills (WIC 1005) with RR=7.6.

For Neck NTST-MSDs (Table 37), additional industries identified include State Health Care Facilities (WIC 7201) with a RR=4.3, Home Health Care Nursing (WIC 6110) with an RR=3.3, and Trucking (WIC 1102) with an RR=2.3. As with the overall NTST-MSDs, Shake Mills (RR=12.5) and Reinforcing Steel Installation (RR=9.6) had the highest CIRs. For Back NTST-MSDs (Table 38), Beer Distributors (WIC 2105) with a RR=4.1 and Landscaping (WIC 0301) with a RR=3.1, join the top 10 list. Along with Reinforcing Steel Installation (RR=9.5), and Shake Mills (RR=8.2), Temporary Help-Vehicle Operation (WIC 7119), had a very high rate (RR=6.4) but small numbers.

For Sciatica, the following top 10 WICs were identified based on Prevention Index (Table 40):

1. Nursing Homes (WIC 6108) RR=4.7

2. Wood Frame Bldg Construction (WIC 0510) RR=3.0
3. Building Construction Not otherwise classified (WIC 0518) RR=3.7
4. Road Construction (WIC 0101) RR=3.3
5. Trucking (WIC 1102) RR=2.9
6. Roofing (WIC 0507) RR=6.8
7. Heating, Ventilation and Air-Condition Systems (WIC 0307) RR=3.2
8. Plumbing (WIC 0306) RR=3.1
9. Wallboard Installation (WIC 0515) RR=8.2
10. Preferred Workers (WIC 7204) RR=7.5

Bridge Construction was first based on CIR and Restaurants (RR=0.8) was first based on number of claims.

For Upper Extremity NTST-MSDs (Table 39), additions to the top 10 list based on the Prevention Index include Meat Dealers Wholesale (WIC 3304) with a RR=4.1 and Meat Products Manufacturing (WIC 4301) with a RR=4.7. Based on CIR, Reinforcing Steel (RR=10.7) and Temporary Help-Vehicle Operation (RR=10.1) were the top two industries for the upper extremity.

For Rotator Cuff Syndrome (Table 41), the top 10 WICs based on the Prevention index include:

1. Trucking NOC (WIC 1102) RR=3.0

2. Wallboard Installation (WIC 0515)  
RR=9.5
3. Wood Products Manufacturing (WIC 2903) RR=3.2
4. Nursing Homes (WIC 6108) RR=2.9
5. Garbage Collection (WIC 4305)  
RR=5.2
6. Meat Dealers Wholesale (WIC 3304)  
RR=3.3
7. Building Construction Not Otherwise  
Classified (0518) RR=3.1
8. Sawmills (WIC 1002) RR=4.2
9. Wood Frame Building Construction  
(WIC 0510) RR=2.7
10. Plywood Manufacturing (WIC 2904)  
RR=5.4

Based on CIR, Reinforcing Steel Installation (RR=13.4) was 1<sup>st</sup> and based on number of claims, Restaurants (RR=0.7) was 1<sup>st</sup>.

For Epicondylitis (Table 42), the top 10 WICs based on the Prevention Index include:

1. Wood Frame Building Construction  
(WIC 0510) RR=3.6
2. Wood Products Manufacturing (WIC 2903) RR=3.2
3. Meat Dealer Wholesale (WIC 3304)  
RR=3.3
4. Building Construction Not Otherwise  
Classified (0518) RR=3.2
5. Wallboard Installation (WIC 0515)  
RR=8.1
6. Roofing (WIC 0507) RR=4.6

7. Aluminum Product Manufacturing  
(WIC 3404) RR=2.4
  8. Plastic Products Manufacturing (WIC 3510) RR=2.7
  9. Cabinet/ Countertop Manufacturing  
(WIC 2907) RR=2.9
  10. Supermarkets (WIC 6402) RR=2.1
- Wallboard Installation-Discounted (RR=11.7) ranked first based on CIR and Restaurants (RR=0.8) ranked first based on number of claims.

For Carpal Tunnel Syndrome (Table 43), the top 10 WICs based on the Prevention Index include:

1. Meat Dealer Wholesale (WIC 3304)  
RR=4.5
2. Supermarkets (WIC 6402) RR=2.8
3. Barber Shops (WIC 6501) RR=3.0
4. Wood Products Manufacturing (WIC 2903) RR=2.9
5. Sawmills (WIC 1002) RR=3.6
6. Plastic Products Manufacturing (WIC 3510) RR=2.8
7. Meat Products Manufacturing (WIC 4301) RR=4.6
8. Logging (WIC 5001) RR=3.5
9. Textile Manufacturing (WIC 3708)  
RR=3.1
10. Wood Frame Building Construction  
(WIC 0510) RR=2.1

Once again Reinforcing Steel Installation (RR=16.9) and Shake Mills (RR=8.8) had the highest CIRs. Clerical Office Not Otherwise Classified had the largest number of claims (n=2,451), but

had a RR=0.6 and ranked 176 based on claims incidence rate.

### 3.3.3.2. Self-Insured

Based on the Prevention Index for compensable NTST-MSDs (Table 44), the top 10 industries by WIC include:

1. Parcel Package Delivery (WIC 1101) RR=5.0
2. Bus Companies (WIC 1404) RR=3.4
3. Airlines, Ground Crew (WIC 6802) RR=4.7
4. Trucking (WIC 1102) RR=3.2
5. Schools, All Other Employees (WIC 6104) RR=2.4
6. Warehouses, NOC (WIC 2102) RR=2.6
7. Cities-All Other Employees NOC (0803) RR=2.5
8. Airlines, Flight Crew (WIC 6801) RR=4.7
9. Temporary Help Administrative Staff (WIC 7104) RR=21.0
10. Wholesale Stores (WIC 6407) RR=1.8

Based on number of claims, Hospitals (WIC 6105) were first with a RR=1.4 followed by Aircraft Manufacturing (WIC 3403) with a RR=0.7. Based on CIR, Temporary Help Administrative Staff were followed by Beer distributors (RR=8.8) and Brick or Clay Products Manufacturing (WIC3501) with a RR=7.1. Although Temporary Help Administrative Staff should only have

claims for staff of those large temporary help agencies, they also occasionally include temporary assembly, machine operator, etc. claimants that are sent to work in other companies.

For compensable Neck NTST-MSDs (Table 45) based on the PI, Bus Companies and Parcel Package Delivery were 1<sup>st</sup> (RR=5.3), others in the top 10 included Hospitals (RR=1.6) and Fire Fighters (WIC 6904) with a RR=3.5. The highest rate was for Temporary Help Administrative Staff (RR=25.7) and the highest count was for hospitals. For Back NTST-MSDs (Table 46), based on the PI, Parcel Package Delivery was 1<sup>st</sup> with a RR=6.0. Wholesale Stores was also in the top 10 based on the PI (RR=3.2). The highest CIR was in Temporary Help Administrative Staff (RR=16.4) and the highest number was in Hospitals (RR=1.5).

For Upper Extremity NTST-MSDs, Parcel Package Delivery (RR=3.8) was 1<sup>st</sup> on the Prevention Index, Table 47. Additional top 10 industries included Supermarkets (WIC 6402) with a RR=2.1, Aluminum Product Manufacturing (WIC 3404) with a RR=2.4. The highest CIR was in Temporary Help Administrative Staff (RR=27.0) and the largest number was in Aircraft Manufacturing (RR=0.8).

### 3.3.4. Temporary Help Work

For the most part, the same industries were the top high-risk industries consistently throughout the nine-year period. However, a more recent trend that does not fully show up in the summary tables is the inclusion of temporary help agencies as high-risk industries. These agencies were separately classified by type of work (e.g., assembly, machine operator, construction, food processing, and health care) in Washington Industrial Codes (WIC) largely after 1989. Because their numbers were originally small but have been growing, it is useful to look at them by rank based on rate ratio.

For all State Fund NTST-MSDs, compared to overall industry rate:

- Temporary Help Vehicle Operation ranked 3<sup>rd</sup>, RR=7.4
- Temporary Help Assembly Work ranked 7<sup>th</sup>, RR=5.6
- Temporary Help Construction ranked 10<sup>th</sup>, RR=4.9
- Temporary Help Machine Operator ranked 15<sup>th</sup>, RR=4.0

For Back NTST-MSDs, based on rate ratio compared to the overall industry rate:

- Temporary Help Vehicle Operation ranked 3<sup>rd</sup>, RR=6.4
- Temporary Help Assembly Work ranked 10<sup>th</sup>, RR=5.1
- Temporary Help Construction ranked 14<sup>th</sup>, RR=4.3

For Upper Extremity NTST-MSDs, compared to the overall industry rate:

- Temporary Help Vehicle Operation ranked 2<sup>nd</sup>, RR=10.1
- Temporary Help Assembly Work ranked 3<sup>rd</sup>, RR=6.9
- Temporary Help Construction ranked 6<sup>th</sup>, RR=6.1
- Temporary Help Machine Operator ranked 9<sup>th</sup>, RR=4.9
- Temporary Help Food Processing ranked 14<sup>th</sup>, RR=4.3

For all Self-Insured NTST-MSDs, compared to overall industry

- Temporary Help-Administrative ranked 1<sup>st</sup>, RR=21.0

For the Self-Insured compensable NTST-MSD claims, temporary administrative staff (largely clerical) was a high risk category (RRs ranging from 16-27).

Temporary workers who do not work through a temporary help agency were not included in these estimates.



## **4.0 Discussion**

In the current study we looked at claims for general and selected specific hand/wrist, elbow, shoulder and back disorders. The focus was on non-traumatic soft tissue musculoskeletal disorders (NTST-MSDs). In previous reports, we referred to these as gradual onset MSDs<sup>vii</sup>. These NTST-MSDs, 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.

### **4.1. Differences from Previous SHARP Reports**

For the first time we have combined the forearm region with elbow, the fingers with hand/wrist, the upper arm with shoulder. This is the most likely reason for increases in the average number of claims per year for these body regions.

Although we used the designation "Non-Traumatic Soft Tissue," in the May 1999 Report<sup>viii</sup>, we made some additional changes in the current report including:

1. Exclusion of lower extremity disorders because after looking at coding for nature and type for a random sample of claims, we could not identify a workable coding scheme that would separate actual sudden onset injuries from more gradual non-traumatic disorders. This eliminated approximately 59,000 claims that would have been in the analysis.
2. Exclusion of contusions (nature=160) even if they were associated with overexertion because we thought there must be a more acute traumatic component to them. This eliminated about 5,000 claims from the back, neck and upper extremity analyses.
3. Exclusion of claims that might have had a body part other than those included in the upper extremity, neck, or back or combination of these in the current report. For example, the primary body part may be leg but the claimant also had epicondylitis. This eliminated about 23,000 claims
4. Exclusion of upper extremity claims that had Nature=190 (Dislocation, herniation or pinched nerve) because we reasoned that those

were more likely to be dislocation than herniation or pinched nerve. This eliminated approximately 2260 claims.

5. Using ANSI z16.2 codes for non-traumatic with the specific diagnoses (sciatica, rotator cuff, epicondylitis and carpal tunnel syndrome).

Therefore, we eliminated approximately 89,000 claims from the analysis that we would have included if we had performed the same analysis as in the May 1999 report.

## **4.2. Magnitude and Cost**

### **4.2.1 State Fund**

Neck, back and upper extremity musculoskeletal disorders represent a significant cause of morbidity in the working population. Claims for these disorders represent 46% of all accepted claims in the State Fund. Non-traumatic Soft Tissue MSDs account for 26.4%. While 24% of all State Fund claims during this period resulted in 4 or more days of lost time (compensable), 36.6% of NTST-MSD claims (49.2% of Neck, 40.2% of back, 33.0% of neck-back combination and 35.7% of upper extremity NTST-MSD claims) resulted in compensable claims in the State Fund. Overall, these NTST-MSD claims for neck, back and upper extremity musculoskeletal disorders in the State

Fund had direct costs of \$2.6 billion in 1998 dollars and 20.5 million lost workdays over the 9-year period. This is equivalent to losing 82,000 full-time workers from the workforce over the nine-year period. While the claims incidence rates are decreasing for most but not all NTST-MSDs, the rate of decrease is less than for all claims excluding NTST-MSDs particularly for the upper extremity. There is no significant decrease for shoulder or elbow NTST-MSDs or the specific diagnoses of rotator cuff, or sciatica. Epicondylitis has increased. Carpal tunnel syndrome has been decreasing significantly but not as rapidly as all claims excluding NTST-MSDs (Figure 6). The percent of CTS cases resulting in surgery has decreased significantly. Severity (number of lost workdays per 10,000 FTEs) decreased for all claims approximately 17.3% per year, and compensable claims severity rate decreased 14.8% per year. Compensable NTST-MSD claims severity rates decreased about 10.4% per year (Table 35). Severity rates for sciatica decreased about 8.8% per year, for rotator cuff syndrome 5.4% per year, for epicondylitis about 6.5% per year, and for CTS about 7.4% per year.

#### 4.2.2 Self-Insured

For the Self-Insured, there were 80,230 compensable neck, back and upper extremity NTST musculoskeletal disorder new claims. It is unfortunate that we have no diagnoses, and the data on costs and lost time are incomplete.

#### **4.3. Comparisons with Other Studies**

The 1997 combined State Fund and Self-Insured compensable claims incidence rate for neck, back and upper extremity NTST-MSDs was 122.0 per 10,000 FTEs. This is slightly higher than the Washington 1997 BLS rate for overexertion and repetitive motion disorders (113.4 per 10,000 FTEs) which is limited to private industry only.

Surgical incidence of CTS in the Montreal adult population<sup>ix</sup> was 9 per 10,000, 19 per 10,000 for male manual workers and 18 per 10,000 for female manual workers, with 75% and 55% of all surgical CTS attributable to work. Food and beverage processors and material handlers were among those occupations at increased risk. Tanaka et al<sup>x</sup> estimated the overall prevalence of self-reported CTS among the general U.S. adult recently working population at 1.47 %. Using the same national survey data, Blanc et al<sup>xi</sup> reported a higher

proportion of females reporting CTS (61%) than males. Work disability (loss or change in work) increased with an odds ratio of 1.5 per 120 minutes of hand bending (95%CI 1.2-1.7). Atroshi et al<sup>xii</sup> estimated a prevalence of 2.7% of a general adult population in Sweden had CTS symptoms with clinical or electrodiagnostically positive findings (2.1% for men and 3.0% for women). Using excessive hand force or wrist flexion/extension or using vibratory tools for more than one hour per day was associated with significantly increased prevalence of CTS. Using the same data source as Tanaka et al, Guo et al<sup>xiii</sup> estimated 22.4 million back pain cases among recent workers (17.9% prevalence) resulting in 149.1 million lost work days in 1988. Approximately 65% of back pain cases were attributable to occupational activities. Similar to our findings, the risks were greatest in construction and nursing occupations.

Although Webster and Snook<sup>xiv</sup> were unable to estimate incidence rates for upper extremity cumulative trauma disorders based on Liberty Mutual data, they identified 6,067 claims in 1989 for policy holders in 45 states with an average cost of \$8,070 and median cost of \$824. They then estimated the national cost to be \$563 million. In a previous report (40-2-1999) for the

same period, we identified 8,791 shoulder, elbow and hand/wrist lost time and medical-only claims with gradual onset in the Washington State Fund. Costs were comparable to the Liberty Mutual claims. The average cost of our 1989 claims ranged from \$7,093-\$8,250 and median cost ranged between \$269-\$332.

Using the average costs and rates for the 1990-1998 State Fund data, and assuming there are 96 million workers in the US (number covered by OSHA) with an overall incidence rate of 116 per 10,000 FTEs for all upper extremity NTST-MSDs with average claim costs approximately \$5,837, the total direct cost would be approximately \$6.5 billion for all upper extremity NTST-MSDs per year.

Webster and Snook <sup>xv</sup> noted that low back pain workers compensation cases represented 16% of all claims and 33% of all costs. The mean cost for low back pain was \$8,321; median cost per case was \$396. Again, this is similar to our 1989 data of \$6,347 average and \$412 median costs. Using our claims incidence rate of 191.6 per 10,000 FTEs for back NTST-MSDs, and applying that to the approximate 96 million US workers, the estimated direct costs would be \$10.8 billion. Combined back and upper extremity NTST-MSD costs

are remarkably similar to the estimates reported by OSHA and the National Safety Council.

There are reasons to believe that these estimates of the magnitude and costs are underestimates. For example, Morse et al<sup>xvi</sup>, in a survey of the Connecticut working population, found that only 10.6% of those with work-related upper extremity disorders went through the workers compensation system and only 21% of those who had medical visits or procedures reported having them paid for by workers compensation. None of these figures take into account the indirect costs to the employer in lost productivity, quality, training replacement workers, recruitment and other administrative costs. Nor do these figures take into account the quantitative and qualitative costs to the claimant and family (e.g., loss in home production), as well as those workers who never file a workers compensation claim but suffer from work-related back or upper extremity disorders. Morse et al (1998) reported the cases in their survey had much higher difficulties with daily tasks (bathing, child care), having lost their homes, had divorces, etc. than non-cases.

The 1997 Washington BLS rate for CTS resulting in lost time was 4.4 per 10,000 FTEs for private industry,

while the 1997 compensable CTS rate for the State Fund was 16.6 per 10,000 FTEs<sup>xvii</sup>. CTS workers compensation data are not available for the Self-Insured employers and the BLS data does not include public sector employees. It is unlikely that these two differences in populations explain the 4-fold difference in estimated rates.

Although there had been some increase in CTS and other NTST-MSDs in Washington State between the late 1980s and mid 1990s, the increase had been quite modest compared to the rapid increase in rates reported by the BLS, suggesting potential underreporting especially in earlier BLS data. Rates have been decreasing for both systems since 1994, as have all injury and illness rates. The incidence of work-related CTS found in this study was 24.5 per 10,000 FTE over the years 1990-1998, while Franklin et al<sup>xviii</sup> who also used Washington State workers' compensation data reported a claim rate of 17.4 per 10,000 FTEs for carpal tunnel syndrome over the period 1984-1988. The increase in claim rate over the years is consistent with national data. This probably represents both increases in true incidence as well as in reporting.

#### **4.4. High Risk Industries**

The focus of this study has been identifying high-risk industries for both research and prevention purposes. It should be noted that there are high-risk jobs in low-risk industries. However, we did not have adequate denominator data to determine incidence rates by occupation in this study.

We used three different approaches to identifying "high-risk" industries: Frequency count, relative risk or rate ratio, and prevention index. Each has advantages and disadvantages depending on the goals. If we were interested in, for example, reducing the overall number of claims by 10%, we would look for the industries where the most claims are occurring and perhaps focus educational campaigns in those industries. It is likely that the reason why there are so many claims is because these are large industries with many employees, even if the relative risk is low. An example of this can be seen with Eating Places in Table 8. This suggests that any specific restaurant may not have a high concentration of risk factors present. The relative risk or rate ratio is used to identify those industries at highest risk. We would expect to find a higher concentration of risk factors present in most workplaces in these industries. This might be important in focusing inspection activities or research where

contrasts in claims incidence rates may be important. However, if the highest risk industry has few employees, the overall industry impact of intervention activities might be small unless control measures have widespread utility. The Prevention Index was developed as a way to obtain the most impact in high-risk industries. It treats frequency and relative risk as equally important. Depending on the type of intervention, education or research focus contemplated, weighting relative risk or incidence rate more heavily than frequency should be considered.

Based on State Fund compensable claims data, the Construction Sector is at highest risk but based on Self-Insured data, Transportation is at the greatest risk (Figures 8 and 9). It is likely that the larger Self-Insured construction initiated prevention activities whereas the small residential contractor in the State Fund has not used the same strategy. It may be that the joint apprenticeship programs, (e.g., carpenter's apprenticeship program) have focused more on using ergonomics principles and workers from these apprenticeships tend to work for the larger Self-Insured employers. Although tasks in the construction industries are quite varied, they are characterized by manual handling of heavy materials, high peak

hand force with periodic repetitive motions (sometimes with segmental vibration as in sawing and drilling), combined with awkward postures. Construction industries are not identified in the top industries for repetitive motion disorders in the BLS data. This discrepancy may reflect our inclusion of "overexertion in lifting" as a non-traumatic onset disorder (whereas the BLS separates overexertion from repetitive motion

It is unclear why the rates are increasing for Transportation among the Self-Insured (twice the State Fund rate in 1997) whereas they are decreasing for the State Fund employers. Additionally, the Self-Insured Public Administration employers have dramatically higher rates than for the State Fund employers. The reasons for this are not readily apparent.

Based on the State Fund Prevention Index and 3 digit SIC code for compensable back, neck and upper extremity NTST-MSDs, the 3-digit SIC code industries involving heavy manual handling are of note: Nursing & Personal Care Facilities, Masonry, Trucking, Residential General Building Contractors, Roofing, Carpentry, Landscaping, Residential Care, Concrete work and Sawmills. These industries are characterized by heavy

manual handling tasks and should be the focus of prevention activities. Within the industries at highest risk ( $RR \geq 2.5$ ), occupations such as drywall installers, roofers, nursing aides, bus drivers accounted for the majority of claims (Table 20). For upper extremity NTST-MSDs, additional industries to include are Miscellaneous Food Preparation, Meat Products, Groceries and Related Products. The Temporary help-assembly WIC was also identified as being at high risk for NTST-MSDs in the State Fund data.

Based on the Self-Insured Prevention Index, the 3-digit SIC code industries requiring the most prevention attention include Trucking and Courier Services, Air Transportation, Grocery Stores, Rolling Mills, Groceries and Related Products, Variety Stores, Nursing & Personal Care Facilities, Personnel Supply Services, Local & Suburban Passenger Transportation and Services to Dwellings and Other Buildings. It is likely that the Variety Store claims are most related to manual handling activities. As shown in Table 29, SIC codes with rate ratios greater than 2.5 had the largest percentage of claims among occupations such as freight/stock handlers and bus or truck drivers. Other industries to include because they are in the top 10 for upper extremity NTST-MSDs are Shipping and

Boat Building & Repair, Miscellaneous Durable Goods, Dairy Products and Paperboard Containers & Boxes.

In general, the State Fund WIC codes provide more information on industries requiring attention (Tables 36-47). While there is substantial overlap between industries at high risk for back and upper extremity NTST-MSDs, there are also some important differences. Shoulder (and rotator cuff) disorders tend to be distributed in the same way as back disorders (Nursing homes, Wood frame Building Construction, Wallboard Installation, Wood Products Manufacturing, and Garbage Collection. For hand/wrist NTST-MSDs, Meat Dealers, Wood Products Manufacturing, Temporary Help Assembly, Plastic Products Manufacturing, Sawmills, Fruit and Vegetable Packing, Meat Products Manufacturing, Supermarkets are particularly important for prevention activities.

