



Medical Services by Size of Claim

It is well known that large workers compensation (WC) claims have a different makeup of medical services than small claims. To a large degree, this is common sense—without reviewing data, we know that complex surgery is not a significant cost component for small claims because the existence of complex surgery already pushes the claim size over some threshold. But, knowing the distribution of services by size of claim can help explain claim costs, and may have implications for future cost trends. With medical costs about 60 percent of WC claims costs and growing, it is useful to look into sources of this growth.

This paper presents estimates of the shares of ultimate medical costs for a variety of service categories. We explore possible implications for differing trends by claim size.

Key Findings

- The mix of services differs between small and large claims
 - Office Visits and Emergency Services dominate the smaller claims
 - Surgery and Anesthesia are a larger share of the \$5,000 to \$100,000 claims than of other claim sizes
 - Hospital Services and Prescription Drugs comprise more than 50 percent of the cost of claims that are greater than \$100,000
- The varying mix of services by claim size has implications for the payout rates by type of service
 - Office Visits, Physical Therapy, and Emergency Services have relatively fast payout patterns
 - Hospital Services and Prescription Drugs have relatively slow payout patterns
- Large claims might currently be subject to greater inflation than smaller claims

Background

This section explains how we organized the data for the study and makes a few observations about the data.

Claim Size Determination

Claim size in this study is the case incurred value of a claim at 36 months of maturity, trended to 2006. Medical costs are trended using the Medical Consumer Price Index, and indemnity costs are trended using the Current Population Survey Wage Index. While individual claim sizes will generally continue to develop after 36 months, defining claim size as we have allows us to fix cohorts of claims that we can then track out to 12 years of development. At 36 months a fair amount is usually known about a claim, and incurred values at 36 months generally give a good indication as to which claims will be large at ultimate, and which will be small. The claim size ranges used are shown in Table A.1 in Appendix A.

Distribution of Medical Dollars by Claim Size

Table 1 shows the distribution of claim costs and dollars of loss by size category as well as the estimated ultimate medical cost per claim. Based on this information:

1. About three-fourths of the total number of claims are in the \$1,000 to \$50,000 claim size range.
2. About four-fifths of the ultimate dollars are associated with claims in the \$10,000 to \$500,000 range.

Table 1. Distribution of Lost Time Medical Dollars by Claim Size

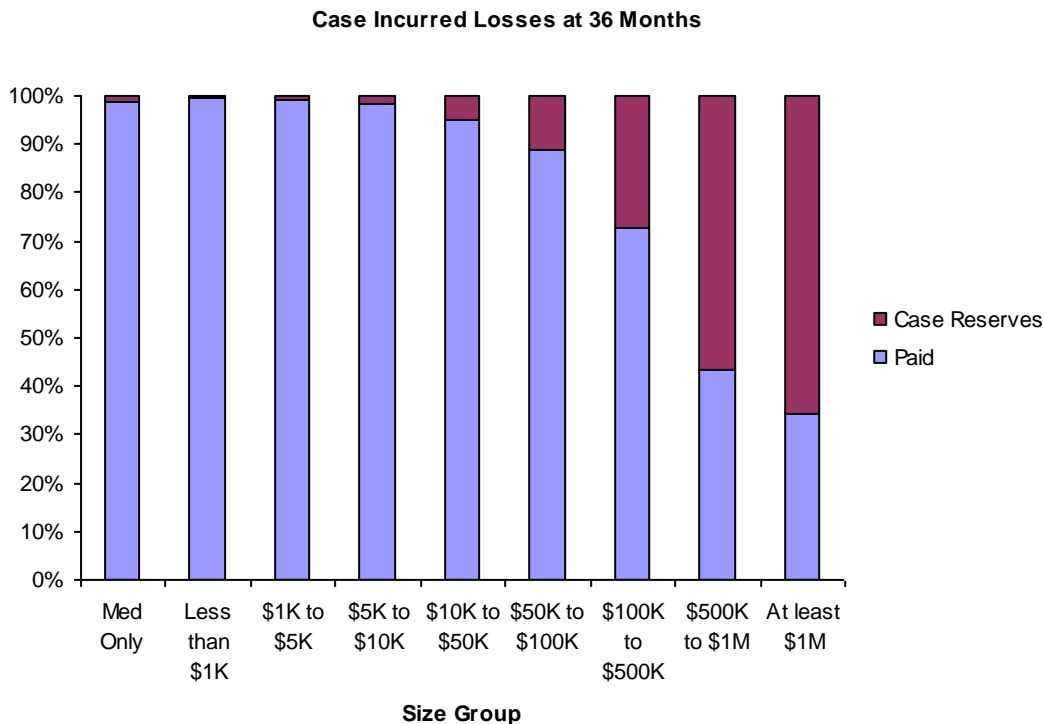
Size Range (\$)*	Annual Claim Count % of Total	Ultimate Cost % of Total	Estimated Ultimate Medical Cost Per Claim
Less than 1K	10.7	0.2	400
1K to 5K	27.2	2.6	1,700
5K to 10K	15.4	4.1	4,700
10K to 50K	32.9	25.8	14,000
50K to 100K	7.6	17.4	41,000
100K to 500K	5.9	38.6	120,000
500K to 1M	0.2	5.3	420,000
At least 1M	0.1	6.0	1,700,000

