Research Brief

YOUR WORKERS COMPENSATION RESOURCE—Comprehensive Data, Objective Analysis, Meaningful Results

January 2015

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# The Relationship Between Accident Report Lag and Claim Cost in Workers Compensation Insurance

## INTRODUCTION

In 2000, a study by The Hartford [1], using its own data, found that the average cost of a workers compensation claim generally rose as the delay in reporting the claim increased. Effectively managing a workers compensation claim ensures that the injured worker receives their benefits efficiently. But an insurer cannot begin to manage a claim until notice is given that an injury has occurred. In this study we look at the relationship between report lag and claim cost using recent industrywide data.

## KEY FINDINGS

- The median cost of claims reported between one day and two weeks after an accident is significantly lower than the median cost of claims reported either on the day of the accident (Day 0) or more than two weeks after the accident.
- The Hartford study found that injuries reported in Week 2 had a higher median cost than claims reported in Week 1. NCCI found a slightly different relationship, which depends on the nature of injury. For sprains and strains and for contusions, the minimum median cost is for claims reported in Week 1. For fractures and lacerations, the minimum median cost is for claims reported in Week 2.
- Across three-day and seven-day waiting period states, the median claim cost for claims reported in Weeks 1 and 2 is lower than the median claim cost for claims reported on either the day of the accident or more than two weeks after the accident.

## DATA DESCRIPTION

This study uses NCCI's Detailed Claim Information data Call (DCI), which includes data for 44 states (listed in Appendix A). Reporting requirements for DCI were revised for claims reported to insurers beginning in September of 2009. This paper is the first use of this new version of DCI for NCCI research.

DCI is used for this research because it is the only source available to us that includes the date the claim was reported to the insurer. DCI also includes more claim detail than other available data sources.

Carriers are required to report all Fatal and Permanent Total claims in the DCI Call. Claims where only medical benefits are provided are not reported. Because certain information required in the DCI data Call is sometimes not captured in company claims systems, carriers are required to submit only a sample of other claims. For each state, NCCI specifies two *sampling ratios*—one for open claims and one for closed claims. To determine which claims to report under DCI, carriers select a random sample of their open and closed claims as of 18 months after report date, using the sampling ratios.

The sampling ratios are shown in Appendix A.

# TERMINOLOGY

**Claim Cost**: We define *claim cost* as the case incurred amount reported in DCI. This amount includes lost-time benefits paid, medical costs paid, vocational rehabilitation expenses, and the case reserve. It reflects the insurance carrier's best estimate of the amount required to settle the claim. Claim cost does not include loss adjustment expense.

**Report Lag**: *Report lag* is the number of days between the date an accident occurs (accident date) and the date the insurer receives notice of the accident (report date). For example, if an accident occurs on January 15 and the insurer receives notice of the claim on January 18, this claim will have a report lag of three days. Similarly, a claim reported on the day of the injury has a lag of zero days. Both the accident date and the report date are reported in DCI.

**Jurisdiction State**: The *jurisdiction state* of a claim is the state whose statutes determine the benefits to be provided to the injured worker. This could be the same state where the injured worker usually works (the exposure state) or the state where the worker was injured (the accident state).

**Lost-Time Claims**: We refer to claims that include indemnity amounts as *lost-time claims* because indemnity benefits are associated with time away from work. Only lost-time claims are reported in DCI.

# METHODOLOGY

Our study considers lost-time claims with two exceptions. We excluded occupational disease and cumulative injury claims because the accident date for such claims is defined differently from that for a traumatic injury. The cost of a workers compensation claim is related to how soon a worker returns to work and whether they have resulting disabilities that limit their earnings. Therefore, we excluded Fatal and Permanent Total claims since these workers do not return to work.

We used data from Report Years 2010 and 2011. These were the most recent complete years available at the time of the study. Although Report Year 2010 was available valued at 30 months after report date, we used both years valued as of 18 months to have the data at a common maturity. The one exception to this is the comparison of Report Year 2010 at 18 and 30 months to determine whether claim maturity affects the results. Data for claims reported to insurers before September 2009 was not available in the current DCI format.

To use the DCI sample database to describe the total population of workers compensation traumatic injury claims, we applied a weight to each claim based on the sampling ratios. The sampling ratio is defined in the DCI reporting requirements and varies by injury type, claim status, and jurisdiction state. In general, the weight is the inverse of the sampling ratio. For example, if the sampling ratio for open claims in State A is 50%, then each open claim in State A receives a weight of 2. We also applied a factor to adjust for any carrier-specific departures from the prescribed sampling ratios.