For the Self-Insured employers, WIC code industries with the highest PI include Parcel Package Delivery, Bus Companies, Airline Ground Crews, Trucking, Warehouses, Wholesale Stores, Schools and Cities with all other employees (grounds, maintenance, etc.) Parcel package delivery, supermarkets, temporary help-administrative, aluminum products manufacturing, meat

products, telephone company other employees, sawmills, bakeries were associated with hand/wrist NTST-MSDs. These industries should be the focus of research and prevention activities.

#### **4.5 Female Workers**

The percentage of female claimants increased somewhat over the years 1990-1998 possibly reflecting the steady increase in the proportion of women in the work force since 1960. In Washington State, the female portion of the workforce increased from 45.3% in 1987 to 46.9% in 1995<sup>xix</sup>. The average percentage of women claimants with hand/wrist NTST-MSD claims from 1990-1998 was 51% among the State Fund employers and 60.6% among the Self-Insured employers. This can be contrasted to 29.4% and 41.5% respectively for Back NTST-MSDs. Women may differentially select or be selected into highly repetitive work that puts them at increased risk<sup>xx</sup> whereas men are selected into heavy manual handling work (with the exception of health care).

#### **4.6. Temporary Workers**

Although there are a variety of temporary work situations (temporary agencies, leasing, independent contractor, etc.), we were only able to

identify claims associated with temporary service agencies. Because of the rapid increase in temporary service agency employment over the study period, summary tables may actually underestimate the current rank order of frequency and incidence of musculoskeletal disorders in segments of this industry. For example, based on the 9-year average incidence rate, Temporary services-assembly ranked 6<sup>th</sup> in the State Fund WIC industries for all NTST-MSDs, 9<sup>th</sup> in neck and 5<sup>th</sup> in upper extremity NTST-MSDs, 7<sup>th</sup> for elbow, 8<sup>th</sup> for shoulder, and 3<sup>rd</sup> for hand/wrist NTST-MSDs. Among the Self-Insured, Temporary Help-Administrative Staff is at high risk for both upper extremity and back disorders based on the prevention index. This WIC actually includes claimants who are temporary help workers in assembly, machine operators, etc. This most likely explains the extremely high rate ratio identified. Because L&I does not manage the self-insured claims like the State Fund, there may be less oversight on the quality of the Self Insured data provided to L&I by the Self-Insured employers. Given the likely continued increase in temporary service employment due to many companies shifting high-risk low skill work away from permanent employees, we can expect to see these temporary service WICs at the top of the Prevention Index



in the future. This change in the labor market presents a major challenge for developing effective prevention strategies.

#### **4.7. Limitations and Strengths of Using Worker's Compensation Data.**

There were a number of limitations in this study. Potential misclassification of the outcome measures is an important consideration. Underestimation of non-traumatic onset was identified in the records review. This was particularly evident in the Self-Insured data. The use of broad industrial categories as surrogates for exposure may mask high-risk jobs in heterogeneously exposed industries. However, misclassification of exposure is believed to be less for WIC than for SIC because WICs are more closely related to exposure (e.g., clerical workers in a factory have a different WIC than the factory workers) whereas SIC is related to commerce. The only major exception to this is Self-Insured Temporary Help employers who may be misclassifying the claimants using the central office WIC rather than their actual employment.

The use of ANSI z16.2 codes of nature and type are cumbersome. This coding scheme should be replaced with the Occupational Injury and Illness

Classification System (OIICS) used by BLS.

Secondly, this study includes very limited data for the largest employers in the state who employ one-third of the workforce (including large aerospace, health care and forest products which are known to involve jobs with work-related risk factors for these musculoskeletal disorders). In some respects, because smaller employers are more represented in the State Fund, costs may be overestimated due to the greater capacity of big employers to return employees to work, even in light duty jobs, thereby reducing lost time days and costs. Differences may also involve higher caseloads for workers compensation adjudicators for the State Fund compared to the Self-Insured, thus delaying the attention needed to address claims once they have been opened.

A third limitation is the inherent bias in reporting. The traumatic onset disorders tend to gain more ready acceptance in the workers compensation system than the more gradual or non-traumatic onset disorders. The medical records review indicated that the State Fund databases were useful for correctly identifying carpal tunnel syndrome, epicondylitis, rotator cuff syndrome and that our

coding scheme for determining non-traumatic soft tissue disorders was good for the neck, back and upper extremity but poor for the lower extremity. For example, a random records review of knee and ankle disorders indicated that the vast majority is of traumatic origin.

In this study we were able to define specific disorders with non-traumatic onset using State Fund data. Among CTS cases, 86% were NTST claims, for epicondylitis, this was true for 78% of claims, for sciatica for 73% of claims and for rotator cuff syndrome, 70% of claims.

We were also able to identify some emerging trends among workers in temporary service agencies. Hopefully, this finding will generate a closer look at health and safety issues affecting contingent workers.

Although much has been written about carpal tunnel syndrome, the magnitude and distribution of sciatica, rotator cuff syndrome and epicondylitis have not been previously described in US working populations. The incidence of rotator cuff syndrome is two-thirds that of CTS (15.3 versus 24.3) but more costly (Table 6). Epicondylitis has less than half of the claims incidence and about half of the cost of CTS per claim but still presents a major lost time

problem. Sciatica appears to be a relatively rare diagnosis (incidence rate of 4.9 per 10,000 FTEs) compared to NTST back disorders (incidence rate of 191.6 per 10,000 FTEs), however, the costs are extremely expensive (approximately \$40,000 on average). Research and prevention activities focused in industries with high demands for manual handling and repetitive work should contribute to the reduction of these work-related disorders.

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**Table 1. State Fund ICD-9 and Procedure Codes (CPT) Used to Extract Claims with Specific Diagnoses, 1990-1998**

<u>Average number/year</u>	<u>Code type</u>	<u>Code #</u>	<u>Description</u>
<u>Rotator Cuff</u>			
381	ICD-9	726.1	Rotator cuff syndrome
1,509	ICD-9	726.10	Rotator cuff, supraspinatus syndrome
146	ICD-9	727.61	Complete rupture of rotator cuff
1,412	ICD-9	840.4	Sprains and strains of rotator cuff capsule
117	CPT	23410	Repair ruptured rotator cuff-acute
95	CPT	23412	Repair ruptured rotator cuff-chronic
111	CPT	23415	Coracoacromial ligament release-chronic ruptured rotator cuff
361	CPT	23420	Repair of complete rotator cuff avulsion, chronic
<u>Epicondylitis</u>			
267	ICD-9	726.31	Medial epicondylitis
1,544	ICD-9	726.32	Lateral epicondylitis
110	CPT	24350	Lateral or medial fasciotomy
<u>Carpal tunnel syndrome</u>			
3,479	ICD-9	354.0	Carpal tunnel syndrome
1,433	CPT	64721	Median nerve decompression at carpal tunnel
<u>Neck diagnoses</u>			
789	ICD-9	722.0	Neuritis or radiculitis due to displacement of cervical disc
113	ICD-9	722.71	Intervertebral disc disorder with myelopathy
15	ICD-9	723	Other disorders of cervical region
2,217	ICD-9	723.1	Cervicalgia (pain in neck)
918	ICD-9	723.4	Cervical radiculitis, radicular syndrome
116	ICD-9	723.3	Cervicobrachial syndrome
58	ICD-9	723.5	Torticollis
8,009	ICD-9	847.0	Sprain and strain of neck
<u>Back diagnoses</u>			
2,573	ICD-9	722.10	Lumbago or sciatica due to displacement of intervertebral disc
350	ICD-9	722.73	Intervertebral disc disorder with myelopathy
90	ICD-9	724	Other disorders of back
6,070	ICD-9	724.2	Lumbago, lumbalgia, low back pain
838	ICD-9	724.3	Sciatica
3,005	ICD-9	724.5	Backache, unspecified

**Table 2a.Coding Scheme for State Fund Musculoskeletal Disorders , 1990-1998**Soft Tissue Nature Code and Description

190 Dislocation or herniation of discs (back and neck only)  
 260 Inflammation or irritation of joints, tendons or muscles  
 310 Strains & sprains  
 400 Multiple injuries (upper extremity only)  
 560 Nervous system  
 562 Bell's Palsy and other diseases of the nerves and peripheral ganglia (carpal tunnel syndrome)  
 580 Symptoms and ill-defined conditions  
 995 Other injury, not elsewhere classified  
 999 Unclassified

NOTE: INJURY NATURE HAS TO BE COMBINED WITH INJURY TYPE AND BODYPART

**Table 2b. Types for Non-Traumatic Soft Tissue Disorders. All State Fund Claims**

Code	Type	Back	Neck	Upper Extremity
		%	%	%
<u>Rubbed or abraded by:</u>				
81	leaning, kneeling, or sitting on objects (not vibrating)	0.0	0.0	0.0
82	objects being handled (not vibrating)	0.0	0.0	0.1
83	vibrating objects	0.0	0.0	0.0
85	repetition of pressure	0.0	0.0	0.0
86	repetitive motion	0.0	0.0	0.0
100	Bodily reaction (strain, sprain, rupture or other internal injuries resulting from assumption of unnatural position or involuntary motion such as efforts to recover balance from slip)	9.2	12.4	2.3
120	Overexertion	19.1	24.4	37.3
121	in lifting objects	45.2	30.7	21.3
122	in pulling or pushing objects	7.0	8.2	7.6
123	in wielding or throwing objects	0.8	0.9	1.3
124	in carrying objects	3.5	3.4	2.0
129	Overexertion, not elsewhere classified	13.7	16.6	22.9
899-999	Unknown (primarily strain, muscle soreness, pain with lifting etc)	1.6	3.7	5.4

**Table 3. Washington State Fund Workers Compensation Claims. All Claims, MSDs and Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity. 1990-1998**

	<u>All Claims</u>	<u>Neck, Back, and Upper Extremity</u>	
		<u>All MSDs</u>	<u>Non-Traumatic Soft Tissue Disorders</u>
Total claims 1990-1998	1,489,984	688,795	392,925
Average total no. claims/year	165,554	76,533	43,658
Average total no. individuals/year	94,257	53,863	33,750
% female	31.4	34.7	35.9
Median age	31	33	34
Average yearly claim rate per 10,000 FTEs	1,347.3	622.2	355.0
Overall yearly claim rate per 10,000 FTEs	1,334.6	617.0	352.0
Severity rate (lost days per 10,000 FTEs)	38,988	29,699	18,403
Average no. claims with time loss/year	38,929	25,748	15,993
% of total claims	23.5	33.6	36.6
Average time loss days/claim	124	147	146
Median time loss days /claim	20	25	23
Average total cost/claim	\$3,866	\$5,941	\$5,923
Median total cost /claim	\$233	\$388	\$470

**Table 4. Washington State Fund Workers Compensation Claims for MSDs and Non Traumatic Soft Tissue Disorders in the Neck and Back 1990-1998**

	Neck Disorders		Back Disorders		Back/Neck or Multiple	
	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue
Total claims 1990-1998	92,050	44,767	276,203	213,865	119,288	46,383
Average total no. claims/year	10,228	4,974	30,689	23,763	13,254	5,154
Average total no. individuals/year	9,246	4,649	25,112	19,850	11,832	4,756
% female	40.3	43.9	30.6	29.4	38.3	39.8
Median age	35	35	33	33	35	34
Average yearly claim rate per 10,000 FTEs	83.1	40.5	249.8	193.5	107.9	42.2
Overall yearly claim rate per 10,000 FTEs	82.5	40.1	247.0	191.6	106.9	41.5
Severity rate (lost days per 10,000 FTEs)	1,205	600	12,654	9,488	6,460	2,196
Average no. claims with time loss/year	4,814	2,446	12,691	9,543	4,562	1,703
% of total claims	47.1	49.2	41.4	40.2	34.4	33.0
Average time loss days/claim	168	162	144	133	176	160
Median time loss days /claim	24	23	18	16	28	23
Average total cost/claim	\$6,992	\$6,536	\$6,432	\$5,897	\$8,343	\$6085
Median total cost /claim	\$467	\$473	\$475	\$469	\$661	\$712



**Table 5. Washington State Fund Workers Compensation Claims for Upper Extremity MSDs and Non-Traumatic Soft Tissue Disorders.1990-1998**

	<b>Upper Extremity Disorders</b>		<b>Shoulder Disorders</b>		<b>Elbow Disorders</b>		<b>Hand/Wrist Disorders</b>	
	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue
Total claims 1990-1998	287,751	129,656	64,143	42,715	44,408	21,586	174,916	65,707
Average total no. claims/year	31,972	14,406	7,127	4,746	4,934	2,398	19,435	7,300
Average total no. individuals/year	26,595	12,833	6,595	4,453	4,670	2,292	17,208	6,811
% female	34.9	43.3	33.2	35.7	32.7	37.8	35.7	51.0
Median age	33	35	35	35	36	37	32	34
Average yearly claim rate per 10,000 FTEs	259.4	116.6	57.6	38.3	40.1	19.4	157.9	59.2
Overall yearly claim rate per 10,000 FTEs	257.8	116.1	57.5	38.3	39.8	19.3	156.7	58.9
Severity rate (lost days per 10,000 FTEs)	9,382	6,119	2,894	1,923	1,203	680	4,662	3,119
Average no. claims with time loss/year	9,504	5,137	2,930	1,838	1,455	813	5,424	2,787
% of total claims	29.7	35.7	41.1	38.9	29.5	33.9	27.9	38.2
Average time loss days/claim	135	162	160	161	137	155	121	164
Median time loss days /claim	35	46	38	35	31	35	34	53
Average total cost/claim	\$4,349	\$5,837	\$6,968	\$6,661	\$3,727	\$4,310	\$3,519	\$5,744
Median total cost /claim	\$245	\$363	\$384	\$382	\$222	\$288	\$226	\$372

**Table 6. Washington State Fund Workers Compensation Claims for Selected Specific Diagnoses 1990-1998**

	<u>Back</u> Sciatica		<u>Shoulder</u> Rotator Cuff Syndrome		<u>Elbow</u> Epicondylitis		<u>Wrist</u> Carpal Tunnel Syndrome	
	<i>MS</i>	<i>Non-traumatic</i>	<i>MS</i>	<i>Non-traumatic</i>	<i>MS</i>	<i>Non-traumatic</i>	<i>MS</i>	<i>Non-traumatic</i>
Total Claims 1990-1998	7,539	5,468	24,424	17,083	15,281	11,897	31,632	27,148
Average # claims/year	838	608	2,714	1,898	1,698	1,322	3,515	3,016
Average total no. individuals/year	819	597	2,564	1,814	1,608	1,262	3,268	2,848
% female	33.8	33.0	34.4	36.8	41.5	44.6	57.8	60.9
Median age	38	38	40	39	40	40	37	37
Average yearly claim rate per 10,000 FTEs	6.8	4.9	21.9	15.3	13.7	10.6	28.6	24.5
Overall yearly claim rate per 10,000 FTEs	6.8	4.9	21.9	15.3	13.7	10.7	28.3	24.3
Severity rate (lost days per 10,000 FTEs)	1,865	1,424	1,997	1,436	630	499	2,886	2,524
Average no. claims with time loss/year	664	481	1,705	1,118	741	568	2,313	1,927
% of total claims	79.3	79.1	62.8	58.9	43.7	43.0	65.8	63.9
Average time loss days/ claim	445	421	244	236	207	208	216	209
Median time loss days/ claim	200	184	95	91	64	62	82	80
Average total cost/claim	\$41,664	\$39,371	\$16,792	\$15,226	\$7,038	\$6,959	\$13,525	\$12,627
Median total cost /claim	\$15,706	\$14,582	\$2,516	\$1,933	\$656	\$676	\$4,291	\$4,056

**Table 7. State Fund Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1990-1998. 1-Digit SICs by Prevention Index\***

<b>SIC DESCRIPTION</b>	<b>HOURS</b>	<b>COUNT</b>	<b>RATE</b>	<b>LOW95</b>	<b>UPP95</b>	<b>RATE RATIO</b>	<b>RATE RANK</b>	<b>COUNT RANK</b>	<b>PREV INDEX</b>
Construction	1,764,225,179	59,978	679.9	674.5	685.4	1.9	1	4	2.5
Manufacturing	2,415,878,200	60,744	502.9	498.9	506.9	1.4	2	3	2.5
Transportation, Communications, Electric, Gas and Sanitary Services	1,053,746,570	22,747	431.7	426.1	437.4	1.2	3	6	4.5
Retail Trade	4,191,421,451	67,102	320.2	317.8	322.6	0.9	7	2	4.5
Services	7,183,635,055	100,670	280.3	278.5	282.0	0.8	8	1	4.5
Wholesale Trade	1,718,934,095	32,458	377.7	373.6	381.8	1.1	5	5	5.0
Agriculture, Forestry, and Fishing	1,049,994,827	17,192	327.5	322.6	332.4	0.9	6	7	6.5
Mining	47,592,659	1,003	421.5	395.8	448.4	1.2	4	10	7.0
Public Administration	1,203,039,145	14,655	243.6	239.7	247.6	0.7	9	8	8.5
Finance, Insurance, and Real Estate	1,543,098,137	10,109	131.0	128.5	133.6	0.4	10	9	9.5

\* 6196 claims had no identifiable SIC code and 71 claims were from non-classifiable establishments and are not included in the table

**Table 8. State Fund Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	19,045	1194.3	1177.4	1211.3	3.4	1	2	1.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	6,325	1023.3	998.3	1048.9	2.9	3	8	5.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	5,074	870.1	846.3	894.3	2.5	8	14	11.0
152 General Building Contractors - Residential Buildings	326,952,728	12,251	749.4	736.2	762.8	2.1	22	3	12.5
242 Sawmills and Planing Mills	81,675,815	3,885	951.3	921.6	981.7	2.7	5	22	13.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	3,493	1050.2	1015.6	1085.6	3.0	2	29	15.5
078 Landscape & Horticultural Services	93,933,012	3,781	805.0	779.6	831.1	2.3	15	25	19.8
421 Trucking and Courier Services, Except Air	327,000,439	10,870	664.8	652.4	677.4	1.9	37	4	20.5
175 Carpentry and Floor Work	100,926,376	3,860	764.9	741.0	789.4	2.2	21	23	22.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	7,762	654.5	640.0	669.2	1.9	40	7	23.5
177 Concrete Work	59,058,363	2,566	869.0	835.7	903.3	2.5	9	40	24.5
702 Rooming & Boarding Houses	102,021,800	3,658	717.1	694.0	740.7	2.0	24	27	25.5
344 Fabricated Structural Metal Products	97,763,547	3,446	705.0	681.6	728.9	2.0	26	30	28.0
179 Miscellaneous Special Trade Contractors	184,274,123	5,725	621.4	605.4	637.7	1.8	52	11	31.5
201 Meat Products	35,433,769	1,721	971.4	926.0	1018.4	2.8	4	64	34.0
836 Residential Care	129,723,196	4,009	618.1	599.1	637.5	1.8	53	19	36.0
514 Groceries & Related Products	281,934,072	7,920	561.8	549.5	574.3	1.6	74	6	40.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	4,408	583.4	566.3	600.9	1.7	65	17	41.0
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	2,608	640.9	616.5	666.0	1.8	45	39	42.0
154 General Building Contractors - Nonresidential Buildings	123,483,174	3,736	605.1	585.9	624.8	1.7	60	26	43.0
521 Lumber & Other Building Materials Dealers	127,731,980	3,781	592.0	573.3	611.2	1.7	63	25	43.8
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	1,859	680.7	650.1	712.4	1.9	32	57	44.5
518 Beer, Wine and Distilled Alcoholic Beverages	58,876,941	1,967	668.2	639.0	698.4	1.9	36	53	44.5
332 Iron and Steel Foundries	24,778,330	1,107	893.5	841.7	947.8	2.5	6	89	47.5
241 Logging	72,854,831	2,218	608.9	583.8	634.8	1.7	58	45	51.5
581 Eating and Drinking Places	1,505,602,866	21,652	287.6	283.8	291.5	0.8	205	1	103.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 9. State Fund Non-Traumatic Soft Tissue Disorders in the Neck 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	2,623	164.5	158.2	170.9	4.1	1	1	1.0
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	792	128.1	119.4	137.4	3.2	3	7	5.0
836 Residential Care	129,723,196	690	106.4	98.6	114.6	2.7	7	10	8.5
702 Rooming & Boarding Houses	102,021,800	501	98.2	89.8	107.2	2.4	13	17	15.0
421 Trucking and Courier Services, Except Air	327,000,439	1,329	81.3	77.0	85.8	2.0	29	3	16.0
806 Hospitals	83,768,036	403	96.2	87.1	106.1	2.4	14	25	19.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	352	105.8	95.1	117.5	2.6	8	33	20.5
175 Carpentry and Floor Work	100,926,376	442	87.6	79.6	96.1	2.2	21	20	20.5
152 General Building Contractors - Residential Buildings	326,952,728	1,206	73.8	69.7	78.1	1.8	40	4	22.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	487	83.5	76.3	91.3	2.1	27	18	22.5
242 Sawmills and Planing Mills	81,675,815	358	87.7	78.8	97.2	2.2	20	32	25.8
171 Plumbing, Heating and Air-Conditioning	237,186,011	839	70.7	66.0	75.7	1.8	46	6	26.0
177 Concrete Work	59,058,363	276	93.5	82.8	105.2	2.3	15	41	28.0
808 Home Health Care Services	58,345,151	265	90.8	80.2	102.5	2.3	16	43	29.5
344 Fabricated Structural Metal Products	97,763,547	387	79.2	71.5	87.5	2.0	32	27	29.5
179 Miscellaneous Special Trade Contractors	184,274,123	650	70.5	65.2	76.2	1.8	47	13	30.0
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	243	89.0	78.1	100.9	2.2	18	48	33.0
154 General Building Contractors - Nonresidential Buildings	123,483,174	404	65.4	59.2	72.1	1.6	55	24	39.5
078 Landscape & Horticultural Services	93,933,012	337	71.8	64.3	79.8	1.8	45	35	40.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	471	62.3	56.8	68.2	1.6	63	19	41.0
734 Services to Dwellings & Other Buildings	114,895,296	376	65.5	59.0	72.4	1.6	54	29	41.3
541 Grocery Stores	410,940,909	1,147	55.8	52.6	59.1	1.4	86	5	45.5
753 Automotive Repair Shops	213,235,945	607	56.9	52.5	61.6	1.4	80	15	47.5
514 Groceries & Related Products	281,934,072	783	55.5	51.7	59.6	1.4	88	8	48.0
172 Painting and Paper Hanging	67,647,176	231	68.3	59.8	77.7	1.7	49	52	50.5
581 Eating and Drinking Places	1,505,602,866	2,505	33.3	32.0	34.6	0.8	180	2	91.0
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	2,515,438	18	143.1	84.8	226.2	3.6	2	247	124.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 10. State Fund Non-Traumatic Soft Tissue Disorders in the Back 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	11,499	721.1	707.9	734.4	3.8	1	2	1.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	3,609	583.9	565.0	603.3	3.0	3	8	5.5
152 General Building Contractors - Residential Buildings	326,952,728	7,269	444.7	434.5	455.0	2.3	14	3	8.5
175 Carpentry and Floor Work	100,926,376	2,341	463.9	445.3	483.1	2.4	10	19	14.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	2,633	451.5	434.4	469.1	2.4	12	17	14.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	2,067	621.4	594.9	648.8	3.2	2	28	15.0
421 Trucking and Courier Services, Except Air	327,000,439	6,422	392.8	383.2	402.5	2.1	28	4	16.0
078 Landscape & Horticultural Services	93,933,012	2,217	472.0	452.6	492.1	2.5	8	25	16.5
242 Sawmills and Planing Mills	81,675,815	1,967	481.7	460.6	503.4	2.5	6	29	17.5
171 Plumbing, Heating and Air-Conditioning	237,186,011	4,563	384.8	373.7	396.1	2.0	30	6	18.0
702 Rooming & Boarding Houses	102,021,800	2,257	442.5	424.4	461.1	2.3	16	21	18.5
177 Concrete Work	59,058,363	1,575	533.4	507.4	560.4	2.8	4	34	19.0
179 Miscellaneous Special Trade Contractors	184,274,123	3,403	369.3	357.0	382.0	1.9	36	9	22.5
518 Beer, Wine and Distilled Alcoholic Beverages	58,876,941	1,311	445.3	421.6	470.1	2.3	13	42	27.5
344 Fabricated Structural Metal Products	97,763,547	1,921	393.0	375.6	411.0	2.1	27	30	28.5
162 Heavy Construction, Except Highway & Street Construction	151,121,372	2,664	352.6	339.3	366.2	1.8	43	16	29.5
154 General Building Contractors - Nonresidential Buildings	123,483,174	2,225	360.4	345.6	375.7	1.9	40	22	31.0
521 Lumber & Other Building Materials Dealers	127,731,980	2,223	348.1	333.8	362.8	1.8	47	23	35.0
836 Residential Care	129,723,196	2,221	342.4	328.3	357.0	1.8	51	24	37.5
553 Auto & Home Supply Stores	118,282,637	1,910	323.0	308.6	337.8	1.7	59	31	45.0
332 Iron and Steel Foundries	24,778,330	631	509.3	470.3	550.7	2.7	5	86	45.5
241 Logging	72,854,831	1,258	345.3	326.5	365.0	1.8	50	44	47.0
327 Concrete, Gypsum and Plaster Products	51,729,968	971	375.4	352.2	399.8	2.0	34	61	47.5
734 Services to Dwellings & Other Buildings	114,895,296	1,814	315.8	301.4	330.6	1.6	63	33	48.0
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	992	363.2	341.0	386.6	1.9	39	59	49.0
581 Eating and Drinking Places	1,505,602,866	11,605	154.2	151.4	157.0	0.8	207	1	104.0

