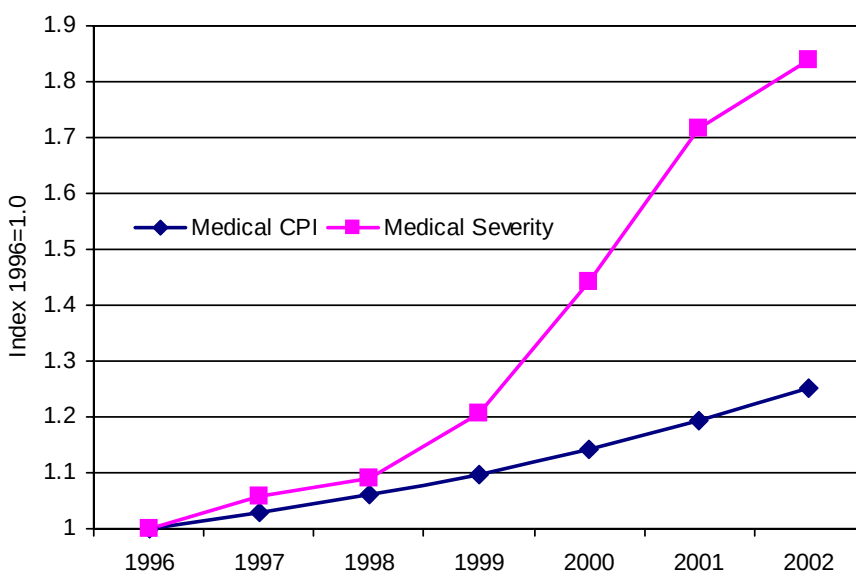


Measuring the Factors Driving Medical Severity: Price, Utilization, Mix

Introduction

It is clear that in recent years, workers compensation medical claims severities have been increasing at a faster rate than would be expected based on medical inflation alone (see Chart 1). Over the 1996/1997 to 2001/2002 period,¹ the medical care component of the Consumer Price Index increased by 21% compared with an increase of 73% for paid medical severity on lost-time claims closed within 24 months of date of injury.² This paper seeks to identify and quantify factors other than price inflation that contribute to the significant increase.³

Chart 1—Medical Severity Has Increased Significantly Faster Than the Medical Consumer Price Index



Accident Years 1996–2002 for NCCI Paid Medical Severity on Lost-Time Claims Closed Within 24 Months of Date of Injury and Calendar Years 1996–2002 for the Medical CPI From the Bureau of Labor Statistics

¹ Throughout the text, all years refer to calendar years when referring to the consumer price index and accident years when referring to medical severity. The calendar year period 1996/1997 is the period from 1/1/1996 to 12/31/1997. The accident year period 1996/1997 includes data on claims for injuries that occurred from 1/1/1996 to 12/31/1997.

² In this study, we have chosen to work with lost-time claims closed within 24 months of date of injury. As indicated later and highlighted in the appendix, while some other measures of medical severity show increases over this period that are lower than the measure used here, they are still higher than the rate of medical inflation.

³ This study is based on data licensed to NCCI by insurers for purposes of this study for the seven accident years from 1996–2002. This study covers lost-time claims. Countrywide, losses from lost-time claims comprise 94% of total losses since medical-only claims cover only 6% of losses.

The key findings include the following⁴:

- There has been a shift to relatively more severe injuries. The share of closed lost-time claims at 24 months with diagnosis codes with high medical severity increased by 2 percentage points from 1996 to 2002, while the share with low severity declined by 8 percentage points over the same period. Among the top 10 leading diagnoses, there was a shift toward more higher-cost sprains of rotator cuffs and fewer lower-cost sprains of the lumbosacral.
- This shift to more serious injuries led to a modest increase (about 10%) in medical severities from accident years 1996/1997 to 2001/2002.
- The key driver, accounting for approximately a 35% increase in medical severities over the years studied, is the markedly higher number of treatments within each diagnosis and a different mix of treatments across service categories. For example, there might be a shift from diagnostic radiology to complex diagnostic testing or from complex surgery to physical therapy.
- A combination of price increases for medical services and additional changes in the treatment mix accounts for about a 25% increase in medical severity over the time period.⁵ In this case, we capture treatment mix shifts within a service category. For example, within the broad service category “drugs, supplies, and durable medical equipment,” there might be a relative shift from lower-priced drugs to high-priced durable medical equipment or a shift within “complex surgery and anesthesia” from one type of complex surgery to another.

Identifying and Quantifying Drivers of the Medical Severity Increase

As mentioned previously, the increase in medical severity has been significant over the last several years. The challenge lies in identifying and quantifying the factors that explain that overall increase.

To aid in this we define a simple “model” of claims costs as follows:

$$\text{Cost} = \text{Price} \times \text{Utilization},$$

where utilization consists of both quantity and mix.⁶ We examined the impacts of:

- “Mix”—Differences in diagnosis mix
- “Quantity”—Differences in the average number of treatments by service category within individual diagnoses
- “Price”—Differences in the average price of treatments by service category within individual diagnoses

Medical severity will change because of the following factors:

1. Changes in prices by service category—i.e., inflation
2. Changes in the number of treatments within a service category—e.g., more physical therapy sessions
3. Changes in the mix of service categories—e.g., a relative increase in “complex surgery”
4. Changes in the mix of diagnoses—e.g., from low cost lumbosacral sprain to higher cost rotator cuff injuries
5. Changes in the mix of treatments within service categories—e.g., from an established generic to a new brand name drug

In the current high level analysis, some of these factors are combined. For example, numbers 2 and 3 are jointly reported as changes in the number of treatments while numbers 1 and 5 are both captured as a change in price. Future research will focus on separating out these more detailed effects.

⁴ In most cases, our results will be rounded to the nearest 1 percentage point or the nearest \$100 to avoid suggesting greater precision than is appropriate statistically.

⁵ The price inflation for this portion is roughly comparable to the medical consumer price index.

⁶ As an illustration of the concept of changes in “mix,” consider the following example:

Johnny goes to the store to buy some apples.

On Monday he buys:

- 3 Golden Delicious at \$0.50 each, and
- 4 Macintosh at \$0.25 each.
- Total cost = $(3 \times \$0.50) + (4 \times \$0.25) = \$2.50$.

On Wednesday he buys:

- 4 Golden Delicious at \$0.50 each, and
- 3 Macintosh at \$0.25 each
- Total cost = $(4 \times \$0.50) + (3 \times \$0.25) = \$2.75$.

Both the total quantity and actual prices were unchanged, but the average price paid for “apples” increased because the mix of specific purchases changed.

This study focuses on lost-time claims closed within 24 months of date of injury. Overall, these include more than three-quarters of all 1996/1997 and 2001/2002 lost-time claims. Calculations in this study are based on data for all (over 3,000) diagnosis codes, while detailed results are presented for the 28 most common diagnoses. For those 28 most common diagnosis codes, the shares of claims covered by this study range from a low of more than 35% for high severity lumbar disc displacement with myelopathy to more than 95% for the low severity open wound of fingers and sprain of ankle.⁷ This study focuses on the change in medical severity from 1996/1997 to 2001/2002.

Differences in Diagnosis Mix Explain a Modest Portion of the Increase in Medical Severities

For the claims included in this study, almost all of the same diagnoses appear in the top 10 in both the 1996/1997 and 2001/2002 periods, but there is one interesting difference. Chart 2 shows the 10 leading diagnoses in terms of number of claims at the beginning and end of the period contained in the study. The one difference (in bold) illustrates the slight shift to more severe injuries. Sprain lumbosacral, a relatively low-severity injury, ranked as the fifth most common injury during the 1996/1997 period, but dropped out of the top 10 in 2001/2002. It was replaced in the top 10 by rotator cuff sprain, which is a much higher-severity injury. Even movement within the top 10 underscores this point. For example, tear of medial cartilage/meniscus of knee, a more costly injury, moved up from ninth to fifth, while sprain of ankle, a less costly injury, moved down from seventh to tenth.

