



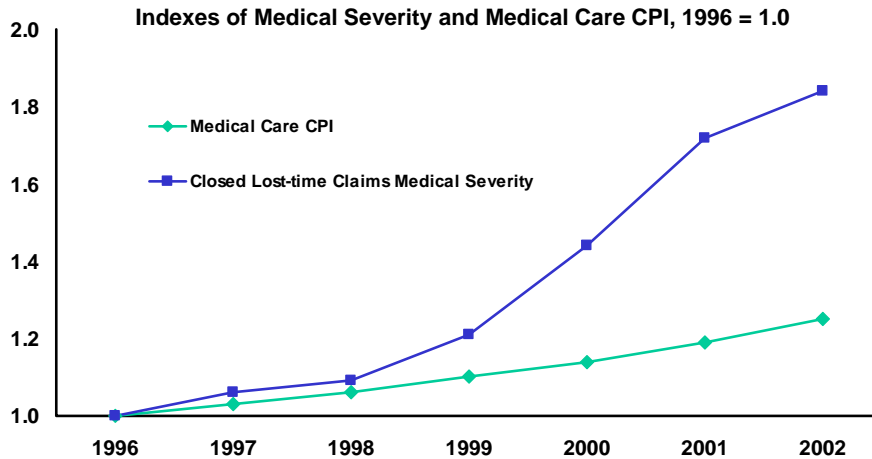
Measuring the Factors Driving Medical Severity: Price, Utilization and Mix

Presented by Martin Wolf, PhD

CAS Ratemaking Seminar WC-4
Key Drivers of Workers Compensation Costs – Economic Perspectives
March 18, 2008
Boston, MA

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Countrywide Medical Severity Is Outpacing the Medical Care CPI



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI; U.S. Bureau of Labor Statistics

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Increase in Medical Care CPI and Paid Medical Severity from 1996/97 to 2001/02

Medical Care CPI and Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury

	Increase Between 2001/02 and 1996/97
Medical Care CPI	21%
Medical Severity on Lost-Time Claims	73%

Source: NCCI

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The Challenge:

Identifying and Quantifying the Drivers of the Medical Severity Increases

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Key Findings: Significant Increases in Medical Severity Reflect Several Factors

- Increases in medical care prices
- Increases in the number of treatments per claim
 - e.g., more physical therapy sessions
- Shifts in the mix
 - to more expensive diagnoses
 - from low-cost lumbosacral sprain to higher cost rotator cuff injuries
 - to more expensive treatments
 - from an established generic to a new brand name drug
 - to more expensive services
 - a relative increase in “complex surgery”

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Key Findings: Quantification of Effects

- A shift toward relatively more severe injuries accounts for roughly 20% of the increase in medical severities
- A markedly higher number of treatments within each diagnosis and service category accounts for roughly 50% of the increase
- Medical care price increases and changes in treatment mix account for the remaining 30%

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Organization of Today's Presentation

- Model of Claims Costs
- Change in Mix (Diagnoses and Age of Worker)
- Changes in Number of Treatments per Claim
- Changes in Cost per Service Treatment
- Joint Impact of Changes in Number of Treatments and Cost per Service Treatment

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A Model of Claims Costs

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A “Model” of Claims Costs

Cost = Price x Utilization

Utilization = Quantity and Mix

Price – Differences in average price per treatment by service category within individual diagnoses

Quantity – Differences in average number of treatments by service category within individual diagnoses

Mix – Differences in diagnosis mix

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Changes in Mix

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An Illustration of the Concept of Changes in “Mix”

On Monday, Johnny buys:
3 Golden Delicious Apples at \$0.50 each, and
4 Macintosh Apples at \$0.25 each
Total cost = (3 x \$0.50) + (4 x \$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 x \$0.50) + (3 x \$0.25) = \$2.75

Avg. Cost per Apple: Mon: 35.7 cents (\$2.50 / 7)
Wed: 39.3 cents (\$2.75 / 7)

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Changes in the Mix of Diagnoses

