



## Analyzing the Shift in the Medical Share of Total Benefits

The medical share of total losses has grown dramatically—from just over 40% in the early 1980s to almost 60% today. These ratios are based on actuarial estimates of ultimate accident year losses. Embedded in these simple ratios is information about the year-to-year changes in medical and indemnity claims payments.

In this study, we investigate the shift in the medical share of total benefits at a more granular level.<sup>1</sup> We first look at patterns using both estimated ultimate and the reported data on which the estimated ultimate is based. Then we look at incremental triangles to isolate payments by report period and accident year to examine what has been happening to the periodic annual payments that contribute to the growing medical share of ultimate losses. We also examine the role of inflation in the rising relative costs of medical losses. And finally, we recognize that the share of medical varies across states and examine the data to see if the change in the mix of states has had any influence. In the appendix, we break down the overall medical share of total benefits to lost time and medical-only for the accident years and reports with available data.

### Key Findings

We find that the rising importance of medical losses is pervasive, whether we look at estimated ultimate losses, reported data, or incremental payments by accident year and report period.

There are interesting patterns in the detailed incremental triangle data.

- Looking at the data by report period reveals that the medical share has been increasing over time for most report periods.
- Looking at the pattern by accident year shows that for a given accident year, the medical share starts out high, falls until the fourth or fifth report, and rises slowly again.

We found that slightly more than half of the increased medical share was the result of differences in medical and wage inflation rates, while the balance was attributed to differences in the growth in medical and indemnity utilization.

Furthermore, although there are differences in the medical share by state, the change in the relative mix of states has had very little impact on the estimated countrywide share of medical and indemnity benefits.

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<sup>1</sup> The medical share of total benefits is defined as medical losses divided by the sum of medical and indemnity losses. The calculation is the same whether we are using estimated ultimate data, paid data reported to date, or incremental paid data by accident year and report period.

In a separate analysis shown in the appendix using unit report data (rather than the financial call data used in this study), we estimated the share of medical-only losses in the first report year at about 15%.

**The Medical Share of Total Losses Has Been Increasing**

Exhibit 1 shows that over the past two decades, the estimated ultimate share of medical has grown markedly—from 46% of ultimate benefits for injuries occurring in accident year 1987 to the 59% preliminary estimate for Accident Year 2007.<sup>2</sup>

## Medical Share of Total Benefits Has Grown Over 20 Years

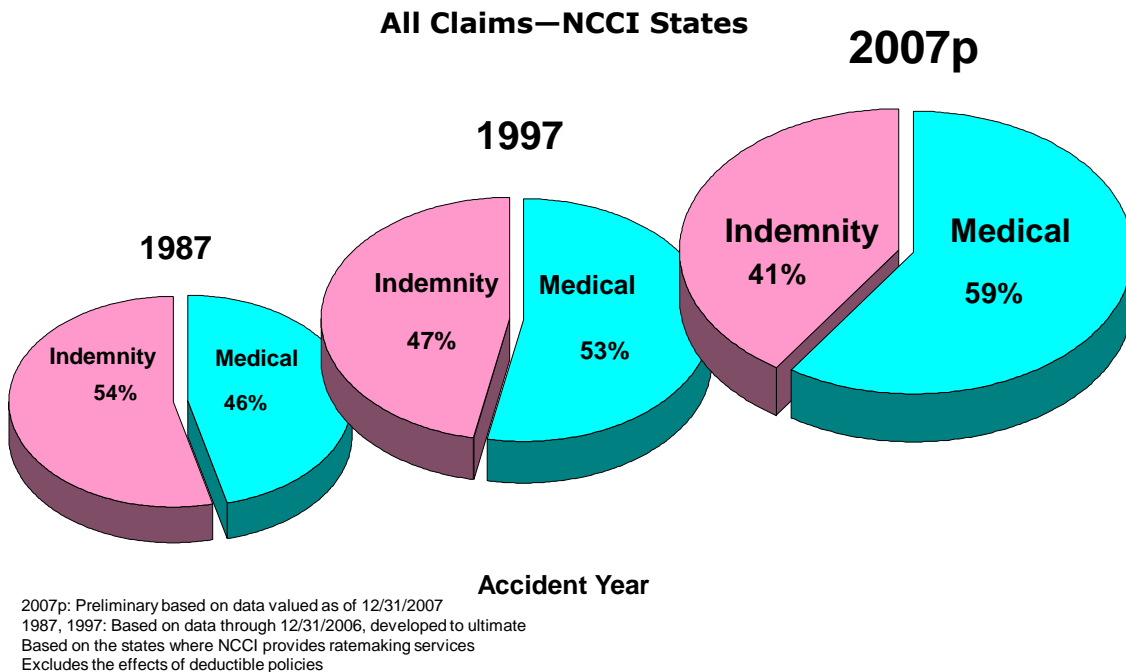


Exhibit 1

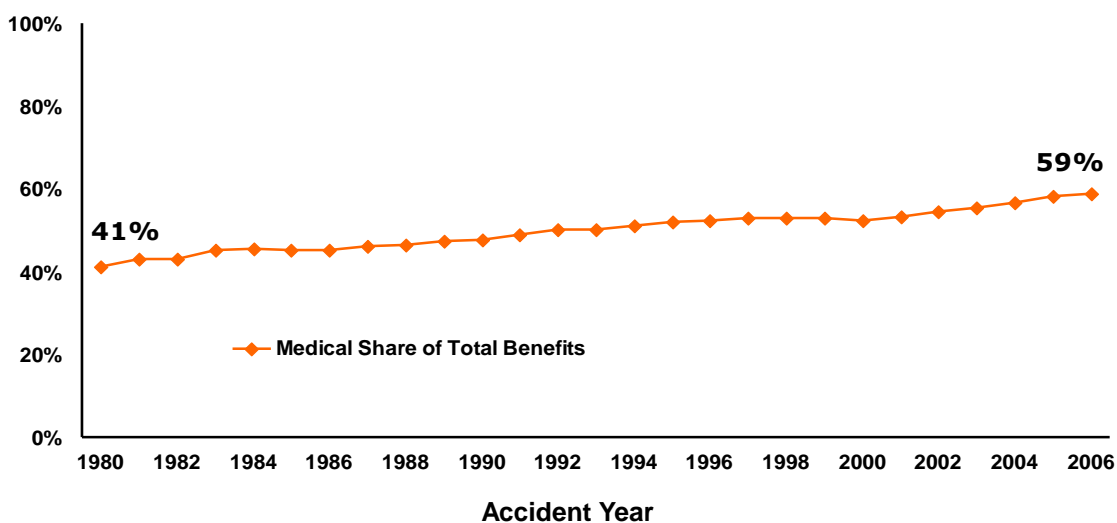
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<sup>2</sup> The remainder of this study uses data valued at 12/31/2006, the most current data available at the time the analysis was performed.