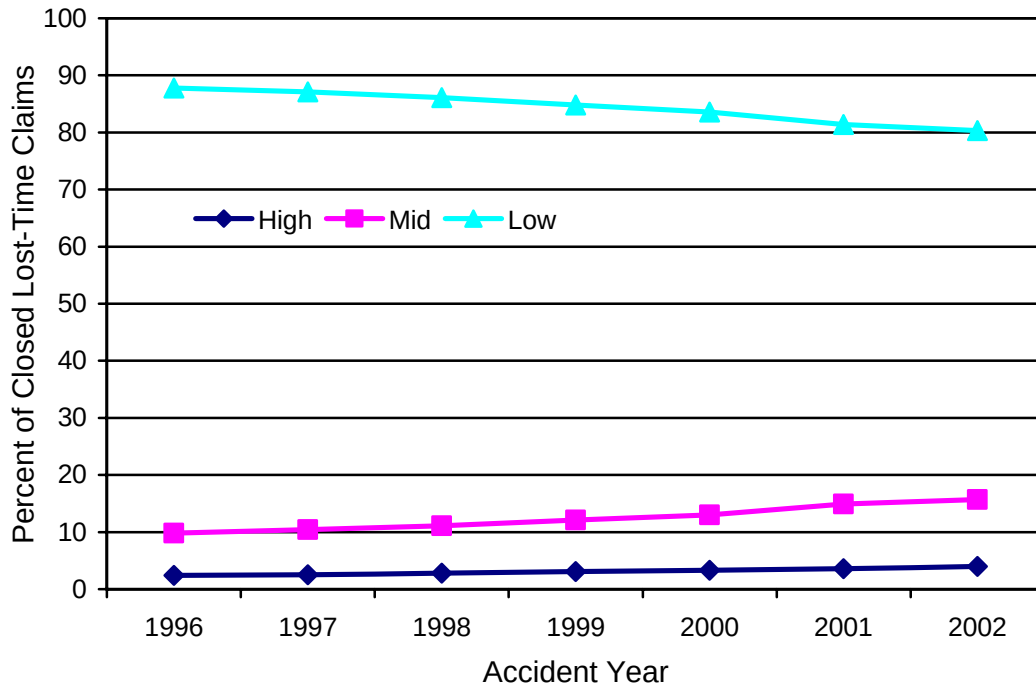
Chart 2—Rankings of Top 10 Claim Diagnoses in Terms of Number of Claims for Lost-Time Claims Closed Within 24 Months of Date of Injury, Accident Years 1996/1997 and 2001/2002, NCCI

1996/1997		2001/2002	
1	Sprain Lumbar Region	1	Sprain Lumbar Region
2	Carpal Tunnel Syndrome	2	Carpal Tunnel Syndrome
3	Lower Leg Injury, not otherwise specified	3	Lower Leg Injury, not otherwise specified
4	Lumbar Disc Displacement	4	Lumbar Disc Displacement
5	Sprain Lumbosacral	5	Tear Medial Cartilage/Meniscus of Knee
6	Lumbago	6	Cervicalgia
7	Sprain of Ankle, not otherwise specified	7	Lumbago
8	Cervicalgia	8	Sprain Rotator Cuff
9	Tear Medial Cartilage/Meniscus of Knee	9	Unilateral Inguinal Hernia
10	Unilateral Inguinal Hernia	10	Sprain of Ankle, not otherwise specified

⁷ See the appendix for the specifics for the 28 diagnosis codes examined in detail. This indicates that there have been no significant changes in closure rates by diagnosis that would likely impact the analysis.

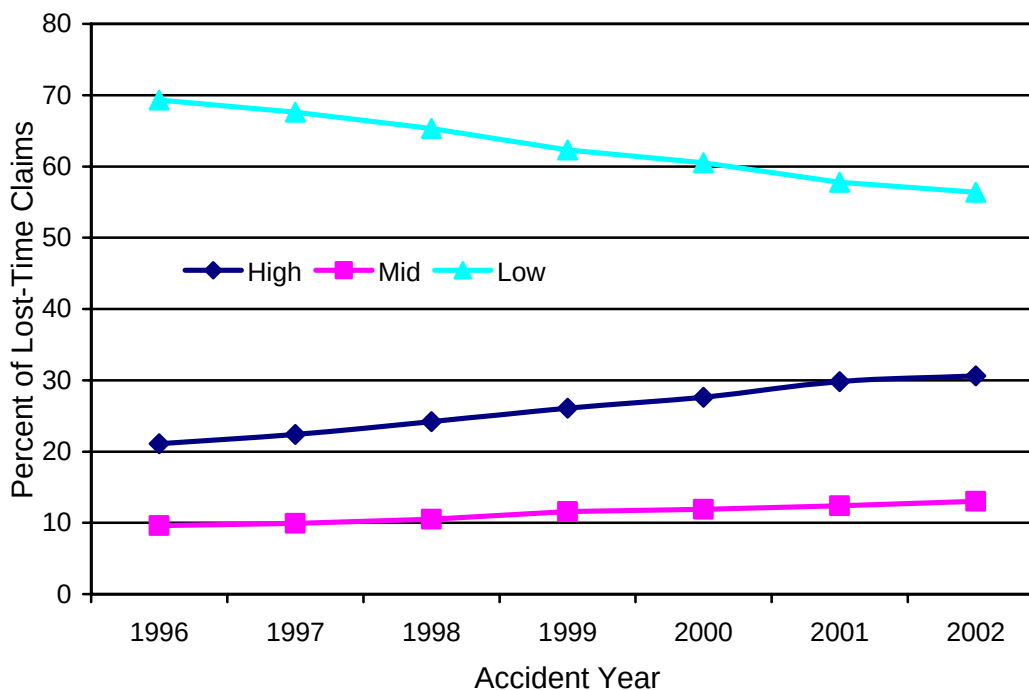
Chart 3 illustrates the broader picture of the shift by including data for all diagnosis codes, not just those in the top 10. It shows the percentage of claims represented by diagnoses designated as high, middle, and low cost injuries over the period from 1996 to 2002.⁸ The share of low cost injuries declined by about eight percentage points over the period, while the share of high cost injuries increased by about two percentage points (almost doubled) and those in the middle group increased by six percentage points. Chart 4 is similar but includes all lost-time claims 24 months after date of injury, not just those that are closed. In that case, the share of low cost injuries declined by 13 percentage points, while the share of high cost injuries increased by 10 percentage points and those in the middle group increased by three percentage points.

Chart 3—Percentage of Lost-Time Claims Closed Within 24 Months of Date of Injury Represented by Diagnoses with High, Middle, and Low Medical Paid Severity in Accident Year 1998, Accident Years 1996–2002, NCCI



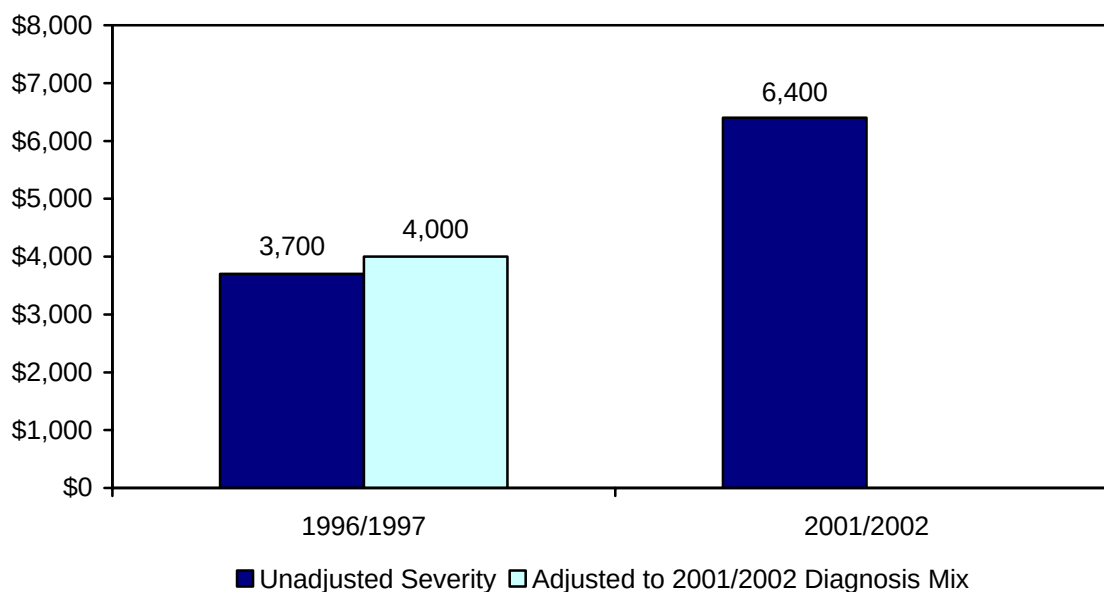
⁸ Injuries by diagnosis were classified as high, middle, or low based on Accident Year 1998 medical paid severity. “High” is medical severity greater than \$10,000, “middle” is greater than \$7,000 and less than or equal to \$10,000, and “low” is less than or equal to \$7,000. The shares of the injuries in each of these initial categories were then tracked over each year in the study.