\* Below the line and Highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours were excluded from the analysis

**Table 11. State Fund Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	4,995	313.2	304.6	322.0	2.7	13	2	7.5
242 Sawmills and Planing Mills	81,675,815	1,521	372.4	354.0	391.6	3.2	4	15	9.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	1,853	317.7	303.4	332.5	2.7	10	10	10.0
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	1,822	294.8	281.4	308.6	2.5	22	11	16.5
201 Meat Products	35,433,769	799	451.0	420.2	483.4	3.9	2	43	22.5
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	1,167	286.8	270.6	303.7	2.5	25	23	24.0
514 Groceries & Related Products	281,934,072	3,127	221.8	214.1	229.7	1.9	44	5	24.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	1,001	301.0	282.6	320.2	2.6	19	31	25.0
152 General Building Contractors - Residential Buildings	326,952,728	3,438	210.3	203.3	217.5	1.8	52	4	28.0
078 Landscape & Horticultural Services	93,933,012	1,130	240.6	226.8	255.0	2.1	35	25	30.0
308 Miscellaneous Plastics Products	101,492,778	1,176	231.7	218.7	245.4	2.0	40	21	30.5
344 Fabricated Structural Metal Products	97,763,547	1,157	236.7	223.2	250.7	2.0	38	24	31.0
421 Trucking and Courier Services, Except Air	327,000,439	2,986	182.6	176.1	189.3	1.6	74	6	40.0
203 Canned, Frozen, & Preserved Fruits, Vegetables, & Foods	76,016,920	839	220.7	206.1	236.2	1.9	45	39	42.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	2,141	180.5	173.0	188.3	1.6	76	9	42.5
175 Carpentry and Floor Work	100,926,376	1,011	200.3	188.2	213.1	1.7	57	30	43.5
177 Concrete Work	59,058,363	650	220.1	203.5	237.7	1.9	46	54	50.0
251 Household Furniture	27,015,625	416	308.0	279.1	339.0	2.7	15	86	50.5
541 Grocery Stores	410,940,909	3,445	167.7	162.1	173.4	1.4	99	3	51.0
806 Hospitals	83,768,036	824	196.7	183.5	210.6	1.7	61	42	51.5
154 General Building Contractors - Nonresidential Buildings	123,483,174	1,107	179.3	168.9	190.2	1.5	78	26	52.0
179 Miscellaneous Special Trade Contractors	184,274,123	1,607	174.4	166.0	183.2	1.5	90	14	52.0
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	599	219.3	202.1	237.6	1.9	47	60	53.5
736 Personnel Supply Services	305,530,051	2,537	166.1	159.7	172.7	1.4	101	7	54.0
372 Aircraft and Parts	88,833,593	827	186.2	173.7	199.3	1.6	71	41	56.0
581 Eating and Drinking Places	1,505,602,866	6,960	92.5	90.3	94.7	0.8	210	1	105.5
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	2,515,438	52	413.4	308.8	542.2	3.6	3	249	126.0
314 Footwear, Except Rubber	1,891,102	47	497.1	365.2	661.0	4.3	1	256	128.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 12. State Fund Claims for Sciatica 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	319	20.0	17.9	22.3	4.1	2	1	1.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	103	16.7	13.6	20.2	3.4	4	7	5.5
152 General Building Contractors - Residential Buildings	326,952,728	188	11.5	9.9	13.3	2.3	11	3	7.0
421 Trucking and Courier Services, Except Air	327,000,439	185	11.3	9.7	13.1	2.3	12	4	8.0
702 Rooming & Boarding Houses	102,021,800	82	16.1	12.8	20.0	3.3	5	15	10.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	91	12.0	9.7	14.8	2.5	10	11	10.5
179 Miscellaneous Special Trade Contractors	184,274,123	100	10.9	8.8	13.2	2.2	16	8	12.0
176 Roofing, Siding, and Sheet Metal Work	66,522,207	59	17.7	13.5	22.9	3.6	3	24	13.3
175 Carpentry and Floor Work	100,926,376	65	12.9	9.9	16.4	2.6	8	21	14.5
171 Plumbing, Heating and Air-Conditioning	237,186,011	116	9.8	8.1	11.7	2.0	26	6	15.8
154 General Building Contractors - Nonresidential Buildings	123,483,174	67	10.9	8.4	13.8	2.2	17	20	18.5
836 Residential Care	129,723,196	70	10.8	8.4	13.6	2.2	18	19	18.5
161 Highway & Street Construction, Except Elevated Highways	59,440,514	39	13.1	9.3	17.9	2.7	7	38	22.5
344 Fabricated Structural Metal Products	97,763,547	49	10.0	7.4	13.3	2.0	24	27	25.5
242 Sawmills and Planing Mills	81,675,815	44	10.8	7.8	14.5	2.2	19	33	25.8
753 Automotive Repair Shops	213,235,945	85	8.0	6.4	9.9	1.6	40	14	27.0
172 Painting and Paper Hanging	67,647,176	37	10.9	7.7	15.1	2.2	15	40	27.5
078 Landscape & Horticultural Services	93,933,012	46	9.8	7.2	13.1	2.0	25	31	28.0
651 Real Estate Operators (Except Developers) and Lessors	235,457,562	88	7.5	6.0	9.2	1.5	46	12	29.0
734 Services To Dwellings & Other Buildings	114,895,296	50	8.7	6.5	11.5	1.8	34	26	30.0
701 Hotels and Motels	274,869,031	92	6.7	5.4	8.2	1.4	55	10	32.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	47	8.1	5.9	10.7	1.6	37	30	33.5
508 Machinery, Equipment and Supplies	255,485,067	87	6.8	5.5	8.4	1.4	54	13	33.5
541 Grocery Stores	410,940,909	116	5.6	4.7	6.8	1.2	65	6	35.3
518 Beer, Wine and Distilled Alcoholic Beverages	58,876,941	30	10.2	6.9	14.5	2.1	22	51	36.3
581 Eating and Drinking Places	1,505,602,866	248	3.3	2.9	3.7	0.7	94	2	48.0
352 Farm and Garden Machinery and Equipment	9,978,888	10	20.0	9.6	36.9	4.1	1	114	57.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis



**Table 13. State Fund Claims for Rotator Cuff Syndrome 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	365	59.1	53.2	65.4	3.9	1	7	4.0
805 Nursing & Personal Care Facilities	318,942,756	593	37.2	34.3	40.3	2.4	15	2	8.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	273	46.8	41.4	52.7	3.1	8	12	10.0
421 Trucking and Courier Services, Except Air	327,000,439	591	36.1	33.3	39.2	2.4	21	3	12.0
242 Sawmills and Planing Mills	81,675,815	193	47.3	40.8	54.4	3.1	7	18	12.5
152 General Building Contractors - Residential Buildings	326,952,728	503	30.8	28.1	33.6	2.0	36	4	20.0
179 Miscellaneous Special Trade Contractors	184,274,123	291	31.6	28.1	35.4	2.1	32	9	20.5
171 Plumbing, Heating and Air-Conditioning	237,186,011	360	30.4	27.3	33.7	2.0	39	8	23.5
514 Groceries & Related Products	281,934,072	413	29.3	26.5	32.3	1.9	45	6	25.5
806 Hospitals	83,768,036	138	32.9	27.7	38.9	2.2	25	30	27.5
721 Laundry, Cleaning and Garment Services	87,313,001	143	32.8	27.6	38.6	2.1	27	28	27.5
344 Fabricated Structural Metal Products	97,763,547	157	32.1	27.3	37.6	2.1	31	24	27.5
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	114	41.7	34.4	50.1	2.7	13	43	28.0
241 Logging	72,854,831	127	34.9	29.1	41.5	2.3	23	35	28.8
176 Roofing, Siding, and Sheet Metal Work	66,522,207	121	36.4	30.2	43.5	2.4	19	40	29.5
175 Carpentry and Floor Work	100,926,376	153	30.3	25.7	35.5	2.0	40	26	33.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	207	27.4	23.8	31.4	1.8	52	15	33.5
201 Meat Products	35,433,769	80	45.2	35.8	56.2	3.0	10	59	34.3
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	125	30.7	25.6	36.6	2.0	37	36	36.5
177 Concrete Work	59,058,363	97	32.8	26.6	40.1	2.1	26	48	37.0
154 General Building Contractors - Nonresidential Buildings	123,483,174	164	26.6	22.7	31.0	1.7	57	21	39.0
541 Grocery Stores	410,940,909	479	23.3	21.3	25.5	1.5	73	5	39.0
173 Electrical Work	242,986,722	288	23.7	21.0	26.6	1.5	70	10	40.0
078 Landscape & Horticultural Services	93,933,012	132	28.1	23.5	33.3	1.8	50	32	40.8
308 Miscellaneous Plastics Products	101,492,778	139	27.4	23.0	32.3	1.8	53	29	41.0
229 Miscellaneous Textile Goods	11,362,269	29	51.0	34.2	73.3	3.3	3	126	64.3
341 Metal Cans and Shipping Containers	9,202,285	24	52.2	33.4	77.6	3.4	2	136	69.0
581 Eating and Drinking Places	1,505,602,866	737	9.8	9.1	10.5	0.6	162	1	81.5

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 14. State Fund Claims for Epicondylitis 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	210	34.0	29.5	38.9	3.2	6	8	7.0
152 General Building Contractors - Residential Buildings	326,952,728	414	25.3	22.9	27.9	2.4	20	2	11.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	160	27.4	23.3	32.0	2.6	13	12	12.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	91	27.4	22.0	33.6	2.6	14	28	21.0
242 Sawmills and Planing Mills	81,675,815	102	25.0	20.4	30.3	2.3	21	26	23.3
179 Miscellaneous Special Trade Contractors	184,274,123	180	19.5	16.8	22.6	1.8	39	10	24.5
175 Carpentry and Floor Work	100,926,376	111	22.0	18.1	26.5	2.1	31	21	26.0
154 General Building Contractors - Nonresidential Buildings	123,483,174	127	20.6	17.1	24.5	1.9	37	16	26.5
177 Concrete Work	59,058,363	76	25.7	20.3	32.2	2.4	17	37	27.0
514 Groceries & Related Products	281,934,072	255	18.1	15.9	20.5	1.7	51	5	28.0
541 Grocery Stores	410,940,909	361	17.6	15.8	19.5	1.6	54	3	28.5
308 Miscellaneous Plastics Products	101,492,778	106	20.9	17.1	25.3	2.0	35	23	29.0
344 Fabricated Structural Metal Products	97,763,547	102	20.9	17.0	25.3	2.0	36	26	30.8
421 Trucking and Courier Services, Except Air	327,000,439	271	16.6	14.7	18.7	1.6	60	4	32.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	199	16.8	14.5	19.3	1.6	59	9	34.0
721 Laundry, Cleaning and Garment Services	87,313,001	84	19.2	15.3	23.8	1.8	43	30	36.5
078 Landscape & Horticultural Services	93,933,012	90	19.2	15.4	23.6	1.8	44	29	36.5
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	79	19.4	15.4	24.2	1.8	40	35	37.3
805 Nursing & Personal Care Facilities	318,942,756	226	14.2	12.4	16.1	1.3	78	6	42.0
173 Electrical Work	242,986,722	175	14.4	12.3	16.7	1.4	75	11	43.0
332 Iron and Steel Foundries	24,778,330	42	33.9	24.4	45.8	3.2	7	80	43.5
267 Converted Paper & Paperboard Products, Except Containers	22,555,316	40	35.5	25.3	48.3	3.3	5	84	44.3
201 Meat Products	35,433,769	46	26.0	19.0	34.6	2.4	15	76	45.5
241 Logging	72,854,831	69	18.9	14.7	24.0	1.8	45	46	45.5
451 Air Transportation, Scheduled, and Air Courier Services	54,619,668	58	21.2	16.1	27.5	2.0	34	58	45.8
336 Nonferrous Foundries (Castings)	13,000,870	30	46.2	31.1	65.9	4.3	3	102	52.3
581 Eating and Drinking Places	1,505,602,866	621	8.2	7.6	8.9	0.8	145	1	73.0
252 Office Furniture	3,716,888	12	64.6	33.3	112.8	6.1	2	172	87.0
224 Narrow Fabric & Other Smallwares Mills: Cotton, Wool, Silk, and Manmade Fiber	2,467,770	10	81.0	38.8	149.1	7.6	1	192	96.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 15. State Fund Claims for Carpal Tunnel Syndrome 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
723 Beauty Shops	105,954,471	368	69.5	62.5	76.9	2.9	9	9	9.0
242 Sawmills and Planing Mills	81,675,815	270	66.1	58.5	74.5	2.7	10	20	15.0
541 Grocery Stores	410,940,909	1,028	50.0	47.0	53.2	2.1	30	2	16.0
944 Administration of Social, Human Resource and Income Maintenance	98,955,428	280	56.6	50.2	63.6	2.3	21	17	19.0
201 Meat Products	35,433,769	176	99.3	85.2	115.2	4.1	6	37	21.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	306	49.5	44.1	55.4	2.0	32	11	21.5
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	232	57.0	49.9	64.8	2.3	20	26	23.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	285	48.9	43.4	54.9	2.0	34	16	25.0
514 Groceries & Related Products	281,934,072	563	39.9	36.7	43.4	1.6	49	3	26.0
308 Miscellaneous Plastics Products	101,492,778	242	47.7	41.9	54.1	2.0	37	25	31.0
943 Administration of Public Health Programs	190,103,723	373	39.2	35.4	43.4	1.6	55	8	31.5
344 Fabricated Structural Metal Products	97,763,547	231	47.3	41.4	53.8	1.9	38	27	32.5
802 Offices and Clinics of Dentists	182,046,167	300	33.0	29.3	36.9	1.4	67	12	39.5
394 Dolls, Toys Games and Sporting and Athletic Goods	50,714,395	131	51.7	43.2	61.3	2.1	26	54	39.8
372 Aircraft and Parts	88,833,593	182	41.0	35.2	47.4	1.7	45	35	40.0
241 Logging	72,854,831	158	43.4	36.9	50.7	1.8	40	43	41.5
152 General Building Contractors - Residential Buildings	326,952,728	509	31.1	28.5	34.0	1.3	77	6	41.5
162 Heavy Construction, Except Highway & Street Construction	151,121,372	252	33.4	29.4	37.7	1.4	66	23	44.5
805 Nursing & Personal Care Facilities	318,942,756	479	30.0	27.4	32.9	1.2	82	7	44.5
721 Laundry, Cleaning and Garment Services	87,313,001	170	38.9	33.3	45.3	1.6	56	40	47.8
176 Roofing, Siding, and Sheet Metal Work	66,522,207	131	39.4	32.9	46.7	1.6	50	54	51.8
078 Landscape & Horticultural Services	93,933,012	162	34.5	29.4	40.2	1.4	64	41	52.5
267 Converted Paper & Paperboard Products, Except Containers	22,555,316	71	63.0	49.2	79.4	2.6	13	93	52.8
203 Canned, Frozen, & Preserved Fruits, Vegetables, & Foods	76,016,920	143	37.6	31.7	44.3	1.5	59	47	53.0
249 Miscellaneous Wood Products	24,844,282	73	58.8	46.1	73.9	2.4	18	89	53.3
581 Eating and Drinking Places	1,505,602,866	1,559	20.7	19.7	21.8	0.9	144	1	72.5
083 Forest Nurseries and Gathering of Forest Products	4,053,799	26	128.3	83.8	188.0	5.3	3	179	90.8
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	2,515,438	21	167.0	103.3	255.2	6.9	2	199	100.3
314 Footwear, Except Rubber	1,891,102	18	190.4	112.8	300.9	7.8	1	216	108.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 16. State Fund Compensable Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	7,368	462.0	451.5	472.7	3.6	3	1	2.0
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	2,914	471.5	454.5	488.9	3.7	2	6	4.0
421 Trucking and Courier Services, Except Air	327,000,439	5,191	317.5	308.9	326.2	2.5	16	3	9.5
152 General Building Contractors - Residential Buildings	326,952,728	5,130	313.8	305.3	322.5	2.4	17	4	10.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	1,569	471.7	448.7	495.7	3.7	1	21	11.0
175 Carpentry and Floor Work	100,926,376	1,771	350.9	334.8	367.7	2.7	9	16	12.5
078 Landscape & Horticultural Services	93,933,012	1,624	345.8	329.2	363.0	2.7	10	20	15.0
836 Residential Care	129,723,196	1,977	304.8	291.5	318.5	2.4	19	12	15.5
177 Concrete Work	59,058,363	1,215	411.5	388.6	435.3	3.2	4	31	17.5
242 Sawmills and Planing Mills	81,675,815	1,332	326.2	308.9	344.2	2.5	15	24	19.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	1,649	282.8	269.3	296.7	2.2	28	19	23.5
179 Miscellaneous Special Trade Contractors	184,274,123	2,315	251.3	241.1	261.7	1.9	42	10	26.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	1,864	246.7	235.6	258.1	1.9	46	14	30.0
806 Hospitals	83,768,036	1,172	279.8	264.0	296.3	2.2	29	32	30.5
201 Meat Products	35,433,769	662	373.7	345.7	403.2	2.9	6	56	31.0
344 Fabricated Structural Metal Products	97,763,547	1,288	263.5	249.3	278.3	2.0	36	26	31.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	2,748	231.7	223.1	240.5	1.8	58	8	33.0
241 Logging	72,854,831	983	269.9	253.2	287.3	2.1	34	37	35.5
702 Rooming & Boarding Houses	102,021,800	1,276	250.1	236.6	264.3	1.9	44	27	35.5
154 General Building Contractors - Nonresidential Buildings	123,483,174	1,484	240.4	228.3	252.9	1.9	49	22	35.5
734 Services to Dwellings & Other Buildings	114,895,296	1,372	238.8	226.4	251.8	1.9	50	23	36.5
172 Painting and Paper Hanging	67,647,176	867	256.3	239.5	274.0	2.0	39	42	40.5
518 Beer, Wine and Distilled Alcoholic Beverages	58,876,941	775	263.3	245.0	282.5	2.0	37	47	42.0
514 Groceries & Related Products	281,934,072	2,811	199.4	192.1	206.9	1.5	84	7	45.5
541 Grocery Stores	410,940,909	3,963	192.9	186.9	199.0	1.5	87	5	46.0
581 Eating and Drinking Places	1,505,602,866	7,032	93.4	91.2	95.6	0.7	210	2	106.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 17. State Fund Compensable Non-Traumatic Soft Tissue Disorders in the Neck 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	318,942,756	1,373	86.1	81.6	90.8	4.4	2	1	1.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	472	76.4	69.6	83.6	3.9	3	6	4.5
836 Residential Care	129,723,196	414	63.8	57.8	70.3	3.2	5	7	6.0
421 Trucking and Courier Services, Except Air	327,000,439	791	48.4	45.1	51.9	2.5	18	3	10.5
152 General Building Contractors - Residential Buildings	326,952,728	674	41.2	38.2	44.5	2.1	23	4	13.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	213	64.0	55.7	73.2	3.2	4	24	14.0
175 Carpentry and Floor Work	100,926,376	268	53.1	46.9	59.9	2.7	11	17	14.0
806 Hospitals	83,768,036	231	55.2	48.3	62.7	2.8	10	21	15.5
702 Rooming & Boarding Houses	102,021,800	255	50.0	44.0	56.5	2.5	17	19	18.0
734 Services to Dwellings & Other Buildings	114,895,296	237	41.3	36.2	46.9	2.1	22	20	21.0
177 Concrete Work	59,058,363	156	52.8	44.9	61.8	2.7	12	33	22.5
179 Miscellaneous Special Trade Contractors	184,274,123	343	37.2	33.4	41.4	1.9	34	12	23.0
242 Sawmills and Planing Mills	81,675,815	188	46.0	39.7	53.1	2.3	19	28	23.5
078 Landscape & Horticultural Services	93,933,012	192	40.9	35.3	47.1	2.1	24	26	25.0
344 Fabricated Structural Metal Products	97,763,547	198	40.5	35.1	46.6	2.1	26	25	25.5
808 Home Health Care Services	58,345,151	146	50.0	42.3	58.9	2.5	16	37	26.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	228	39.1	34.2	44.5	2.0	31	23	27.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	400	33.7	30.5	37.2	1.7	47	8	27.5
154 General Building Contractors - Nonresidential Buildings	123,483,174	229	37.1	32.4	42.2	1.9	35	22	28.5
162 Heavy Construction, Except Highway & Street Construction	151,121,372	262	34.7	30.6	39.1	1.8	43	18	30.5
241 Logging	72,854,831	144	39.5	33.3	46.5	2.0	29	38	33.5
541 Grocery Stores	410,940,909	594	28.9	26.6	31.3	1.5	62	5	33.5
172 Painting and Paper Hanging	67,647,176	134	39.6	33.2	46.9	2.0	28	42	34.8
411 Local & Suburban Passenger Transportation	31,808,218	91	57.2	46.1	70.3	2.9	8	65	36.3
514 Groceries & Related Products	281,934,072	393	27.9	25.2	30.8	1.4	67	9	38.0
581 Eating and Drinking Places	1,505,602,866	1,128	15.0	14.1	15.9	0.8	151	2	76.5
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	2,515,438	12	95.4	49.2	166.7	4.8	1	210	105.3

