



# Carpal Tunnel Claims Rank Second Among Major Lost Time Diagnoses

Recent analysis conducted by NCCI confirms that carpal tunnel syndrome (CTS) injuries continue to account for a relatively modest 2% of total lost time claims. Moreover, it appears that along with virtually all injury types, the frequency of CTS claims has fallen over the past decade (Exhibit 1).

It may seem surprising, therefore, that CTS actually ranks second behind back injuries as the leading lost-time diagnosis. Moreover, in terms of the total costs of all claims and lost time claims CTS also ranks second. Compared with back strain cases, CTS claimants are more likely to be higher paid.

As a result, the severity of CTS claims is greater than that of back strain cases. CTS claimants also tend to be older, and their severity tends to rise with age. As the workforce ages over the coming decades, these findings suggest that insurance companies and employers need to carefully monitor some of the financial and demographic characteristics of CTS injuries.

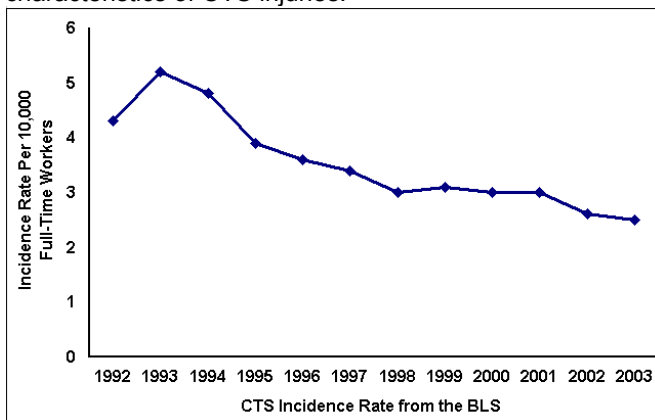


Exhibit 1. The Frequency of CTS Injuries as Measured by the Bureau of Labor Statistics Has Fallen Steadily Since the Early 1990s.

NCCI examined the implications and workplace effect of CTS over the six years from 1996–2001. The results in the current study are consistent with results of an analysis of repetitive stress injuries, including CTS,

conducted in 2001 based on NCCI’s Detailed Claims Information (DCI). Both studies determined that CTS claims account for only a small portion (under 2%) of total lost-time claims. This is also comparable to results from the early 1990s as reported in another NCCI study from 1996. The current study also indicates that CTS claims account for just over 4% of total claims costs. Nevertheless, CTS ranks second in terms of total incurred losses. (See Table 2 for details.)

### Overview

Based on the data underlying this study,<sup>1</sup> CTS ranks second behind lumbar disc displacement in terms of total loss costs, with just under \$1 billion incurred for CTS claims 18 months after the injury. (This is just behind the \$1.4 billion incurred at 18 months for lumbar disc displacement.) See Table 2 for details.

To gain a better understanding into the significance of CTS claims, NCCI compared their characteristics with those of back strain cases and found major differences. For example:

- CTS cases are more likely to result in lost-time claims compared with back injuries.
- Women suffer relatively more CTS injuries while men incur more back injuries.
- Workers suffering CTS injuries are more likely to be higher paid than workers incurring back injuries.
- Compared with back strain cases, CTS claimants tend to be older (over 35).

NCCI also examined the severity of CTS claims by age group.

- As it did for most diagnosis categories, indemnity and total severity of lost-time CTS claims rose with each age group until age 65 and over when it fell (likely reflecting offset provisions in most state workers compensation laws regarding indemnity payments and the likely decline in average weekly wages as people over 65 take part-time jobs). See Exhibits 5 and 6.

<sup>1</sup> Based on data licensed to NCCI by insurers for purposes of this study covering losses reported from over 5.5 million claims over the six years from 1996–2001.

- In contrast, medical severity of CTS claims continued to increase for those 65 and over for both lost-time claims and medical-only claims, but the increase was particularly significant for medical-only claims. See Exhibits 4 and 7.

Since CTS claimants tend to be older, CTS injuries could become even more prevalent as the workforce ages over the coming decades.

Conventional wisdom sometimes assumes that CTS is confined to clerical positions. However, in examining the data by occupational class, this study found that employees in manufacturing positions also experience significant CTS syndrome injuries; in fact, these are more severe, possibly due to more surgery.

NCCI also looked at the impact of attorney involvement on CTS claim severity and found that the involvement of attorneys has a more pronounced impact on indemnity than medical.

The following offers a detailed overview of the points made above along with a broad examination of the costs and market impact of CTS injuries.