**Top 10 Claim Diagnoses by Accident Year for
Lost-Time Claims That Closed Within 24 Months of Date of Injury**

	Accident Years 1996/1997		Accident Years 2001/2002	
	Diagnosis and Severity Index		Diagnosis and Severity Index	
1	Sprain Lumbar Region	0.43	Sprain Lumbar Region	0.43
2	Carpal Tunnel Syndrome	1.44	Carpal Tunnel Syndrome	1.17
3	Lower Leg Injury, not otherwise specified	0.87	Lower Leg Injury, not otherwise specified	0.76
4	Lumbar Disc Displacement	1.94	Lumbar Disc Displacement	1.85
5	Sprain Lumbosacral	0.37	Tear Medial Cartilage/Meniscus of Knee	1.64
6	Lumbago	0.61	Cervicalgia	1.24
7	Sprain of Ankle, not otherwise specified	0.25	Lumbago	0.56
8	Cervicalgia	1.33	Sprain Rotator Cuff	2.14
9	Tear Medial Cartilage/Meniscus of Knee	2.03	Unilateral Inguinal Hernia	0.82
10	Unilateral Inguinal Hernia	1.11	Sprain of Ankle, not otherwise specified	0.24

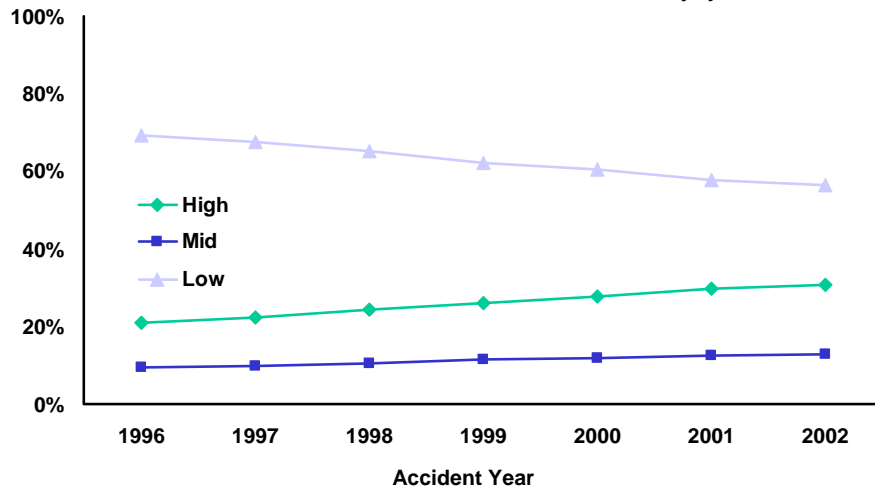
The severity index is the ratio of paid medical severity for that diagnosis to overall average paid medical severity.
Source: NCCI

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The Share of Diagnoses with “Low” Medical Severity Has Declined While the Share of “Mid” and “High” Has Increased

All Lost-Time Claims at 24 Months After Date of Injury



Injuries by diagnosis were classified as high, mid, and low based on paid medical severity in accident year 1998.
Source: NCCI

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Could The Change in Diagnosis Mix Be Related to the Increased Age of Injured Workers?

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Changes in Mix Explain Roughly 20% of the Increase in Paid Medical Severity

Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury

	Increase in Severity, Accident Years 2001/02 vs. 1996/97	Percent of Severity Increase, Accident Years 2001/02 vs. 1996/97
Unadjusted Medical Severities on Lost-Time Claims	73%	100%
Increase Due to Diagnosis Mix and Age Differences*	15%	21%

Source: NCCI

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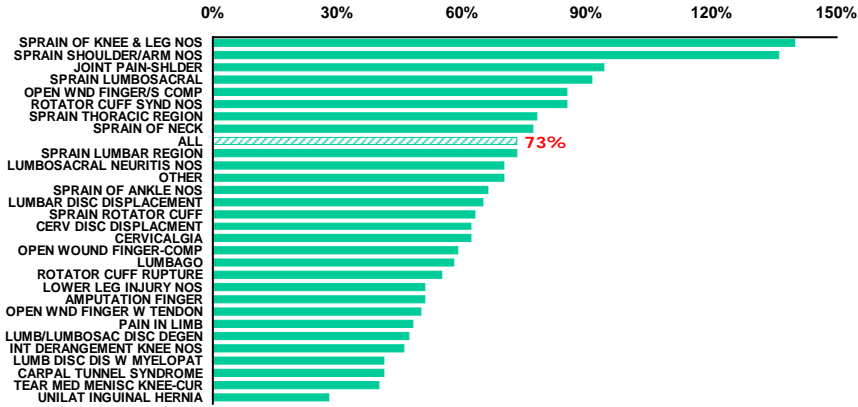
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Changes in Number of Treatments

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Severity Increased in All Leading Diagnoses

Percentage Increase in Severity by Diagnosis Code
Accident Years 2001/2002 Over 1996/1997