We calculated weighted median claim costs for claims reported (1) the day of the accident (2) in each of the first four weeks after the accident and (3) after the fourth week. The determination of the weighted median is described in Appendix B.

We selected the median as our measure of central tendency because it is less influenced by extreme values than the mean.

In an effort to find drivers of the differences in median costs by report lag, we split the data into various categories as noted below and illustrated in the next section.

- Overall claim costs
- Distribution of claims
- Percentage of claims by nature of injury
  - Sprains/strains
  - Fractures
  - Contusions
  - Lacerations
- Waiting period
- Share of medical
- Percentage with attorney involvement
- Percentage with lump-sum payments
- Closure ratio
- Paid-to-incurred ratios

Note that while we are able to identify correlations in the data, we are not able to determine cause and effect relationships.

In particular, we cannot necessarily conclude that for two similar injuries, with one reported early and the other reported late, that:

1. The late reported claim will cost more than the early reported claim, or
2. That the fact of late reporting will cause the cost of the second claim to be higher than it would have been had it been reported earlier

# DETAILED RESULTS

## OVERALL CLAIM COSTS

The median cost per claim for claims reported on the day of injury is about 25% more than the median cost for claims reported in Week 1, as shown in Exhibit 1. Claims reported on the day of injury likely include very severe injuries that require immediate medical attention. Such claims often require extensive medical care and an extended recovery time away from work.

We found that median cost was lowest for claims reported in Weeks 1 and 2. Median claim cost rises for claims reported in Week 3 by about 35% relative to Week 2. In Week 4, the median cost rises another 12%. Median claim cost drops a bit for claims reported after Week 4 but is still higher than for those reported in Weeks 1 and 2.

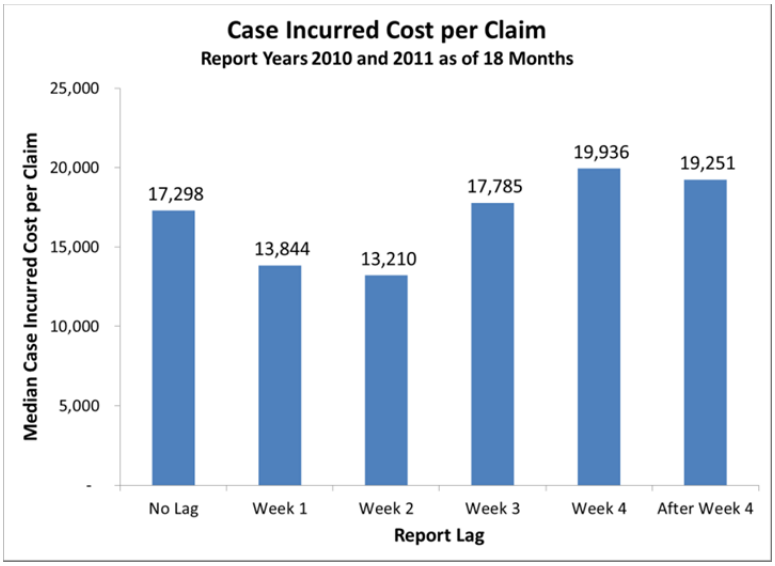


**Exhibit 1**

Exhibit 2 shows that more than 80% of lost-time claims are reported within the first two weeks.