**Carpal Tunnel is a Leading Lost-Time Diagnosis, but Sprains, Cuts, and Wounds dominate the Top 10 for Medical Only**

Carpal Tunnel Syndrome is a leading diagnosis among injuries resulting in lost time. Exhibit 2 contains the frequency ranks by age for the top 10 lost time diagnosis codes for all ages.<sup>2</sup> CTS ranks first overall for all ages and ranks in the top 5 for all but the youngest workers.

Broken down by age category for lost time claims, CTS:

- Ranks ninth for ages 16–24
- Ranks third in the 25–34 age group
- Ranks first for ages 35–64
- Ranks second for 65 and over

Back injuries account for five of the top 10 most common lost-time injuries. As a group, back injuries rank as the leading category of workplace injury.

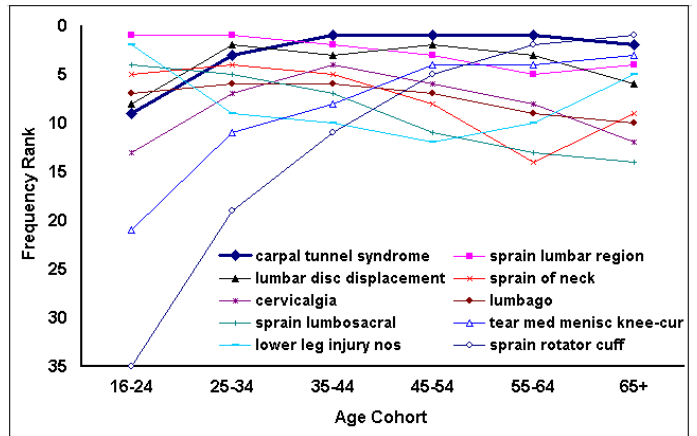


Exhibit 2. Lost-Time Frequency Ranks by Age for the Top 10 Diagnosis Codes

**Medical-Only Claims**

In contrast to a prominent position in lost-time claims, CTS is not among the leading diagnosis codes for medical-only claims. Exhibit 3 tracks the frequency rank by age for CTS and for the top 10 medical only diagnosis codes for all ages. Over every age group CTS ranks well down the list at 22nd (See Table 1).

By age category for medical-only claims, CTS:

- Ranks 46th for ages 16–24
- Ranks 24th in the 25–34 age group,
- Ranks 15th for ages 35–44
- Ranks 8th for those aged 45–54
- Ranks 15th for 55–64
- Ranks 30th for 65 and over.

Six categories of sprain, including two back injuries, appear in the top 10. The leading categories are open wounds to the fingers and sprain of the lumbar region.

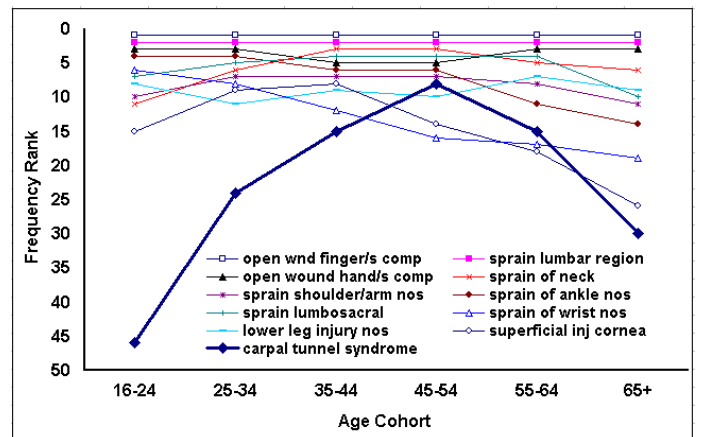


Exhibit 3. Medical-Only Frequency Ranks by Age for CTS and for the Top 10 Diagnosis Codes

<sup>2</sup> The glossary contains descriptions of the diagnosis codes included in the graphs and tables in this report.