*Size is reported value (Paid plus Case) at 36 months

Case Incurred at 36 Months

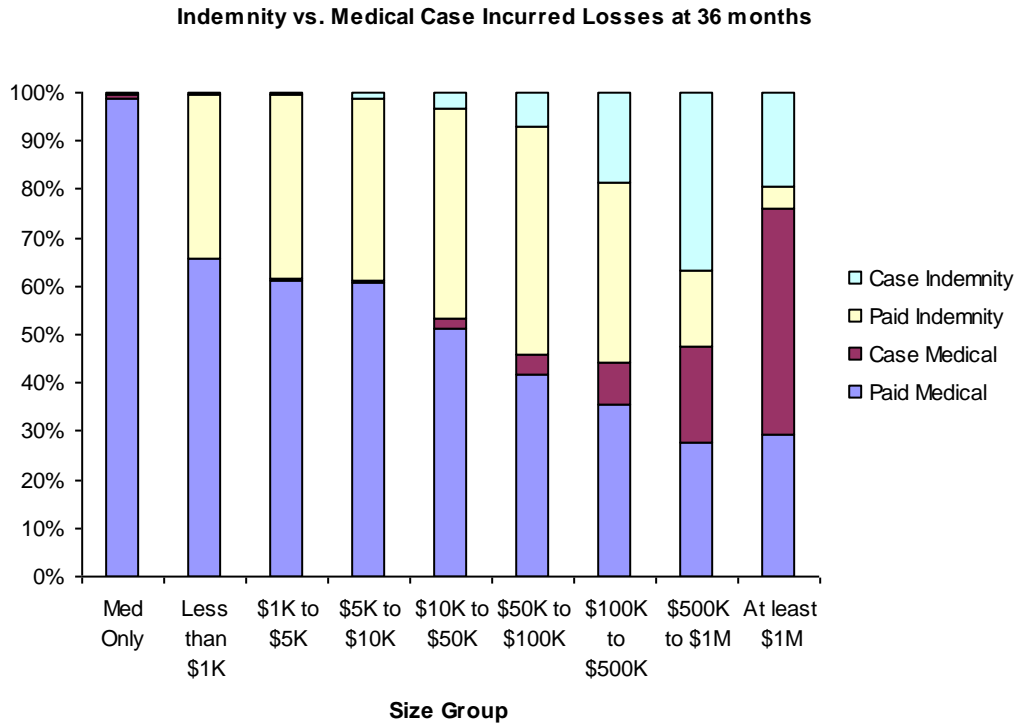
Figure 1 shows that smaller claims are largely paid within three years of the injury while larger claims take longer to pay.

Figure 1: Distribution of Case-Incurred Dollars at 36 Months



For claims at 36 months of maturity that are at least \$1M in size, medical case reserves account for nearly 50 percent of the paid plus case estimate (Figure 2).

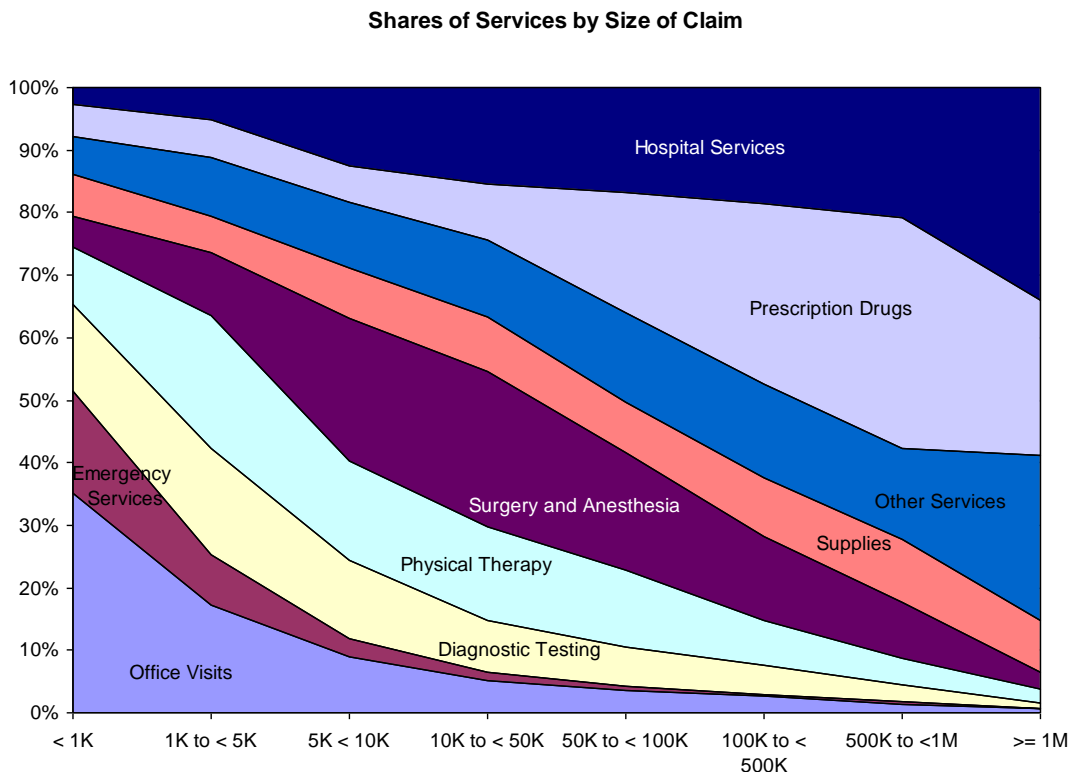
Figure 2: Distribution of Indemnity and Medical Case Incurred Dollars at 36 Months



Estimating Ultimate Shares

Many of the key results we present here are ultimate shares of given medical services for a size range. Ultimate shares by accident year were derived from a review of historical shares by accident year and relative service year, apparent trends in those shares, and payout patterns for size of claim ranges. Technical details are given in Appendix B. The average ultimate shares for Accident Years 2001 to 2003 by size of loss and service category are shown in Figure 3.

Figure 3: Ultimate Lost Time Medical Dollar Distribution by Service Category by Size of Loss



Discussion of Findings

Large Claims vs. Small Claims

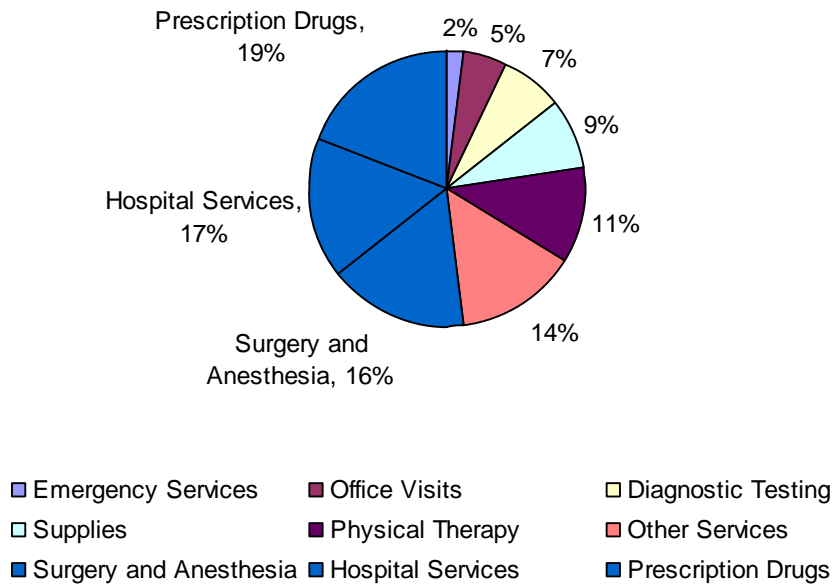
As you move across Figure 3 from left to right, you can see a shift in the mix of medical services as claim size increases. The shares for Office Visits, Emergency Services, Diagnostic Testing, and Physical Therapy are greater for smaller claims than for larger claims. Conversely, the shares for Hospital Services, Prescription Drugs, and Other Services generally increase as the claim size increases. Interestingly, Surgery and Anesthesia costs represent a larger share of total medical costs for claims in the \$5K to \$100K range when compared with either larger or smaller claim sizes.