In Exhibit 2, we see that the increase in the medical share of total losses over time has been slow and steady from 41% in 1980 to 59% in 2006. Exhibits 1 and 2 are based on estimates of ultimate losses, which are based on actuarial development of reported benefits (paid or paid plus case reserves). We will look at the underlying reported data in the next two sections.

## Medical Share of Total Has Been Increasing

Share of Total Benefits—Estimated Ultimate

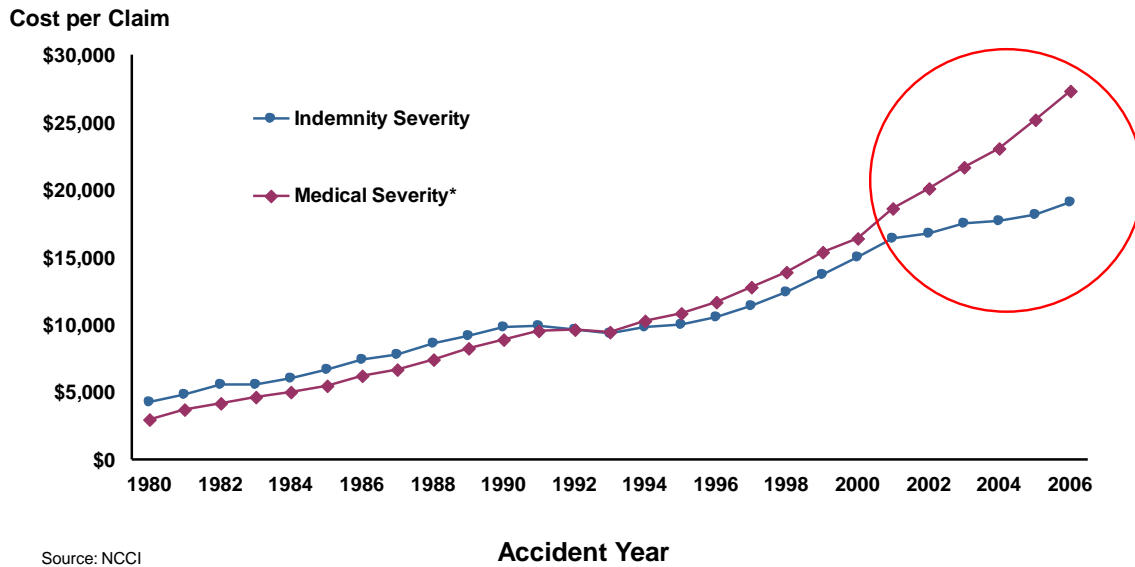


Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services  
Data developed to ultimate and without loss limitation  
Excludes the effects of deductible policies, adjustments for wage inflation, and changes in benefit level

Exhibit 2

By definition, the growing share of medical reflects the faster growth of medical severity relative to indemnity severity (see Exhibit 3). The rising share of medical since 2001 reflects the growth in medical severity combined with a moderation in the growth of indemnity severity.

## Medical Share Is Also Based on Indemnity Severity, Which Is Slowing



Source: NCCI

### Accident Year

\* Medical severity includes all medical losses divided by lost-time claims. Medical only claim counts are not available.

Based on data through 12/31/2006 in the states where NCCI provides ratemaking services

Data developed to ultimate and without loss limitation

Excludes the effects of deductible policies, adjustments for wage inflation, and changes in benefit level

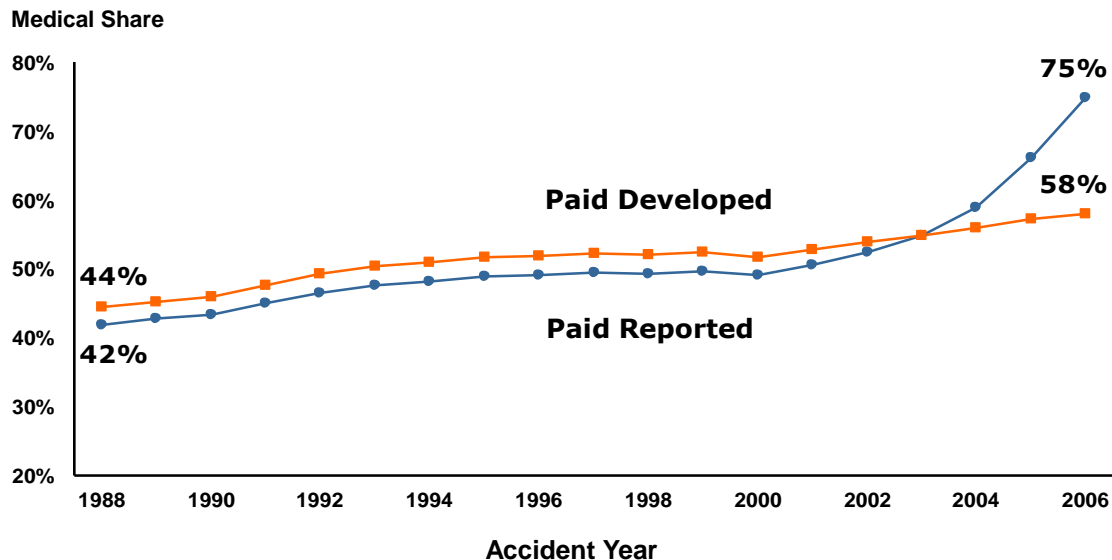
### Exhibit 3

## Reported Versus Developed Data

In Exhibit 4, we compare the estimated ultimate medical share and the medical share of reported paid on which the ultimate estimate is based. For the paid reported data, the medical share of total losses is approximately 75% in the initial year of the most recent accident year (2006) but after 19 years (i.e., accident year 1988), the medical share of actual paid losses has dropped to 42%. In part, the high initial level of medical payments reflects the significance of medical-only early in an accident year as seen in the appendix. As shown even more clearly in the next section where we look at incremental data, the high level also reflects differences in accident year and report period payment patterns.

## Medical Share of Total Has Been Increasing

All NCCI States, All Writers



Source: NCCI  
Based on unlimited data through 12/31/2006 in the states where NCCI provides ratemaking services

### Exhibit 4

The second line in Exhibit 4 shows the medical share when the reported numbers are developed to ultimate. The medical share of estimated ultimate total indemnity and medical losses is 58% for Accident Year 2006 (much lower than the 75% of actual paid losses in 2006 for Accident Year 2006) and 44% of estimated ultimate for Accident Year 1988 (slightly higher than the 42% of cumulative loss payments through 19 years.)