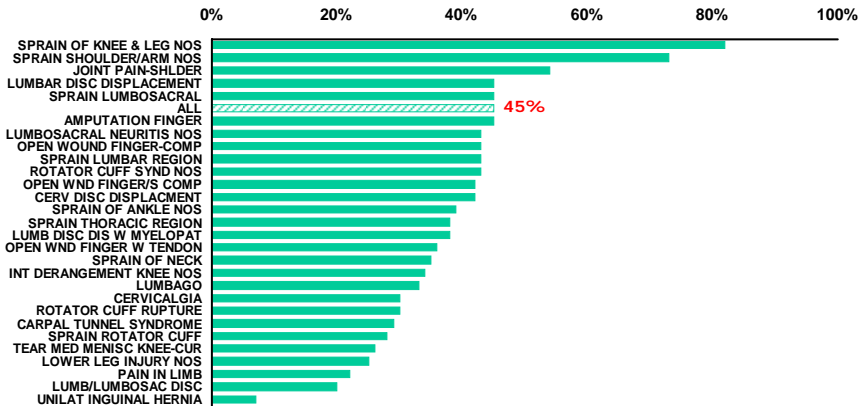
Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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The Number of Treatments per Claim Increased in All Leading Diagnoses

Percentage Increase in Number of Treatments Per Claim by Diagnosis Code
Accident Years 2001/2002 Over 1996/1997



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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What Contributes to These Increases?

Let's Look at the Range of Services

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Treatments per Claim Up the Most for Physical Therapy, Complex Surgery, and Complex Diagnostic Testing

Overall Severity Increase = 73%	Average Treatments per Claim			
	Treatment Service Group	Accident Years 1996/1997	Accident Years 2001/2002	% Difference
	Physical Therapy	19.5	32.6	67%
	Complex Surgery and Anesthesia	1.0	1.5	60%
	Complex Diagnostic Testing	0.4	0.7	57%
	Other	4.4	6.1	39%
	Drugs, Supplies, and DME	5.6	7.5	34%
	Surgical Treatments	0.6	0.7	26%
	Pathology	1.1	1.4	26%
	Emergency Services	0.8	0.9	19%
	Hospital Services	0.9	1.0	15%
	Diagnostic Radiology	2.6	2.9	14%
	Office Visits	5.8	6.4	11%
	Total Treatments	42.6	61.8	45%

Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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Why the Dramatic Increase in the Number of Treatments?

Were More Claims Receiving a Service?

or

Was There an Increase in the Number of Treatments per Service?

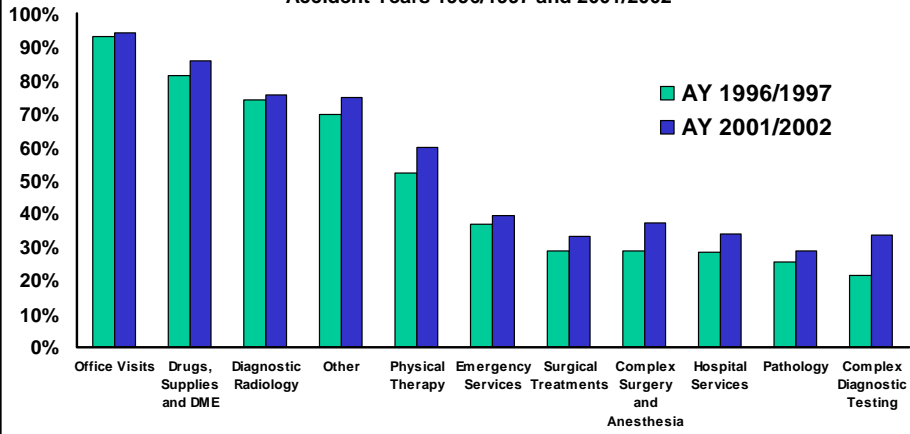
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The Share of Claims Receiving a Service

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The Percentage of Claims Receiving the Indicated Service Increased for All Service Groups