Diagnosis	Claims Rank	Total Severity	Total Severity Rank	Indemnity Severity	Indemnity Severity Rank	Medical Severity	Medical Severity Rank
<b>Lost-Time Claims</b>							
ALL	.	18,488		9,770		8,718	
CARPAL TUNNEL SYNDROME	1	20,405	5	11,329	5	9,077	5
SPRAIN LUMBAR REGION	2	8,358	9	4,693	9	3,665	9
LUMBAR DISC DISPLACEMENT	3	37,178	1	21,679	1	15,500	1
SPRAIN OF NECK	4	12,288	8	6,763	8	5,525	8
CERVICALGIA	5	28,526	3	16,282	3	12,244	3
LUMBAGO	6	14,993	6	8,516	6	6,477	6
SPRAIN LUMBOSACRAL	7	7,773	10	4,436	10	3,337	10
TEAR MED MENISC KNEE-CUR	8	22,529	4	11,409	4	11,120	4
LOWER LEG INJURY NOS	9	13,236	7	7,171	7	6,065	7
SPRAIN ROTATOR CUFF	10	32,635	2	17,880	2	14,755	2
<b>Medical-Only Claims</b>							
ALL	.	516		-	-	516	
OPEN WND FINGER/S COMP	1	266	10	-	-	266	10
SPRAIN LUMBAR REGION	2	555	4	-	-	555	4
OPEN WOUND HAND/S COMP	3	278	9	-	-	278	9
SPRAIN OF ANKLE NOS	4	402	8	-	-	402	8
SPRAIN LUMBOSACRAL	5	557	3	-	-	557	3
SPRAIN OF NECK	6	772	2	-	-	772	2
SPRAIN SHOULDER/ARM NOS	7	511	5	-	-	511	5
LOWER LEG INJURY NOS	8	499	6	-	-	499	6
SPRAIN OF WRIST NOS	9	415	7	-	-	415	7
SUPERFICIAL INJ CORNEA	10	206	11	-	-	206	11
CARPAL TUNNEL SYNDROME	22	1,425	1	-	-	1,425	1

Table 1. Incurred Severity of High Frequency Injuries<sup>3</sup> 18 Months After Injury Date

**The Severity of Medical-Only Claims Costs**

The impact of claims on total loss costs reflects the combined impact of frequency and severity of claims costs. The analysis below examines the severity of claims and looks at the impact of major claim categories on total loss costs.

CTS medical-only claims are much more severe, and the severity increases dramatically with age when compared with the top 10 medical-only claims ranked by frequency. Exhibit 4 contains the average total incurred severity at 18 months for the top 10 medical-only diagnosis codes for all ages plus CTS.

The severity for CTS is higher than the others for all age groups (and also rises for each age group). Exhibit 4 shows that CTS average total incurred severity at 18 months is about \$1000 for claimants 16-24 where it is a low ranking injury type. But it rises 60% to \$1,670 for the 45-54 age cohort, where CTS falls in the top 10 most common injury categories. Severity continues to rise to over \$1,800 for those 65 and older.

CTS claims are relatively expensive. The average total incurred at 18 months for CTS medical-only claims for all age groups was \$1,425, compared to \$516 for all medical-only claims. (See Table 1.)

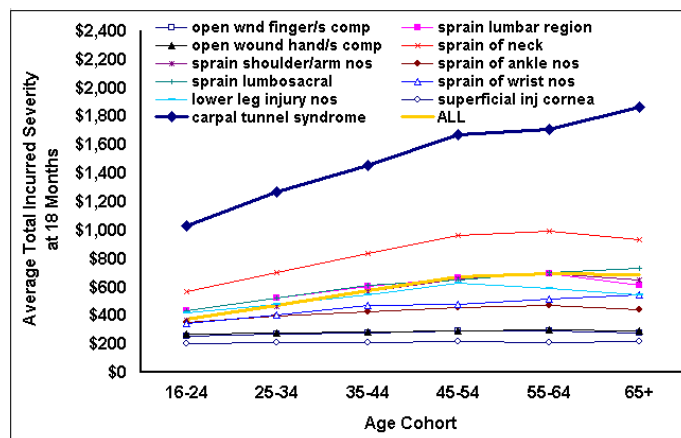


Exhibit 4. Average Total Incurred Severity at 18 Months for the Top 10 Medical-Only Diagnosis Codes Plus CTS.

<sup>3</sup> Looking at severity rankings alone is not particularly informative because many of the highest-ranking severities are for injury types with such low frequency that they are not significant in terms of total claims costs.

### The Severity of Lost-Time Claims Costs

On average for all age groups, the average total incurred cost at 18 months for lost-time CTS claims is \$20,405 compared to \$1,425 (discussed above for medical-only CTS claims). Average total incurred severity at 18 months for CTS is also 10% higher than the average for all lost-time claims. Among the top 10 lost time codes ranked by frequency, the average total incurred cost at 18 months for CTS claims ranks fifth highest. (See Table 1).

Exhibit 5 contains the average total incurred severity at 18 months for the top 10 lost time diagnosis codes for all ages. CTS severity is typical of the leading injury categories; it rose for all age categories except over 65 where it fell slightly. The graph shows that CTS average total incurred severity at 18 months is just over \$15,000 for claimants 16–24 but rises to over \$22,700 for those 55 to 64.