Chart 4—Percentage of All Lost-Time Claims at 24 Months After Date of Injury Represented by Diagnoses with High, Middle, and Low Medical Paid Severity in Accident Year 1998, Accident Years 1996–2002, NCCI



For lost-time claims closed within 24 months of date of injury, the shift in the mix of injuries over time explains about 15% of the increase in medical severities between the years 1996/1997 and 2001/2002. Chart 5 shows the unadjusted medical severities in each time period along with the estimated medical severity for 1996/1997 after using the 2001/2002 mix distribution to control for differences in diagnosis mix.

Chart 5—Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury After Adjusting for Diagnosis Mix, Accident Years 1996/1997 and 2001/2002, NCCI



The reported medical severity increased \$2,700—just over 70%—between 1996/1997 and 2001/2002. The relative shift to more severe diagnoses accounts for \$300 to \$600 of the increase in medical severity.⁹ Therefore, the shift in diagnosis mix on average led to an increase of roughly 10% in paid medical severity on lost-time claims closed within 24 months of date of injury over the period. (See Chart 6.)

Chart 6—Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury After Adjusting for Diagnosis Mix, Accident Years 1996/1997 and 2001/2002, NCCI

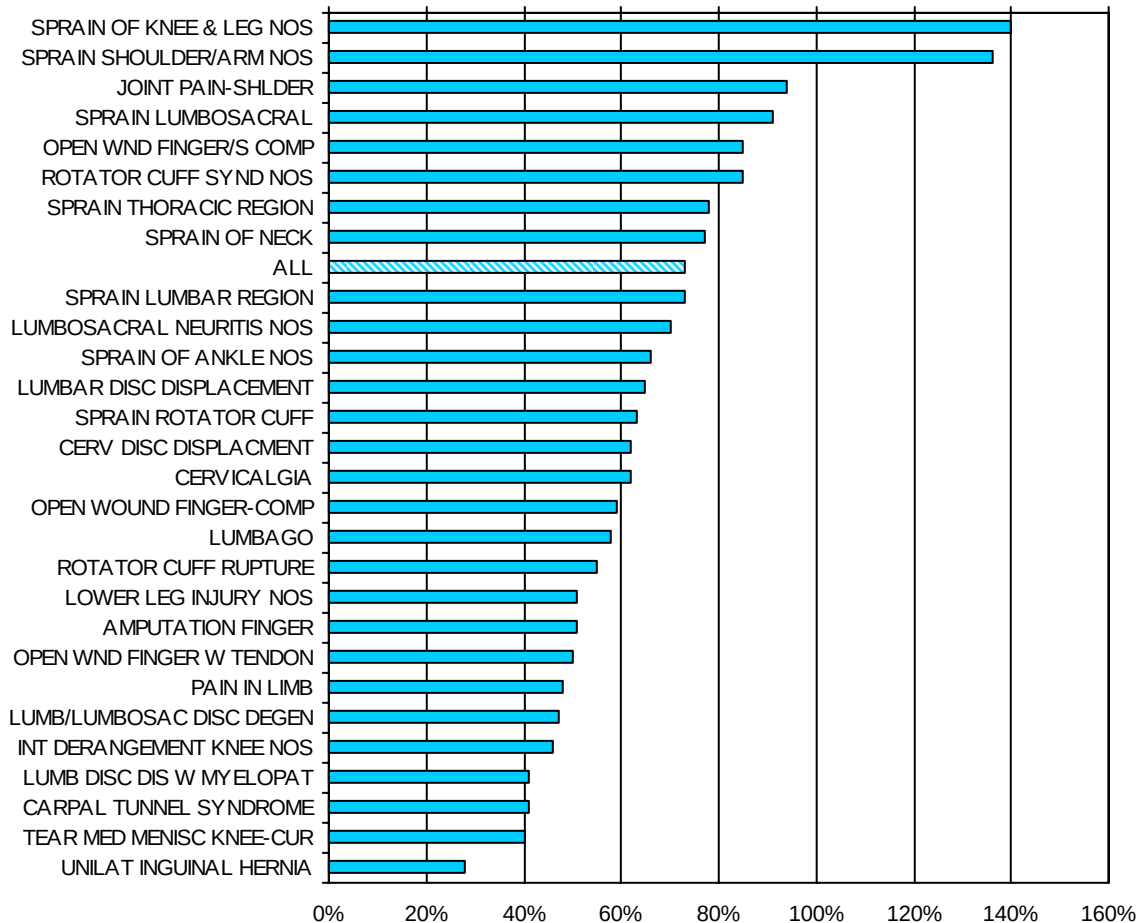
	1996/97 (on 01/02 Mix)	2001/02	Dollar Difference (96/97 on 01/02 Mix)	Dollar Difference (01/02 on 96/97 Mix)	Increase in Costs 2001/02 vs. 1996/97
Unadjusted Medical Severities on Lost-Time Claims	3,700	6,400	2,700	2,700	73%
Adjusted for Diagnosis Mix Differences	4,000	6,400	2,400	2,100	
Portion Due to Diagnosis Mix Differences			300	600	8%–16%

⁹ The impact due to the change in diagnosis mix is \$300–\$600 based on the range of alternative estimates. That is, whether the 1996/1997 severities were restated using the 2001/2002 diagnosis mix or whether the 2001/2002 severities were restated using the 1996/1997 diagnosis mix. The charts in this paper only show the 1996/1997 severities restated using the 2001/2002 mix, but the impact is shown as the range.

Of the Remainder, Increases in Number of Treatments Explain a Little More Than Half of the Increase in Severities; Price Increases Explain a Little Less Than Half

As seen in Charts 5 and 6, for all diagnoses combined, paid medical severity on lost-time claims closed within 24 months of date of injury increased 73% from 1996/1997 to 2001/2002. Chart 7¹⁰ contains the percentage differences in severities for the top 28 diagnoses examined in detail in this study; over the 1996/1997 to 2001/2002 time period, severity increased for all 28 of these codes. The range is from an increase of 28% for unilateral inguinal hernia to an increase of almost 140% for sprain of knee and leg. Differences in the number of treatments and the differences in the average price per treatment can help to further explain these differences in severity.

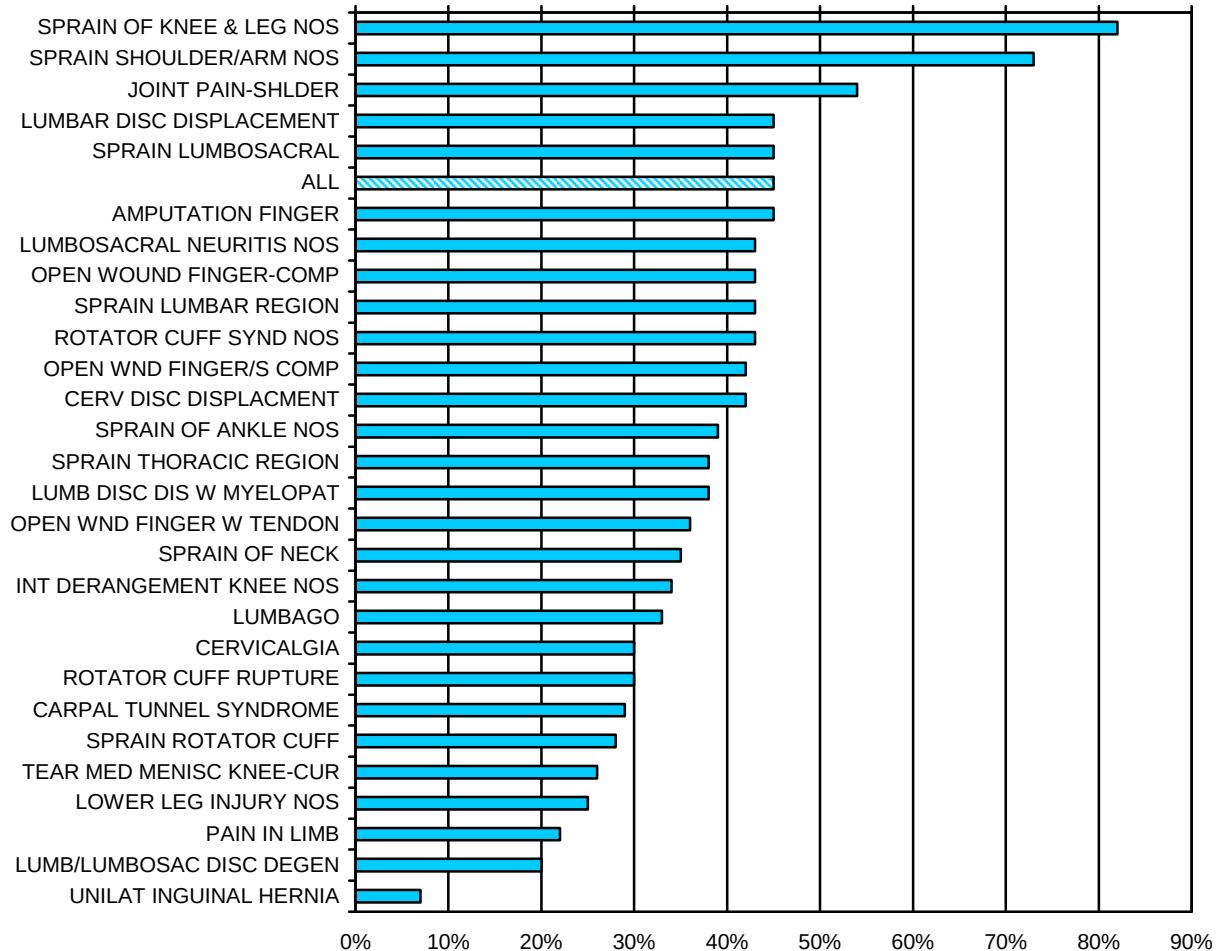
Chart 7—Increase in Severity by Diagnosis Code, Accident Years 2001/2002 Over 1996/1997, NCCI