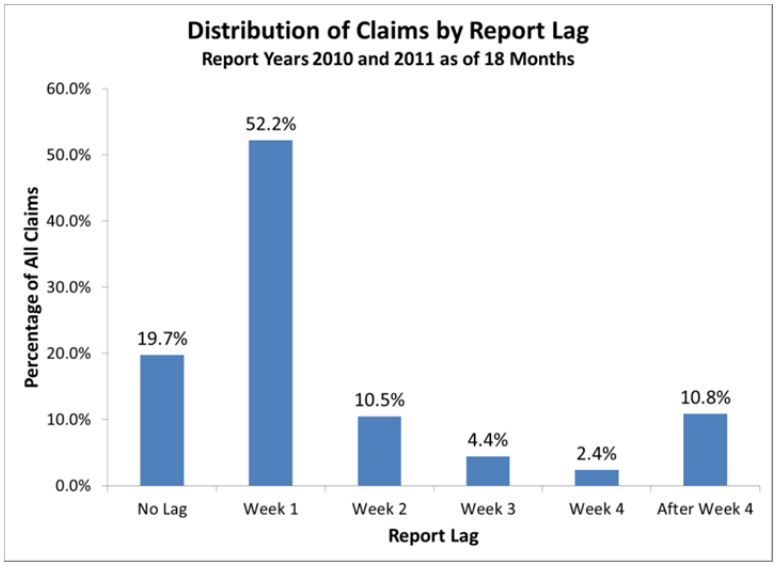


**Exhibit 2**

We investigated several different subcategories of claims to determine whether this pattern of claim cost variation by report lag was consistent across categories.

## NATURE OF INJURY

We looked at claims by the nature of injury for some of the most common natures of injury. Exhibit 3 shows that almost half of all lost-time claims are sprain or strain injuries. Other common injuries are fractures, contusions, and lacerations. Together, these four nature-of-injury classes account for over 70% of all claims.

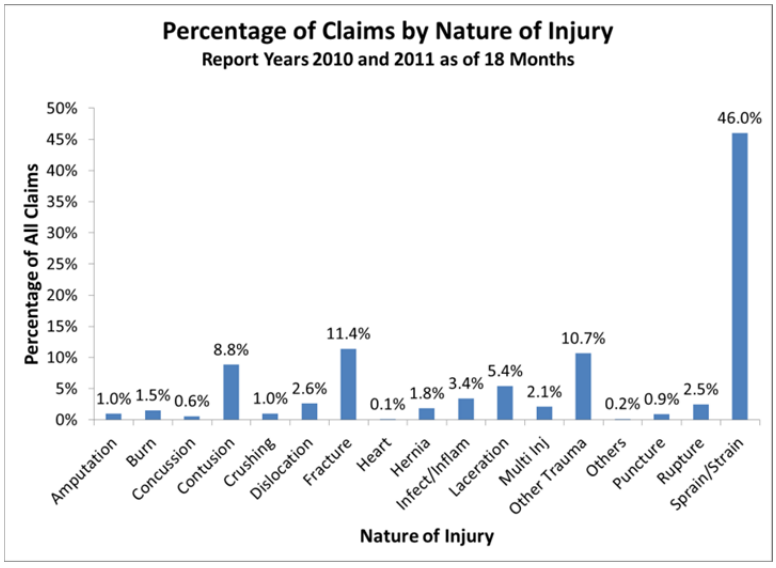


**Exhibit 3**

For sprains and strains, the minimum median cost is for claims reported in the first week after injury, with the median cost for claims reported in the second week just slightly higher, as shown in Exhibit 4. Median cost increases as the report lag increases from Week 1 through Week 4. Although our data only allows us to identify a correlation, not a causation, the results are consistent with the idea that early intervention after a workplace injury can lead to lower claim cost. Median cost of a sprain or strain injury reported in Week 4 is about 70% higher than the cost of a similar claim reported in Week 1.