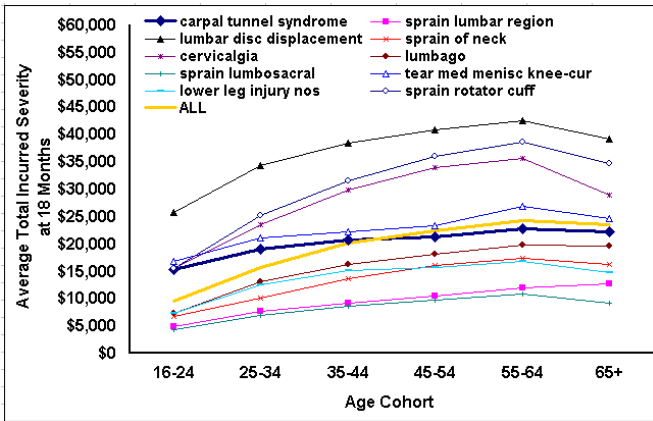


Exhibit 5. Average Total Incurred Severity at 18 Months for the Top 10 Lost-Time Diagnosis Codes

Looking at indemnity and medical separately for lost time claims indicates that average indemnity costs for CTS claims rose with every age category until 65 and older, when they fell (Exhibit 6). In contrast, average medical costs continued to rise for every age category, but the growth for the 65 and older age category was not as large as it was for medical-only claims (Exhibit 7).

Exhibits 6 and 7 also show that for lost-time claims, indemnity and medical severities fluctuate between above average and below average, depending on the age category. In general, both indemnity and medical severity is above average for the younger age cohorts. It then becomes about average for the older age cohorts for indemnity and below average for the older age cohorts for medical.

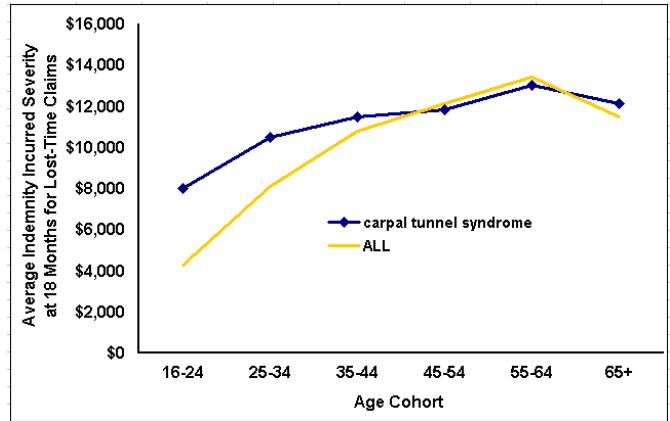


Exhibit 6. Indemnity Severity Fluctuates Between Above Average and Below Average, Depending on the Age Category

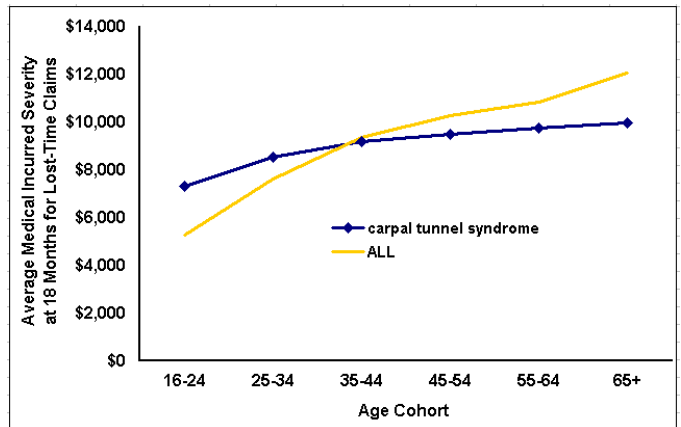


Exhibit 7. Medical Severity Also Fluctuates Between Above Average and Below Average, Depending on the Age Category

**Total Incurred Claims Costs**

The impact of claims on total loss costs reflects the combined impact of frequency and severity of claims costs. The analysis below looks at the impact of major claim diagnosis categories on total loss costs. It includes data for both medical-only and lost-time claims.

As Table 2 shows, due to its relatively low frequency among medical-only claims, CTS ranks 8th among all claim types. But due to the high severity and its prominent rank among lost-time injuries CTS is second to lumbar disc displacement in terms of total incurred claims costs estimated at 18 months. Average incurred severity at 18 months for lost-time and medical-only CTS claims combined is \$12,181.