¹⁰ "All" in charts 7, 8, and 10 pertains to all claims covering over 3,000 different diagnoses, not just those claims with the top 28 diagnoses examined in the charts. Similarly Charts 9, 11, and 12 also contain aggregated data for all claims with these 3,000 plus diagnosis codes.

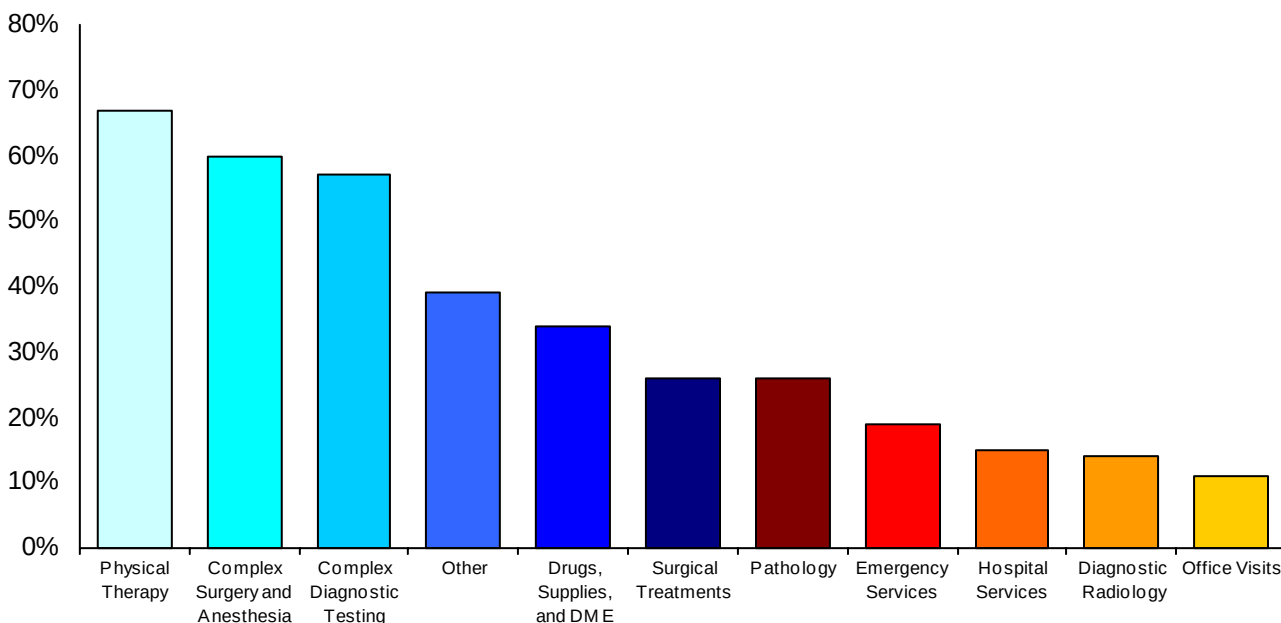
Chart 8 shows the increase in the total number of treatments by diagnosis code over the period. The overall number of treatments increased for each of these diagnoses, ranging from an increase of 7% for unilateral inguinal hernia to more than 80% for sprain of knee and leg. For all diagnoses combined, the number of treatments increased 45%. These numbers are for lost-time claims closed within 24 months of date of injury, but the overall increase in the number of treatments is similar for all claims 24 months after date of injury.

Chart 8—Increase in Number of Treatments by Diagnosis Code, Accident Years 2001/2002 Over 1996/1997, NCCI



It is also important to look at differences in number of treatments by service category.¹¹ Chart 9 shows the differences in number of treatments by service category for all diagnoses combined. The three service groups with above average increases in the average number of treatments are physical therapy (67%), complex surgery and anesthesia (60%), and complex diagnostic testing (57%). All service categories showed increases in the number of treatments over the period, but those with the smallest gains are office visits (11%), diagnostic radiology (14%), and hospital services (15%).

Chart 9—Increase in Number of Treatments for All Diagnosis Codes by Service Category, Accident Years 2001/2002 Over 1996/1997, NCCI



Charts 10 and 11 are comparable to Charts 8 and 9, but they show increases in “price”¹² instead of increases in the average number of treatments. The average price increase across all types of injuries over the period was 19%.¹³ (Again, this is for lost-time claims closed within 24 months of date of injury, but the change is similar for all lost-time claims 24 months after date of injury.) As with the average number of treatments, price increased for each of the 28 diagnosis codes. The range was from a high of 37% for shoulder and arm sprains down to 2% for lumbar disc displacement with myelopathy. In terms of price increases by service category, those with the largest increases include emergency services at 67%, hospital services at 48%, and drugs, supplies, and durable medical equipment at 42%.

¹¹ The appendix contains descriptions of the types of procedures included in each service category.

¹² This is estimated by dividing the total payments in a category by the total number of treatments, so it can be influenced not only by changes in specific prices, but also by relative shifts in the specific mix of treatments within these broader service categories. For example, a relative shift toward higher-priced durable medical equipment (DME) would show up as a price effect when, in fact, it is a change in mix. Future research will investigate these changes in more detail.

¹³ It is reassuring to note that this is very much in line with the 21% increase in the medical Consumer Price Index for the same time period.

Chart 10—Increase in Average Price by Diagnosis Code, Accident Years 2001/2002 Over 1996/1997, NCCI