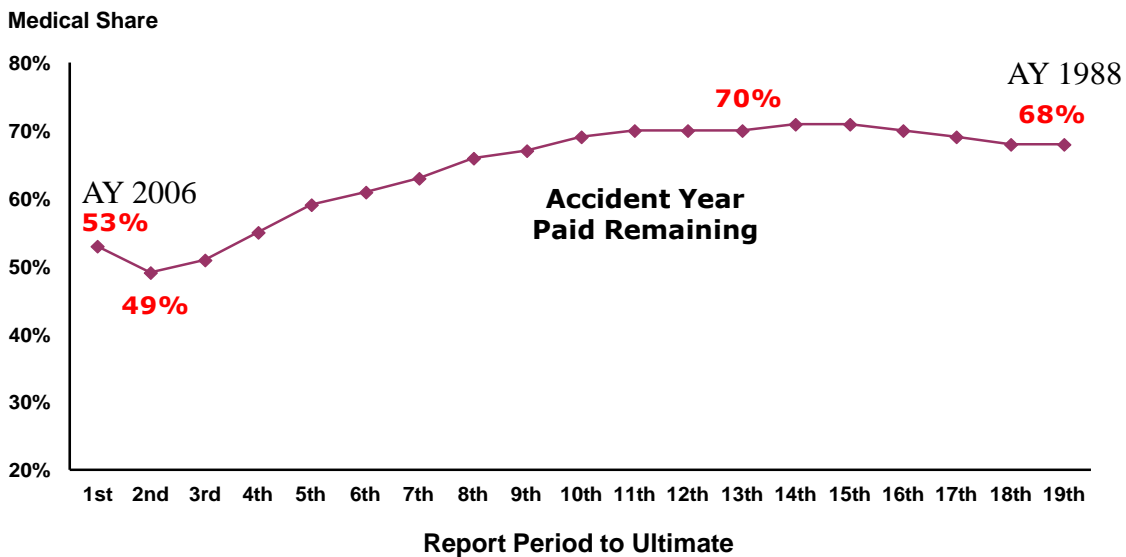
For Accident Year 1988, the difference between the 42% reported at 19 years and the 44% ultimate indicates that the medical share of the payments in the “tail” (19th to ultimate) must be well above 44%. Most claims are already closed and most payments for Accident Year 1988 have already been made; thus it will take a high medical share in

the tail to move the total share from 42% to 44%.<sup>3</sup> Similarly, the share of remaining (future) payments on Accident Year 2006 will have to be less than 58% to offset the 75% share of payments in the first report year.

Exhibit 5 shows the implicit medical share of what is left to be paid (i.e., remaining development) by development period; this is the difference between the actuarial estimate of ultimate losses and what has been paid to date.<sup>4</sup> Indeed, we see that for Accident Year 1988, the medical share of payments in the tail is estimated to be 68%, well above the 44% for ultimate. Similarly, for Accident Year 2006, the medical share of estimated future loss payments is 53%, less than the estimated 58% share of estimated ultimate losses for Accident Year 2006.<sup>5</sup> As development progresses, the medical share rises (and the indemnity share falls) until about the 11th report period. The medical share of future payments beyond the 11th period settles in near 70%.

## Medical Share of Total Has Been Increasing

All NCCI States, All Writers



Source: NCCI  
Based on unlimited data through 12/31/2006 in the states where NCCI provides ratemaking services

Exhibit 5

<sup>3</sup> It is interesting to note that the difference between the two lines in Exhibit 4 (the share of cumulative paid and the share of estimated ultimate) for AY2000 and earlier is relatively unchanged. It seems likely that this is due, in large part, to the fact that traditional actuarial development methodology uses development factors for individual accident years that are highly correlated; in particular, the factor for any given report period (say, 10th) to ultimate includes the factor for the next report period (11th) to ultimate. They all include a common tail factor.

<sup>4</sup> The difference between the actuarial estimate of ultimate losses and what has been paid to date was calculated for both indemnity and medical. The share of medical shown here is then calculated by dividing the medical remaining development by the sum of the indemnity and medical remaining development.

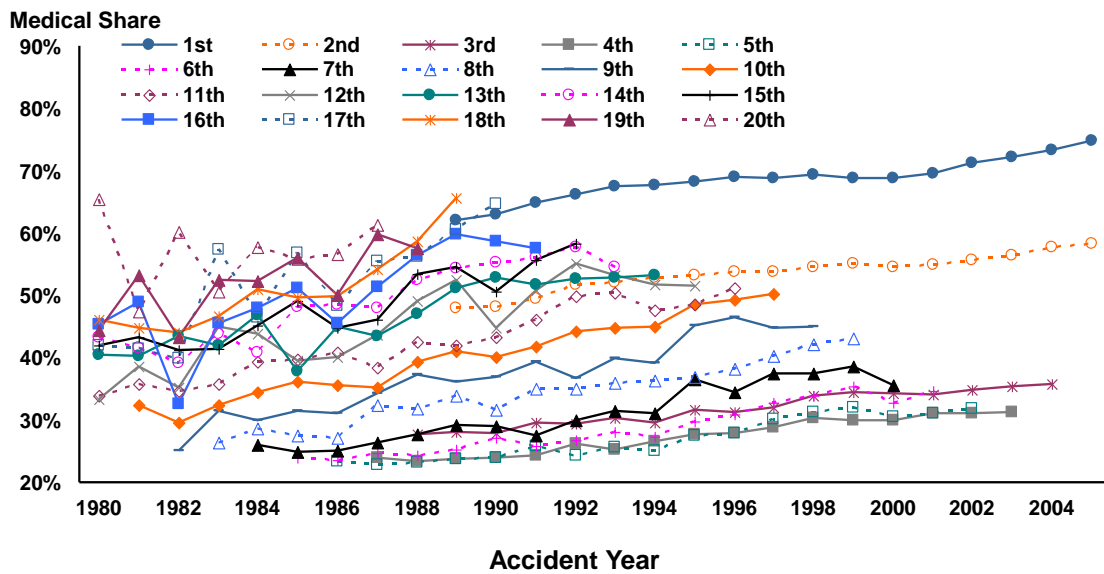
<sup>5</sup> This analysis is based on all claims. The direction would be similar, but the numbers slightly different if we were looking at lost time only.

## Incremental Payment Patterns

Economists like to look at payment patterns.<sup>6</sup> This section contains incremental triangle data, allowing us to look at payment patterns by accident year and report period. Exhibit 6 shows the incremental paid triangle data by report period for Accident Years 1980 through 2005. The medical share of total for these payments has been increasing steadily over time for most report periods, although the graph is somewhat difficult to decipher because it contains so many observations. The next several exhibits break Exhibit 6 down into groups of report periods to make the patterns easier to see.