The shares underlying Figure 3 are given in Appendix A, Table A.1. In Figure 3, and all subsequent exhibits, claim size is the size of the claim at 36 months and shares are based on estimated ultimate values.

Because more than 80 percent of medical costs are for claims between \$10,000 and \$500,000, Prescription Drugs, Hospital Services, and Surgery and Anesthesia, collectively, account for more than half of total ultimate medical dollars (Figure 4).

Figure 4: Ultimate Medical Dollar Service Distribution

Ultimate Medical Dollar Service Distribution



Cost Distribution

Not only are there big differences in shares by service across size ranges, but some services have a higher concentration of their total costs in smaller (larger) claims. For example, less than 30 percent of Prescription Drug costs are associated with claims under \$100K, while more than 70 percent of Office Visit costs are associated with claims of this size (Figures 5 and 6).

Figure 5: Prescription Drugs Share Distribution

**Prescription Drugs Share Distribution
for Lost Time Claims**

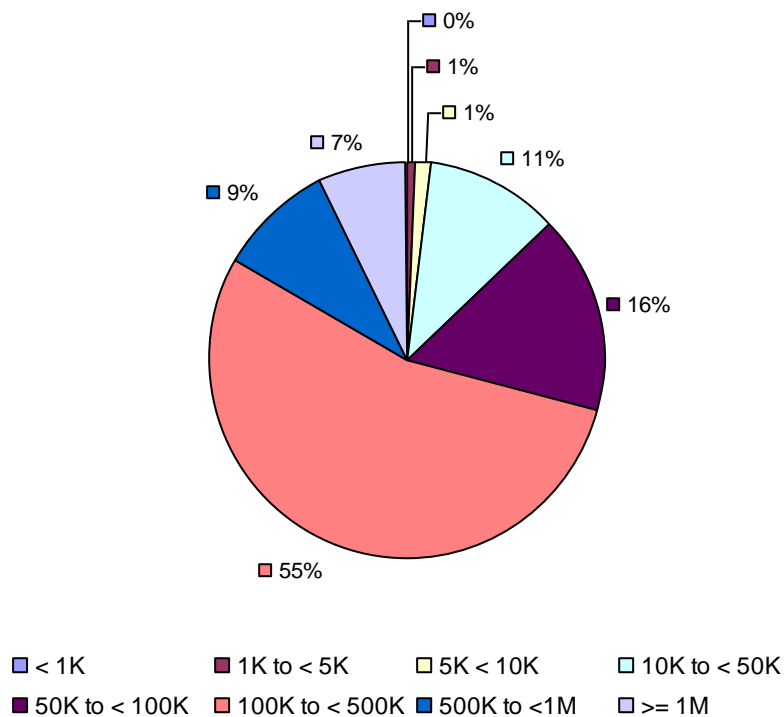
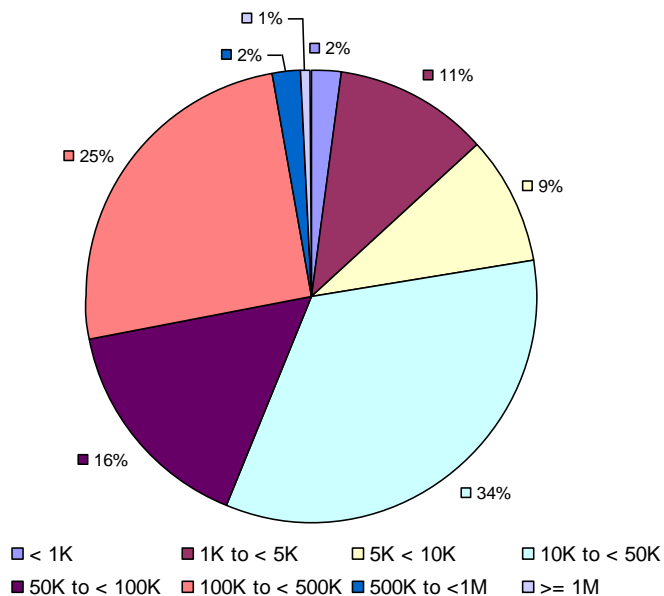


Figure 6: Office Visits Share Distribution

**Office Visits Share Distribution
for Lost Time Claims**



For each the following services, more than 30 percent of the claim dollars expended for that service group are associated with claims in the \$10K to \$50K size range:

- Office Visits
- Physical Therapy
- Emergency Services
- Diagnostic Testing
- Surgery and Anesthesia

Less than 15 percent of total Prescription Drug costs are associated with claims in this size range (See Appendix A Table A.2).

In contrast, more than 50 percent of Prescription Drug costs and approximately 40 percent of each of Hospital Services, Other Services, and Supplies are expended in connection with claims in the \$100K to \$500K claim size range. In fact, the distribution of Hospital Services and Other Services across the different size groups are quite similar (Figures 7, 8, and 9).