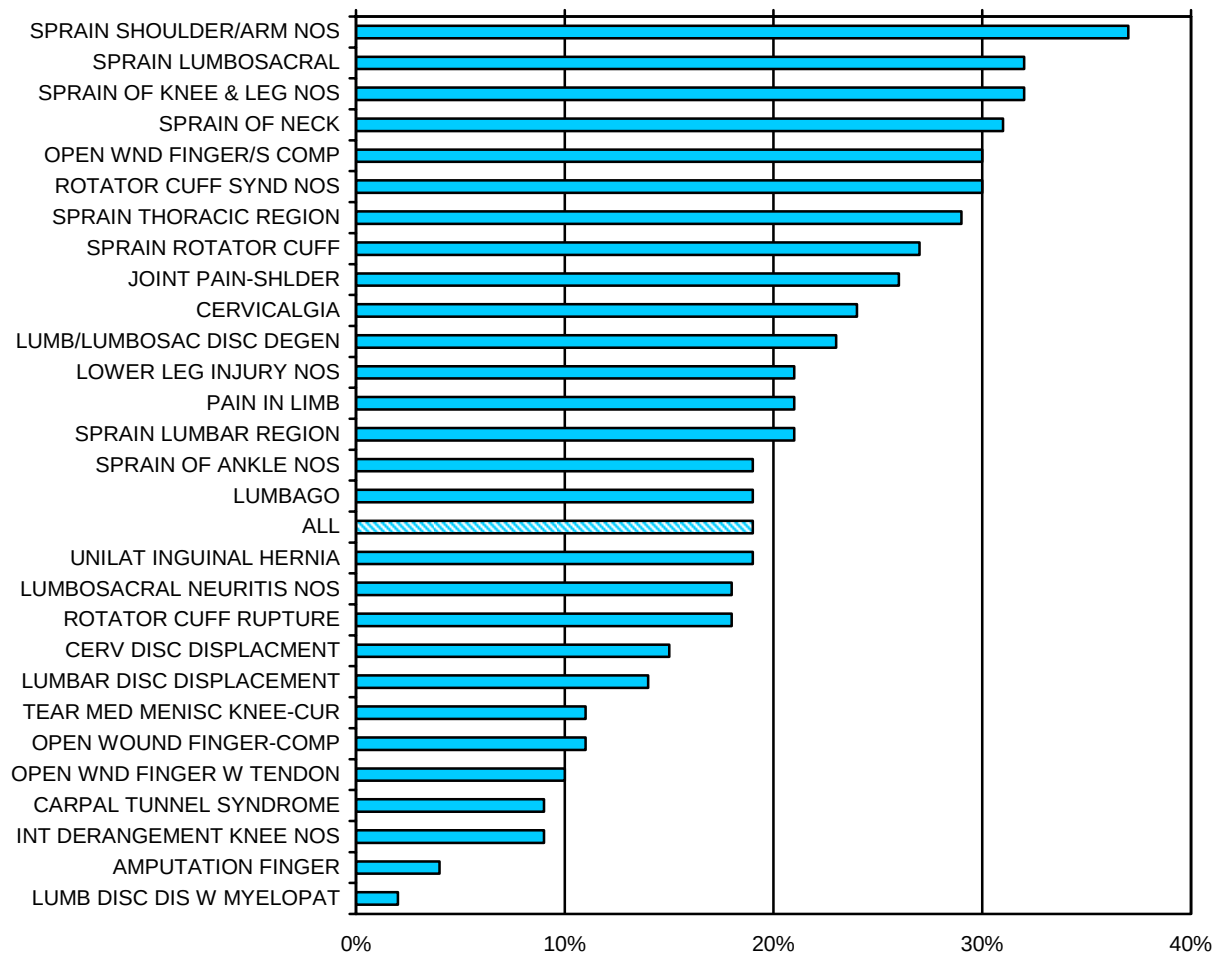


Chart 11—Increase in Price for All Diagnosis Codes by Service Category, Accident Years 2001/2002 Over 1996/1997, NCCI

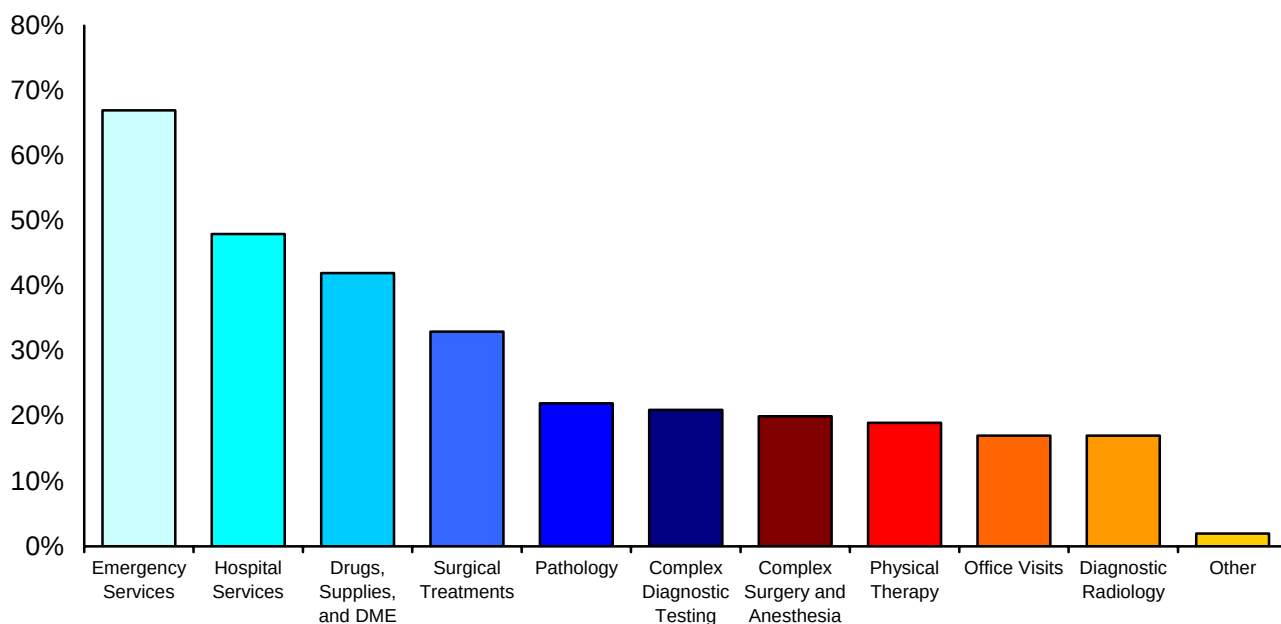


Chart 12 is a table showing the average number of treatments by service category for all diagnosis codes combined, along with the average price per treatment and differences in overall severity. This chart is at the most aggregate level across all diagnoses. It shows just two factors (the increase in the number of treatments and the increase in price) that combine to equal the overall increase in severity. Therefore, the impact of the change in the mix of injuries is embedded in the overall increases in the number of treatments and price, but not explicitly identified. Chart 12 shows that at this aggregate level over the 1996/1997 to 2001/2002 period, the number of treatments increased by 45% and price increased by 19% for an overall severity increase of 73% ($1.45 \times 1.19 = 1.73$). However, calculations in this study to measure the impacts of the factors driving the increase in medical severity also take into account the shift in diagnosis mix and are done by service category at the very detailed diagnosis level.

The top four contributors to the \$2,700 increase in severity are physical therapy (24%), complex surgery and anesthesia (21%), hospital services (14%), and drugs, supplies and durable medical equipment (12%). Even though the average price for physical therapy (\$40 in 2001/2002) is relatively low compared to the other service groups, physical therapy contributes about a quarter of the increase in severity due to its large number of treatments (33 in 2001/2002). The opposite holds true for complex surgery and anesthesia. In this case, the average number of treatments is low at 1.5 in 2001/2002, but its price is high at more than \$750.

Chart 12—Differences in Number of Treatments, Price, and Severity Accident Years 2001/2002 Over 1996/1997 for All Diagnoses, NCCI

Overall Severity % 1996/1997 Over 2001/2002: 73%	All Diagnoses							
	Average Treatments per Claim			Average Price per Treatment ¹⁴			Average Dollar & % Dollar Differences in Severity	
Treatment Service Group	1996/ 1997	2001/ 2002	% Difference	1996/ 1997	2001/ 2002	% Difference	Dollar Difference in Severity	% of Total Severity Dollar Difference
Physical Therapy	19.5	32.6	67%	34	40	19%	652	24%
Complex Surgery and Anesthesia	1.0	1.5	60%	634	764	20%	564	21%
Complex Diagnostic Testing	0.4	0.7	57%	464	559	21%	177	7%
Other	4.4	6.1	39%	131	134	2%	242	9%
Drugs, Supplies, and DME	5.6	7.5	34%	66	94	42%	334	12%
Surgical Treatments	0.6	0.7	26%	252	336	33%	100	4%
Pathology	1.1	1.4	26%	33	40	22%	19	1%
Emergency Services	0.8	0.9	19%	101	169	67%	77	3%
Hospital Services	0.9	1.0	15%	647	958	48%	385	14%
Diagnostic Radiology	2.6	2.9	14%	62	72	17%	52	2%
Office Visits	5.8	6.4	11%	54	63	17%	91	3%
Total Treatments	42.6	61.8	45%	87	103	19%	2,695	100%

¹⁴ As a reminder, this is an estimate based on dividing total payments by total number of treatments and can also reflect changes in mix within each category.

Sprain of Knee and Leg and Sprain of Shoulder/Arm as Examples

The number of treatments and price per treatment by service category also help explain the severity differences for individual diagnoses. As indicated in Chart 7, sprain of knee and leg and sprain of shoulder and arm had the largest increases in severity of the diagnosis codes examined in detail for this report (139% and 136%, respectively). Both of these codes experienced above-average increases in the average number of treatments and the average price per treatment. Charts 13 and 14 are examples of the data used for over 3,000 diagnoses to obtain the results in Charts 15 and 16.

Chart 13 shows that for sprain of knee and leg, physical therapy is the service category contributing the most to the severity increase of \$2,400. Its relatively-low price of \$40 in 2001/2002, is offset by the high number of treatments, which more than doubled from 11 to 25. The average number of complex surgery and anesthesia treatments also more than doubled from 1996/1997 to 2001/2002. Even though the number is small (about one treatment on average), because this is a high-priced treatment (greater than \$900 in 2001/2002), it contributes a quarter of the severity increase. The hospital services category is also a top contributor to the severity increase, driven by a high average price that more than doubled, likely reflecting a combination of both price increases and a shift to more expensive services.