## Medical Share of Total Has Been Increasing for Most Report Periods

### Incremental Paid Triangle Data



Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services

Exhibit 6

<sup>6</sup> The reasoning is that payments reflect what has actually happened; incurred losses include claims adjusters' expectations of what might happen in the future.

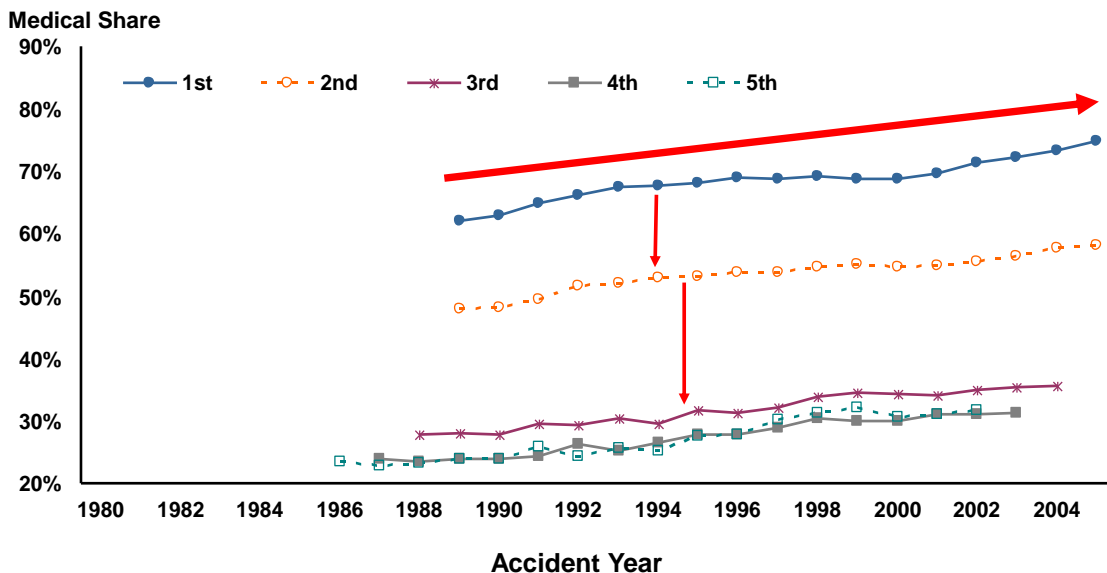
## Development Period Perspective

Exhibit 7 shows the first through fifth reports from Exhibit 6. The share starts out high for the first report (as we saw earlier for first report for Accident Year 2006 in Exhibit 4), declines considerably for the second report<sup>7</sup> and then again for the third report as indicated by the down arrows in Exhibit 7. It continues to decline until the fourth or fifth report, but not as dramatically. This indicates that indemnity payments are increasingly important or, alternatively, medical payments are less important early on in the development of a typical accident year.

However, Exhibit 7 also indicates that the influence of indemnity has been declining steadily over time as seen by the upward slope of the medical share across accident years. For example, the medical share of total losses at the first report increased from 62% in 1989 to 75% in 2005. This general pattern is highlighted in Exhibit 7 by the thick upward-sloping red arrow.

## Medical Share of Total Has Been Increasing for Most Report Periods

### Incremental Paid Triangle Data



Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services

Exhibit 7

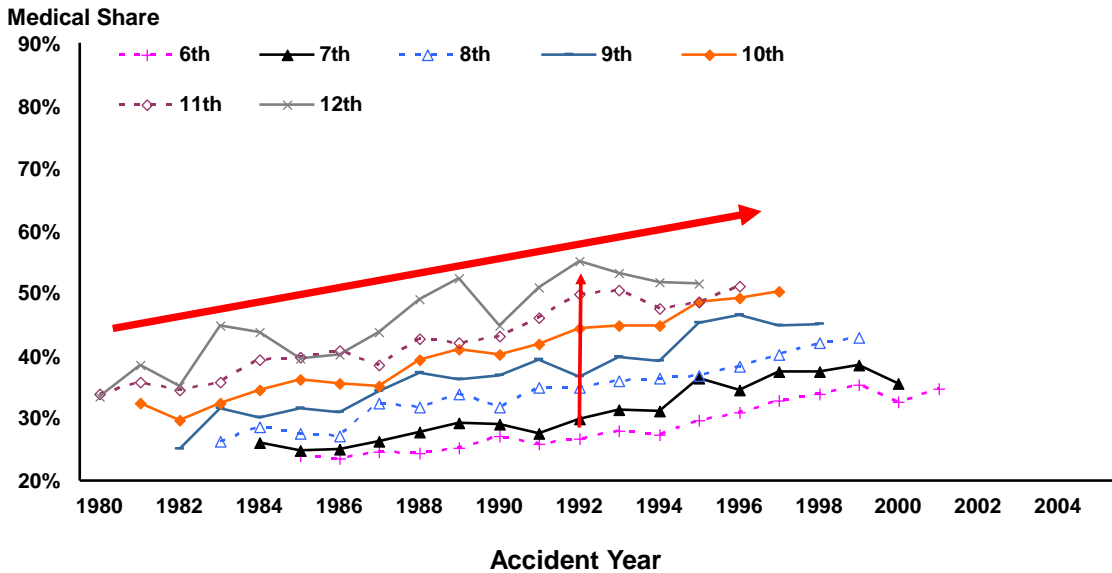
<sup>7</sup> As shown in the appendix, this is true for lost time as well as medical-only claims.

After the fifth report, the medical share begins to increase again as shown by the upward pointing arrow in Exhibit 8. The sixth through 12th reports show an increase in the medical share of total loss payments. For example, in Accident Year 1992, the medical share of total was 27% for the sixth report, but 55% for the 12th. This indicates that, eventually, the importance of indemnity payments in the development of an accident year begins to decline.

Exhibit 8 also indicates that the importance of indemnity has been declining steadily over time—that is, the medical share of report period loss payments has been increasing across accident years. For example, the medical share of total losses at the sixth report increased from 24% in 1985 to 35% in 2001. This general upward trend in the medical share of total benefits is seen for all of the report periods as shown by the thick red arrow.