Figure 7: Hospital Services Share Distribution

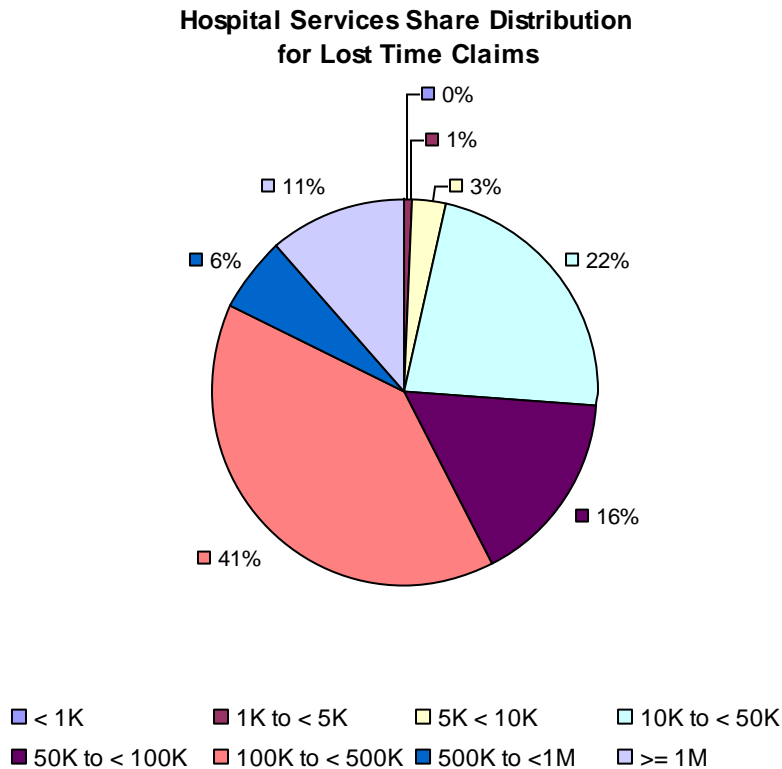


Figure 8: Other Services Share Distribution

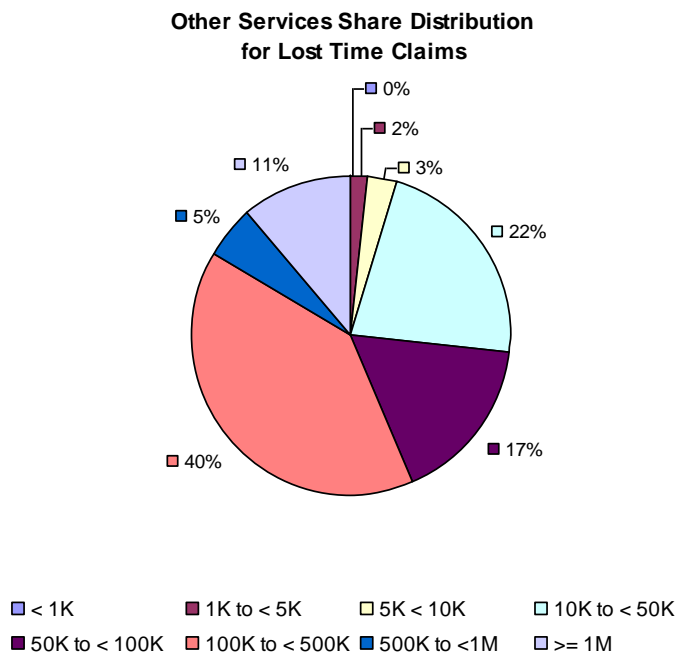
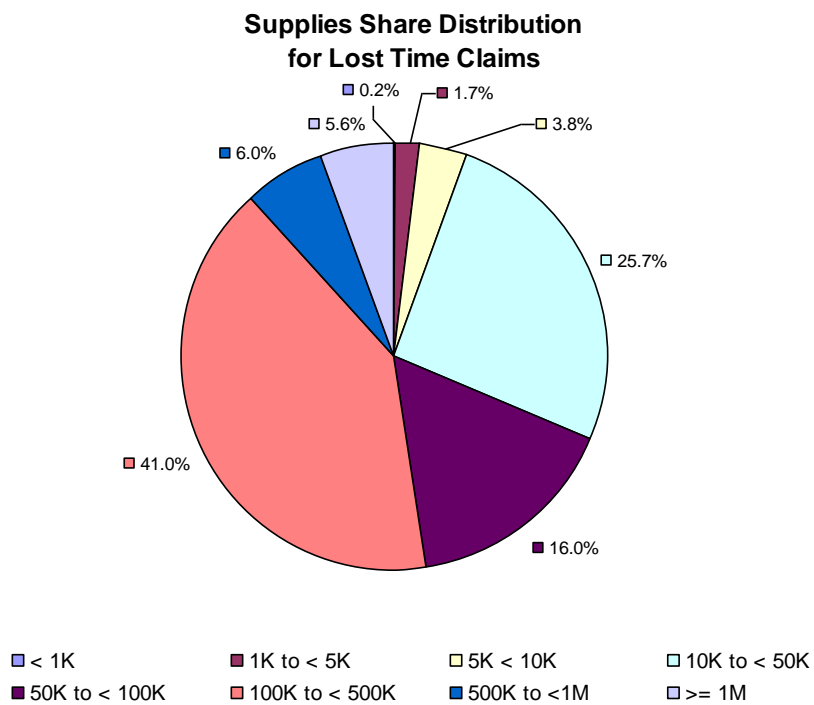


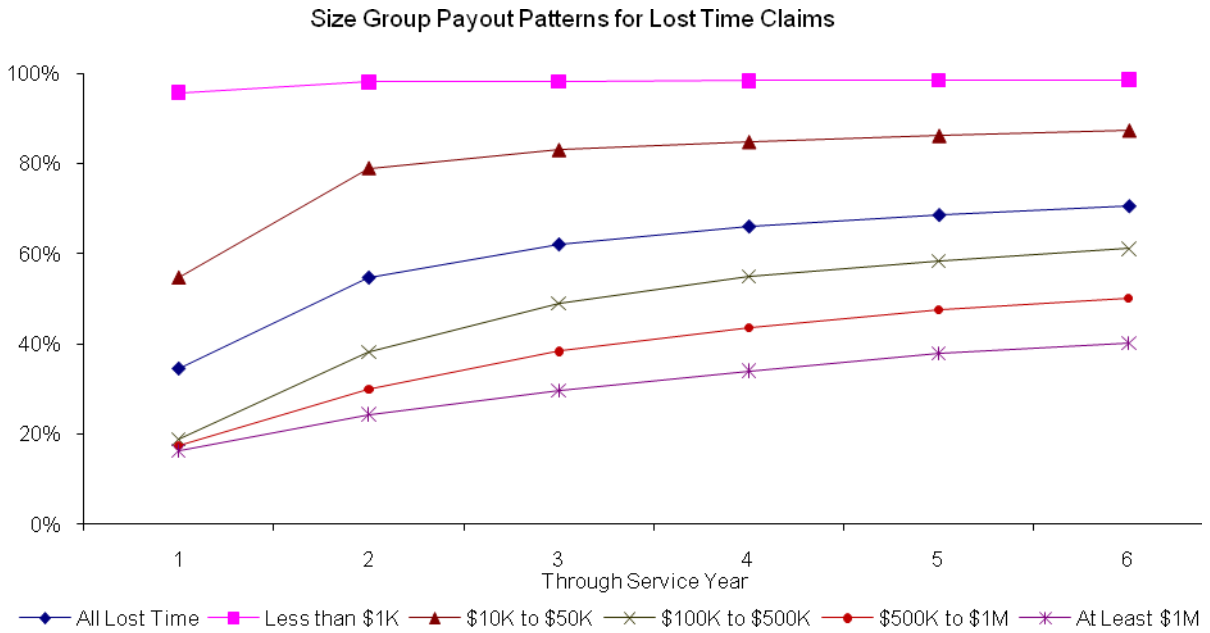
Figure 9: Supplies Share Distribution



Payout Patterns

We now turn to relationships among payout rates, claim size, and service distribution. Larger claims tend to take longer to pay out than smaller claims (see Figure 10). While 80 percent of medical costs are paid out by the second service year for claims that are less than \$50K, only 40 percent are paid by the end of the sixth service year for claims that exceed \$1 million. This implies that services that are more prevalent in the smaller claim size categories will generally pay out faster than services that are more prevalent in the larger claim size categories.