Chart 14 shows a similar story for sprain of shoulder and arm. The number of physical therapy treatments is high and has almost doubled. The number of complex surgery and anesthesia treatments tripled, and the average price of hospital services more than doubled.

Chart 13—Differences in Number of Treatments, Price, and Severity 2001/2002 Over 1996/1997 for Sprain of Knee and Leg, NCCI

Overall Severity % 1996/1997 Over 2001/2002: 139%	Sprain of Knee and Leg, not otherwise specified							
	Average Treatments per Claim			Average Price per Treatment			Average Dollar & % Dollar Differences in Severity	
Treatment Service Group	1996/ 1997	2001/ 2002	% Difference	1996/ 1997	2001/ 2002	% Difference	Dollar Difference in Severity	% of Total Severity Dollar Difference
Pathology	0.3	0.7	135%	27	37	38%	18	1%
Complex Surgery and Anesthesia	0.4	1.0	126%	774	932	20%	580	24%
Physical Therapy	11.3	25.2	123%	30	40	31%	660	27%
Complex Diagnostic Testing	0.3	0.6	111%	538	621	15%	209	9%
Hospital Services	0.3	0.5	83%	419	986	136%	387	16%
Other	2.0	3.2	58%	91	100	10%	137	6%
Drugs, Supplies, and DME	3.3	5.2	57%	66	85	29%	221	9%
Surgical Treatments	0.1	0.2	38%	102	126	24%	8	0%
Office Visits	4.5	5.6	26%	54	63	17%	112	5%
Diagnostic Radiology	1.4	1.7	20%	56	62	10%	25	1%
Emergency Services	0.4	0.5	19%	109	185	69%	50	2%
Total Treatments	24.3	44.3	82%	71	93	31%	2,407	100%

Chart 14—Differences in Number of Treatments, Price, and Severity 2001/2002 Over 1996/1997 for Sprain of Shoulder/Arm, NCCI

Overall Severity % 1996/1997 Over 2001/2002: 136%	Sprain of Shoulder/Arm, not otherwise specified							
	Average Treatments per Claim			Average Price per Treatment			Average Dollar & % Dollar Differences in Severity	
Treatment Service Group	1996/ 1997	2001/ 2002	% Difference	1996/ 1997	2001/ 2002	% Difference	Dollar Difference in Severity	% of Total Severity Dollar Difference
Complex Surgery and Anesthesia	0.2	0.6	200%	693	886	28%	406	17%
Complex Diagnostic Testing	0.2	0.5	168%	527	627	19%	225	9%
Physical Therapy	19.3	37.4	94%	30	38	26%	836	35%
Hospital Services	0.2	0.4	75%	340	873	157%	244	10%
Other	2.8	4.6	66%	94	97	3%	185	8%
Surgical Treatments	0.2	0.4	62%	151	178	18%	32	1%
Pathology	0.3	0.4	60%	26	39	48%	10	0%
Drugs, Supplies, and DME	3.8	6.0	56%	35	58	66%	211	9%
Office Visits	5.5	7.0	27%	53	62	16%	137	6%
Diagnostic Radiology	1.6	2.0	25%	60	73	21%	51	2%
Emergency Services	0.4	0.4	14%	76	185	143%	53	2%
Total Treatments	34.5	59.8	73%	51	69	37%	2,389	100%

Quantifying the Key Factors That Account for the Increase in Medical Severity

Clearly, increases in the number of treatments is another key factor in explaining the increase in medical severity over time. Charts 15 and 16 build on Charts 5 and 6, which adjusted for changes in diagnosis mix. The graph now also shows medical severities after controlling for the increases in the number of treatments, including the effect of changes in the mix of treatments across service categories. The severity in 1996/1997 was restated using the number of treatments by diagnosis by service category for 2001/2002. Increases in the number of treatments by service category alone increased average medical costs by about \$1,200, an increase of roughly 35% in medical severity.

Together, shifts in diagnosis mix and increases in the number of treatments by service category led to an average increase in medical severity over the period of \$1,500 to \$1,800. The combination of price inflation and change in mix within broad service categories increased medical severity an additional \$900 to \$1,200 or about 25%.

Again, these calculations are not strictly comparable to the data shown in Chart 12. As explained earlier, Chart 12 displays only changes in the number of treatments and price at the aggregate level. The calculations in Chart 16 explicitly account first for shifts in diagnosis mix and then examine changes in the number of treatments and price at the very detailed diagnosis code level.

Chart 15—Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury After Adjusting for Diagnosis Mix and Number of Treatments, Accident Years 1996/1997 and 2001/2002, NCCI

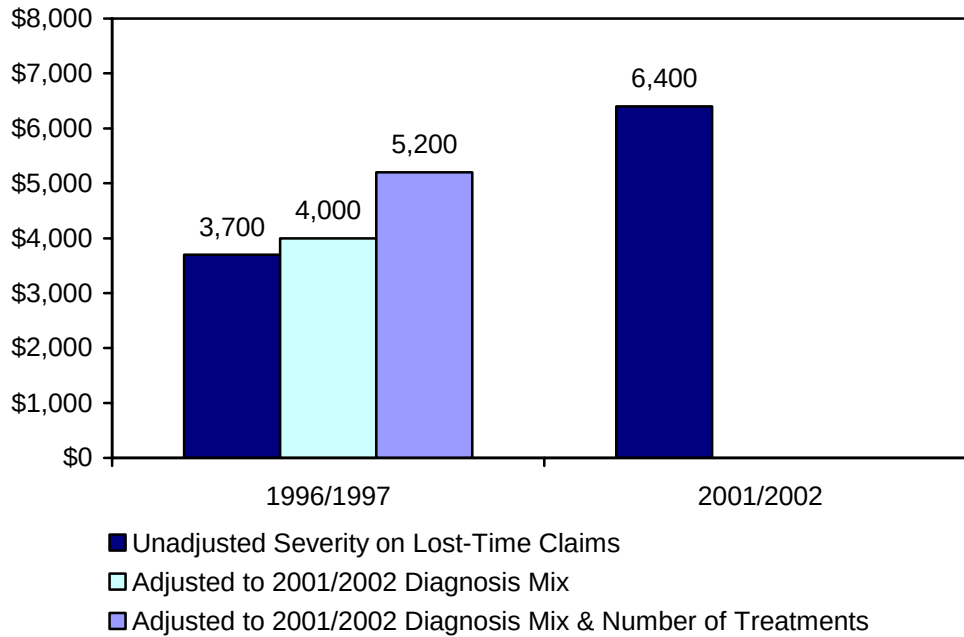


Chart 16—Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury After Adjusting for Diagnosis Mix and Number of Treatments, Accident Years 1996/1997 and 2001/2002, NCCI

	1996/97 (on 01/02 Mix)	2001/02	Dollar Difference (96/97 on 01/02 Mix)	Dollar Difference (01/02 on 96/97 Mix)	Increase in Costs 2001/02 vs. 1996/97
Unadjusted Medical Severities on Lost-Time Claims	3,700	6,400	2,700	2,700	73%
Adjusted for Diagnosis Mix Differences	4,000	6,400	2,400	2,100	
Portion Due to Diagnosis Mix Differences			300	600	8%–16%
Adjusted for Diagnosis Mix & Number of Treatments	5,200	6,400	1,200	900	
Portion Due to Number of Treatments			1,200	1,200	33%
Remaining Portion Due to Price and Other Factors			1,200	900	32%–24%