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 18. State Fund Compensable Non-Traumatic Soft Tissue Disorders in the Back 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

<b>SIC DESCRIPTION</b>	<b>HOURS**</b>	<b>COUNT</b>	<b>RATE</b>	<b>LOW95</b>	<b>UPP95</b>	<b>RATE RATIO</b>	<b>RATE RANK</b>	<b>COUNT RANK</b>	<b>PREV INDEX</b>
805 Nursing & Personal Care Facilities	318,942,756	4,999	313.5	304.8	322.3	4.1	2	1	1.5
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	1,810	292.8	279.5	306.7	3.8	3	6	4.5
421 Trucking and Courier Services, Except Air	327,000,439	3,393	207.5	200.6	214.6	2.7	9	3	6.0
152 General Building Contractors - Residential Buildings	326,952,728	3,330	203.7	196.8	210.7	2.6	11	4	7.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	1,054	316.9	298.0	336.6	4.1	1	18	9.5
175 Carpentry and Floor Work	100,926,376	1,170	231.9	218.8	245.5	3.0	6	15	10.5
078 Landscape & Horticultural Services	93,933,012	1,046	222.7	209.4	236.6	2.9	8	19	13.5
836 Residential Care	129,723,196	1,195	184.2	173.9	195.0	2.4	16	14	15.0
177 Concrete Work	59,058,363	810	274.3	255.7	293.9	3.6	4	27	15.5
179 Miscellaneous Special Trade Contractors	184,274,123	1,490	161.7	153.6	170.1	2.1	32	8	20.0
242 Sawmills and Planing Mills	81,675,815	745	182.4	169.6	196.0	2.4	17	31	24.0
702 Rooming & Boarding Houses	102,021,800	870	170.6	159.4	182.3	2.2	24	24	24.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	1,198	158.5	149.7	167.8	2.1	37	13	25.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	942	161.5	151.4	172.2	2.1	33	22	27.5
518 Beer, Wine and Distilled Alcoholic Beverages	58,876,941	546	185.5	170.2	201.7	2.4	15	41	28.0
171 Plumbing, Heating and Air-Conditioning	237,186,011	1,784	150.4	143.5	157.6	2.0	49	7	28.0
154 General Building Contractors - Nonresidential Buildings	123,483,174	975	157.9	148.2	168.1	2.1	40	21	30.5
172 Painting and Paper Hanging	67,647,176	570	168.5	155.0	182.9	2.2	26	39	32.5
344 Fabricated Structural Metal Products	97,763,547	786	160.8	149.7	172.4	2.1	36	29	32.5
241 Logging	72,854,831	587	161.1	148.4	174.7	2.1	35	38	36.5
734 Services to Dwellings & Other Buildings	114,895,296	844	146.9	137.2	157.2	1.9	52	26	39.0
327 Concrete, Gypsum and Plaster Products	51,729,968	422	163.2	148.0	179.5	2.1	31	53	42.0
806 Hospitals	83,768,036	626	149.5	138.0	161.6	1.9	51	35	43.0
521 Lumber & Other Building Materials Dealers	127,731,980	847	132.6	123.8	141.9	1.7	64	25	44.5
808 Home Health Care Services	58,345,151	454	155.6	141.6	170.6	2.0	43	50	46.5
<b>581 Eating and Drinking Places</b>	<b>1,505,602,866</b>	<b>3,920</b>	<b>52.1</b>	<b>50.5</b>	<b>53.7</b>	<b>0.7</b>	<b>212</b>	<b>2</b>	<b>107.0</b>

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 19. State Fund Compensable Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1990-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
174 Masonry, Stonework, Tile Setting and Plastering	123,613,687	848	137.2	128.1	146.8	3.3	7	8	7.5
805 Nursing & Personal Care Facilities	318,942,756	1,574	98.7	93.9	103.7	2.4	25	2	13.5
242 Sawmills and Planing Mills	81,675,815	493	120.7	110.3	131.9	2.9	12	18	15.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	116,636,463	590	101.2	93.2	109.7	2.4	21	13	17.0
209 Miscellaneous Food Preparation & Kindred Products	81,385,791	437	107.4	97.6	117.9	2.6	18	21	19.3
201 Meat Products	35,433,769	317	178.9	159.8	199.7	4.3	3	37	20.0
152 General Building Contractors - Residential Buildings	326,952,728	1,394	85.3	80.9	89.9	2.1	41	4	22.5
176 Roofing, Siding, and Sheet Metal Work	66,522,207	376	113.0	101.9	125.1	2.7	16	30	23.0
078 Landscape & Horticultural Services	93,933,012	441	93.9	85.3	103.1	2.3	30	19	24.5
514 Groceries & Related Products	281,934,072	1,127	79.9	75.3	84.8	1.9	48	6	27.0
177 Concrete Work	59,058,363	303	102.6	91.4	114.8	2.5	20	38	29.0
421 Trucking and Courier Services, Except Air	327,000,439	1,282	78.4	74.2	82.8	1.9	53	5	29.0
806 Hospitals	83,768,036	385	91.9	83.0	101.6	2.2	31	28	29.5
175 Carpentry and Floor Work	100,926,376	437	86.6	78.7	95.1	2.1	40	21	30.3
541 Grocery Stores	410,940,909	1,506	73.3	69.6	77.1	1.8	61	3	32.0
836 Residential Care	129,723,196	508	78.3	71.7	85.4	1.9	54	16	35.0
267 Converted Paper & Paperboard Products, Except Containers	22,555,316	167	148.1	126.5	172.3	3.6	5	67	36.0
241 Logging	72,854,831	327	89.8	80.3	100.0	2.2	36	36	36.0
344 Fabricated Structural Metal Products	97,763,547	394	80.6	72.8	89.0	1.9	47	27	37.0
308 Miscellaneous Plastics Products	101,492,778	395	77.8	70.3	85.9	1.9	55	26	40.5
723 Beauty Shops	105,954,471	398	75.1	67.9	82.9	1.8	57	25	41.0
162 Heavy Construction, Except Highway & Street Construction	151,121,372	525	69.5	63.7	75.7	1.7	68	15	41.5
721 Laundry, Cleaning and Garment Services	87,313,001	344	78.8	70.7	87.6	1.9	51	33	42.0
179 Miscellaneous Special Trade Contractors	184,274,123	626	67.9	62.7	73.5	1.6	76	11	43.5
251 Household Furniture	27,015,625	154	114.0	96.7	133.5	2.8	15	74	44.5
581 Eating and Drinking Places	1,505,602,866	2,496	33.2	31.9	34.5	0.8	180	1	90.5
314 Footwear, Except Rubber	1,891,102	28	296.1	196.7	428.0	7.2	1	206	103.3
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	2,515,438	26	206.7	135.0	302.9	5.0	2	216	108.8

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 20. State Fund Compensable Claims, Top 5 Occupations for 3-Digit SICs with Rate Ratio  $\geq 2.5$  for Non-Traumatic Soft Tissue Disorders. 1990-1998**

SIC DESCRIPTION	OCCUPATION	COUNT	% OF CLAIMS IN SIC	(COUNT IN SIC)
176 Roofing, Siding, and Sheet Metal Work	Roofers	869	55.4	1,569
	Supervisors-construction	120	7.7	
	Carpenters & apprentices	104	6.6	
	Construction laborers	99	6.3	
	Sheet metal workers and apprentices	65	4.1	
	Total of five occupations	1257	80.1	
174 Masonry, Stonework, Tile Setting and Plastering	Drywall installers	1253	43.0	2,914
	Insulation workers	293	10.1	
	Construction laborers	256	8.8	
	Brickmason, stonemason and apprentices	236	8.1	
	Carpenters & Apprentices	173	5.9	
	Total of five occupations	2211	75.9	
805 Nursing & Personal Care Facilities	Nursing aides and orderlies	5152	69.9	7,368
	Health aides, excluding nursing	378	5.1	
	Licensed practical nurses	264	3.6	
	Maids and housekeepers	262	3.6	
	Registered nurses	208	2.8	
	Total of five occupations	6264	85.0	
177 Concrete Work	Construction laborers	283	23.3	1,215
	Concrete and terrazzo finishers	278	22.9	
	Carpenters and apprentices	148	12.2	
	Supervisors-construction	109	9.0	
	Construction trades, nec	71	5.8	
	Total of five occupations	889	73.2	
314 Footwear, Except Rubber	Shoe repairers	15	39.5	38
	Shoe machine operators	8	21.1	
	Miscellaneous precision workers, nec	3	7.9	
	Grinding, polishing, machine operating	2	5.3	
	Total of four occupations	28	73.8	
201 Meat Products	Butchers and meatcutters	196	29.6	662
	Laborers, excluding construction	114	17.2	
	Hand packer/ packager	62	9.4	
	Truck drivers, excluding logging	39	5.9	
	Freight/stock handlers, nec	19	2.9	
	Total of five occupations	430	65.0	
	(TABLE 20 Continued)			
202 Dairy Products	Laborers, excluding construction	32	17.5	
	Truck drivers, excluding logging	21	11.5	
	Hand packer/ packager	18	9.8	



	Freight/ stock handlers, nec	16	8.7	
	Machine operators, not specified	14	7.7	
413 Intercity & Rural Bus Transportation	Total of five occupations	101	55.2	183
	Bus drivers	105	69.1	
	Truck drivers, excluding logging	11	7.2	
	Freight/stock handlers, nec	8	5.3	
	Bus, truck and stationary engine mechanics	7	4.6	
175 Carpentry and Floor Work	Total of four occupations	131	89.5	152
	Carpenters and apprentices	647	36.5	
	Carpet installers	220	12.4	
	Construction laborers	143	8.1	
	Supervisors construction	80	4.5	
	Tilesetters, hard and soft	67	3.8	
078 Landscape & Horticultural Services	Total of five occupations	1157	65.3	1,771
	Groundskeepers and gardeners, excluding farmers	1008	62.1	
	Supervisors, related agricultural occupations	198	12.2	
	Laborers, excluding construction	48	3.0	
	Construction laborers	47	2.9	
	Nursery workers	29	1.8	
267 Converted Paper & Paperboard Products	Total of five occupations	1330	82.0	1,624
	Machine operators, not specified	60	15.8	
	Laborers, excluding construction	46	12.1	
	Miscellaneous machine operators, nec	33	8.7	
	Packaging/ filling machine operators	23	6.0	
	Production helpers	23	6.0	
945 Administration of Veterans' Affairs, Except Health and Insurance	Total of five occupations	185	48.6	381
	Nursing aides and orderlies	21	35.6	
	Licensed practical nurses	8	13.6	
	Janitors and cleaners	5	8.5	
	Health aides, excluding nursing	4	6.8	
	Waiters, waitress assistants	3	5.1	
	Total of five occupations	41	69.6	59

(TABLE 20 Continued)

244 Wood Containers	Laborers, excluding construction	65	28.4	
	Sawing machine operators	20	8.7	
	Assemblers	19	8.3	
	Truck drivers, excluding logging	16	7.0	
	Machine operators, not specified	13	5.7	

328 Cut Stone & Stone Products	Total of five occupations	133	58.1	229
	Laborers, excluding construction	5	18.5	
	Assemblers	3	11.1	
	Grinding/ polishing machine operators	3	11.1	
	Handmolders and shapers, excluding jewellers	2	7.4	
	Supervisors, production	2	7.4	
242 Sawmills and Planing Mills	Total of five occupations	15	55.5	27
	Mash-feeder/ offbearers	246	18.5	
	Laborers, excluding construction	175	13.1	
	Sawing machine operators	165	12.4	
	Miscellaneous woodworking machine operators	145	10.9	
	Grader/ sorter, excluding agriculture	76	5.7	
421 Trucking and Courier Services, Except Air	Total of five occupations	807	60.6	1,332
	Truck drivers, excluding logging	2903	55.9	
	Freight/ stock handlers, not elsewhere classified	511	9.8	
	Garbage collectors	382	7.4	
	Laborers, excluding construction	337	6.5	
	Messengers	125	2.4	
	Total of five occupations	4258	82.0	5,191

**Table 21. Washington Self-Insured Workers Compensable (Lost Time) Claims. All Claims, MSDs, and Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity. 1990-1998**

	<u>All Claims</u>	<u>Neck, Back, and Upper Extremity</u>		
		All	All MSDs	Non-Traumatic Soft Tissue Disorders
Total claims 1990-1998	172,435	116,999	111,756	80,230
Average total no. claims/year	19,159	13,000	12,417	8,914
Average total no. individuals/year	14,404	10,360	9,915	7,372
% female	43.3	46.4	46.9	48.3
Median age	38	37	38	37
Average yearly claim rate per 10,000 FTEs	351.5	237.6	227.8	164.1
Overall yearly claim rate per 10,000 FTEs	350.6	237.0	227.2	163.6

**Table 22. Self-Insured Compensable (Lost Time) Claims for MSDs and Non Traumatic Soft Tissue Disorders in the Neck and Back  
1990-1998**

	<b>Neck Disorders</b>		<b>Back Disorders</b>		<b>Back/Neck or Multiple</b>	
	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue
Total claims 1990-1998	4,050	2,541	49,707	42,592	17,797	8,283
Average total no. claims/year	450	282	5,523	4,732	1,977	920
Average total no. individuals/year	433	272	4,766	4,127	1,836	876
% female	51.4	54.6	41.7	41.5	54.1	56.8
Median age	37	37	37	37	39	38
Average yearly claim rate per 10,000 FTEs	8.2	5.1	99.8	85.9	37.1	17.0
Overall yearly claim rate per 10,000 FTEs	8.1	5.1	99.4	85.6	37.0	17.0

**Table 23. Self-Insured Compensable (Lost Time) Claims for Upper Extremity MSDs and Non-Traumatic Soft Tissue Disorders  
1990-1998**

	<b>Upper Extremity Disorders</b>		<b>Shoulder Disorders</b>		<b>Elbow Disorders</b>		<b>Hand/Wrist Disorders</b>	
	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue	All MSDs	Non-Traumatic Soft Tissue
Total claims 1990-1998	40,196	26,812	11,203	8,642	4,414	2,704	20,533	12,421
Average total no. claims/year	4,366	2,979	1,245	960	490	300	2,281	1,380
Average total no. individuals/year	4,027	2,726	1,167	904	475	291	2,156	1,315
% female	48.5	54.9	43.5	45.8	43.0	46.4	50.2	60.6
Median age	38	39	39	39	40	40	38	39
Average yearly claim rate per 10,000 FTEs	82.9	56.2	23.4	18.2	9.0	5.7	41.9	25.7
Overall yearly claim rate per 10,000 FTEs	82.7	56.0	23.4	18.2	8.9	5.6	41.7	25.6

**Table 24. Self-Insured Compensable (Lost Time) Claims for Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1992-1998. I-Digit SICs by prevention index\***

<b>SIC DESCRIPTION</b>	<b>HOURS</b>	<b>COUNT</b>	<b>RATE</b>	<b>LOW95</b>	<b>UPP95</b>	<b>RATE RATIO</b>	<b>RATE RANK</b>	<b>COUNT RANK</b>	<b>PREV INDEX</b>
Transportation, Communications, Electric., Gas, and Sanitary Services	511,792,734	7,535	294.5	287.8	301.2	1.8	1	4	2.5
Retail Trade	1,119,774,255	11,092	198.1	194.4	201.8	1.2	3	3	3.0
Manufacturing	2,229,014,011	16,219	145.5	143.3	147.8	0.9	6	1	3.5
Public Administration	605,474,551	5,372	177.4	172.7	182.3	1.1	4	5	4.5
Services	2,202,458,319	15,824	143.7	141.5	146.0	0.9	7	2	4.5
Wholesale Trade	214,754,489	1,698	158.1	150.7	165.8	1.0	5	6	5.5
Mining	3,657,273	46	251.6	184.2	335.5	1.5	2	10	6.0
Construction	54,165,052	342	126.3	113.2	140.4	0.8	8	8	8.0
Finance, Insurance, and Real Estate	340,118,688	1,017	59.8	56.2	63.6	0.4	10	7	8.5
Agriculture, Forestry, and Fishing	43,896,065	258	117.6	103.6	132.8	0.7	9	9	9.0

\* 3036 claims had no identifiable SIC code

**Table 25. Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
421 Trucking and Courier Services, Except Air	108,724,617	3,452	635.0	614.0	656.5	3.9	1	5	3.0
451 Air Transportation, Scheduled, and Air Courier Services	82,935,553	1,840	443.7	423.7	464.5	2.7	3	7	5.0
541 Grocery Stores	395,578,610	5,457	275.9	268.6	283.3	1.7	18	3	10.5
335 Rolling, Drawing, & Extruding of Nonferrous Metals	45,214,320	803	355.2	331.1	380.6	2.2	8	14	11.0
514 Groceries & Related Products	36,305,930	663	365.2	338.0	394.1	2.2	6	17	11.5
533 Variety Stores	66,573,506	1,050	315.4	296.6	335.1	1.9	13	10	11.5
805 Nursing & Personal Care Facilities	32,377,303	546	337.3	309.6	366.8	2.1	10	22	16.0
736 Personnel Supply Services	59,235,857	793	267.7	249.4	287.0	1.6	20	15	17.5
411 Local & Suburban Passenger Transportation	19,272,666	405	420.3	380.3	463.3	2.6	4	33	18.5
734 Services to Dwellings & Other Buildings	29,297,232	456	311.3	283.4	341.2	1.9	15	25	20.0
806 Hospitals	701,088,881	7,348	209.6	204.9	214.5	1.3	39	1	20.0
208 Beverages	33,603,713	455	270.8	246.5	296.9	1.7	19	26	22.5
265 Paperboard Containers & Boxes	34,619,203	453	261.7	238.2	287.0	1.6	21	28	24.5
912 Legislative Bodies	183,033,634	1,834	200.4	191.3	209.8	1.2	42	8	25.0
509 Miscellaneous Durable Goods	9,152,859	211	461.1	400.9	527.6	2.8	2	49	25.5
373 Ship and Boat Building and Repairing	23,150,629	367	317.1	285.4	351.2	1.9	12	39	25.5
202 Dairy Products	27,151,083	384	282.9	255.3	312.6	1.7	17	37	27.0
521 Lumber & Other Building Materials Dealers	36,580,201	425	232.4	210.8	255.5	1.4	27	30	28.5
922 Public Order and Safety	39,559,768	454	229.5	208.9	251.6	1.4	30	27	28.5
911 Executive Offices	260,694,328	2,186	167.7	160.7	174.9	1.0	53	6	29.5
495 Sanitary Services	12,525,106	208	332.1	288.5	380.5	2.0	11	50	30.5
209 Miscellaneous Food Preparation & Kindred Products	27,224,552	347	254.9	228.8	283.2	1.6	23	40	31.5
832 Individual & Family Social Services	9,690,167	168	346.7	296.3	403.3	2.1	9	55	32.0
203 Canned, Frozen, & Preserved Fruits, Vegetables, & Foods	108,527,677	897	165.3	154.7	176.5	1.0	54	12	33.0
262 Paper Mills	36,744,802	404	219.9	199.0	242.4	1.3	34	34	34.0
372 Aircraft and Parts	1,224,794,272	7,307	119.3	116.6	122.1	0.7	76	2	39.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 26. Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Neck 1992-1998. Top 25 3-Digit SICs by Prevention Index**

SIC DESCRIPTION	HOURS*	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
421 Trucking and Courier Services, Except Air	108,724,617	91	16.7	13.5	20.6	3.3	2	5	3.5
451 Air Transportation, Scheduled, and Air Courier Services	82,935,553	58	14.0	10.6	18.1	2.8	3	8	5.5
806 Hospitals	701,088,881	272	7.8	6.9	8.7	1.5	14	1	7.5
411 Local & Suburban Passenger Transportation	19,272,666	21	21.8	13.5	33.3	4.3	1	15	8.0
533 Variety Stores	66,573,506	29	8.7	5.8	12.5	1.7	7	10	8.5
541 Grocery Stores	395,578,610	138	7.0	5.9	8.2	1.4	16	3	9.5
514 Groceries & Related Products	36,305,930	19	10.5	6.3	16.3	2.1	5	17	11.0
911 Executive Offices	260,694,328	90	6.9	5.6	8.5	1.4	17	6	11.5
912 Legislative Bodies	183,033,634	60	6.6	5.0	8.4	1.3	18	7	12.5
805 Nursing & Personal Care Facilities	32,377,303	17	10.5	6.1	16.8	2.1	4	22	12.8
736 Personnel Supply Services	59,235,857	23	7.8	4.9	11.7	1.5	13	13	13.0
335 Rolling, Drawing, & Extruding of Nonferrous Metals	45,214,320	18	8.0	4.7	12.6	1.6	12	19	15.5
372 Aircraft and Parts	1,224,794,272	263	4.3	3.8	4.8	0.9	29	2	15.5
922 Public Order and Safety	39,559,768	16	8.1	4.6	13.1	1.6	9	24	16.5
963 Regulation & Administration of Communications, Electric, Gas & Other Utilities	27,581,440	14	10.2	5.5	17.0	2.0	6	29	17.5
531 Department Stores	181,877,777	40	4.4	3.1	6.0	0.9	27	9	18.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	59,371,614	18	6.1	3.6	9.6	1.2	19	19	19.0
265 Paperboard Containers & Boxes	34,619,203	14	8.1	4.4	13.6	1.6	10	29	19.5
821 Elementary & Secondary Schools	945,403,008	129	2.7	2.3	3.2	0.5	38	4	21.0
734 Services to Dwellings & Other Buildings	29,297,232	12	8.2	4.2	14.3	1.6	8	36	22.0
333 Primary Smelting and Refining of Nonferrous Metals	77,386,041	18	4.7	2.8	7.4	0.9	25	19	22.0
581 Eating and Drinking Places	131,389,746	24	3.7	2.3	5.4	0.7	32	12	22.0
801 Offices and Clinics of Doctors Of Medicine	147,664,066	25	3.4	2.2	5.0	0.7	33	11	22.0
203 Canned, Frozen, & Preserved Fruits, Vegetable & Food Specialties	108,527,677	21	3.9	2.4	5.9	0.8	30	15	22.5
614 Personal Credit Institutions	73,078,223	17	4.7	2.7	7.4	0.9	24	22	22.8