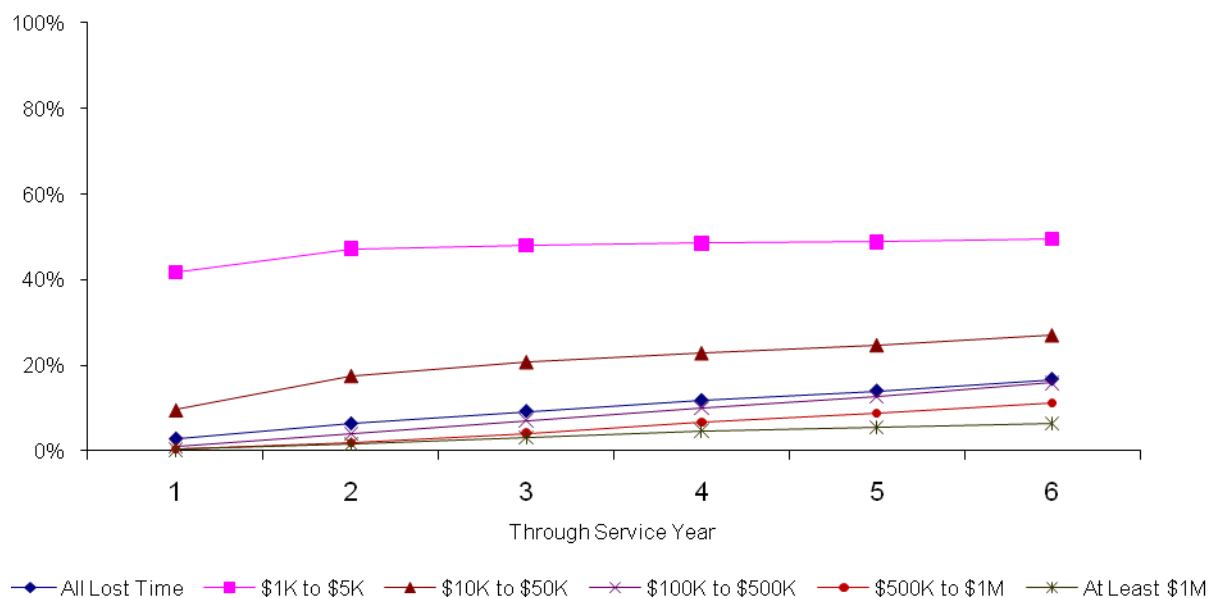
Figure 10: Payout Pattern by Size of Loss



Prescription drugs provide the most extreme example, exhibiting the slowest payout rate of any service category. On an overall basis, less than 20 percent of prescription drug costs for indemnity lost-time claims are paid by the end of the sixth service year (Figure 11). There are two main drivers contributing to this slow rate of payout. First, most prescription drug payouts are associated with claims in the larger claim size categories—which typically payout more slowly. In addition, prescription drugs have a slower payout rate versus any other service category—even for the small claim sizes. For example, for claims in the \$1K to \$5K size range, only about 50 percent of drug costs are paid by the sixth service year, while nearly 95 percent of all medical costs for this size category are paid at that point.

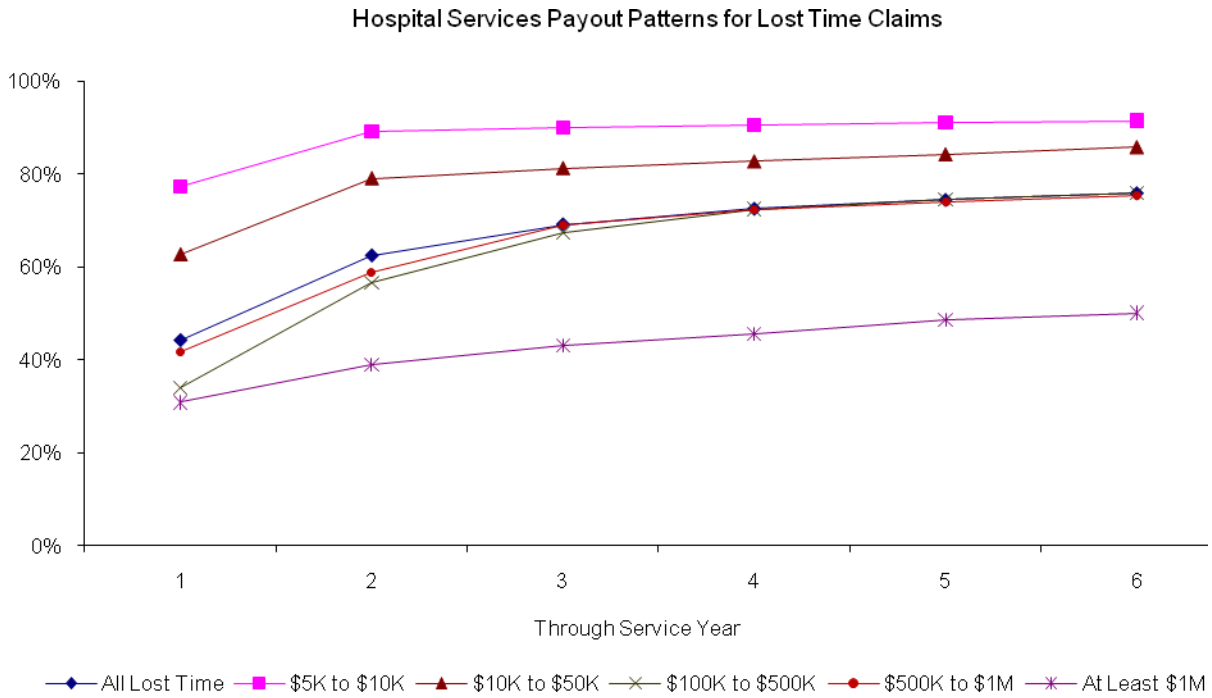
Figure 11: Prescription Drug Payout Pattern by Size of Loss

Prescription Drug Payout Patterns for Lost Time Claims



Hospitals have the second slowest payout pattern (Figure 12). In fact, the Hospital Services payout pattern is between the overall payout patterns for all services for the claims greater than \$100K and claims less than \$100K. It is interesting to note that for claims greater than \$100K, a larger proportion of Hospital Services are paid in the first service year than for the average service. This is mainly due to the fact that severe injuries are more likely to require a hospital stay earlier on in the claim's life when compared with less severe injuries.