Conclusion

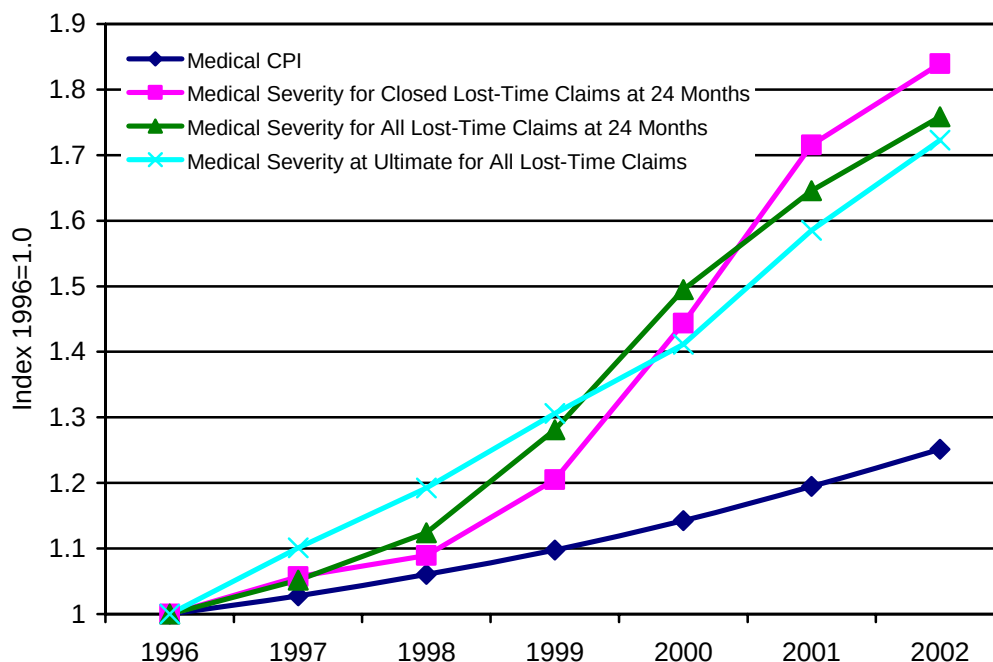
Workers compensation medical severity in recent years has increased at a pace significantly faster than overall medical inflation. This is the first in a series of studies to develop a more complete understanding of the factors driving increases in medical severity. In particular, this study has identified and quantified the major factors underlying that increase. A shift toward more severe diagnoses accounts for a modest portion of the increase. Of the remaining portion, a little more than half is due to an increase in the number of treatments within a service category or a shift across service categories for a given diagnosis. A little less than half is due to an increase in the average price of medical services or a shift to more expensive treatments within service categories for a given diagnosis.

Appendix

Comparison of Measures of Medical Severity

Chart A-1 is similar to Chart 1 in the study, but includes other measures of medical severity in addition to the one used in this study. All three measures of medical severity increased at a faster rate than medical inflation over this period.

Chart A-1—Medical Severity Has Increased Significantly Faster Than the Medical Consumer Price Index, Accident and Calendar Years 1996–2002, NCCI for Medical Severity and Bureau of Labor Statistics for the Medical CPI



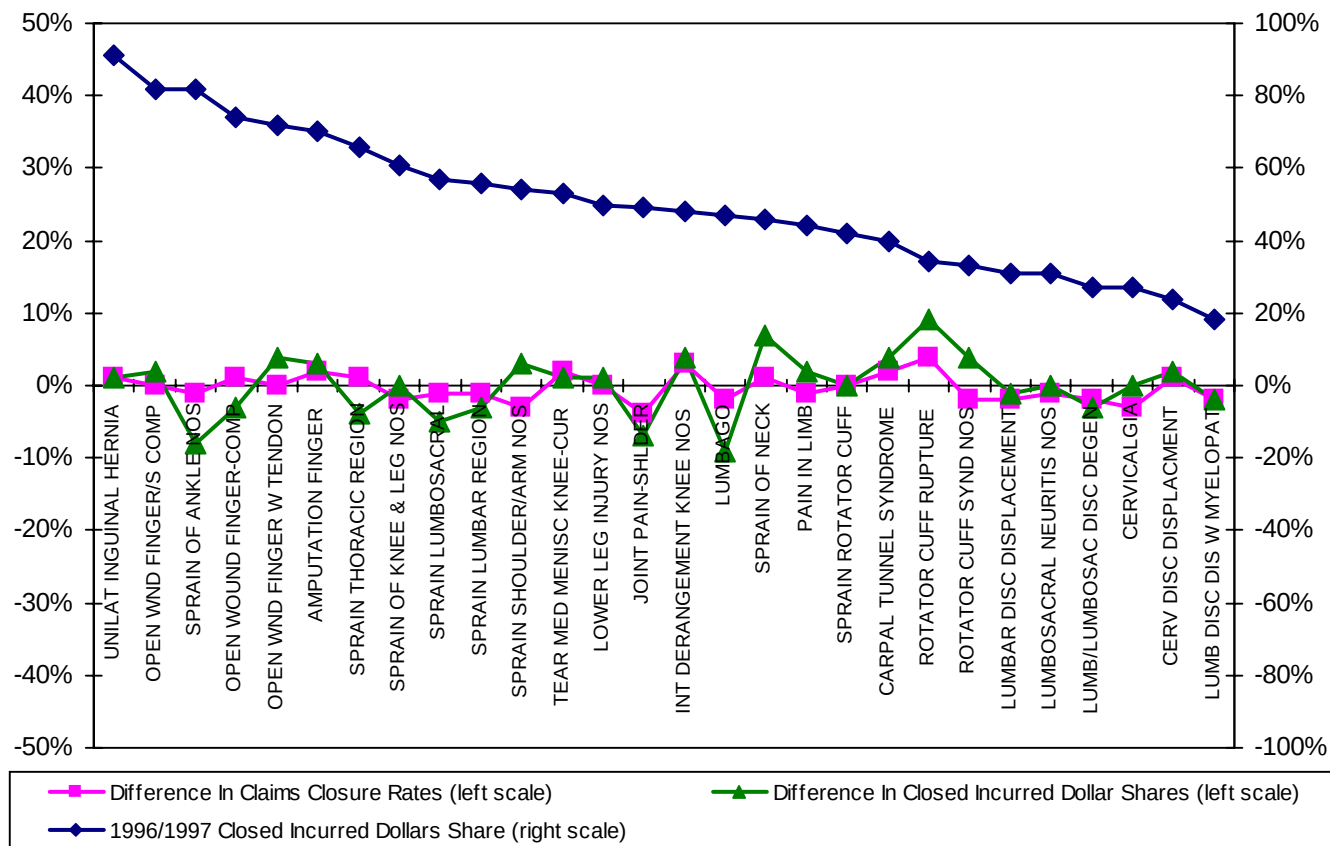
Comparison of Data Coverage by Diagnosis Code and Year

Chart A-2 shows that the closure rates at 24 months for all lost-time claims and the related estimated incurred covered by the data used in this study are similar by diagnosis code between the two time periods and should not materially affect the changes in severity. Chart A-3 illustrates that there is no marked pattern in closure rates based on the percentage of incurred dollars for lost-time claims closed within 24 months of date of injury.

Chart A-2—The Percentage of All Lost-Time Claims and Estimated Incurred Dollars at 24 Months Represented by Lost-Time Claims Closed Within 24 Months of Date of Injury, Accident Years 1996/1997 and 2001/2002, NCCI

Diagnosis	Percentage of Closed Lost-Time Claims at 24 Months to All Lost-Time Claims at 24 Months		Percentage of Incurred Dollars for Closed Lost-Time Claims at 24 Months to Incurred Dollars for All Lost-Time Claims at 24 Months	
	1996–1997	2001–2002	1996–1997	2001–2002
Total	77%	75%	36%	37%
OPEN WND FINGER/S COMP	96%	95%	82%	85%
SPRAIN OF ANKLE NOS	96%	95%	82%	74%
UNILAT INGUINAL HERNIA	94%	95%	91%	92%
SPRAIN OF KNEE & LEG NOS	91%	89%	61%	61%
SPRAIN LUMBOSACRAL	91%	89%	57%	52%
SPRAIN THORACIC REGION	91%	91%	66%	62%
OPEN WOUND FINGER-COMP	90%	90%	74%	71%
SPRAIN LUMBAR REGION	89%	88%	56%	53%
OPEN WND FINGER W TENDON	89%	89%	72%	76%
SPRAIN SHOULDER/ARM NOS	87%	85%	54%	56%
AMPUTATION FINGER	87%	89%	70%	73%
LOWER LEG INJURY NOS	83%	83%	50%	51%
LUMBAGO	83%	81%	47%	38%
SPRAIN OF NECK	79%	80%	46%	54%
JOINT PAIN-SHLDER	79%	75%	49%	42%
PAIN IN LIMB	79%	78%	44%	46%
TEAR MED MENISC KNEE-CUR	73%	75%	53%	54%
INT DERANGEMENT KNEE NOS	70%	73%	48%	52%
SPRAIN ROTATOR CUFF	63%	62%	42%	42%
CARPAL TUNNEL SYNDROME	62%	64%	40%	44%
LUMBOSACRAL NEURITIS NOS	60%	59%	31%	31%
ROTATOR CUFF SYND NOS	60%	58%	33%	37%
CERVICALGIA	58%	55%	27%	27%
LUMBAR DISC DISPLACEMENT	58%	55%	31%	31%
LUMB/LUMBOSAC DISC DEGEN	57%	55%	27%	24%
ROTATOR CUFF RUPTURE	55%	59%	34%	43%
CERV DISC DISPLACMENT	44%	45%	24%	26%
LUMB DISC DIS W MYEOPAT	38%	37%	18%	17%

Chart A-3—Difference in Closure Rates and Closed Incurred Dollar Shares Between 1996/1997 and 2001/2002 Ranked by the Share of Incurred Dollars on Lost-Time Claims Closed Within 24 Months of Date of Injury for 1996/1997, Accident Years 1996/1997 and 2001/2002, NCCI



Glossary of Service Categories

Chart A-4 contains the more detailed treatment types contained in each of the service categories used in this analysis. Complex surgery and anesthesia and surgical treatments may still require further explanation. Complex surgeries are invasive and often require inpatient hospitalization. Surgical treatments are usually noninvasive surgical procedures that are often performed in a doctor's office or emergency room as an outpatient service.