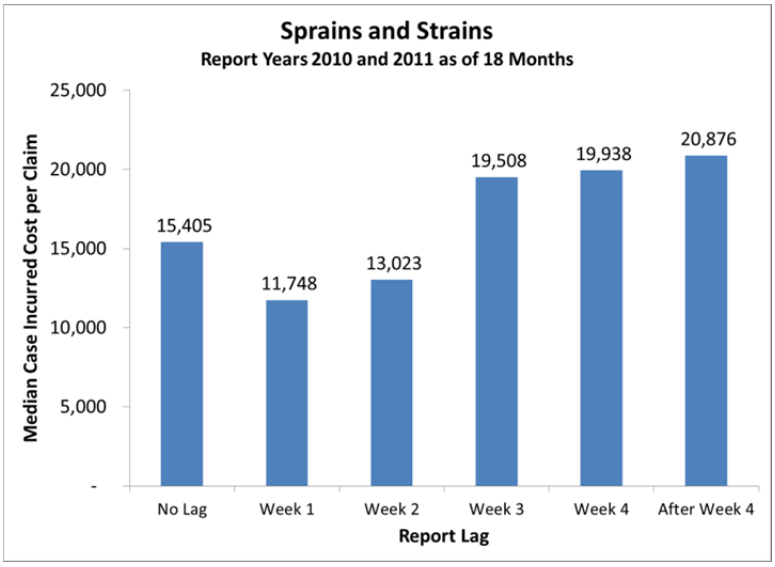


**Exhibit 4**

The pattern of median claim cost versus report lag for fractures contrasts with that for sprains and strains. As shown in Exhibit 5, the minimum median cost is for claims reported in Week 2. The median cost for claims reported in Week 3 is also low compared to other claims. One possible explanation is that the severity of fractures is more apparent to an injured worker than a sprain or strain, so workers with a fracture injury seek treatment relatively early. We recognize that fractures can take a wide variety of forms, with treatment for compound fractures being significantly different from treatment for hairline fractures. The DCI data does not separately identify the various types of fractures.

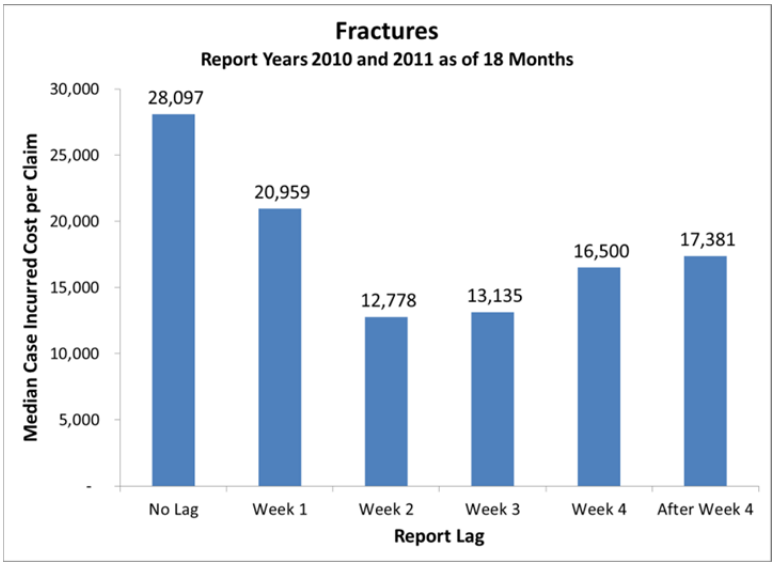


**Exhibit 5**

The relationship between report lag and median claim cost for contusions, displayed in Exhibit 6, is more similar to that of sprains and strains than it is to that of fractures. Median cost is high for claims reported immediately. It is at its lowest for claims reported in Week 1 and rises steadily as the report lag increases.

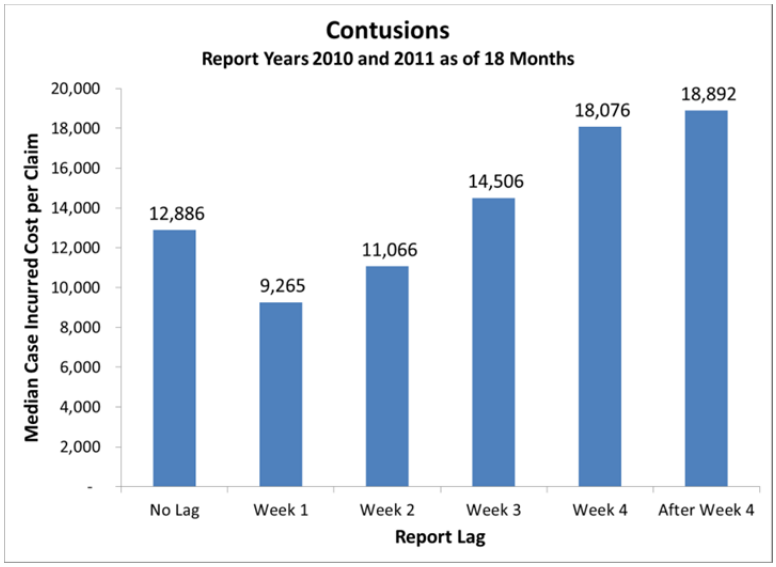


**Exhibit 6**

Median claim cost for lacerations is at its lowest for claims reported in Weeks 1 and 2. Exhibit 7 shows how costs rise quickly in Weeks 3 and 4, with the median cost in Week 4 more than twice the median for Week 2. The median cost for claims reported beyond Week 4 decreases, but the data is relatively sparse, with only about 5% of lacerations in this category.