In general, the top ranking claims in terms of total claims costs achieve their prominence because of high severities rather than high frequencies. For example, back and neck injuries hold six of the top 10 places in terms of total loss costs, but five of these (lumbar disc displacement, cervicalgia, lumbosacral neuritis, cervical disc displacement, and lumbar or lumbosacral intervertebral disc degeneration) rank well below CTS in frequency. The high incurred severities of these injury types, however, place them in the top 10 in terms of total loss costs. Only one of the top 10, sprain of lumbar region, is there due to high frequency. CTS falls in between ranking eighth in terms of frequency but second in terms of total loss costs.

Diagnosis	1996-2000					Rank by	
	# of Claims	Incurred (\$M) at 18 Months	Incurred Severity at 18 Months	% of Claims	% of Incurred \$	Incurred \$ at 18 Months	# of Claims
ALL	4,674,193	22,200	4,853	100.0	100.0	-	-
LUMBAR DISC DISPLACEMENT	48,025	1,391	29,701	1.0	6.3	1	19
CARPAL TUNNEL SYNDROME	82,322	966	12,181	1.8	4.3	2	8
CERVICALGIA	47,757	737	15,762	1.0	3.3	3	20
SPRAIN ROTATOR CUFF	30,585	659	21,907	0.7	3.0	4	31
LUMBOSACRAL NEURITIS NOS	27,613	650	24,081	0.6	2.9	5	36
TEAR MED MENISC KNEE-CUR	28,740	515	18,219	0.6	2.3	6	34
CERV DISC DISPLACEMENT	14,754	475	33,263	0.3	2.1	7	62
SPRAIN LUMBAR REGION	183,031	446	2,479	3.9	2.0	8	3
ROTATOR CUFF SYND NOS	30,398	437	14,671	0.7	2.0	9	32
LUMB/LUMBOSAC DISC DEGEN	16,122	416	26,501	0.3	1.9	10	58

Table 2. Diagnoses Ranked By Total Incurred Claims Costs

**CTS and Back Injuries—Two Leading Diagnoses**

While CTS and back claims are two leading workers compensation claims diagnoses, they have very different characteristics. Exhibit 8 shows that CTS injuries are more likely to result in lost-time claims. For CTS, 60% of claims are lost-time compared with 34% for backs.<sup>4</sup> Similarly, for lost-time claims, a higher share of CTS injuries is permanent partial (47%), compared to back injuries (31%).

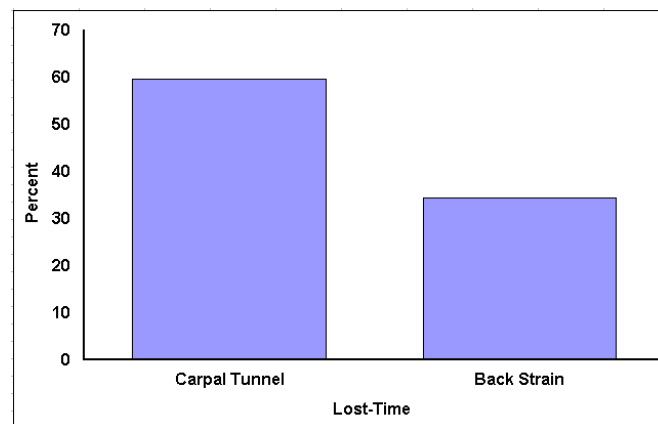
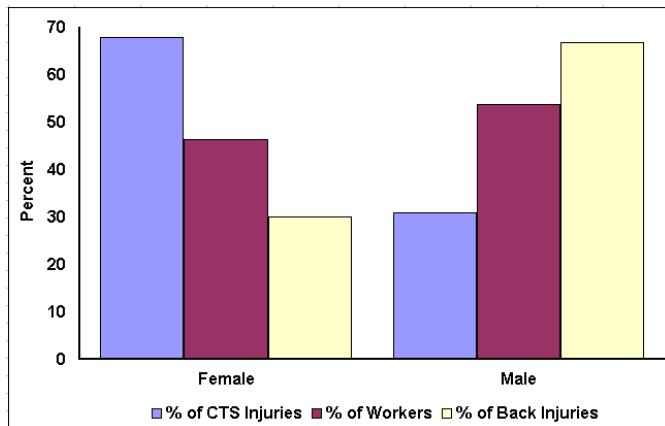


Exhibit 8. CTS Injuries Are More Likely to Result in Lost-Time Claims.

**CTS versus Back Injuries—Gender Differences**

There are statistical gender biases in CTS and back injuries. Women suffer relatively more CTS injuries while men incur more back injuries. As indicated in Exhibit 9, women make up slightly less than half of the workforce but suffer almost 70% of CTS injuries and roughly 30% of



*Exhibit 9. Women Make Up Slightly Less Than Half of the Workforce but Suffer Almost 70% of CTS Injuries and Roughly 30% of Back Injuries*

back injuries. Forecasts from the Bureau of Labor Statistics show that men’s and women’s shares of the workforce are expected to remain about the same through 2012.