\* SIC groups that had less than 200,000 hours per year were excluded from the analysis



**Table 27. Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Back 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE	RATE	COUNT	PREV
						RATIO	RANK	RANK	INDEX
421 Trucking and Courier Services, Except Air	108,724,617	2,139	393.5	377.0	410.5	4.6	1	5	3.0
451 Air Transportation, Scheduled, and Air Courier Services	82,935,553	944	227.6	213.4	242.6	2.7	2	8	5.0
533 Variety Stores	66,573,506	622	186.9	172.5	202.1	2.2	9	10	9.5
541 Grocery Stores	395,578,610	2,844	143.8	138.6	149.2	1.7	18	3	10.5
514 Groceries & Related Products	36,305,930	370	203.8	183.6	225.7	2.4	7	16	11.5
805 Nursing & Personal Care Facilities	32,377,303	335	206.9	185.4	230.3	2.4	6	18	12.0
335 Rolling, Drawing, & Extruding of Nonferrous Metals	45,214,320	418	184.9	167.6	203.5	2.2	10	14	12.0
734 Services to Dwellings & Other Buildings	29,297,232	279	190.5	168.8	214.2	2.2	8	21	14.5
208 Beverages	33,603,713	278	165.5	146.6	186.1	1.9	12	22	17.0
806 Hospitals	701,088,881	4,311	123.0	119.3	126.7	1.4	33	1	17.0
411 Local & Suburban Passenger Transportation	19,272,666	219	227.3	198.2	259.4	2.7	3	32	17.5
912 Legislative Bodies	183,033,634	1,016	111.0	104.3	118.1	1.3	37	7	22.0
922 Public Order and Safety	39,559,768	257	129.9	114.5	146.8	1.5	26	24	25.0
832 Individual & Family Social Services	9,690,167	102	210.5	171.7	255.6	2.5	5	46	25.5
265 Paperboard Containers & Boxes	34,619,203	226	130.6	114.1	148.7	1.5	24	30	27.0
495 Sanitary Services	12,525,106	110	175.6	144.4	211.7	2.1	11	45	28.0
521 Lumber & Other Building Materials Dealers	36,580,201	229	125.2	109.5	142.5	1.5	29	28	28.5
736 Personnel Supply Services	59,235,857	328	110.7	99.1	123.4	1.3	38	19	28.5
373 Ship and Boat Building And Repairing	23,150,629	164	141.7	120.8	165.1	1.7	19	40	29.5
202 Dairy Products	27,151,083	177	130.4	111.9	151.1	1.5	25	37	31.0
963 Regulation & Admin. of Communications, Electric, Gas & Other Utilities	27,581,440	179	129.8	111.5	150.3	1.5	27	36	31.5
209 Miscellaneous Food Preparation & Kindred Products	27,224,552	169	124.2	106.1	144.3	1.5	30	39	34.5
553 Auto & Home Supply Stores	56,647,977	265	93.6	82.6	105.5	1.1	46	23	34.5
911 Executive Offices	260,694,328	1,030	79.0	74.3	84.0	0.9	63	6	34.5
581 Eating and Drinking Places	131,389,746	541	82.4	75.6	89.6	1.0	60	11	35.5
372 Aircraft and Parts	1,224,794,272	3,378	55.2	53.3	57.1	0.6	80	2	41.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 28. Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE	RATE	COUNT	PREV
						RATIO	RANK	RANK	INDEX
421 Trucking and Courier Services, Except Air	108,724,617	914	168.1	157.4	179.4	3.0	2	5	3.5
451 Air Transportation, Scheduled, and Air Courier Services	82,935,553	552	133.1	122.2	144.7	2.4	5	8	6.5
736 Personnel Supply Services	59,235,857	340	114.8	102.9	127.7	2.1	12	10	11.0
541 Grocery Stores	395,578,610	2,009	101.6	97.2	106.1	1.8	20	2	11.0
335 Rolling, Drawing, & Extruding of Nonferrous Metals	45,214,320	299	132.3	117.7	148.1	2.4	6	18	12.0
373 Ship And Boat Building and Repairing	23,150,629	166	143.4	122.4	167.0	2.6	4	26	15.0
514 Groceries & Related Products	36,305,930	217	119.5	104.2	136.5	2.1	10	21	15.5
509 Miscellaneous Durable Goods	9,152,859	139	303.7	255.3	358.6	5.4	1	34	17.5
202 Dairy Products	27,151,083	156	114.9	97.6	134.4	2.1	11	29	20.0
265 Paperboard Containers & Boxes	34,619,203	181	104.6	89.9	121.0	1.9	17	24	20.5
262 Paper Mills	36,744,802	187	101.8	87.7	117.5	1.8	19	22	20.5
533 Variety Stores	66,573,506	304	91.3	81.3	102.2	1.6	27	16	21.5
201 Meat Products	28,110,768	149	106.0	89.7	124.5	1.9	15	30	22.5
411 Local & Suburban Passenger Transportation	19,272,666	117	121.4	100.4	145.5	2.2	8	42	25.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	59,371,614	221	74.4	65.0	84.9	1.3	35	20	27.5
912 Legislative Bodies	183,033,634	573	62.6	57.6	68.0	1.1	48	7	27.5
242 Sawmills and Planing Mills	36,865,396	158	85.7	72.9	100.2	1.5	28	28	27.8
209 Miscellaneous Food Preparation & Kindred Products	27,224,552	138	101.4	85.2	119.8	1.8	21	35	28.0
911 Executive Offices	260,694,328	794	60.9	56.8	65.3	1.1	52	6	29.0
333 Primary Smelting and Refining of Nonferrous Metals	77,386,041	266	68.7	60.7	77.5	1.2	40	19	29.5
203 Canned, Frozen, & Preserved Fruits, Vegetables, & Foods	108,527,677	334	61.6	55.1	68.5	1.1	49	11	30.0
806 Hospitals	701,088,881	1,976	56.4	53.9	58.9	1.0	57	3	30.0
521 Lumber & Other Building Materials Dealers	36,580,201	146	79.8	67.4	93.9	1.4	31	32	31.3
495 Sanitary Services	12,525,106	71	113.4	88.5	143.0	2.0	13	51	32.0
372 Aircraft and Parts	1,224,794,272	2,913	47.6	45.9	49.3	0.8	64	1	32.5
721 Laundry, Cleaning and Garment Services	2,911,773	22	151.1	94.7	228.8	2.7	3	78	40.5

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 29. Self-insured Compensable (Lost Time) Claims, Top 5 Occupations for 3 Digit SICs with Rate Ratio  $\geq 2.5$  for Non-Traumatic Soft Tissue Disorders**

<b>SIC DESCRIPTION</b>	<b>OCCUPATION</b>	<b>COUNT</b>	<b>% OF CLAIMS IN SIC</b>	<b>(COUNT IN SIC)</b>
421 Trucking and Courier Services, Except Air	Truck drivers, excluding logging	1812	52.5	
	Freight/ stock handlers, not elsewhere classified	667	19.3	
	Laborers, excluding construction	291	8.4	
	Messengers	272	7.9	
	Grader/ sorter, excluding agriculture	65	1.9	
	Total of five occupations	3107	90.0	3,452
509 Miscellaneous Durable Goods	Molding and casting machine operators	72	34.1	
	Grinding/ polishing machine operators	20	9.5	
	Laborers, excluding construction	18	8.5	
	Miscellaneous machine operators, not elsewhere classified	14	6.6	
	Machine operators, not specified	13	6.2	
	Total of five occupations	137	64.9	211
451 Air Transportation, Scheduled, and Air Courier Services	Freight/ stock handlers, not elsewhere classified	792	43.0	
	Public transportation attendants	540	29.4	
	Transportation ticketing and reservation agents	109	5.9	
	Aircraft mechanics, excluding engine	57	3.1	
	Laborers, excluding construction	35	1.9	
	Total of five occupations	1533	83.3	1,840
411 Local & Suburban Passenger Transportation	Bus drivers	163	40.3	
	Health technicians, not elsewhere classified	99	24.4	
	Physicians' assistants	57	14.1	
	Truck drivers, excluding logging	20	4.9	
	Total of four occupations	339	83.7	405

**Table 30. Combined State Fund and Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1992-1998. 1-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
Construction	1,456,082,178	18,558	254.9	251.2	258.6	1.9	1	4	2.5
Manufacturing	4,132,426,051	31,521	152.6	150.9	154.2	1.1	4	2	3.0
Transportation, Communications, Electric, Gas and Sanitary Services	1,355,244,749	14,896	219.8	216.3	223.4	1.6	2	5	3.5
Retail Trade	4,454,630,423	27,996	125.7	124.2	127.2	0.9	5	3	4.0
Services	7,979,828,150	43,712	109.6	108.5	110.6	0.8	8	1	4.5
Wholesale Trade	1,574,694,152	9,818	124.7	122.2	127.2	0.9	6	6	6.0
Mining	40,454,152	353	174.5	156.8	193.7	1.3	3	10	6.5
Public Administration	1,569,352,867	9,123	116.3	113.9	118.7	0.9	7	7	7.0
Agriculture, Forestry, and Fishing	888,294,595	4,666	105.1	102.1	108.1	0.8	9	8	8.5
Finance, Insurance, and Real Estate	1,560,270,873	3,508	45.0	43.5	46.5	0.3	10	9	9.5

\* 5862 claims had no identifiable SIC code and 19 claims were from non-classifiable establishments and are not included in the table

**Table 31. Combined State Fund and Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
421 Trucking and Courier Services, Except Air	371,130,012	7,391	398.3	389.3	407.5	3.0	4	4	4.0
805 Nursing & Personal Care Facilities	279,188,108	5,611	402.0	391.5	412.6	3.0	3	6	4.5
174 Masonry, Stonework, Tile Setting and Plastering	97,009,401	2,172	447.8	429.2	467.0	3.4	1	13	7.0
451 Air Transportation, Scheduled, and Air Courier Services	124,888,568	2,367	379.1	363.9	394.6	2.8	6	11	8.5
152 General Building Contractors - Residential Buildings	255,429,006	3,529	276.3	267.3	285.6	2.1	23	8	15.5
176 Roofing, Siding, and Sheet Metal Work	53,155,929	1,179	443.6	418.6	469.7	3.3	2	36	19.0
175 Carpentry and Floor Work	85,850,737	1,384	322.4	305.7	339.9	2.4	12	26	19.0
836 Residential Care	102,344,406	1,487	290.6	276.0	305.7	2.2	20	20	20.0
541 Grocery Stores	709,445,679	8,371	236.0	231.0	241.1	1.8	44	1	22.5
177 Concrete Work	48,276,510	949	393.2	368.5	419.0	2.9	5	44	24.5
078 Landscape & Horticultural Services	80,688,524	1,243	308.1	291.2	325.7	2.3	15	34	24.5
242 Sawmills and Planing Mills	100,786,202	1,356	269.1	255.0	283.8	2.0	25	29	27.0
734 Services to Dwellings & Other Buildings	122,854,053	1,535	249.9	237.5	262.7	1.9	38	19	28.5
335 Rolling, Drawing, & Extruding of Nonferrous Metals	47,249,167	807	341.6	318.4	366.0	2.6	9	49	29.0
533 Variety Stores	79,792,213	1,146	287.2	270.9	304.4	2.2	21	38	29.5
179 Miscellaneous Special Trade Contractors	154,860,223	1,789	231.0	220.5	242.0	1.7	48	16	32.0
806 Hospitals	764,324,640	8,228	215.3	210.7	220.0	1.6	64	2	33.0
411 Local & Suburban Passenger Transportation	44,346,780	720	324.7	301.4	349.3	2.4	11	61	36.0
162 Heavy Construction, Except Highway & Street Construction	123,581,919	1,419	229.6	217.9	241.9	1.7	50	25	37.5
702 Rooming & Boarding Houses	89,286,472	1,120	250.9	236.4	266.0	1.9	36	40	38.0
171 Plumbing, Heating and Air-Conditioning	191,862,228	2,083	217.1	207.9	226.7	1.6	63	14	38.5
514 Groceries & Related Products	258,195,791	2,651	205.3	197.6	213.3	1.5	67	10	38.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	149,006,973	1,641	220.3	209.7	231.2	1.6	60	18	39.0
201 Meat Products	56,365,774	752	266.8	248.1	286.6	2.0	28	54	41.0
344 Fabricated Structural Metal Products	77,480,964	906	233.9	218.9	249.6	1.8	46	45	45.5
372 Aircraft and Parts	1,290,016,689	7,716	119.6	117.0	122.3	0.9	166	3	84.5

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 32. Combined State Fund and Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Neck 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
805 Nursing & Personal Care Facilities	279,188,108	963	69.0	64.7	73.5	4.8	2	1	1.5
174 Masonry, Stonework, Tile Setting and Plastering	97,009,401	362	74.6	67.1	82.7	5.2	1	7	4.0
836 Residential Care	102,344,406	310	60.6	54.0	67.7	4.2	3	10	6.5
421 Trucking and Courier Services, Except Air	371,130,012	705	38.0	35.2	40.9	2.6	18	3	10.5
702 Rooming & Boarding Houses	89,286,472	225	50.4	44.0	57.4	3.5	6	16	11.0
175 Carpentry and Floor Work	85,850,737	213	49.6	43.2	56.8	3.5	7	19	13.0
152 General Building Contractors - Residential Buildings	255,429,006	450	35.2	32.1	38.6	2.5	22	5	13.5
176 Roofing, Siding, and Sheet Metal Work	53,155,929	139	52.3	44.0	61.8	3.6	5	30	17.3
179 Miscellaneous Special Trade Contractors	154,860,223	255	32.9	29.0	37.2	2.3	28	14	21.0
808 Home Health Care Services	47,773,337	118	49.4	40.9	59.2	3.4	8	39	23.3
078 Landscape & Horticultural Services	80,688,524	145	35.9	30.3	42.3	2.5	21	27	24.0
171 Plumbing, Heating and Air-Conditioning	191,862,228	290	30.2	26.9	33.9	2.1	37	12	24.5
177 Concrete Work	48,276,510	110	45.6	37.5	54.9	3.2	9	42	25.5
162 Heavy Construction, Except Highway & Street Construction	123,581,919	196	31.7	27.4	36.5	2.2	31	21	26.0
344 Fabricated Structural Metal Products	77,480,964	134	34.6	29.0	41.0	2.4	23	33	28.0
734 Services to Dwellings & Other Buildings	122,854,053	188	30.6	26.4	35.3	2.1	34	23	28.5
753 Automotive Repair Shops	169,734,714	227	26.7	23.4	30.5	1.9	43	15	29.0
172 Painting and Paper Hanging	55,750,317	107	38.4	31.5	46.4	2.7	17	46	31.5
154 General Building Contractors - Nonresidential Buildings	117,350,111	168	28.6	24.5	33.3	2.0	39	25	32.0
411 Local & Suburban Passenger Transportation	44,346,780	94	42.4	34.3	51.9	2.9	13	52	32.5
721 Laundry, Cleaning and Garment Services	70,517,212	114	32.3	26.7	38.8	2.2	29	41	35.0
514 Groceries & Related Products	258,195,791	292	22.6	20.1	25.4	1.6	61	11	36.0
701 Hotels and Motels	236,491,826	263	22.2	19.6	25.1	1.5	65	13	39.0
243 Millwork, Veneer, Plywood, and Structural Wood Members	149,006,973	174	23.4	20.0	27.1	1.6	55	24	39.5
242 Sawmills and Planing Mills	100,786,202	132	26.2	21.9	31.1	1.8	47	34	40.5
581 Eating and Drinking Places	1,324,992,024	832	12.6	11.7	13.4	0.9	132	2	67.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 33. Combined State Fund and Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Back 1992-1998.  
Top 25 3-Digit SICs by Prevention Index**

<b>SIC DESCRIPTION</b>	<b>HOURS*</b>	<b>COUNT</b>	<b>RATE</b>	<b>LOW95</b>	<b>UPP95</b>	<b>RATE</b>	<b>RATE</b>	<b>COUNT</b>	<b>PREV</b>
						<b>RATIO</b>	<b>RANK</b>	<b>RANK</b>	<b>INDEX</b>
805 Nursing & Personal Care Facilities	279,188,108	3,770	270.1	261.5	278.8	3.6	3	4	3.5
421 Trucking and Courier Services, Except Air	371,130,012	4,685	252.5	245.3	259.8	3.3	5	2	3.5
174 Masonry, Stonework, Tile Setting and Plastering	97,009,401	1,349	278.1	263.5	293.4	3.7	2	12	6.8
451 Air Transportation, Scheduled, and Air Courier Services	124,888,568	1,237	198.1	187.2	209.5	2.6	10	13	11.5
152 General Building Contractors - Residential Buildings	255,429,006	2,295	179.7	172.4	187.2	2.4	17	8	12.5
175 Carpentry and Floor Work	85,850,737	916	213.4	199.8	227.7	2.8	6	20	13.0
176 Roofing, Siding, and Sheet Metal Work	53,155,929	813	305.9	285.2	327.7	4.0	1	29	15.0
078 Landscape & Horticultural Services	80,688,524	816	202.3	188.6	216.6	2.7	9	28	18.5
836 Residential Care	102,344,406	898	175.5	164.2	187.3	2.3	19	21	20.0
179 Miscellaneous Special Trade Contractors	154,860,223	1,159	149.7	141.2	158.6	2.0	30	14	22.0
177 Concrete Work	48,276,510	633	262.2	242.2	283.5	3.5	4	42	23.0
734 Services to Dwellings & Other Buildings	122,854,053	942	153.4	143.7	163.5	2.0	29	18	23.5
171 Plumbing, Heating and Air-Conditioning	191,862,228	1,349	140.6	133.2	148.3	1.9	42	12	26.8
702 Rooming & Boarding Houses	89,286,472	761	170.5	158.6	183.0	2.3	23	31	27.0
162 Heavy Construction, Except Highway & Street Construction	123,581,919	896	145.0	135.7	154.8	1.9	36	22	29.0
533 Variety Stores	79,792,213	681	170.7	158.1	184.0	2.3	22	39	30.5
541 Grocery Stores	709,445,679	4,441	125.2	121.5	128.9	1.7	59	3	31.0
806 Hospitals	764,324,640	4,757	124.5	121.0	128.1	1.6	61	1	31.0
518 Beer, Wine and Distilled Alcoholic Beverages	47,214,747	449	190.2	173.0	208.6	2.5	13	51	32.0
242 Sawmills and Planing Mills	100,786,202	737	146.3	135.9	157.2	1.9	35	36	35.5
335 Rolling, Drawing, & Extruding of Nonferrous Metals	47,249,167	422	178.6	162.0	196.5	2.4	18	56	37.0
411 Local & Suburban Passenger Transportation	44,346,780	405	182.7	165.3	201.3	2.4	16	59	37.5
172 Painting and Paper Hanging	55,750,317	464	166.5	151.7	182.3	2.2	26	49	37.5
521 Lumber & Other Building Materials Dealers	137,532,600	849	123.5	115.3	132.1	1.6	62	24	43.0
344 Fabricated Structural Metal Products	77,480,964	542	139.9	128.4	152.2	1.9	43	45	44.0

\* SIC groups that had less than 200,000 hours per year were excluded from the analysis

**Table 34. Combined State Fund and Self-Insured Compensable (Lost Time) Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1992-1998. Top 25 3-Digit SICs by Prevention Index\***

SIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
174 Masonry, Stonework, Tile Setting and Plastering	97,009,401	650	134.0	123.9	144.7	3.0	7	13	10.0
451 Air Transportation, Scheduled, and Air Courier Services	124,888,568	715	114.5	106.3	123.2	2.6	13	12	12.5
421 Trucking and Courier Services, Except Air	371,130,012	1,930	104.0	99.4	108.8	2.3	21	5	13.0
541 Grocery Stores	709,445,679	3,135	88.4	85.3	91.5	2.0	35	1	18.0
201 Meat Products	56,365,774	378	134.1	120.9	148.4	3.0	6	32	19.0
242 Sawmills and Planing Mills	100,786,202	522	103.6	94.9	112.9	2.3	22	20	21.0
805 Nursing & Personal Care Facilities	279,188,108	1,197	85.7	81.0	90.7	1.9	38	7	22.5
209 Miscellaneous Food Preparation & Kindred Products	90,736,535	448	98.7	89.8	108.3	2.2	25	24	24.5
335 Rolling, Drawing, & Extruding of Nonferrous Metals	47,249,167	299	126.6	112.6	141.8	2.8	8	47	27.5
243 Millwork, Veneer, Plywood, and Structural Wood Members	149,006,973	632	84.8	78.3	91.7	1.9	42	14	28.0
514 Groceries & Related Products	258,195,791	1,001	77.5	72.8	82.5	1.7	55	9	32.0
152 General Building Contractors - Residential Buildings	255,429,006	981	76.8	72.1	81.8	1.7	57	10	33.5
176 Roofing, Siding, and Sheet Metal Work	53,155,929	278	104.6	92.7	117.6	2.3	20	53	36.5
202 Dairy Products	34,333,121	207	120.6	104.7	138.2	2.7	10	68	39.0
736 Personnel Supply Services	318,384,776	1,031	64.8	60.9	68.8	1.4	75	8	41.5
177 Concrete Work	48,276,510	245	101.5	89.2	115.0	2.3	24	60	42.0
533 Variety Stores	79,792,213	335	84.0	75.2	93.5	1.9	44	40	42.0
373 Ship and Boat Building and Repairing	51,276,801	249	97.1	85.4	110.0	2.2	27	58	42.3
836 Residential Care	102,344,406	394	77.0	69.6	85.0	1.7	56	30	43.0
721 Laundry, Cleaning and Garment Services	70,517,212	300	85.1	75.7	95.3	1.9	41	46	43.5
078 Landscape & Horticultural Services	80,688,524	333	82.5	73.9	91.9	1.8	47	41	44.0
806 Hospitals	764,324,640	2,282	59.7	57.3	62.2	1.3	86	3	44.5
175 Carpentry and Floor Work	85,850,737	337	78.5	70.3	87.4	1.8	53	39	46.0
162 Heavy Construction, Except Highway & Street Construction	123,581,919	421	68.1	61.8	75.0	1.5	69	27	48.0
267 Converted Paper & Paperboard Products, Except Containers	24,762,544	154	124.4	105.5	145.7	2.8	9	88	48.5
372 Aircraft and Parts	1,290,016,689	3,092	47.9	46.3	49.7	1.1	122	2	62.0
314 Footwear, Except Rubber	1,545,700	21	271.7	168.1	415.4	6.1	1	222	111.5
222 Broadwoven Fabric Mills, Manmade Fiber & Silk	1,894,100	17	179.5	104.5	287.4	4.0	2	238	120.0
393 Musical Instruments	2,008,504	15	149.4	83.5	246.4	3.3	3	245	124.0