## Medical Share of Total Has Been Increasing for Most Report Periods

**Incremental Paid Triangle Data**



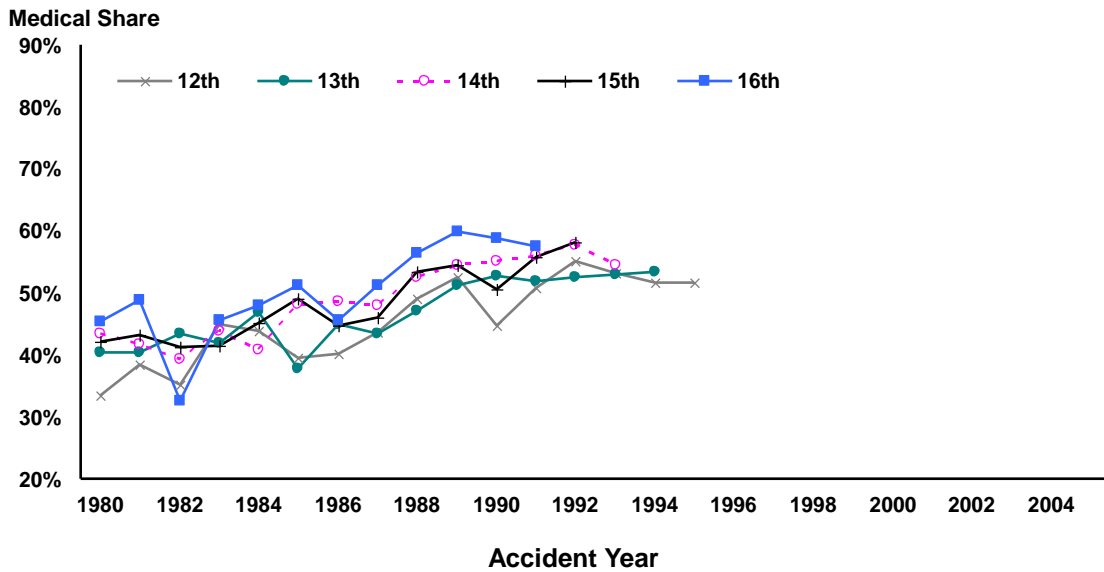
Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services

**Exhibit 8**

The 12th through 16th reports (see Exhibit 9) also continue to show slight increases, but not as much as from the 6th to 12th. These are more clustered. After 12 years of payments, the accident year medical share is more stable. However, the share has been growing from around 40% for early accident years to near 50% more recently.

## Medical Share of Total Has Been Increasing for Most Report Periods

### Incremental Paid Triangle Data



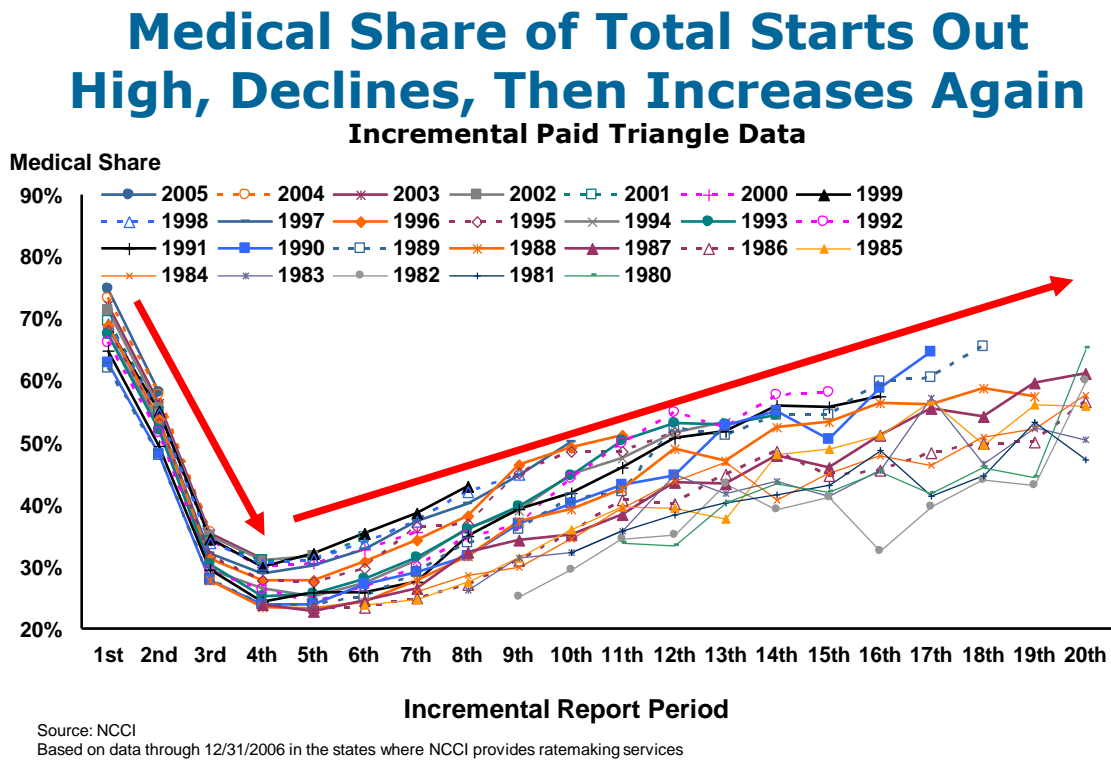
Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services

### Exhibit 9

Exhibits 6 through 9 indicate that the upward drift in the medical share of total workers compensation benefit payments over time has been pervasive for virtually all development periods.

**Accident Year Perspective**

Exhibit 10 shifts the focus from report periods to accident years. It contains the same data as in Exhibit 6, but is arranged by accident year across incremental report periods. It confirms what was seen in the previous exhibits—the medical share of total starts out high at the first report, declines through the fourth or fifth reports as seen by the downward-sloping red arrow, and then increases again as seen by the upward-sloping red arrow.



**Exhibit 10**

The incremental payment pattern analysis confirms that the increasing importance of medical is pervasive, whether we look at estimated ultimate losses or actual calendar year payments. There are interesting patterns in the detailed incremental triangle data:

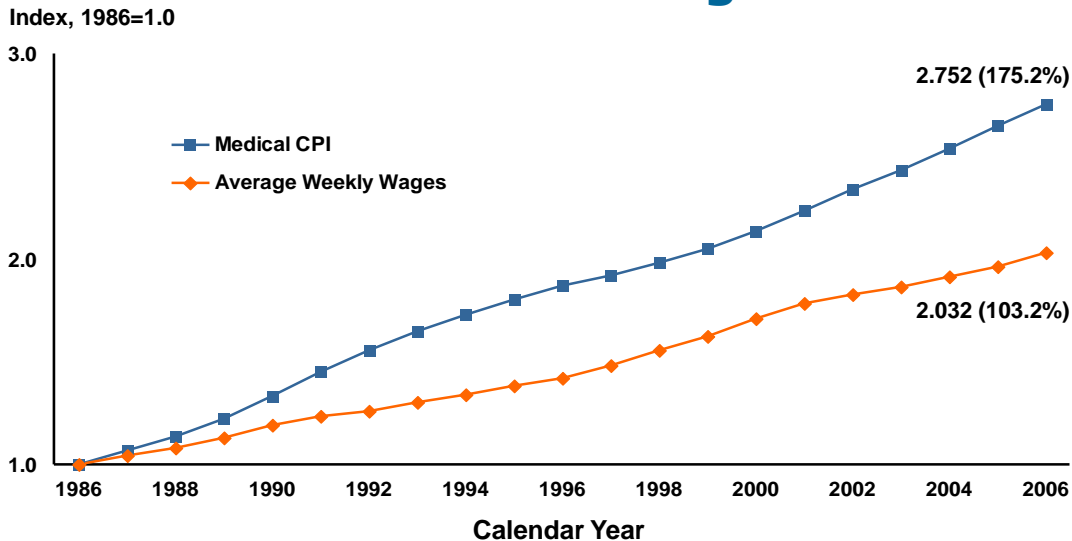
- The medical share of incremental payments for most report periods has been increasing steadily over time.
- For a given accident year, the share starts out high, falls rather dramatically until the 4th and 5th development years, and then rises slowly again.

## What Seems to Be Underlying the Shift?

Analysis of medical severity often tries to separate the role of price changes from utilization changes. That is of interest here. In particular, to what extent can the rising share of medical be attributed simply to high relative rates of medical price inflation compared with wage inflation? In this section, we examine differences in inflation for indemnity and medical severity.

Exhibit 11 shows that differences in inflation might go a long way toward explaining the increasing share of medical. In particular, growth in the medical Consumer Price Index (CPI) has exceeded growth in wages over the last 20 years. From 1986 to 2006, medical CPI increased 175% versus 103% for wages.

## Growth in the Medical Consumer Price Index (CPI) Has Exceeded Growth in Wages



Source: NCCI and US Bureau of Labor Statistics  
Average weekly wages are calculated from Current Population Survey data

Exhibit 11

As seen in Columns 2 and 3 of Exhibit 12, the medical share of total losses grew from 45% in 1986 to 59% in 2006. In the last column of Exhibit 12, we estimate what the medical share would have been in 2006 due solely to differences in the growth of average weekly wages and the medical consumer price index over the period. The medical share of total losses would have been 53% due to inflation differences alone. Thus, slightly more than half of the increased share from 45% to 59% is likely the result of differences in inflation rates.

The balance (the difference between the 59% and 53% shares) would be attributed to differences in the growth in medical and indemnity utilization. Other research by NCCI suggests that in the case of medical utilization the key driver in recent years has been increases in the number of billed treatments per claim.<sup>8</sup> The next two exhibits show the differences in utilization for indemnity and medical severity.

## Medical Share of Total Losses Would Have Exceeded 50% Due to Inflation Differences Alone

	1986 Split	2006 Split	2006 Split Due to Inflation Alone
Medical Share	45%	59%	53%
Indemnity Share	55%	41%	47%
	100%	100%	100%

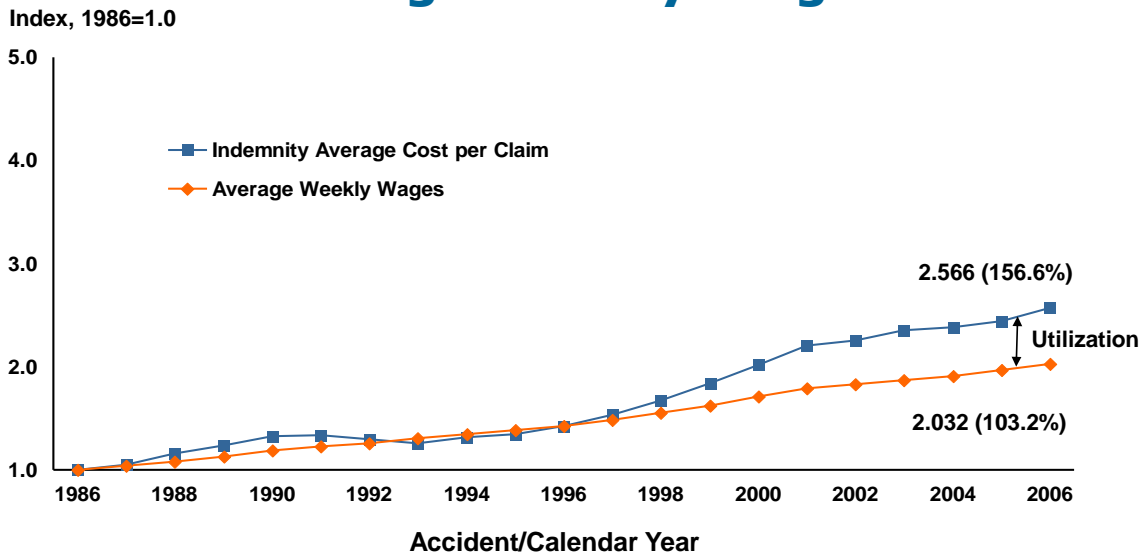
**Exhibit 12**

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<sup>8</sup> See [ncci.com](http://ncci.com) for the studies “Measuring the Factors Driving Medical Severity: Price, Utilization, Mix” published in January 2007 and “Factors Influencing the Growth in Treatments per Claim” published in September 2008.

Exhibit 13 illustrates the likely impact of wage inflation on indemnity severity. Growth in indemnity average cost per claim has exceeded growth in average weekly wages. Indemnity average cost per claim increased nearly 157% from 1986 to 2006, while average weekly wages increased 103%. The difference between the two is due to utilization. The changes in utilization can be attributed to changes in claim duration and benefit levels. Exhibit 13 is on the same scale as Exhibit 14 showing medical utilization, so the two can be compared.

## Growth in Indemnity Average Cost per Claim Has Exceeded Growth in Average Weekly Wages



Source: NCCI and US Bureau of Labor Statistics  
 Average weekly wages are calculated from Current Population Survey data  
 Accident year for average cost per claim; calendar year for average weekly wages

Exhibit 13

Exhibit 14 suggests that utilization has been a key factor in the increase in medical severity since the mid 1990s. The growth in medical average cost per claim (344% from 1986 to 2006) has exceeded the growth in the medical CPI (175%). Again, the difference is due to utilization and is greater than utilization for indemnity seen in Exhibit 13.