CTS injuries are particularly prominent among office and clerical workers. Office and clerical workers account for the largest share of total CTS injuries for both male and female workers. The share of CTS claims accounted for by this occupational class is 17% for females and 5% for males. Similarly, among all injuries incurred by office and clerical workers CTS claims contributed almost 8% of the total for female workers but less than 2% for males. The fact that a greater share of office and clerical workers are women while men hold a greater share of manufacturing jobs undoubtedly accounts for much of the difference between genders in the relative share of CTS and back injuries.

Other top occupational classes include those in manufacturing and retail trade. Table 3 displays the top 10 occupational classes for CTS injuries by gender.

<sup>4</sup> As indicated in the analysis of medical-only claims, CTS was well down in the frequency rankings while back and neck sprains were in the top 10. The more severe lost-time back and neck injuries are less common, a fortunate fact for both workers and workers compensation loss costs.

Occupational Class	Rank by CTS Claims
<b>Female</b>	
ALL	
CLERICAL OFFICE EMPLOYEES NOC	1
TELEVISION, RADIO, TELEPHONE OR TELECOMMUNICATION DEVICE MFG. NOC	2
TELEPHONE OR TELEGRAPH CO.: ALL OTHER EMPLOYEES & DRIVERS	3
STORE: RETAIL NOC	4
AIRPLANE MFG.	5
STORE: MEAT, GROCERY AND PROVISION STORES COMBINED-RETAIL NOC	6
SALESPERSONS, COLLECTORS OR MESSENGERS-OUTSIDE	7
STORE: WHOLESALE NOC	8
CLOTHING MANUFACTURING	9
PHYSICIAN & CLERICAL	10
<b>Male</b>	
ALL	
CLERICAL OFFICE EMPLOYEES NOC	1
AIRPLANE MFG.	2
TRUCKING: NOC-ALL EMPLOYEES & DRIVERS	3
MACHINE SHOP NOC	4
AIRCRAFT OR HELICOPTER OPERATION: AIR CARRIER-SCHEDULED OR SUPPLEMENTAL: ALL OTHER EMPLOYEES & DRIVERS	5
TELEVISION, RADIO, TELEPHONE OR TELECOMMUNICATION DEVICE MFG. NOC	6
TELEPHONE OR TELEGRAPH CO.: ALL OTHER EMPLOYEES & DRIVERS	7
METAL GOODS MFG. NOC	8
TRUCKING: PARCEL OR PACKAGE DELIVERY-ALL EMPLOYEES & DRIVERS	9
FIREPROOF EQUIPMENT MFG	10

Table 3. Top 10 Occupational Classes for CTS Injuries by Gender

The data also indicates that on average men earn a higher average weekly wage than women in the same occupational class. However, of the four classes that are in the top 10 for both males and females, males have a lower indemnity severity incurred at 18 months in two of them (clerical office employees and telephone or

telegraph company all other employees and drivers) despite having a higher average weekly wage. Medical costs, while roughly similar, are usually slightly lower for males than females in the same occupational class although airplane manufacturing is an exception where medical costs are higher for males.

### Differences in Average Weekly Wage—CTS and Back Injuries

Back injuries are similar to the total of all injuries for both average weekly wages and indemnity severity, whereas CTS injuries have a slightly higher average weekly wage but materially higher severity (See Exhibits 10 and 11). Therefore only a portion of the higher indemnity severity of CTS claims is explained by the higher average weekly wage.

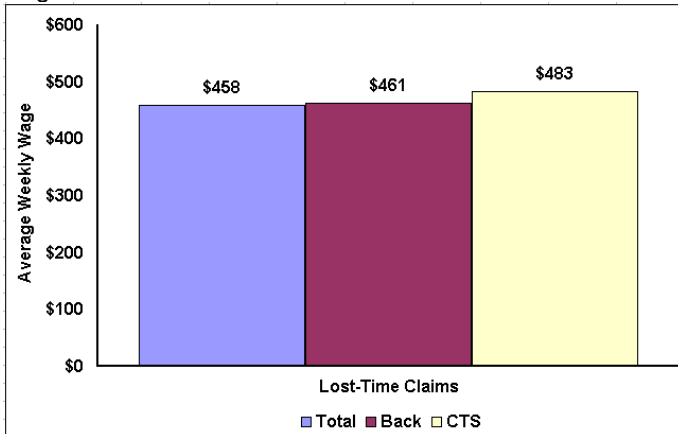


Exhibit 10. The Average Weekly Wage of CTS Lost-Time Claims Is Slightly Higher Than For Total and Back Claims.