Figure 12: Hospital Services Payout Pattern by Size of Loss



At the other extreme, Physical Therapy (Figure 13) and Office Visits (Figure 14) pay out faster than the average for lost-time claims across all service categories.

Figure 13: Physical Therapy Payout Pattern by Size of Loss

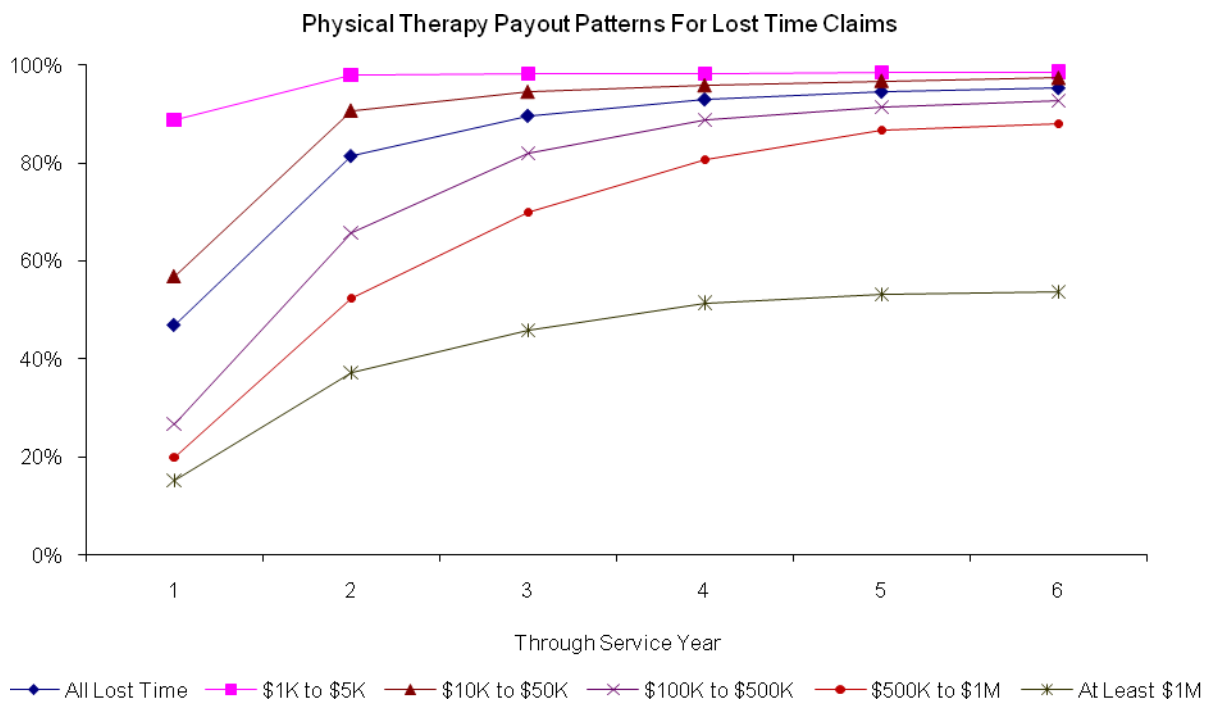
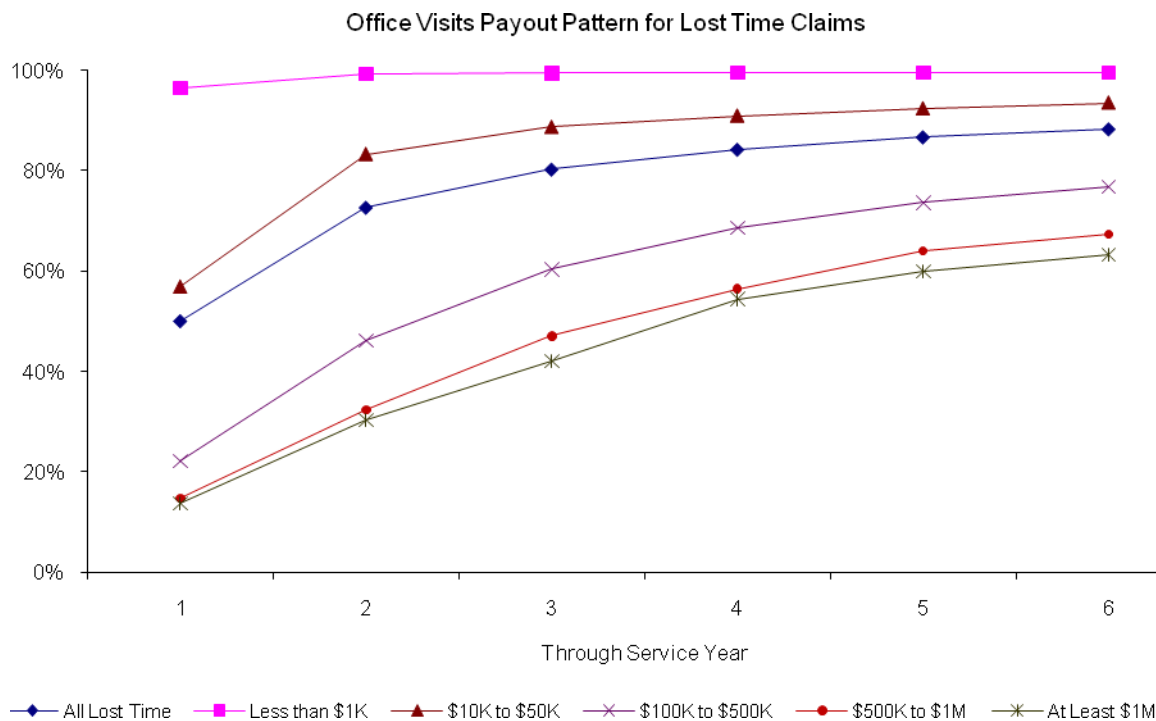