## Growth in Medical Average Cost per Claim has Exceeded Growth in the Medical CPI

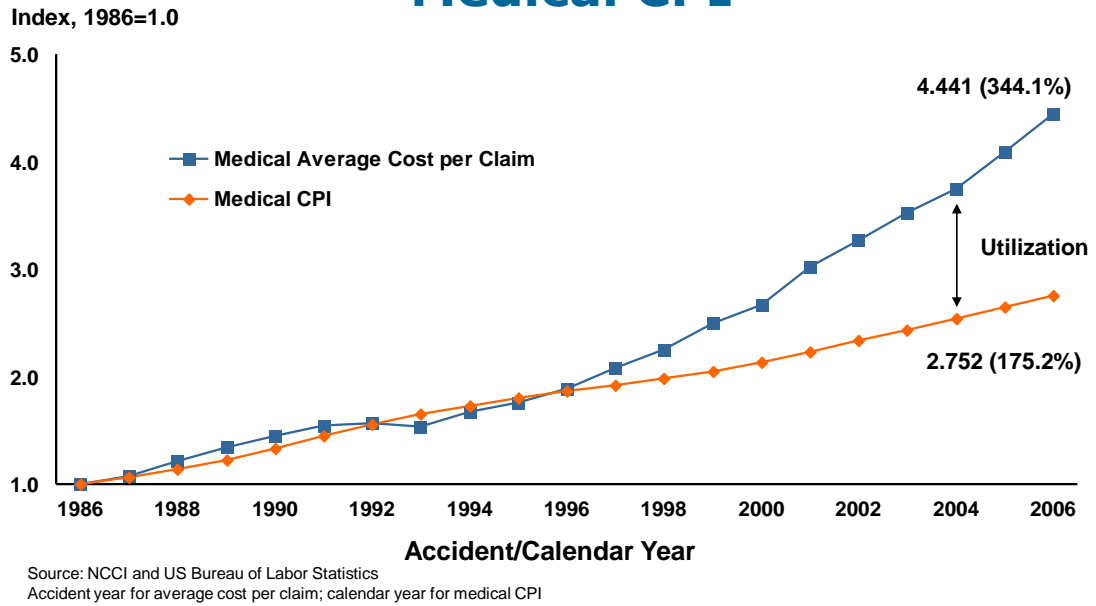
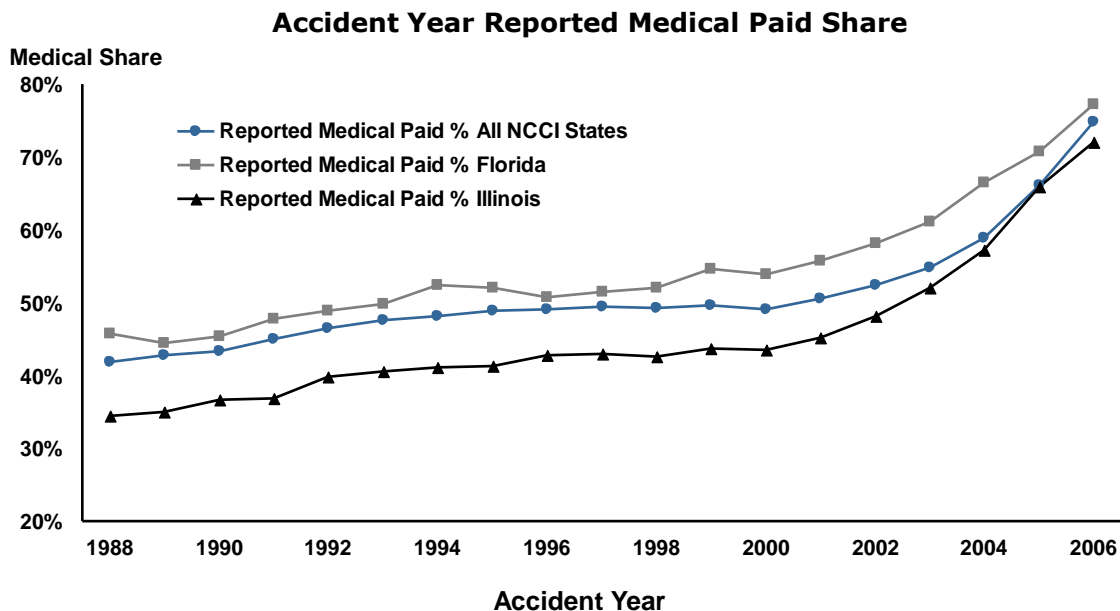


Exhibit 14

## Does Change in State Mix Explain Any of the Shift in Medical Share?

If the medical share of total losses differs among states, could the increase in the total reflect a relative increase in the states with high medical (or low indemnity) shares? Exhibit 15 shows that not all states are the same. Here, we look at two large states (Florida and Illinois) compared to the average of all NCCI states for the medical share of total using reported paid data. While there are differences in magnitude, the patterns are similar.

## Medical Share Patterns Are Similar Across States



Source: NCCI  
Based on data through 12/31/2006 in the states where NCCI provides ratemaking services  
All NCCI States includes all writers  
Florida data is private carriers plus self insured  
Illinois data is private carriers

Exhibit 15

We tested to see if the shift in the share of medical losses over time was impacted by a change in the mix of losses by state, but found that it was not. The medical share of total losses in 2006 is 58.9%. When adjusted to the 1988 mix of losses by state, it is 58.5%--so the change in mix by state has not materially impacted the medical share of total losses.

### Conclusions

We find that the rising importance of medical losses is pervasive, whether we look at estimated ultimate losses, reported data, or incremental payments by accident year and report period.

- There are interesting patterns in the detailed incremental triangle data.
  - The medical share has been increasing for most report periods.

- For a given accident year, the share starts out high, falls, and then rises again.
- The shift in the medical share is what is anticipated due to inflation and utilization.
- There are differences by state, but the change in mix has had very little impact on the overall share.

**Acknowledgements:** The authors would like to thank Anna Elez and Jim Davis of NCCI's Actuarial and Economic Services Division for their significant contribution to this research study.