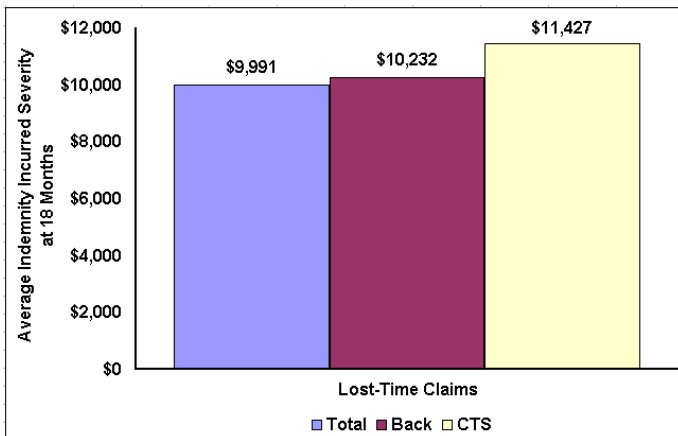


Exhibit 11. Indemnity Severity of CTS Lost-Time Claims Is Significantly Higher Than For Total and Back Claims.

### CTS vs. Back Injuries—Age Differences

Compared with back strain cases, CTS claimants tend to be older workers. Undoubtedly, this reflects in part age differences in the occupation classes more likely to experience either CTS or back injuries. Workers 35 and older incur approximately 70% of CTS injuries. In contrast workers 35 and older suffer roughly 50% of all back injuries.

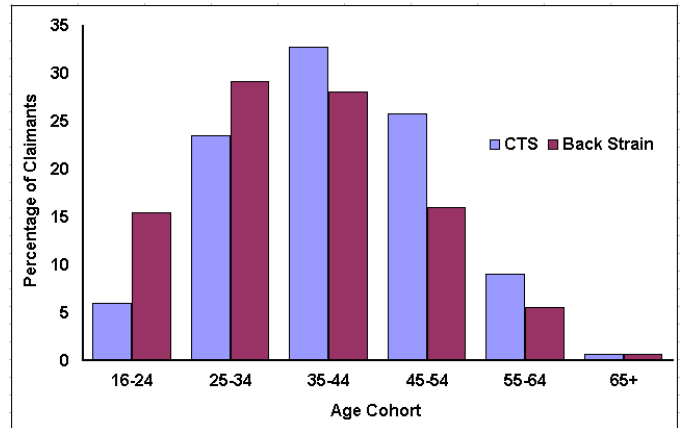


Exhibit 12. CTS Claimants Tend to be Older Workers.

### CTS Injuries With and Without Surgery

Forty-one percent of all CTS claims involved CTS surgeries. Attorney involvement and incurred costs are higher for CTS claims with surgery (average costs are almost three times higher for claims with surgery than for claims without). The average weekly wage is consistently higher for claims with surgery than for claims without surgery. Below we look at differences in claim characteristics with and without surgery across several demographics.

#### Age

The rate of surgery increases with age, although medical costs associated with surgical claims stay fairly constant.

- The percentage of CTS claims with surgery increases with each age group, from a low of 20% for 16–24 to a high of 53% for 55–64 and 65 and over.
- Attorney involvement and average weekly wage are higher for surgery relative to non-surgery claims for every age group.
- Attorney involvement for claims with surgery peaks at 25% for 25–34, but for claims without surgery attorney involvement increases with each age group, peaking at 19% for 65 and over.
- Average weekly wages for surgery claims increase with each age group up to 55–64, then decline for 65 and over, contributing to the lower total costs for the 65 and older group compared with the 55–64 age group.
- Medical costs for surgical claims are fairly constant across age groups while medical costs for nonsurgical claims increase with each age group.

**Gender**

Males are slightly more likely to have surgery, but attorney involvement by gender is roughly the same.

- Males have a slightly larger share of claims with surgery (45% vs. 40% for females).
- Attorney involvement is roughly the same for both men and women diagnosed with CTS injuries for both surgery claims (22.5% female vs. 21.5% male) and for non-surgery claims (11.2% female and 10.9% male).
- Wages are higher for claims with surgery and higher for males than females.

**Industry**

Rates of surgery and attorney involvement vary by industry with clerical and professional occupations, the industry with the most CTS claims, falling at the low end of the range.