\* Below the line and highlighted in grey are industries that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* SIC groups that had less than 200,000 hours per year were excluded from the analysis



**Table 35. SF Compensable Non-Traumatic Soft Tissue Disorder Severity Rates\* 1992-1998**

	1992	1997	Change 1992-1997 (%)	
<i>State Fund</i>			Overall	Average per yr
Agriculture, Forestry, Fishing	20,182	9,748	-51.7	-10.3
Construction	66,094	33,699	-49.0	-9.8
Manufacturing	36,208	15,553	-57.0	-11.4
Transp, comm, el, gas, & sanitary serv	29,935	13,655	-54.4	-10.9
Wholesale trade	19,458	9,245	-52.5	-10.5
Retail trade	19,395	8,581	-55.8	-11.2
Finance, ins, real est	7,549	4,080	-46.0	-9.2
Services	17,666	8,841	-50.0	-10.0
Public admin	11,775	6,055	-48.6	-9.7
All industries	228,262	109,457	-52.0	-10.4

\*Lost days per 10,000 FTEs

**Table 36. State Fund Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1990-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
6108 Nursing Homes	318,998,144	21,452	1345.0	1327.0	1363.1	3.8	17	2	9.5
0510 Wood Frame Bldg. Construction	194,531,508	10,184	1047.0	1026.8	1067.6	3.0	36	3	19.5
2903 Wood Products Mfg.	114,642,084	6,105	1065.1	1038.5	1092.1	3.0	34	8	21.0
0507 Roofing	30,718,052	2,789	1815.9	1749.1	1884.5	5.2	9	41	25.0
0515 Wallboard Installation	17,974,290	1,989	2213.2	2117.0	2312.6	6.3	5	54	29.5
7114 Temp. Help-Assembly	20,511,447	2,014	1963.8	1878.9	2051.5	5.6	7	52	29.5
1002 Sawmills	46,261,695	2,714	1173.3	1129.6	1218.3	3.3	24	42	33.0
0518 Building Construction NOC	87,932,579	4,392	998.9	969.6	1028.9	2.8	47	21	34.0
4305 Garbage Collection	32,762,438	2,137	1304.5	1249.8	1361.1	3.7	18	51	34.5
6907 Moving Companies	24,074,567	1,912	1588.4	1518.0	1661.2	4.5	12	58	35.0
0301 Landscaping	67,457,555	3,446	1021.7	987.8	1056.4	2.9	40	33	36.5
3304 Meat Dealers Wholesale	81,167,764	3,992	983.6	953.4	1014.6	2.8	51	25	38.0
0306 Plumbing	95,520,364	4,481	938.2	911.0	966.1	2.7	59	19	39.0
0102 Concrete Construction	38,232,096	2,173	1136.7	1089.4	1185.6	3.2	30	49	39.5
2105 Beer Distributors	34,437,289	2,001	1162.1	1111.7	1214.2	3.3	27	53	40.0
5103 Foundries, NOC	24,921,130	1,526	1224.7	1164.0	1287.7	3.5	21	71	46.0
6802 Airlines, Ground Crew	25,150,030	1,528	1215.1	1154.9	1277.6	3.5	23	70	46.5
1101 Parcel Package Delivery	130,388,856	5,312	814.8	793.0	837.0	2.3	83	13	48.0
7201 State Health Care Facilities	80,720,784	3,610	894.4	865.5	924.1	2.5	68	30	49.0
0307 HVAC Systems	85,317,579	3,757	880.7	852.8	909.3	2.5	71	28	49.5
0502 Floor Covering Installation	20,455,835	1,291	1262.2	1194.3	1333.0	3.6	19	81	50.0
4301 Meat Products Mfg.	21,057,070	1,289	1224.3	1158.4	1293.0	3.5	22	82	52.0
0512 Insulation Installation	24,309,496	1,392	1145.2	1085.9	1207.0	3.3	28	77	52.5
1102 Trucking, NOC	162,999,719	5,834	715.8	697.6	734.4	2.0	99	9	54.0
5209 Boilermaking	41,375,841	1,945	940.2	898.8	982.9	2.7	57	57	57.0
1005 Shake Mills	1,673,631	223	2664.9	2326.5	3038.6	7.6	2	203	102.5
0109 Reinforcing Steel Installation	1,170,742	199	3399.6	2943.6	3906.1	9.7	1	211	106.0
3905 Restaurants	1,592,192,021	23,728	298.1	294.3	301.9	0.8	224	1	112.5
7119 Temp. Help-Vehicle Operation	1,238,666	162	2615.7	2228.4	3051.0	7.4	3	224	113.5

\* Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 37. State Fund Non-Traumatic Soft Tissue Disorders in the Neck 1990-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
6108 Nursing Homes	318,998,144	2,926	183.4	176.9	190.2	4.6	13	1	7.0
7201 State Health Care Facilities	80,720,784	692	171.5	158.9	184.7	4.3	18	9	13.5
0515 Wallboard Installation	17,974,290	295	328.2	291.9	367.9	8.2	3	41	22.0
0510 Wood Frame Bldg. Construction	194,531,508	985	101.3	95.0	107.8	2.5	47	4	25.5
0507 Roofing	30,718,052	267	173.8	153.6	196.0	4.3	17	43	30.0
6907 Moving Companies	24,074,567	229	190.2	166.4	216.5	4.7	11	53	32.0
6110 Home Health Care, Nursing	47,086,664	314	133.4	119.0	149.0	3.3	25	39	32.0
2903 Wood Products Mfg.	114,642,084	577	100.7	92.6	109.2	2.5	49	17	33.0
7114 Temp. Help-Assembly	20,511,447	197	192.1	166.2	220.9	4.8	10	61	35.5
1102 Trucking, NOC	162,999,719	765	93.9	87.3	100.8	2.3	69	7	38.0
0518 Building Construction NOC	87,932,579	438	99.6	90.5	109.4	2.5	51	27	39.0
7204 Preferred Workers	17,941,424	176	196.2	168.3	227.4	4.9	9	70	39.3
0102 Concrete Construction	38,232,096	240	125.5	110.2	142.5	3.1	31	48	39.5
0306 Plumbing	95,520,364	474	99.2	90.5	108.6	2.5	54	25	39.5
0504 Painting	75,277,953	379	100.7	90.8	111.4	2.5	48	33	40.5
4305 Garbage Collection	32,762,438	216	131.9	114.9	150.7	3.3	27	56	41.5
0307 HVAC Systems	85,317,579	407	95.4	86.4	105.1	2.4	64	30	47.0
0512 Insulation Installation	24,309,496	169	139.0	118.9	161.7	3.5	24	73	48.3
1101 Parcel Package Delivery	130,388,856	577	88.5	81.4	96.0	2.2	81	17	49.0
1404 Bus Companies	46,850,712	234	99.9	87.5	113.5	2.5	50	50	50.0
3304 Meat Dealers Wholesale	81,167,764	381	93.9	84.7	103.8	2.3	68	32	50.0
6802 Airlines, Ground Crew	25,150,030	159	126.4	107.6	147.7	3.2	29	76	52.5
7111 Temp. Help-Health Care	18,586,858	134	144.2	120.8	170.8	3.6	23	87	55.0
0302 Masonry Construction	20,832,640	138	132.5	111.3	156.5	3.3	26	86	55.8
1002 Sawmills	46,261,695	228	98.6	86.2	112.2	2.5	58	54	56.0
1005 Shake Mills	1,673,631	42	501.9	361.7	678.4	12.5	1	175	87.8
3905 Restaurants	1,592,192,021	2,736	34.4	33.1	35.7	0.9	201	2	101.5
0109 Reinforcing Steel Installation	1,170,742	22	375.8	235.4	569.0	9.4	2	209	105.5
4904 Clerical Office, NOC	3,117,822,728	1,266	8.1	7.7	8.6	0.2	246	3	124.5

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 38. State Fund Non-Traumatic Soft Tissue Disorders in the Back 1990-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
6108 Nursing Homes	318,998,144	13,017	816.1	802.2	830.3	4.3	15	1	8.0
0510 Wood Frame Bldg. Construction	194,531,508	5,981	614.9	599.4	630.7	3.2	32	3	17.5
0507 Roofing	30,718,052	1,638	1066.5	1015.4	1119.4	5.6	8	36	22.0
0518 Building Construction NOC	87,932,579	2,606	592.7	570.2	615.9	3.1	40	18	29.0
0515 Wallboard Installation	17,974,290	1,086	1208.4	1137.6	1282.5	6.3	4	57	30.5
6907 Moving Companies	24,074,567	1,188	986.9	931.6	1044.7	5.2	9	53	31.0
2105 Beer Distributors	34,437,289	1,349	783.5	742.2	826.4	4.1	18	44	31.0
2903 Wood Products Mfg.	114,642,084	3,075	536.5	517.7	555.8	2.8	58	10	34.0
0301 Landscaping	67,457,555	2,008	595.3	569.6	622.0	3.1	39	30	34.5
4305 Garbage Collection	32,762,438	1,238	755.7	714.2	799.0	3.9	20	50	35.0
0306 Plumbing	95,520,364	2,607	545.9	525.1	567.2	2.9	54	17	35.5
7114 Temp. Help-Assembly	20,511,447	1,007	981.9	922.2	1044.5	5.1	10	62	36.0
0102 Concrete Construction	38,232,096	1,273	665.9	629.8	703.5	3.5	23	49	36.0
1101 Parcel Package Delivery	130,388,856	3,343	512.8	495.5	530.5	2.7	64	8	36.0
1002 Sawmills	46,261,695	1,395	603.1	571.9	635.6	3.1	37	42	39.5
0307 HVAC Systems	85,317,579	2,258	529.3	507.7	551.6	2.8	59	24	41.5
5103 Foundries, NOC	24,921,130	892	715.9	669.6	764.4	3.7	21	67	44.0
0502 Floor Covering Installation	20,455,835	819	800.7	746.8	857.5	4.2	17	73	45.0
6802 Airlines, Ground Crew	25,150,030	831	660.8	616.7	707.3	3.5	25	71	48.0
0302 Masonry Construction	20,832,640	723	694.1	644.4	746.6	3.6	22	80	51.0
6405 Tire Sales & Service	48,936,413	1,320	539.5	510.8	569.4	2.8	57	46	51.5
1102 Trucking, NOC	162,999,719	3,410	418.4	404.5	432.7	2.2	96	7	51.5
2102 Warehouses, NOC	58,339,827	1,475	505.7	480.2	532.1	2.6	67	39	53.0
7201 State Health Care Facilities	80,720,784	1,855	459.6	438.9	481.0	2.4	78	32	55.0
5209 Boilermaking	41,375,841	1,120	541.4	510.1	574.0	2.8	56	56	56.0
1005 Shake Mills	1,673,631	132	1577.4	1319.8	1870.6	8.2	2	199	100.5
0109 Reinforcing Steel Installation	1,170,742	107	1827.9	1498.0	2208.9	9.5	1	217	109.0
3905 Restaurants	1,592,192,021	12,587	158.1	155.4	160.9	0.8	226	2	114.0
7119 Temp. Help-Vehicle Operation	1,238,666	76	1227.1	966.8	1536.0	6.4	3	234	118.5

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 39. State Fund Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1990-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
3304 Meat Dealers Wholesale	81,167,764	1,939	477.8	456.7	499.5	4.1	15	12	13.5
2903 Wood Products Mfg.	114,642,084	2,346	409.3	392.9	426.2	3.5	22	7	14.5
6108 Nursing Homes	318,998,144	5,658	354.7	345.6	364.1	3.1	33	2	17.5
1002 Sawmills	46,261,695	1,054	455.7	428.6	484.0	3.9	18	33	25.3
7114 Temp. Help-Assembly	20,511,447	821	800.5	746.7	857.2	6.9	3	48	25.5
0507 Roofing	30,718,052	836	544.3	508.0	582.5	4.7	11	47	29.0
0510 Wood Frame Bldg. Construction	194,531,508	2,891	297.2	286.5	308.3	2.6	62	4	33.0
0515 Wallboard Installation	17,974,290	560	623.1	572.6	676.9	5.4	8	61	34.3
4301 Meat Products Mfg.	21,057,070	580	550.9	507.0	597.6	4.7	10	59	34.5
0518 Building Construction NOC	87,932,579	1,374	312.5	296.2	329.5	2.7	50	21	35.5
2104 Fruit & Vegetable Packing	172,327,570	2,402	278.8	267.7	290.1	2.4	72	6	39.0
3510 Plastic Products Manufacturing	95,273,772	1,447	303.8	288.3	319.8	2.6	59	20	39.5
0301 Landscaping	67,457,555	1,048	310.7	292.2	330.1	2.7	51	34	42.5
4305 Garbage Collection	32,762,438	594	362.6	334.0	393.0	3.1	31	55	43.0
5103 Foundries, NOC	24,921,130	510	409.3	374.5	446.4	3.5	21	69	45.0
6802 Airlines, Ground Crew	25,150,030	511	406.4	371.9	443.2	3.5	23	68	45.5
3708 Textile Mfg.	43,120,692	714	331.2	307.3	356.4	2.9	41	51	46.0
3404 Aluminum Product Mfg.	139,393,657	1,834	263.1	251.2	275.5	2.3	81	14	47.5
6908 Paper Products Mfg.	24,555,960	469	382.0	348.2	418.2	3.3	27	73	50.0
0306 Plumbing	95,520,364	1,264	264.7	250.3	279.7	2.3	80	25	52.5
2904 Plywood Mfg.	21,873,713	440	402.3	365.6	441.7	3.5	25	81	52.8
0512 Insulation Installation	24,309,496	449	369.4	336.0	405.2	3.2	29	77	52.8
7201 State Health Care Facilities	80,720,784	1,098	272.0	256.2	288.6	2.3	76	30	53.0
2905 Furniture/Casket Mfg.	20,281,477	410	404.3	366.1	445.4	3.5	24	86	54.8
5209 Boilermaking	41,375,841	632	305.5	282.1	330.3	2.6	57	53	55.0
0109 Reinforcing Steel Installation	1,170,742	73	1247.1	977.5	1568.0	10.7	1	198	99.3
7119 Temp. Help-Vehicle Operation	1,238,666	73	1178.7	923.9	1482.0	10.1	2	198	99.8
3905 Restaurants	1,592,192,021	7,774	97.7	95.5	99.8	0.8	214	1	107.5
4904 Clerical Office, NOC	3,117,822,728	5,540	35.5	34.6	36.5	0.3	259	3	131.0

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 40. State Fund Claims for Sciatica 1990-1998. Top 25 WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
6108 Nursing Homes	318,998,144	366	22.9	20.7	25.4	4.7	8	1	4.5
0510 Wood Frame Bldg. Construction	194,531,508	143	14.7	12.4	17.3	3.0	22	3	12.5
0518 Building Construction NOC	87,932,579	79	18.0	14.2	22.4	3.7	13	17	15.0
0101 Road Construction	105,726,705	85	16.1	12.8	19.9	3.3	16	14	15.0
1102 Trucking, NOC	162,999,719	117	14.4	11.9	17.2	2.9	25	5	15.0
0507 Roofing	30,718,052	51	33.2	24.7	43.7	6.8	4	30	16.8
0307 HVAC Systems	85,317,579	66	15.5	12.0	19.7	3.2	18	21	19.5
0306 Plumbing	95,520,364	72	15.1	11.8	19.0	3.1	21	19	19.8
0515 Wallboard Installation	17,974,290	36	40.1	28.1	55.5	8.2	2	41	21.5
7204 Preferred Workers	17,941,424	33	36.8	25.3	51.7	7.5	3	43	23.0
2105 Beer Distributors	34,437,289	33	19.2	13.2	26.9	3.9	12	43	27.5
0504 Painting	75,277,953	52	13.8	10.3	18.1	2.8	27	28	27.5
7201 State Health Care Facilities	80,720,784	53	13.1	9.8	17.2	2.7	29	27	27.8
4910 Prop. And Bldg. Management	198,408,417	101	10.2	8.3	12.4	2.1	49	7	28.0
6907 Moving Companies	24,074,567	30	24.9	16.8	35.6	5.1	7	51	28.8
0502 Floor Covering Installation	20,455,835	28	27.4	18.2	39.6	5.6	6	55	30.3
6509 Boarding Homes	151,912,678	80	10.5	8.4	13.1	2.2	45	16	30.5
3402 Machine Shops	219,757,227	105	9.6	7.8	11.6	2.0	59	6	32.5
2009 Bldg. And Home Improvement Centers	94,392,082	53	11.2	8.4	14.7	2.3	42	27	34.3
4905 Motels & Hotels	141,628,309	72	10.2	8.0	12.8	2.1	50	19	34.3
0107 Underground Utilities	39,496,528	30	15.2	10.2	21.7	3.1	19	51	34.8
0512 Insulation Installation	24,309,496	25	20.6	13.3	30.4	4.2	10	61	35.3
1501 Counties-All Other Employees NOC	82,185,958	47	11.4	8.4	15.2	2.3	40	32	35.8
3401 Auto Dealers & Repair	276,321,707	119	8.6	7.1	10.3	1.8	68	4	36.0
1101 Parcel Package Delivery	130,388,856	65	10.0	7.7	12.7	2.0	51	22	36.5
0201 Bridge Construction	6,308,921	13	41.2	21.9	70.5	8.4	1	104	52.3
3905 Restaurants	1,592,192,021	259	3.3	2.9	3.7	0.7	110	2	56.0

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 41. State Fund Claims for Rotator Cuff Syndrome 1990-1998. Top 25 WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
1102 Trucking, NOC	162,999,719	373	45.8	41.2	50.7	3.0	37	5	21.0
0515 Wallboard Installation	17,974,290	130	144.7	120.9	171.8	9.5	4	39	21.3
2903 Wood Products Mfg.	114,642,084	277	48.3	42.8	54.4	3.2	33	10	21.5
6108 Nursing Homes	318,998,144	711	44.6	41.4	48.0	2.9	42	2	22.0
4305 Garbage Collection	32,762,438	131	80.0	66.9	94.9	5.2	9	37	23.0
3304 Meat Dealers Wholesale	81,167,764	202	49.8	43.1	57.1	3.3	32	20	26.0
0518 Building Construction NOC	87,932,579	206	46.9	40.7	53.7	3.1	34	18	26.0
1002 Sawmills	46,261,695	148	64.0	54.1	75.2	4.2	22	34	28.0
0510 Wood Frame Bldg. Construction	194,531,508	396	40.7	36.8	44.9	2.7	54	3	28.5
2904 Plywood Mfg.	21,873,713	90	82.3	66.2	101.2	5.4	6	55	30.5
0507 Roofing	30,718,052	110	71.6	58.9	86.3	4.7	14	47	30.5
6802 Airlines, Ground Crew	25,150,030	92	73.2	59.0	89.7	4.8	12	54	32.8
0504 Painting	75,277,953	171	45.4	38.9	52.8	3.0	39	28	33.3
0306 Plumbing	95,520,364	201	42.1	36.5	48.3	2.8	51	21	36.0
0307 HVAC Systems	85,317,579	180	42.2	36.3	48.8	2.8	50	24	37.0
7201 State Health Care Facilities	80,720,784	171	42.4	36.3	49.2	2.8	49	28	38.3
2105 Beer Distributors	34,437,289	94	54.6	44.1	66.8	3.6	25	52	38.5
7204 Preferred Workers	17,941,424	70	78.0	60.8	98.6	5.1	10	72	40.8
6907 Moving Companies	24,074,567	73	60.6	47.5	76.3	4.0	23	66	44.5
2104 Fruit & Vegetable Packing	172,327,570	300	34.8	31.0	39.0	2.3	83	7	45.0
5001 Logging	36,757,688	85	46.2	36.9	57.2	3.0	36	58	47.0
0302 Masonry Construction	20,832,640	68	65.3	50.7	82.8	4.3	21	76	48.3
3510 Plastic Products Manufacturing	95,273,772	175	36.7	31.5	42.6	2.4	74	25	49.5
0601 Electrical Wiring	144,539,300	242	33.5	29.4	38.0	2.2	89	13	51.0
2102 Warehouses, NOC	58,339,827	113	38.7	31.9	46.6	2.5	59	44	51.5
0524 Wallboard Installation - Discounted	3,194,735	28	175.3	116.5	253.4	11.5	3	138	70.3
3905 Restaurants	1,592,192,021	806	10.1	9.4	10.8	0.7	179	1	90.0
1005 Shake Mills	1,673,631	16	191.2	109.2	310.5	12.5	2	180	90.8
0109 Reinforcing Steel Installation	1,170,742	12	205.0	105.8	358.1	13.4	1	197	98.8