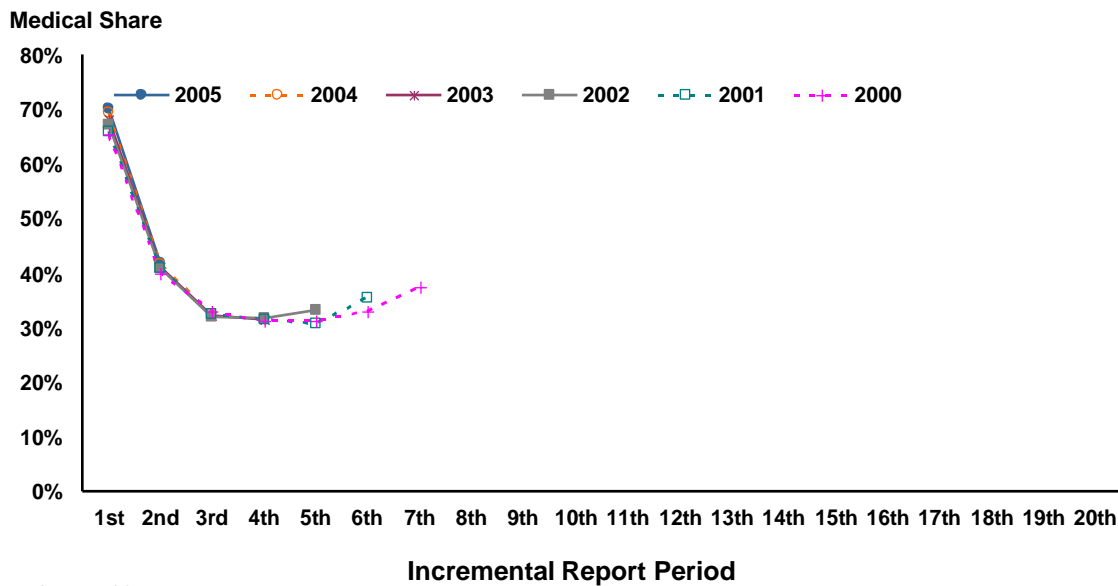
# Appendix A

## Separating the Medical Share Into the Medical-Only and Lost-Time Shares of Total Losses

Financial Call data used in this analysis allows us to go back to 1980 and out to 20th report, but does not allow us to separate the medical share into the medical-only and lost-time shares of total losses. Workers Compensation Statistical Plan (WCSP) data does allow that separation for the most recent accident years and out to 7th report. Exhibit A1 shows the overall medical share of total losses for these years, and reports using WCSP data. As with the Financial Call data, this shows the share starting out high, declining, and then starting to pick up again.

## Medical Share of Total Losses Using WCSP Data

### Incremental Paid Triangle Data



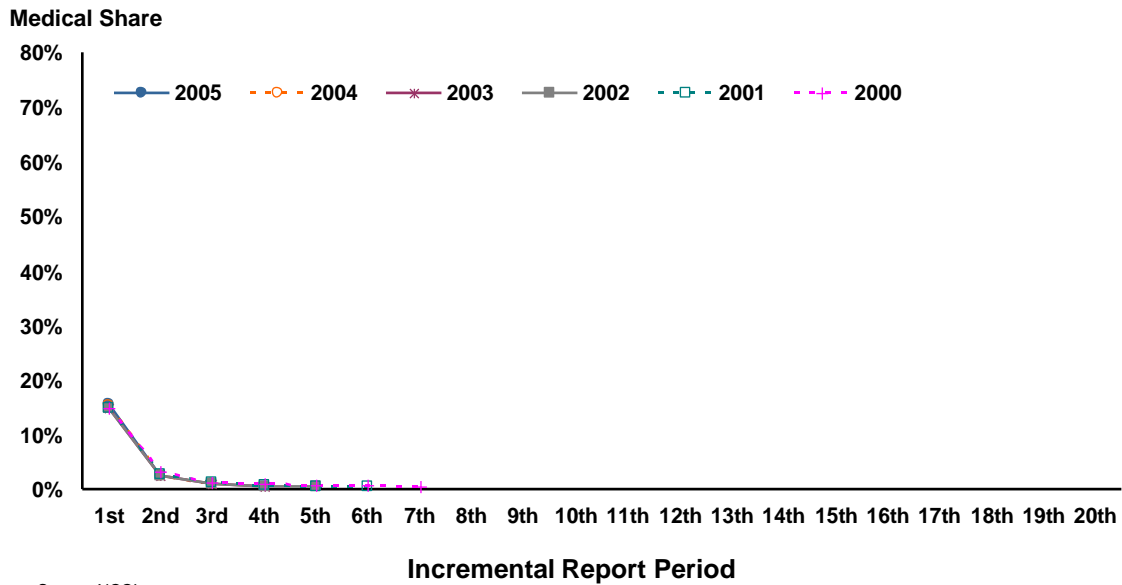
Source: NCCI

Exhibit A1

Exhibit A2 shows the medical-only share of total (indemnity and medical) losses. As expected, the share of medical-only is most important in the first report and falls to near zero soon thereafter. Based on this data, we estimate the medical-only share of total indemnity and medical losses to be about 15% in the first report year.

## Medical-Only Share of Total Losses Using WCSP Data

### Incremental Paid Triangle Data

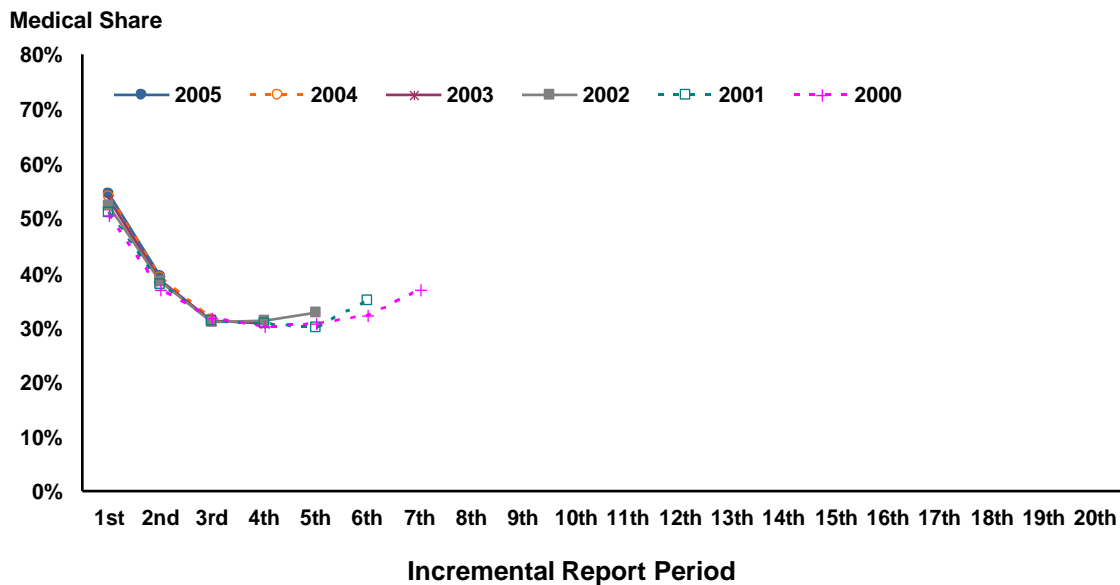


Source: NCCI

Exhibit A2

Exhibit A3 contains the share of total losses that are lost-time medical. Even when losses from medical-only claims are excluded, the patterns in lost-time medical are similar to the patterns in the total medical share, with the shares starting out high, declining, and then increasing again.

## Lost Time Share of Total Losses Using WCSP Data Incremental Paid Triangle Data



**Exhibit A3**

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