Accident Years 1996/1997 and 2001/2002



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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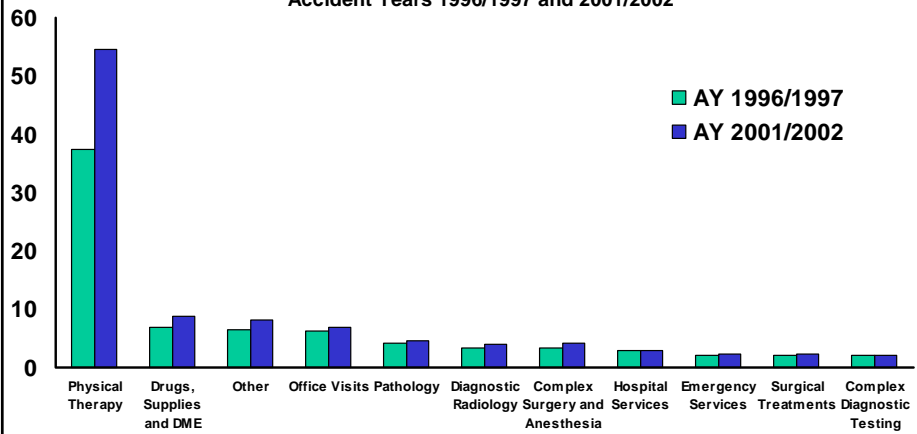
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The Number of Treatments per Service

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Quantity—Number of Treatments per Claim Receiving Indicated Service

Accident Years 1996/1997 and 2001/2002



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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The Average Cost per Service Treatment

- Price and Mix -

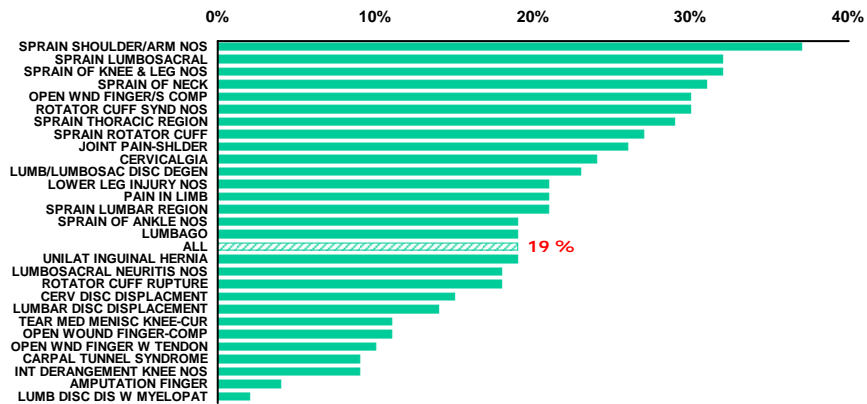
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Average Cost per Service Treatment Reflects Both Price Increases and Shifts Within a Service Category to More Costly Treatments

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Average Cost per Service Treatment Increased in All Leading Diagnoses

Percentage Increase in Average Cost per Service Treatment by Diagnosis Code
Accident Years 2001/2002 Over 1996/1997



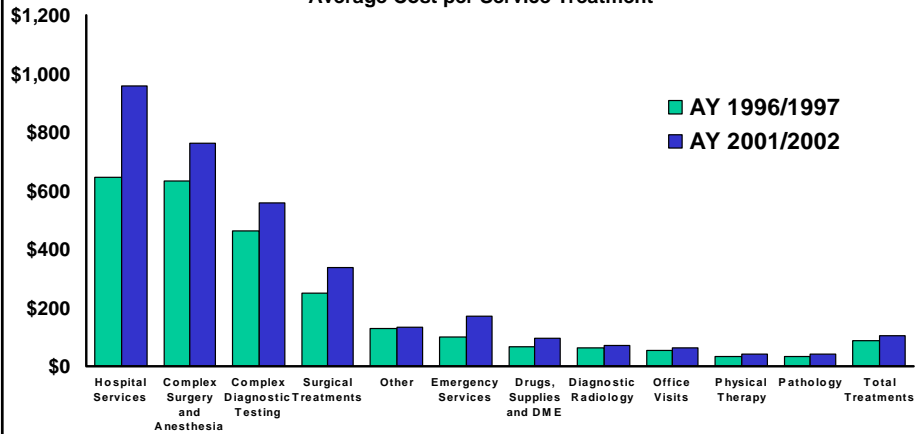
Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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Average Cost per Service Treatment (Price Mix Combination)

Contributions to Medical Claims Costs

Average Cost per Service Treatment



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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The Average Cost per Service Treatment Increased 19%; Medical CPI Was Up 21%

Overall Severity Increase = 73%	Average Cost per Service Treatment*		
	Accident Years 1996/1997	Accident Years 2001/2002	% Difference
Physical Therapy	34	40	19%
Complex Surgery and Anesthesia	634	764	20%
Complex Diagnostic Testing	464	559	21%
Other	131	134	2%
Drugs, Supplies, and DME	66	94	42%
Surgical Treatments	252	336	33%
Pathology	33	40	22%
Emergency Services	101	169	67%
Hospital Services	647	958	48%
Diagnostic Radiology	62	72	17%
Office Visits	54	63	17%
Total Treatments	87	103	19%