Chart A-4—Glossary of Service Categories, NCCI

SERVICE CATEGORY	
01 Office Visits	001. New patient office visit
01 Office Visits	002. Established patient office visit
01 Office Visits	006. Consultations (initial)
01 Office Visits	007. Consultations (follow-up)
01 Office Visits	081. Consultations (general)
02 Physical Therapy	013. Physical medicine modalities w/ office visit
02 Physical Therapy	014. Physical medicine procedures
02 Physical Therapy	015. Physical medicine tests and measurements
02 Physical Therapy	016. Physical medicine: other
03 Emergency Services	003. Emergency services
04 Hospital Services	004. Hospital services
04 Hospital Services	005. Critical Care
04 Hospital Services	065. Hospital inpatient bundled services
05 Diagnostic Radiology	040. Diagnostic Radiology/Ultrasound head/neck
05 Diagnostic Radiology	041. Diagnostic Radiology/Ultrasound chest
05 Diagnostic Radiology	042. Diagnostic Radiology/Ultrasound spine/pelvis
05 Diagnostic Radiology	043. Diagnostic Radiology (no ultrasound) upper extremities
05 Diagnostic Radiology	044. Diagnostic Radiology (no ultrasound) lower extremities
05 Diagnostic Radiology	078. Other Radiology
06 Complex Diagnostic Testing	045. CT/CAT/MRI head/neck
06 Complex Diagnostic Testing	046. CT/CAT/MRI chest
06 Complex Diagnostic Testing	047. CT/CAT/MRI (spine/pelvis)
06 Complex Diagnostic Testing	048. CT/CAT/MRI upper extremities
06 Complex Diagnostic Testing	049. CT/CAT/MRI lower extremities
06 Complex Diagnostic Testing	079. Other CT/CAT/MRI
07 Pathology	051. Laboratory/Pathology
08 Complex Surgery and Anesthesia	028. Surgery (Integumentary)
08 Complex Surgery and Anesthesia	029. Surgery (musculoskeletal: head, neck, thorax)
08 Complex Surgery and Anesthesia	030. Surgery (spine)
08 Complex Surgery and Anesthesia	031. Surgery (musculoskeletal: shoulder)
08 Complex Surgery and Anesthesia	032. Surgery (musculoskeletal: upper arm, elbow, forearm/wrist)
08 Complex Surgery and Anesthesia	033. Surgery (musculoskeletal: hand & fingers)
08 Complex Surgery and Anesthesia	034. Surgery (musculoskeletal: pelvis, hip)
08 Complex Surgery and Anesthesia	035. Surgery (musculoskeletal: femur/knee)
08 Complex Surgery and Anesthesia	036. Surgery (musculoskeletal: leg/ankle)
08 Complex Surgery and Anesthesia	037. Surgery (musculoskeletal: foot)
08 Complex Surgery and Anesthesia	039. Arthroscopy
08 Complex Surgery and Anesthesia	064. Anesthesia
08 Complex Surgery and Anesthesia	066. Surgery (hernia)
08 Complex Surgery and Anesthesia	072. Surgery (general)
08 Complex Surgery and Anesthesia	073. Surgery (brain)
08 Complex Surgery and Anesthesia	074. Surgery (nerves)

SERVICE CATEGORY

08 Complex Surgery and Anesthesia	076. Surgery (eye)
08 Complex Surgery and Anesthesia	087. Dental Surgery
08 Complex Surgery and Anesthesia	098. Surgery (Cardiovascular)
08 Complex Surgery and Anesthesia	100. Surgery (Digestive System)
08 Complex Surgery and Anesthesia	102. Surgery (Auditory System)
08 Complex Surgery and Anesthesia	104. General Musculoskeletal Surgery
08 Complex Surgery and Anesthesia	106. Abdomen Surgery
08 Complex Surgery and Anesthesia	108. Lymph Surgery
08 Complex Surgery and Anesthesia	110. Mouth Surgery
08 Complex Surgery and Anesthesia	112. Liver, Pancreas, Gallbladder, Kidney, Bladder, Adrenal Surgery
08 Complex Surgery and Anesthesia	114. Reproductive/Urinary Surgery
09 Surgical Treatments	018. Treatment (integumentary)
09 Surgical Treatments	019. Treatment (musculoskeletal: head, neck, thorax)
09 Surgical Treatments	020. Treatment (Spine)
09 Surgical Treatments	021. Treatment (musculoskeletal: shoulder)
09 Surgical Treatments	022. Treatment (musculoskeletal: upper arm, elbow, forearm/wrist)
09 Surgical Treatments	023. Treatment (musculoskeletal: hand & fingers)
09 Surgical Treatments	024. Treatment (musculoskeletal: pelvis, hip)
09 Surgical Treatments	025. Treatment (musculoskeletal: femur/knee)
09 Surgical Treatments	026. Treatment (musculoskeletal: leg/ankle)
09 Surgical Treatments	027. Treatment (musculoskeletal: foot)
09 Surgical Treatments	070. Treatment (lesions)
09 Surgical Treatments	071. Treatment (general)
09 Surgical Treatments	075. Treatment (eye)
09 Surgical Treatments	077. Treatment (ear)
09 Surgical Treatments	094. Misc. Treatment
09 Surgical Treatments	099. Treatment (Digestive System)
09 Surgical Treatments	101. Treatment (Nervous System)
09 Surgical Treatments	103. General Musculoskeletal Treatment
09 Surgical Treatments	105. Abdomen Treatment
09 Surgical Treatments	107. Lymph Treatment
09 Surgical Treatments	109. Mouth Treatment
09 Surgical Treatments	111. Liver, Pancreas, Gallbladder, Kidney, Bladder, Adrenal Treatment
09 Surgical Treatments	113. Reproductive/Urinary Treatment
10 Drugs, Supplies and DME	053. Drugs
10 Drugs, Supplies and DME	054. Supplies
10 Drugs, Supplies and DME	055. Fabrication of Orthotics/Prosthetics
10 Drugs, Supplies and DME	090. Durable Medical Equipment
10 Drugs, Supplies and DME	093. Orthotics Procedures
10 Drugs, Supplies and DME	095. Vision Supplies and Prostheses (Glasses, Prosthetic Eyes, etc.)
10 Drugs, Supplies and DME	096. Hearing Equipment
10 Drugs, Supplies and DME	121. Miscellaneous Supplies
11 Other	008. Legal Consultations
11 Other	009. Psychological testing/diagnosis/evaluation
11 Other	010. Psychotherapy and treatment (includes ECT, hypnosis, drug treatment/monitoring)
11 Other	011. Other Psychological
11 Other	012. Neuromuscular testing
11 Other	017. Burn treatment

SERVICE CATEGORY

11 Other	038. Casting & Strapping
11 Other	050. Acupuncture
11 Other	052. Other Diagnostic (cardiac, allergies, other vascular, pulmonary)
11 Other	056. Home Medical Services
11 Other	057. Nursing Facilities
11 Other	058. Custodial Care
11 Other	059. Immunizations
11 Other	060. Therapeutic/Diagnostic Injections
11 Other	061. Gastroenterology
11 Other	062. Ophthalmology (excluding glasses)
11 Other	063. Dermatological Procedures
11 Other	067. Case Management by physician
11 Other	068. Biofeedback
11 Other	069. Miscellaneous
11 Other	080. Hearing Tests
11 Other	082. Transportation
11 Other	083. Dental Restorative
11 Other	084. Dental Endodontics
11 Other	085. Dental Periodontics
11 Other	086. Dental Prosthodontics and misc. Prosthetics
11 Other	088. Dental orthodontics
11 Other	089. Misc. Dental
11 Other	091. Rehabilitative Services
11 Other	092. Non-Injectable Drugs
11 Other	097. Preventive Services
11 Other	115. Radiation Therapy
11 Other	116. Hyperthermia
11 Other	117. Dialysis
11 Other	118. Cardiac Diagnostic
11 Other	119. Chemotherapy
11 Other	120. Unspecified Medical/Diagnostic

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