- Clerical and professional occupations have the highest share of CTS claims but one of the lowest rates of surgery at 38% vs. the overall surgery rate of 41%. Of industries with at least 3% of CTS claims, surgical rates range from 37% for cartage and trucking to 48% for metal forming.
- Of industries with at least 3% of CTS claims, attorney involvement for claims with surgery ranges from 20% in clerical and professional occupations to 27% in operation and maintenance. For CTS claims without surgery attorney involvement ranges from 9% in metal forming to 15% in vehicles and operation and maintenance.

**Attorney Involvement**

The rate of attorney involvement is twice as high for surgical CTS claims vs. nonsurgical CTS claims. However, the costs of nonsurgical claims with an attorney are significantly higher than surgical claims without an attorney for total and indemnity. Costs of claims with an attorney are more than 4 times higher than those without an attorney for claims without surgery but less than twice as high for claims with surgery.

- Overall for CTS claims, attorney involvement is 22% for claims with surgery vs. 11% for claims without surgery.
- Costs for claims with an attorney but no surgery (\$21,339 total, \$13,325 indemnity) are higher than for claims with surgery but no attorney (\$16,102 total, \$8,004 indemnity) for total and indemnity. Average medical costs are similar (\$8,014 vs. \$8,098). See Table 4.
- For claims without surgery, total average claims costs are more than four times higher with an attorney and indemnity costs are six times higher with an attorney.
- For claims with surgery, total average claims costs are 1.8 times higher with an attorney.
- 58% of claims with an attorney have surgery, while only 38% of claims without an attorney have surgery.

	Total		Indemnity		Medical	
	Surgery Yes	Surgery No	Surgery Yes	Surgery No	Surgery Yes	Surgery No
Attorney Yes	29,240	21,339	17,376	13,325	11,864	8,014
Attorney No	16,102	4,815	8,004	2,227	8,098	2,588

Table 4. Incurred Severity at 18 Months of CTS Claims With and Without an Attorney and Surgery

**Conclusion**

Carpal tunnel syndrome is a leading lost-time diagnosis and ranked second in terms of total costs behind lumbar disc displacement. Compared with back strain cases, CTS claimants are more likely to be higher paid and older. CTS medical severity rose with each age group

while indemnity severity rose until age 65 and older, probably due to offset provisions. Since CTS claimants tend to be older, CTS injuries could become even more prevalent as the workforce ages over the coming decades.

## Glossary of Diagnosis Codes<sup>5</sup>

**Carpal tunnel syndrome**—CTS syndrome including median nerve entrapment and partial thenar atrophy.

**Cerv disc displacement**—Displacement of cervical intervertebral disc without myelopathy. Includes neuritis (brachial) or radiculitis due to displacement or rupture of cervical intervertebral disc.

**Cervicalgia**—Pain in neck.

**Lower leg injury nos<sup>6</sup>**—An unspecified injury of the knee, leg, ankle, or foot.

**Lumbago**—Low back pain, low back syndrome, lumbalgia.

**Lumbar disc displacement**—Displacement of lumbar intervertebral disc without myelopathy. Includes lumbago or sciatica due to displacement of intervertebral disc and neuritis or radiculitis due to displacement or rupture of lumbar intervertebral disc.

**Lumb/lumbosac disc degen**—Degeneration of lumbar or lumbosacral intervertebral disc.

**Lumbosacral neuritis nos**—Thoracic or lumbosacral neuritis or radiculitis, unspecified, including radicular syndrome of lower limbs.

**Open wnd finger/s comp**—Open wound of a finger or fingers, including fingernails, thumb, and thumbnail, without mention of complication.

**Open wound hand/s comp**—Open wound of hand except finger(s) alone without mention of complication.

**Rotator cuff synd nos**—Disorders of bursae and tendons in the shoulder region, unspecified, including rotator cuff syndrome nos and supraspinatus syndrome nos.

**Sprain lumbar region**—Sprain or strain of lumbar region of the back.

**Sprain lumbosacral**—Sprain or strain of a joint or ligament in the lumbosacral region.

**Sprain of ankle nos**—Sprain or strain of an unspecified site on the ankle.

**Sprain of neck**—Sprain or strain of neck region of the back including anterior longitudinal (ligament), cervical; atlanto-axial (joints); atlanto-occipital (joints); and whiplash injury.

**Sprain of wrist nos**—Sprain or strain of an unspecified site on the wrist.

**Sprain rotator cuff**—Sprain or strain of rotator cuff, excluding a complete rupture.

**Sprain shoulder/arm nos**—Sprain or strain of unspecified site of shoulder and upper arm.

**Superficial inj cornea**—Superficial injury of the cornea including corneal abrasion and superficial laceration. Excludes corneal injury due to contact lens.

**Tear med menisc knee-cur**—Tear of medial cartilage or meniscus of knee, current.

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<sup>6</sup> Not otherwise specified