Lost-Time Claims Closed Within 24 Months of Date of Injury

*This is an estimate based on dividing total payments by total number of treatments and can also reflect changes in mix within each category.
Source: NCCI

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Combined Impact of Changes in Treatment per Claim and Cost per Service Treatment

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Differences in the Number of Treatments, Cost per Service Treatment, and Severity by Service Group

Overall Severity % 1996/1997 Over 2001/2002: 73%	All Diagnoses							
	Average Treatments per Claim			Average Cost per Service Treatment			Average Dollar & % Dollar Differences in Severity	
	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%

Lost-Time Claims Closed Within 24 Months of Date of Injury

* This is an estimate based on dividing total payments by total number of treatments and can also reflect changes in mix within each category.
Source: NCCI

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Differences in the Number of Treatments, Cost per Service Treatment, and Severity for Sprain of Knee and Leg

Overall Severity % 1996/1997 Over 2001/2002: 139%	Sprain of Knee and Leg, not otherwise specified							
	Average Treatments per Claim			Average Cost per Service Treatment			Average Dollar & % Dollar Differences in Severity	
	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%

Lost-Time Claims Closed Within 24 Months of Date of Injury

* This is an estimate based on dividing total payments by total number of treatments and can also reflect changes in mix within each category.
Source: NCCI

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Changes in The Number of Treatments and the Average Cost per Service Treatment Explain the Major Portion of the Increase in Paid Medical Severity

Paid Medical Severities on Lost-Time Claims Closed Within 24 Months of Date of Injury

	Increase in Severity, Accident Years 2001/02 vs. 1996/97	Percent of Severity Increase, Accident Years 2001/02 vs. 1996/97
Unadjusted Medical Severities on Lost-Time Claims	73%	100%
Increase Due to Diagnosis Mix Differences	15%	21%
Increase Due to Number of Treatments	38%	52%
Remaining Increase Due to Price and Other Factors	20%	27%

Source: NCCI

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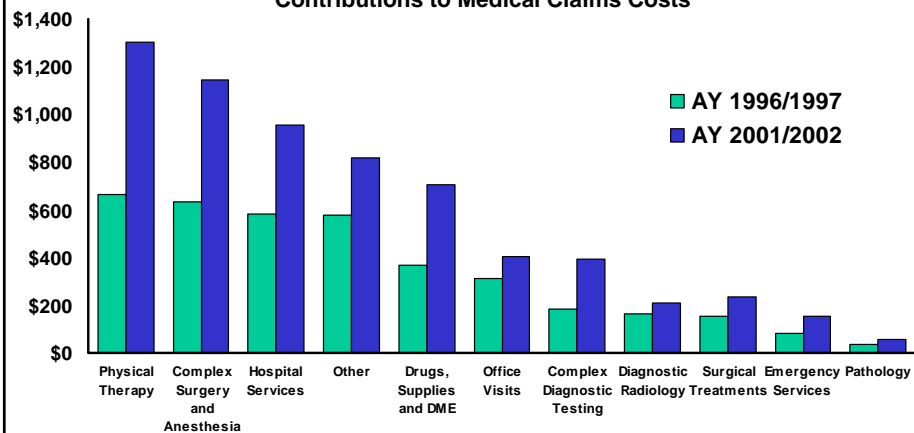
Changes in the Average Cost per Claim

Treatment per Claim and Cost per Service Treatment Combined

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Physical Therapy and Complex Surgery Are the Two Biggest Components of Average Cost Per Claim

Contributions to Medical Claims Costs



Lost-Time Claims Closed Within 24 Months of Date of Injury
Source: NCCI

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Key Findings: Significant Increases in Medical Severity Reflect Several Factors

- Increases in medical care prices
- Increases in the number of treatments per claim
 - e.g., more physical therapy sessions
- Shifts in the mix
 - to more expensive diagnoses
 - from low-cost lumbosacral sprain to higher cost rotator cuff injuries
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 - from an established generic to a new brand name drug
 - to more expensive services
 - a relative increase in “complex surgery”

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Key Findings: Quantification of Effects

- A shift toward relatively more severe injuries accounts for roughly 20% of the increase in medical severities
- A markedly higher number of treatments accounts for roughly 50% of the increase
- Medical care price increases and additional changes in treatment mix account for the remaining 30%

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