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 42. State Fund Claims for Epicondylitis 1990-1998. Top 25 WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
0510 Wood Frame Bldg. Construction	194,531,508	370	38.0	34.3	42.1	3.6	14	3	8.5
2903 Wood Products Mfg.	114,642,084	195	34.0	29.4	39.1	3.2	22	11	16.5
3304 Meat Dealers Wholesale	81,167,764	144	35.5	29.9	41.8	3.3	17	21	19.0
0518 Building Construction NOC	87,932,579	151	34.3	29.1	40.3	3.2	21	18	19.5
0515 Wallboard Installation	17,974,290	78	86.8	68.6	108.3	8.1	2	41	21.3
0507 Roofing	30,718,052	75	48.8	38.4	61.2	4.6	10	45	27.5
3404 Aluminum Product Mfg.	139,393,657	180	25.8	22.2	29.9	2.4	43	13	28.0
3510 Plastic Products Manufacturing	95,273,772	135	28.3	23.8	33.5	2.7	35	22	28.5
2907 Cabinet/Countertop Mfg.	59,498,695	91	30.6	24.6	37.6	2.9	28	34	31.0
6402 Supermarkets	260,483,458	296	22.7	20.2	25.5	2.1	60	4	32.0
0302 Masonry Construction	20,832,640	56	53.8	40.6	69.8	5.0	4	61	32.5
6908 Paper Products Mfg.	24,555,960	60	48.9	37.3	62.9	4.6	9	57	32.8
3402 Machine Shops	219,757,227	251	22.8	20.1	25.9	2.1	59	8	33.3
5103 Foundries, NOC	24,921,130	59	47.3	36.0	61.1	4.4	11	58	34.5
0102 Concrete Construction	38,232,096	64	33.5	25.8	42.8	3.1	23	50	36.5
0301 Landscaping	67,457,555	87	25.8	20.7	31.8	2.4	44	36	40.0
1002 Sawmills	46,261,695	68	29.4	22.8	37.3	2.8	33	48	40.3
0306 Plumbing	95,520,364	113	23.7	19.5	28.4	2.2	53	28	40.3
5307 State Government Manual Labor	189,519,273	197	20.8	18.0	23.9	2.0	71	10	40.5
2905 Furniture/Casket Mfg.	20,281,477	46	45.4	33.2	60.5	4.3	12	70	40.8
5209 Boilermaking	41,375,841	62	30.0	23.0	38.4	2.8	30	52	40.8
0513 Interior Finish Carpentry	56,694,483	76	26.8	21.1	33.6	2.5	41	43	42.0
0101 Road Construction	105,726,705	120	22.7	18.8	27.1	2.1	61	25	43.0
3708 Textile Mfg.	43,120,692	61	28.3	21.6	36.3	2.7	36	54	45.0
0601 Electrical Wiring	144,539,300	150	20.8	17.6	24.4	1.9	72	19	45.5
0105 Fence Erection	7,309,118	24	65.7	42.1	97.7	6.2	3	117	60.0
3905 Restaurants	1,592,192,021	698	8.8	8.1	9.4	0.8	134	1	67.5
0524 Wallboard Installation - Discounted	3,194,735	20	125.2	76.4	193.4	11.7	1	136	68.3
4904 Clerical Office, NOC	3,117,822,728	604	3.9	3.6	4.2	0.4	160	2	81.0

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis



**Table 43. State Fund Claims for Carpal Tunnel Syndrome 1990-1998. Top 25 WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
3304 Meat Dealers Wholesale	81,167,764	443	109.2	99.2	119.8	4.5	9	11	10.0
6402 Supermarkets	260,483,458	894	68.6	64.2	73.3	2.8	31	5	18.0
6501 Barber Shops	114,054,477	418	73.3	66.4	80.7	3.0	26	12	19.0
2903 Wood Products Mfg.	114,642,084	399	69.6	62.9	76.8	2.9	30	13	21.5
1002 Sawmills	46,261,695	202	87.3	75.7	100.2	3.6	16	33	24.5
3510 Plastic Products Manufacturing	95,273,772	322	67.6	60.4	75.4	2.8	32	19	25.5
4301 Meat Products Mfg.	21,057,070	117	111.1	91.9	133.2	4.6	8	52	29.8
5001 Logging	36,757,688	157	85.4	72.6	99.9	3.5	18	44	31.0
3708 Textile Mfg.	43,120,692	160	74.2	63.2	86.6	3.1	25	41	33.0
0510 Wood Frame Bldg. Construction	194,531,508	499	51.3	46.9	56.0	2.1	58	9	33.5
0515 Wallboard Installation	17,974,290	104	115.7	94.5	140.2	4.8	7	62	34.3
3802 Clothing Mfg.	96,780,338	275	56.8	50.3	64.0	2.3	48	22	35.0
0518 Building Construction NOC	87,932,579	260	59.1	52.2	66.8	2.4	46	26	36.0
3404 Aluminum Product Mfg.	139,393,657	359	51.5	46.3	57.1	2.1	57	16	36.5
0507 Roofing	30,718,052	114	74.2	61.2	89.2	3.1	24	54	39.0
6908 Paper Products Mfg.	24,555,960	104	84.7	69.2	102.6	3.5	19	62	40.3
3402 Machine Shops	219,757,227	456	41.5	37.8	45.5	1.7	72	10	41.0
4902 State Government - Clerical	554,190,312	1,063	38.4	36.1	40.7	1.6	79	3	41.0
4002 Creameries	10,655,091	78	146.4	115.7	182.7	6.0	5	80	42.5
7204 Preferred Workers	17,941,424	86	95.9	76.7	118.4	3.9	11	75	42.8
3906 Bakeries Wholesale NOC	35,872,084	117	65.2	53.9	78.2	2.7	34	52	42.8
0504 Painting	75,277,953	201	53.4	46.3	61.3	2.2	53	35	43.8
5209 Boilermaking	41,375,841	126	60.9	50.7	72.5	2.5	43	50	46.5
2907 Cabinet/Countertop Mfg.	59,498,695	159	53.4	45.5	62.4	2.2	52	42	47.0
0302 Masonry Construction	20,832,640	86	82.6	66.0	102.0	3.4	20	75	47.3
3905 Restaurants	1,592,192,021	1,818	22.8	21.8	23.9	0.9	150	2	76.0
0109 Reinforcing Steel Installation	1,170,742	24	410.0	262.6	610.1	16.9	1	159	79.8
4904 Clerical Office, NOC	3,117,822,728	2,451	15.7	15.1	16.4	0.6	176	1	88.5
1005 Shake Mills	1,673,631	18	215.1	127.4	340.0	8.8	2	176	88.8
7119 Temp. Help-Vehicle Operation	1,238,666	10	161.5	77.3	297.0	6.6	3	207	104.8

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 44. Self-Insured (Compensable) Non-Traumatic Soft Tissue Disorders in the Neck, Back, and Upper Extremity 1992-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
1101 Parcel Package Delivery	73,092,027	2,992	818.7	789.6	848.6	5.0	5	5	5.0
1404 Bus Companies	48,664,338	1,347	553.6	524.4	584.0	3.4	9	9	9.0
6802 Airlines, Ground Crew	31,811,223	1,233	775.2	732.5	819.7	4.7	6	13	9.5
1102 Trucking, NOC	45,490,367	1,196	525.8	496.4	556.5	3.2	10	15	12.5
6104 Schools, All Other Employees	188,859,036	3,709	392.8	380.2	405.6	2.4	21	4	12.5
2102 Warehouses, NOC	76,012,466	1,595	419.7	399.3	440.8	2.6	18	8	13.0
0803 Cities-All Other Employees, NOC	91,647,031	1,884	411.1	392.8	430.1	2.5	20	7	13.5
6801 Airlines, Flight Crew	17,161,635	653	761.0	703.7	821.7	4.7	7	24	15.5
7104 Temp. Help Admin. Staff	2,314,502	398	3439.2	3109.5	3794.3	21.0	1	32	16.5
6407 Wholesale Stores, NOC	40,646,747	930	457.6	428.7	488.0	2.8	13	21	17.0
6402 Supermarkets	293,590,816	4,243	289.0	280.4	297.9	1.8	35	3	19.0
4103 Newspaper Publishing	9,870,767	301	609.9	542.9	682.8	3.7	8	37	22.5
6602 Janitorial Service	19,479,680	426	437.4	396.8	481.0	2.7	15	30	22.5
1405 Ambulance Service	5,212,389	236	905.5	793.7	1028.7	5.5	4	44	24.0
1802 Aluminum Smelting	73,776,289	1,105	299.6	282.1	317.8	1.8	32	16	24.0
6904 Fire Fighters	31,946,238	549	343.7	315.5	373.7	2.1	24	25	24.5
3404 Aluminum Product Mfg.	47,990,329	728	303.4	281.8	326.3	1.9	29	22	25.5
3906 Bakeries Wholesale NOC	34,956,145	528	302.1	276.9	329.0	1.8	30	27	28.5
3606 Boat Building or Repair NOC	10,234,820	227	443.6	387.7	505.2	2.7	14	45	29.5
1303 Telephone Co. - All Other Employees	32,202,242	483	300.0	273.8	328.0	1.8	31	28	29.5
6108 Nursing Homes	92,424,923	1,234	267.0	252.3	282.4	1.6	48	12	30.0
6105 Hospitals	692,191,371	7,700	222.5	217.5	227.5	1.4	59	1	30.0
4002 Creameries	16,136,530	294	364.4	323.9	408.5	2.2	23	38	30.5
2104 Fruit & Vegetable Packing	24,953,683	390	312.6	282.3	345.2	1.9	28	33	30.5
1301 Electric Power Plants	49,996,985	702	280.8	260.4	302.4	1.7	40	23	31.5
2105 Beer Distributors	1,691,544	120	1418.8	1176.3	1696.6	8.7	2	65	33.5
3501 Brick Or Clay Product Mfg., NOC	2,094,581	122	1164.9	967.4	1390.9	7.1	3	64	33.5
3403 Aircraft Mfg.	1,206,533,696	7,197	119.3	116.6	122.1	0.7	93	2	47.5

\*Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 45. Self-Insured (Compensable) Non-Traumatic Soft Tissue Disorders in the Neck 1992-1998. WICs by Prevention Index**

WIC DESCRIPTION	HOURS*	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
1404 Bus Companies	48,664,338	65	26.7	20.6	34.0	5.3	3	6	4.5
1101 Parcel Package Delivery	73,092,027	83	22.7	18.1	28.2	4.5	4	5	4.5
6104 Schools, All Other Employees	188,859,036	96	10.2	8.2	12.4	2.0	16	4	10.0
6802 Airlines, Ground Crew	31,811,223	32	20.1	13.8	28.4	4.0	7	14	10.5
0803 Cities-All Other Employees, NOC	91,647,031	51	11.1	8.3	14.6	2.2	13	8	10.5
6801 Airlines, Flight Crew	17,161,635	27	31.5	20.7	45.8	6.2	2	20	11.0
2102 Warehouses, NOC	76,012,466	46	12.1	8.9	16.1	2.4	12	11	11.5
6105 Hospitals	692,191,371	286	8.3	7.3	9.3	1.6	22	1	11.5
6904 Fire Fighters	31,946,238	28	17.5	11.6	25.3	3.5	8	17	12.3
1102 Trucking, NOC	45,490,367	28	12.3	8.2	17.8	2.4	11	17	13.8
6402 Supermarkets	293,590,816	100	6.8	5.5	8.3	1.3	25	3	14.0
6407 Wholesale Stores, NOC	40,646,747	27	13.3	8.8	19.3	2.6	9	20	14.5
1501 Counties-All Other Employees, NOC	111,125,403	47	8.5	6.2	11.2	1.7	20	10	14.8
7104 Temp. Help Admin. Staff	2,314,502	15	129.6	72.5	213.8	25.7	1	30	15.5
3403 Aircraft Mfg.	1,206,533,696	261	4.3	3.8	4.9	0.9	31	2	16.5
6108 Nursing Homes	92,424,923	39	8.4	6.0	11.5	1.7	21	13	16.8
6304 Department Stores	234,788,225	59	5.0	3.8	6.5	1.0	29	7	18.0
2401 Pulp Or Paper Mfg.	127,939,668	39	6.1	4.3	8.3	1.2	27	13	19.8
4103 Newspaper Publishing	9,870,767	11	22.3	11.1	39.9	4.4	5	36	20.3
1802 Aluminum Smelting	73,776,289	28	7.6	5.0	11.0	1.5	24	17	20.3
3404 Aluminum Product Mfg.	47,990,329	21	8.8	5.4	13.4	1.7	18	24	20.8
4305 Garbage Collection	9,413,297	10	21.2	10.2	39.1	4.2	6	38	21.8
6602 Janitorial Service	19,479,680	12	12.3	6.4	21.5	2.4	10	34	21.8
3906 Bakeries Wholesale NOC	34,956,145	16	9.2	5.2	14.9	1.8	17	29	22.8
6103 Schools, Professional Staff	828,440,403	47	1.1	0.8	1.5	0.2	36	10	22.8

\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Table 46. Self-Insured (Compensable) Non-Traumatic Soft Tissue Disorders in the Back 1992-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
1101 Parcel Package Delivery	73,092,027	1,861	509.2	486.3	532.9	6.0	4	5	4.5
6802 Airlines, Ground Crew	31,811,223	691	434.4	402.6	468.1	5.1	6	12	9.0
1102 Trucking, NOC	45,490,367	729	320.5	297.7	344.6	3.7	9	10	9.5
2102 Warehouses, NOC	76,012,466	980	257.9	242.0	274.5	3.0	16	8	12.0
6104 Schools, All Other Employees	188,859,036	2,029	214.9	205.6	224.4	2.5	20	4	12.0
0803 Cities-All Other Employees, NOC	91,647,031	1,110	242.2	228.2	256.9	2.8	18	7	12.5
6407 Wholesale Stores, NOC	40,646,747	555	273.1	250.8	296.8	3.2	12	16	14.0
6801 Airlines, Flight Crew	17,161,635	285	332.1	294.7	373.0	3.9	7	25	16.0
1404 Bus Companies	48,664,338	594	244.1	224.9	264.6	2.9	17	15	16.0
7104 Temp. Help Admin. Staff	2,314,502	162	1399.9	1192.6	1632.8	16.4	1	35	18.0
6108 Nursing Homes	92,424,923	793	171.6	159.9	184.0	2.0	27	9	18.0
1405 Ambulance Service	5,212,389	169	648.5	554.4	753.9	7.6	3	34	18.3
6602 Janitorial Service	19,479,680	255	261.8	230.7	296.0	3.1	13	26	19.5
6402 Supermarkets	293,590,816	2,048	139.5	133.5	145.7	1.6	38	3	20.5
6904 Fire Fighters	31,946,238	344	215.4	193.2	239.4	2.5	19	23	21.0
6105 Hospitals	692,191,371	4,495	129.9	126.1	133.7	1.5	46	1	23.5
4103 Newspaper Publishing	9,870,767	148	299.9	253.5	352.3	3.5	11	38	24.3
1301 Electric Power Plants	49,996,985	394	157.6	142.4	174.0	1.8	32	21	26.5
1802 Aluminum Smelting	73,776,289	541	146.7	134.6	159.6	1.7	36	18	27.0
2105 Beer Distributors	1,691,544	75	886.8	697.5	1111.6	10.4	2	57	29.3
1501 Counties-All Other Employees NOC	111,125,403	672	120.9	112.0	130.4	1.4	49	13	31.0
4002 Creameries	16,136,530	148	183.4	155.1	215.5	2.1	26	38	31.8
1002 Sawmills	70,372,221	461	131.0	119.3	143.5	1.5	45	20	32.5
3404 Aluminum Product Mfg.	47,990,329	322	134.2	119.9	149.7	1.6	42	24	33.0
2104 Fruit & Vegetable Packing	24,953,683	183	146.7	126.2	169.5	1.7	35	32	33.5
3403 Aircraft Mfg.	1,206,533,696	3,334	55.3	53.4	57.2	0.6	87	2	44.5

\* Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

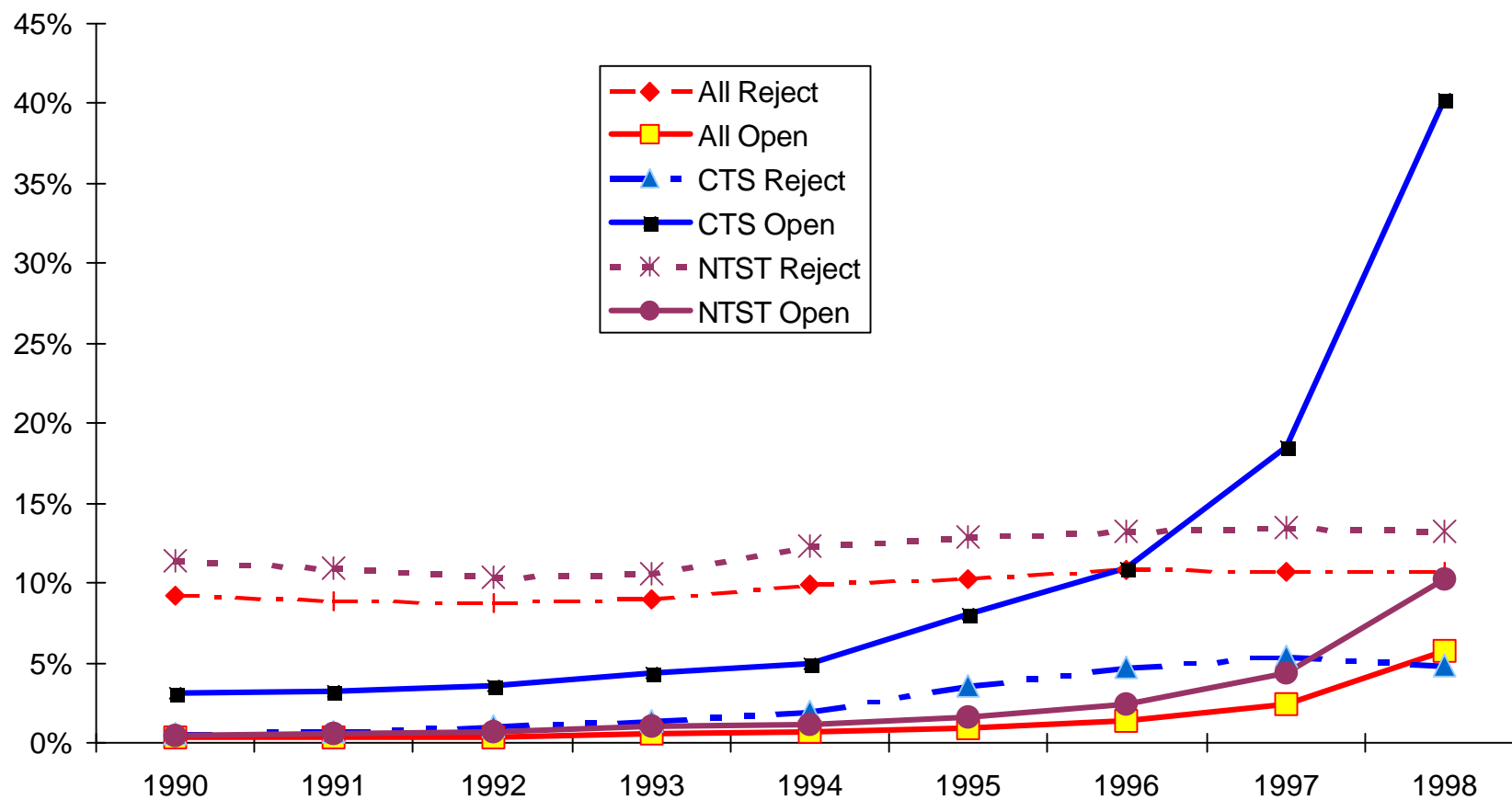
**Table 47. Self-Insured (Compensable) Non-Traumatic Soft Tissue Disorders in the Upper Extremity 1992-1998. WICs by Prevention Index\***

WIC DESCRIPTION	HOURS**	COUNT	RATE	LOW95	UPP95	RATE RATIO	RATE RANK	COUNT RANK	PREV INDEX
1101 Parcel Package Delivery	73,092,027	786	215.1	200.3	230.6	3.8	7	5	6.0
1404 Bus Companies	48,664,338	516	212.1	194.2	231.2	3.8	8	9	8.5
6802 Airlines, Ground Crew	31,811,223	364	228.9	205.9	253.6	4.1	5	15	10.0
7104 Temp. Help Admin. Staff	2,314,502	175	1512.2	1296.4	1753.6	27.0	1	29	15.0
6801 Airlines, Flight Crew	17,161,635	201	234.2	203.0	269.0	4.2	4	28	16.0
6104 Schools, All Other Employees	188,859,036	1,135	120.2	113.3	127.4	2.1	31	4	17.5
6402 Supermarkets	293,590,816	1,718	117.0	111.6	122.7	2.1	35	3	19.0
3404 Aluminum Product Mfg.	47,990,329	327	136.3	121.9	151.9	2.4	22	17	19.5
1102 Trucking, NOC	45,490,367	312	137.2	122.4	153.3	2.5	21	20	20.3
0803 Cities-All Other Employees, NOC	91,647,031	544	118.7	108.9	129.1	2.1	34	7	20.5
1802 Aluminum Smelting	73,776,289	443	120.1	109.2	131.8	2.1	32	11	21.5
1303 Telephone Co. - All Other Employees	32,202,242	221	137.3	119.8	156.6	2.5	20	26	23.0
3906 Bakeries Wholesale NOC	34,956,145	233	133.3	116.7	151.6	2.4	25	23	24.0
6407 Wholesale Stores, NOC	40,646,747	268	131.9	116.6	148.6	2.4	26	22	24.0
4103 Newspaper Publishing	9,870,767	108	218.8	179.5	264.2	3.9	6	43	24.5
2102 Warehouses, NOC	76,012,466	424	111.6	101.2	122.7	2.0	38	12	25.0
3606 Boat Building or Repair NOC	10,234,820	107	209.1	171.4	252.7	3.7	9	44	26.5
1002 Sawmills	70,372,221	390	110.8	100.1	122.4	2.0	40	14	27.0
2104 Fruit & Vegetables Packing	24,953,683	161	129.0	109.9	150.6	2.3	27	30	28.5
4002 Creameries	16,136,530	114	141.3	116.5	169.7	2.5	19	39	28.8
2401 Pulp or Paper Mfg.	127,939,668	541	84.6	77.6	92.0	1.5	50	8	29.0
3501 Brick or Clay Product Mfg. NOC	2,094,581	60	572.9	437.2	737.5	10.2	2	57	29.5
4301 Meat Products Mfg.	23,421,019	149	127.2	107.6	149.4	2.3	28	32	30.0
3605 Truck Mfg.	11,626,685	93	160.0	129.1	196.0	2.9	14	47	30.5
4305 Garbage Collection	9,413,297	77	163.6	129.1	204.5	2.9	12	50	31.0
6105 Hospitals	692,191,371	2,108	60.9	58.3	63.6	1.1	65	2	33.5
2105 Beer Distributors	1,691,544	34	402.0	278.4	561.8	7.2	3	71	37.0
3403 Aircraft Mfg.	1,206,533,696	2,857	47.4	45.6	49.1	0.8	77	1	39.0