Figure 14: Office Visits Payout Pattern by Size of Loss

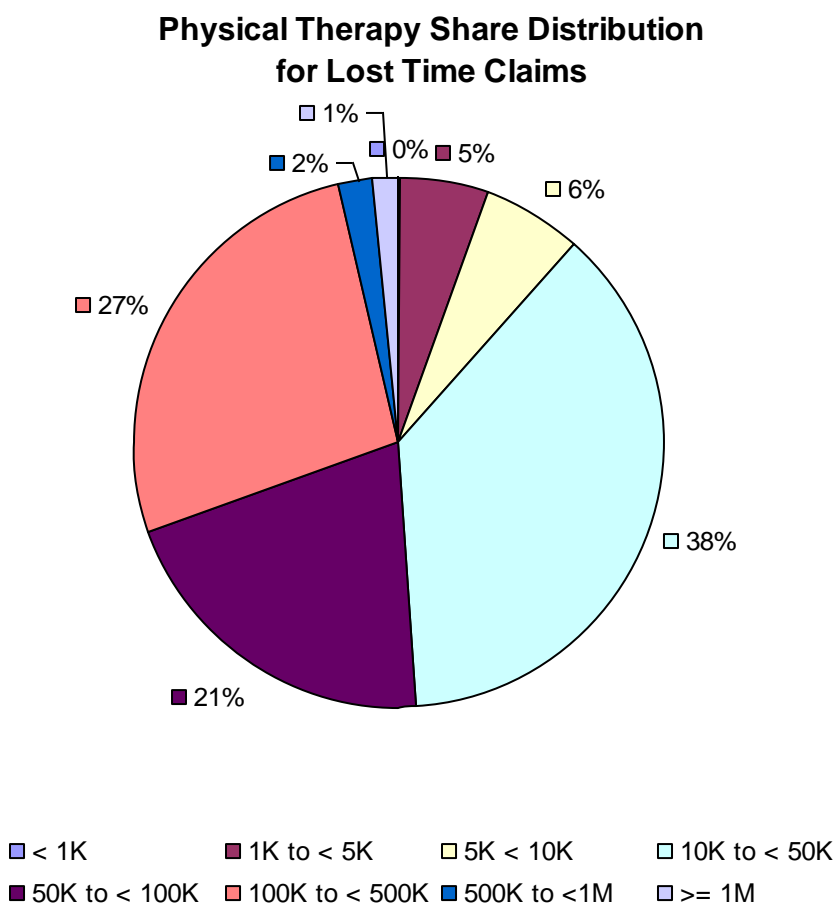


There are two drivers contributing to the faster payout for Physical Therapy. One is that within each size range, Physical Therapy pays out faster than the average service. The other is that Physical Therapy costs are more concentrated in smaller claim sizes—which tend to pay out more rapidly.

The faster payout for Physical Therapy in each size range is shown by contrasting Figure 13, Physical Therapy payout patterns, with Figure 10, payout patterns across all lost-time claims. More than 90 percent of Physical Therapy costs are paid by the sixth service year for claim sizes up to \$500K. In contrast, the percentages paid by the sixth service year for overall services on lost-time claims range from 61 percent for the \$100K to \$500K claims to 87 percent for the \$10K to \$50K claims.

The concentration of Physical Therapy costs in smaller claims is illustrated by the fact that nearly 70 percent of Physical Therapy costs are associated with claims under \$100K (Figure 15), while only 50 percent of total lost-time medical costs are associated with claims under \$100K (Appendix A, Table A.2).

Figure 15: Other Services Share Distribution



It is interesting to note that 95 percent of Physical Therapy costs are paid by the sixth service year, while less than 71 percent of total lost time medical costs are paid by that point.

While not as fast as Physical Therapy, Office Visits payout rates by size range are still faster than the average of all services combined (Figures 10, 13 and 14). Costs associated with Office Visits are slightly more concentrated in the smaller claim size ranges than are Physical Therapy costs. In fact, 72 percent of Office Visit costs are associated with claim sizes less than \$100K (Figure 6) compared with a corresponding figure of 70 percent for Physical Therapy. Overall, 88 percent of lost-time Office Visit costs are paid by the sixth service year.

Trend

Because historical cost trends have varied from one medical service type to another, knowing the service composition of different size claims might be useful in forecasting cost trends for different claim size groups. From 1998 to 2007, according to the Medical Consumer Price Index (CPI), the average prices of medical services increased 45 percent (Appendix C, Table C.1). Hospital Services had above-average price changes, at 75 percent, Prescription Drugs had near-average price increases at 43 percent, and Professional Services had below-average price increases, at 35 percent. This suggests that claims with larger medical components might be trending at a higher rate than that associated with smaller claims—because Hospital and Prescription Drug costs are a large share of medical costs for large claims, while Professional Services are a large share of costs for smaller claims. In fact, a rough calculation suggests that the average cost per medical service for services on claims greater than \$1 million might recently have been increasing at about 1 percent per year more than the average cost per medical service for services for claims less than \$50,000. Of course, other factors affect changes in the costs of otherwise comparable claims from one year to the next, including changes in the number of services provided for comparable injuries, and the mix of services provided.

Claims that are open for a long period tend to be larger than claims that close quickly. As a result, the possible higher trend for larger claims suggests that claims open for more than a few years might be subject to higher trend than claims that close more quickly.

Also, a higher trend for larger claims might have a leveraged effect of on claims covered excess of large deductibles or excess of reinsurance retentions.

Conclusion

Large claims have a substantially different mix of medical services when compared with that for small claims. This difference in the mix of services affects the resulting payout pattern for a given service and might have implications for differences in trend for claims of varying sizes.

Acknowledgements

Chris Laws, Satya Arya, and Jay Rosen contributed to this study.

Appendix A—Distribution Tables

Table A.1: Shares by Service Group and Size of Claim
Average for Accident Years 2001 to 2003

	All Claims	Med Only	Lost Time Only	Less than \$1K	\$1K to \$5K	\$5K to \$10K	\$10K to \$50K	\$50K to \$100K	\$100K to \$500K	\$500K to \$1M	At Least \$1M
Office Visits	5.3%	17.7%	4.0%	35.2%	17.2%	8.9%	5.2%	3.6%	2.6%	1.4%	0.6%
Physical Therapy	11.0%	16.2%	10.4%	9.2%	21.2%	16.0%	15.0%	12.4%	7.3%	4.3%	2.3%
Emergency Services	2.0%	11.1%	0.9%	16.2%	8.1%	3.1%	1.2%	0.6%	0.4%	0.3%	0.2%
Hospital Services	16.7%	6.5%	17.9%	2.6%	5.2%	12.4%	15.5%	16.9%	18.5%	20.9%	34.1%
Diagnostic Services	7.0%	14.9%	6.2%	13.9%	17.1%	12.4%	8.3%	6.2%	4.6%	2.7%	0.8%
Surgery and Anesthesia	16.1%	10.6%	16.8%	4.8%	10.0%	22.8%	24.9%	18.9%	13.5%	9.0%	2.7%
Prescription Drugs	19.1%	5.9%	20.6%	5.2%	6.0%	5.8%	8.8%	19.1%	28.9%	36.7%	24.7%
Other Services	14.1%	10.0%	14.6%	6.0%	9.4%	10.6%	12.3%	14.3%	15.1%	14.7%	26.6%
Supplies	8.6%	7.1%	8.7%	6.8%	5.9%	8.1%	8.7%	8.0%	9.3%	9.9%	8.1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Size is reported value (Paid Plus Case) at 36 months and shares are at estimated ultimate value.