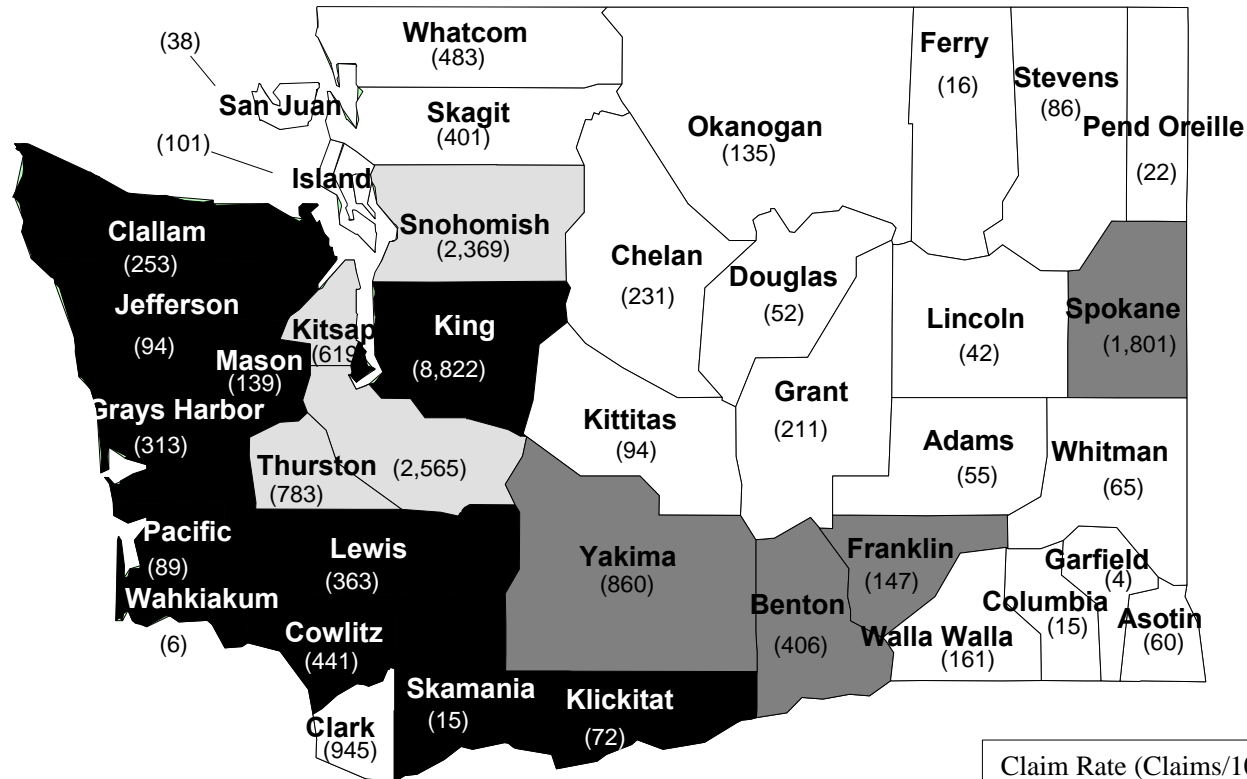
\* Below the line and highlighted in grey are risk classes that were in the top three by rate or count that were not in the top 25 based by prevention index

\*\* Risk classes that had less than 100,000 hours per year were excluded from the analysis

**Figure 1. State Fund Claims: Percent Rejected or Still Open, 1990-1998** (10/99 extract)



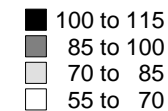
**Figure 2. Combined State Fund and Self-Insured Compensable Non-Traumatic Soft Tissue Disorder Claims in Washington State. Counts for Counties () and Rates for Eight Areas in 1997\*.**



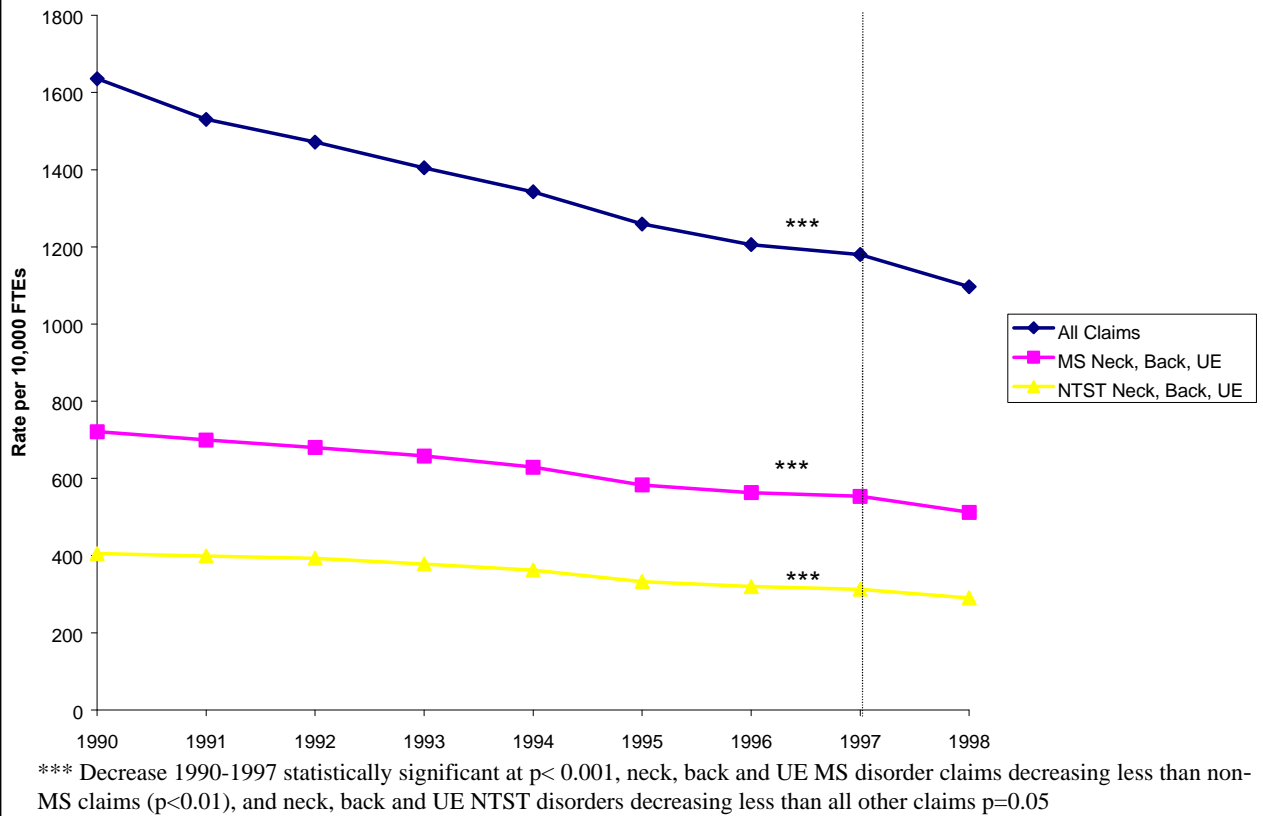
**\*Areas:**

North Sound	West Balance	King County	Other Puget Metro	Clark County	Eastern Balance	Spokane County	Yakima-Tri-Cities
Island San Juan Skagit Whatcom	Balance of Western Washington	King	Kitsap Pierce Snohomish Thurston	Clark	Balance of Eastern Washington	Spokane	Benton Franklin Yakima

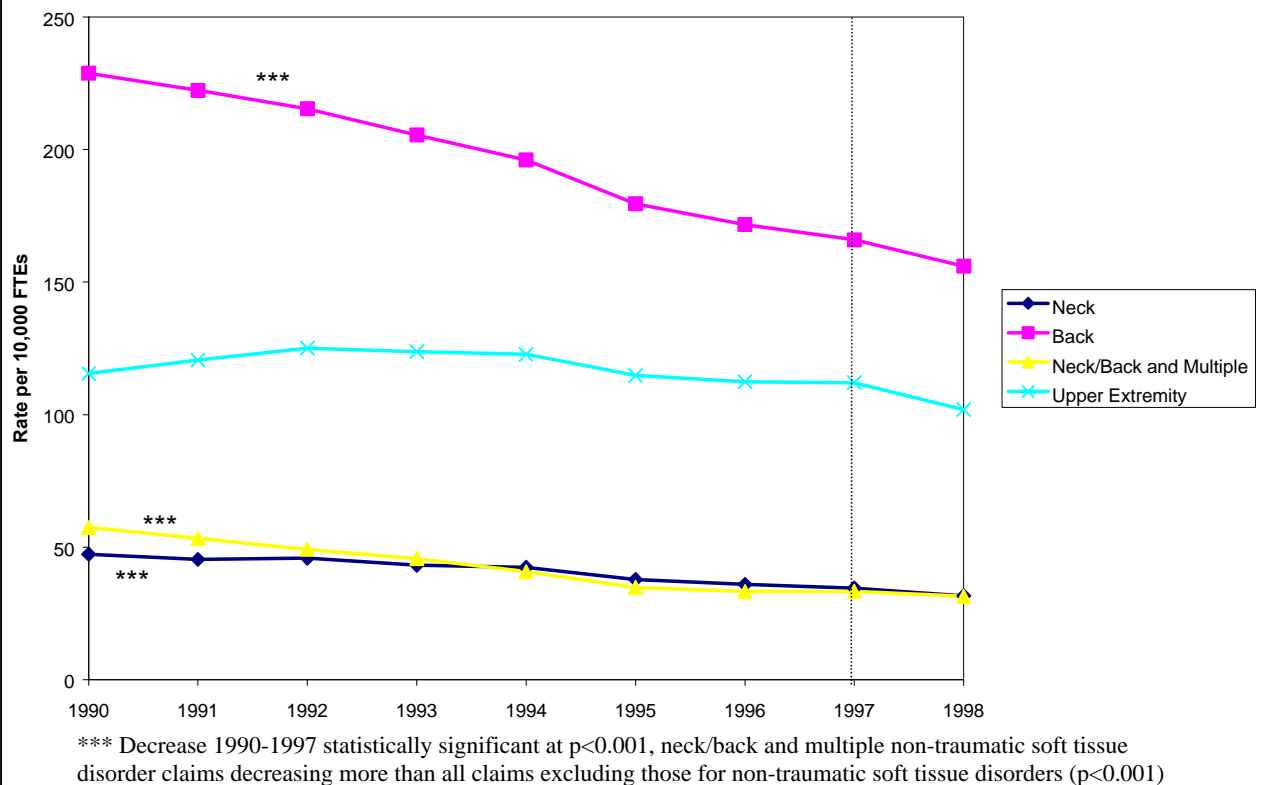
Claim Rate (Claims/10,000 Worker-yr)  
Based on 1998 WA State Population Survey



**Figure 3. Washington State Fund Claims Incidence Rates 1990-1998**

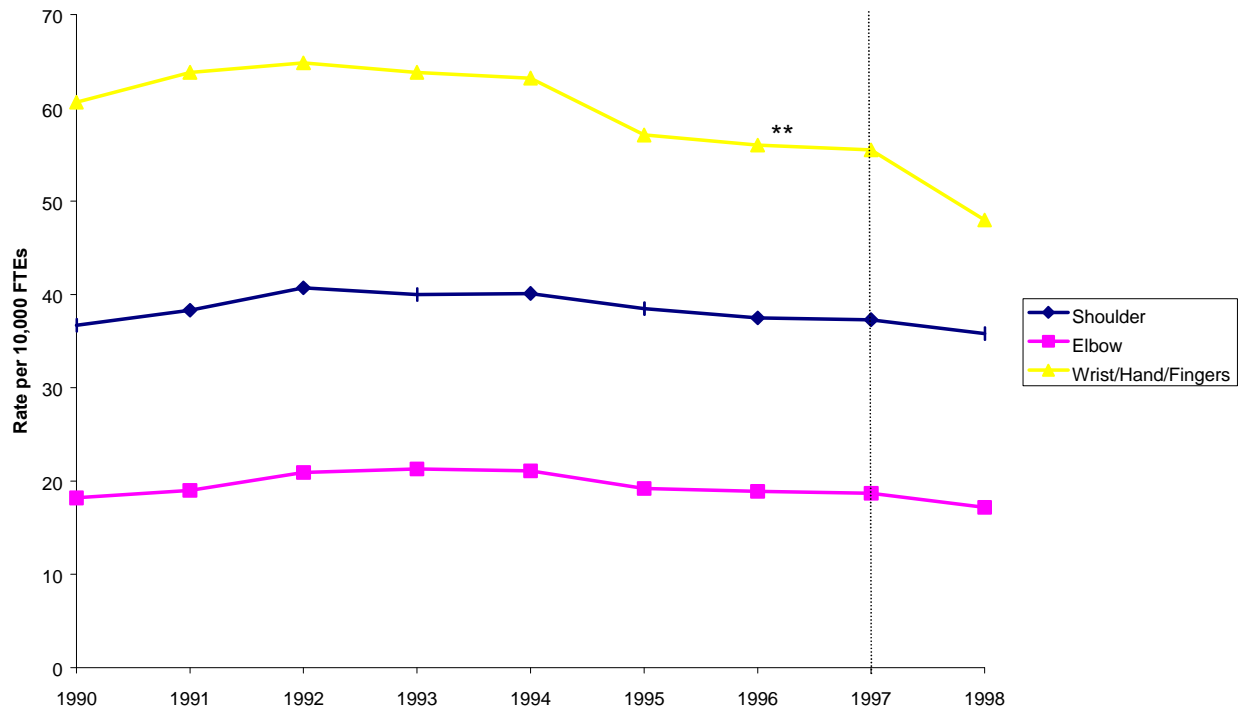


**Figure 4. Washington State Fund Claims Incidence Rates for Non-Traumatic Soft Tissue Disorders 1990-1998**



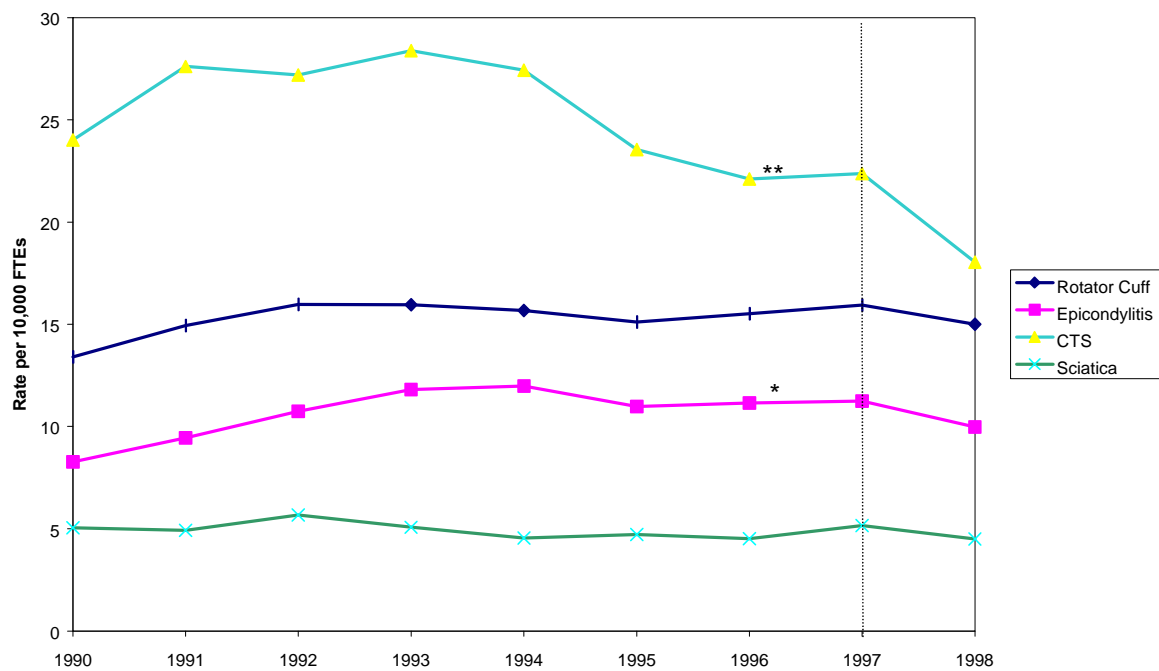


**Figure 5. Washington State Fund Claims Incidence Rates for Non-Traumatic Soft Tissue Disorders 1990-1998**



\*\* Decrease 1990-1997 statistically significant at  $p < 0.01$ , wrist/hand/finger non-traumatic soft tissue disorder claims decreasing statistically significantly less than all claims excluding those for non-traumatic soft tissue disorders ( $p < 0.001$ )

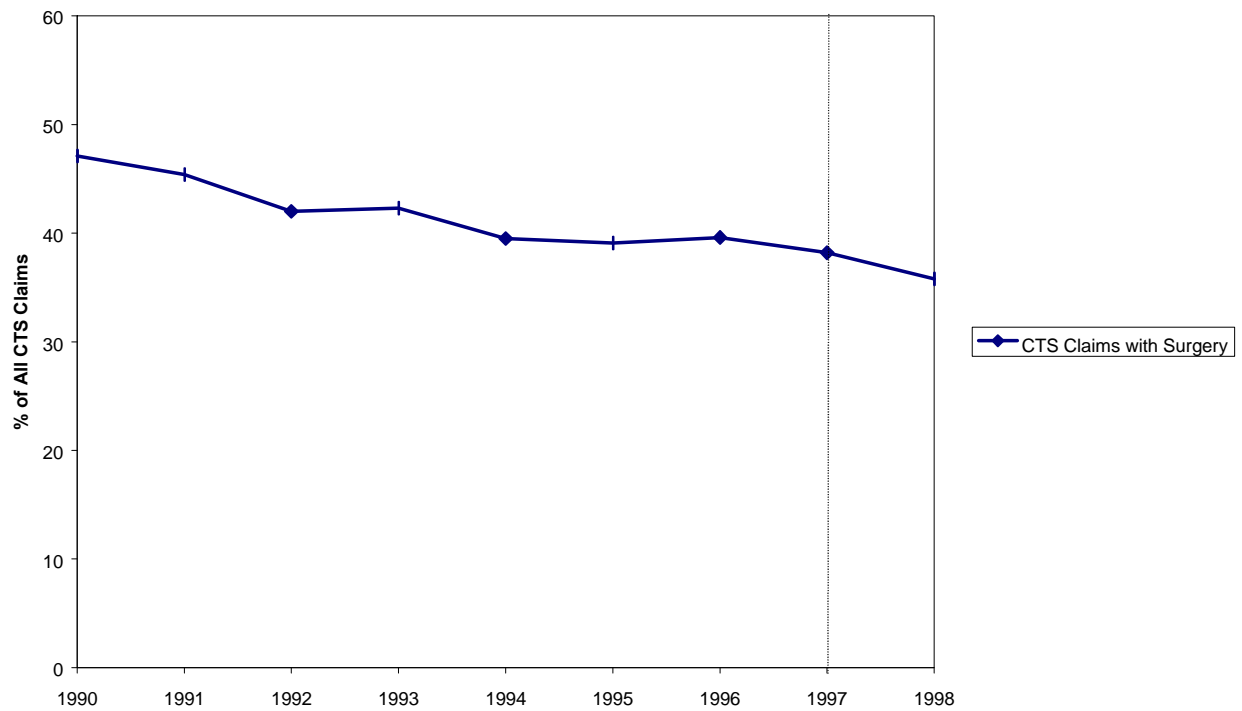
**Figure 6. Washington State Fund Claims Incidence Rates for Specific Musculoskeletal Disorders in 1990-1998**



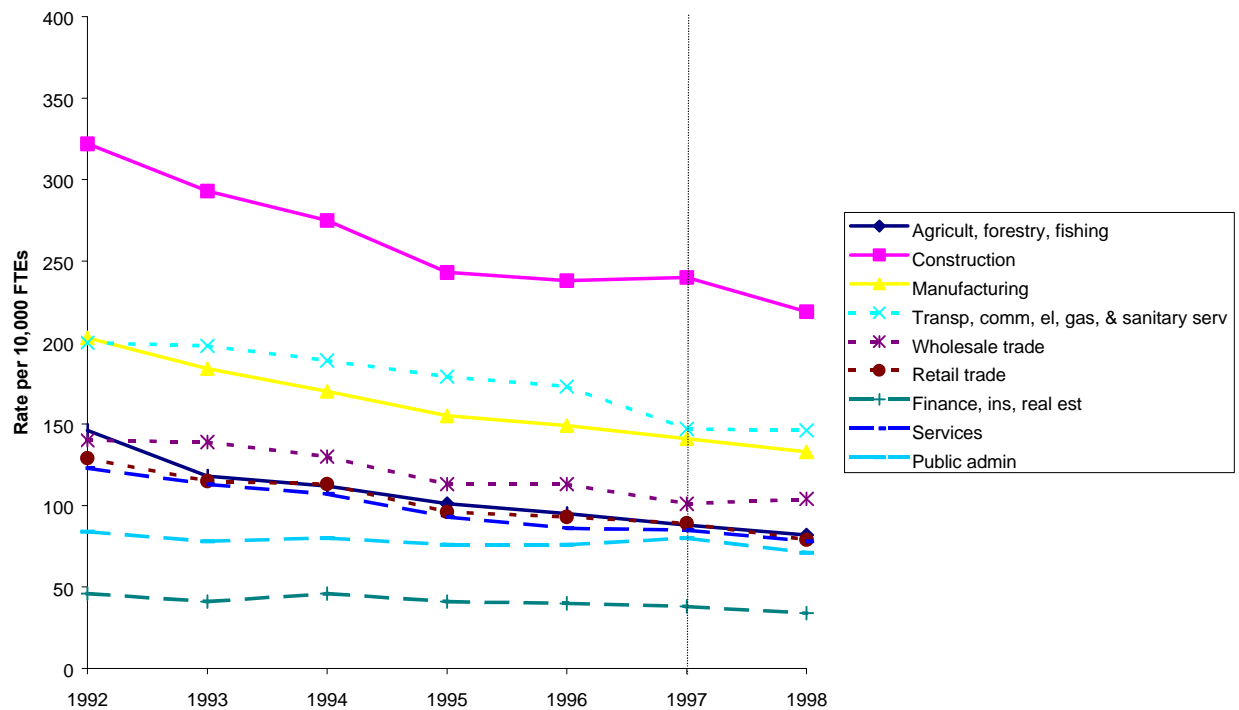
\*\* Decrease 1990-1997 statistically significant at  $p < 0.01$ , CTS decreasing statistically significantly less than all claims excluding those for non-traumatic soft tissue disorders ( $p < 0.001$ ).

\* Increase statistically significant at  $p < 0.05$ .

**Figure 7. Percent of State Fund Carpal Tunnel Syndrome Claims Resulting in Surgery, 1990-1998**



**Figure 8. State Fund Compensable Non-Traumatic Soft Tissue Disorder Claims Incidence Rates by 1-Digit SICs. 1992-1998**



**Figure 9. Self-Insured Compensable Non-Traumatic Soft Tissue Disorder Claims Incidence Rates by 1-Digit SICs. 1992-1998**