Appendix A—Distribution Tables (Cont'd)

Table A.2: Distribution Indemnity Claim Medical Costs for Given Services Across Size Ranges
Average for Accident Years 2001 to 2003

	Less than \$1K	\$1K to \$5K	\$5K to \$10K	\$10K to \$50K	\$50K to \$100K	\$100K to \$500K	\$500K to \$1M	At Least \$1M	Total
Office Visits	2.1%	11.2%	9.1%	33.7%	16.0%	25.2%	1.9%	0.9%	100.0%
Physical Therapy	0.2%	5.2%	6.3%	37.1%	20.7%	27.0%	2.2%	1.3%	100.0%
Emergency Services	4.1%	22.1%	13.2%	32.9%	10.5%	14.4%	1.8%	1.0%	100.0%
Hospital Services	0.0%	0.8%	2.8%	22.4%	16.4%	39.9%	6.2%	11.5%	100.0%
Diagnostic Testing	0.5%	7.2%	8.2%	34.6%	17.6%	28.7%	2.3%	0.8%	100.0%
Surgery and Anesthesia	0.1%	1.5%	5.6%	38.3%	19.6%	31.1%	2.9%	1.0%	100.0%
Prescription Drugs	0.1%	0.7%	1.1%	11.0%	16.2%	54.1%	9.5%	7.2%	100.0%
Other Services	0.1%	1.7%	3.0%	21.8%	17.1%	40.0%	5.3%	11.0%	100.0%
Supplies	0.2%	1.7%	3.8%	25.7%	16.0%	41.0%	6.0%	5.6%	100.0%
Total	0.2%	2.6%	4.1%	25.8%	17.4%	38.6%	5.3%	6.0%	100.0%

Size is reported value (Paid Plus Case) at 36 months and shares are at estimated ultimate value.

Appendix B—Technical Appendix

Data

We looked at medical payments for claims in accident years 1996 to 2003, using sample data provided by carriers for states where NCCI provides ratemaking services.

Service Group

We looked at data over 9 different service groups and 11 different service periods.

The service groups were as follows:

1. Office Visits
2. Physical Therapy
3. Emergency Services
4. Hospital Services
5. Diagnostic Testing
6. Surgery and Anesthesia
7. Drugs
8. Other Services
9. Supplies

Estimating Ultimate Shares

Our main analysis estimates service category shares by accident year and relative service year. For each service category and size range (at 36 months, trended to 2006), we used two loss development triangles:

- A triangle with the dollars paid for the service category by accident year and relative service year, and
- A triangle with dollars paid across all service categories by accident year and relative service year.

The ratio of these triangles gives the historic shares for the service category by accident year and service year. We completed the triangle taking into account apparent trends in the shares by accident year and service year, and we selected shares for the service periods beyond the available data.

We used the payout patterns indicated by the paid triangle for all service categories to weight the shares in a given service category, and estimate the service category's share of ultimate medical costs for each accident year.

Appendix C—Medical Consumer Price Index Inflation

**Table C.1: Cumulative Change in Consumer Price Index
From 1998 Through 2007**

Item	Cumulative Change
Medical care	+45%
Medical care commodities	+31%
Medical care services	+50%
Prescription drugs	+43%
Nonprescription medical equipment and supplies	+6%
Professional services	+35%
Physicians' services	+32%
Dental services	+52%
Eyeglasses and eye care	+19%
Services by other medical professionals	+27%
Hospital and related services	+74%
Hospital services	+75%
Inpatient hospital services	+71%
Outpatient hospital services	+82%
Nursing home and adult day care services	+49%

Source: <http://www.bls.gov/data/>

Extract Date: August 8, 2008

Table C.2: Definitions of published medical care indexes as of December 2007

Item	Definition
Medical care	Medical care commodities and medical care services.
Medical care commodities	Prescription drugs, nonprescription over-the-counter-drugs, and other medical equipment and supplies.
Prescription drugs	All drugs dispensed by prescription. Mail order outlets are included. Prices reported represent transaction prices between the pharmacy, patient, and third party payer, if applicable.
Nonprescription medical equipment and supplies	Nonprescription medicines and dressings used externally, contraceptives, and supportive and convalescent medical equipment (i.e., adhesive strips, heating pads, athletic supporters, and wheelchairs).
Medical care services	Professional medical services, hospital services, nursing home services, and health insurance imputation.
Professional services	Physicians, dentists, eye care providers, and other medical professionals.
Physicians' services	Services by medical physicians in private practice, including osteopaths, which are billed by the physician. Includes house, office, clinic, and hospital visits. (Excludes ophthalmologists. See Eyeglasses and eye care.)
Dental services	Services performed by dentists, oral or maxillofacial surgeons, orthodontists, periodontists, or other dental specialists in group or individual practice. Treatment may be provided in the office or hospital.
Eyeglasses and eye care	Services provided by opticians, optometrists, and ophthalmologists. Includes eye exams, dispensing of eyeglasses and contact lenses, office visits, and surgical procedures in the office or hospital.
Services by other medical professionals	Services performed by other professionals such as psychologists, chiropractors, physical therapists, podiatrists, social workers, and nurse practitioners in or out of the office.
Hospital and related services	Services provided to inpatients and outpatients. Includes emergency room visits, nursing home care and adult day care. Includes transaction prices only.
Hospital services	Services provided to patients during visits to hospitals, ambulatory surgical centers, or other similar settings.
Inpatient hospital services	Services for inpatients. Includes a mixture of itemized services, DRG-based services, per diems, packages, or other bundled services.
Outpatient hospital services	Services provided to patients classified as outpatients in hospitals, free standing services facilities, ambulatory surgery, and urgent care centers.
Nursing home and adult day care services	Charges for residential care at nursing homes, nursing home units of retirement homes, and convalescent or rest homes. Also includes non-residential adult day care, a newer item with few price observations at this time.

Source: <http://www.bls.gov/cpi/cpifact4.htm>

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