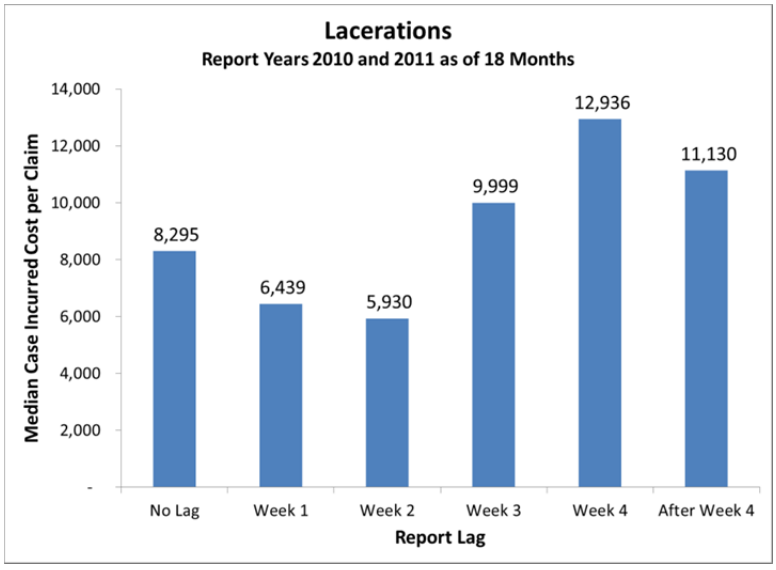


**Exhibit 7**

Although there are different median cost levels between natures of injury, the pattern of relatively high cost for claims with no report lag, low relative cost in Weeks 1 and 2, and rising cost in Weeks 3 and 4 is consistent.

## WAITING PERIOD

We considered whether the *waiting period* (number of days of disability before indemnity benefits begin) for statutory benefits might influence the relationship between median claim cost and report lag. Most states have either a three-day or seven-day waiting period. Waiting periods for all DCI states are listed in Appendix C. Exhibit 8 shows the median cost per claim by report lag for three-day and seven-day waiting period states. We did not include Oklahoma because its waiting period changed between three days and seven days. For states with a three-day waiting period, the minimum cost is for claims reported in Week 1. In states with a seven-day period, the minimum cost is for claims reported in Week 2. In both cases, Weeks 1 and 2 have a lower median cost than the other report lag categories.

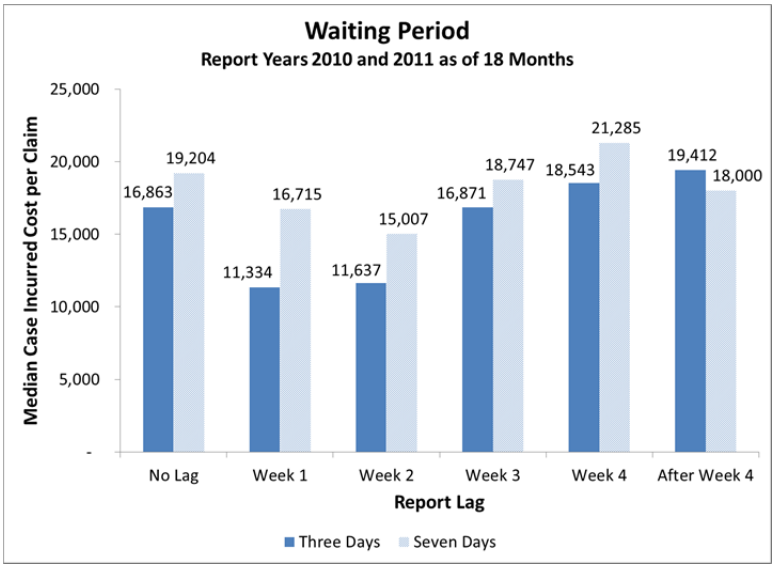


**Exhibit 8**

Exhibit 9 shows that a slightly higher share of claims is reported on the day of the accident in seven-day waiting period states, and there is a slightly lower share in Week 1. Through the end of Week 1, shares of claims reported are very similar between the two waiting periods, with 71.4% of claims reported for the three-day waiting period states and 72.6% for the seven-day waiting period states. This argues against there being any shifting of claims to later reporting with a longer waiting period.

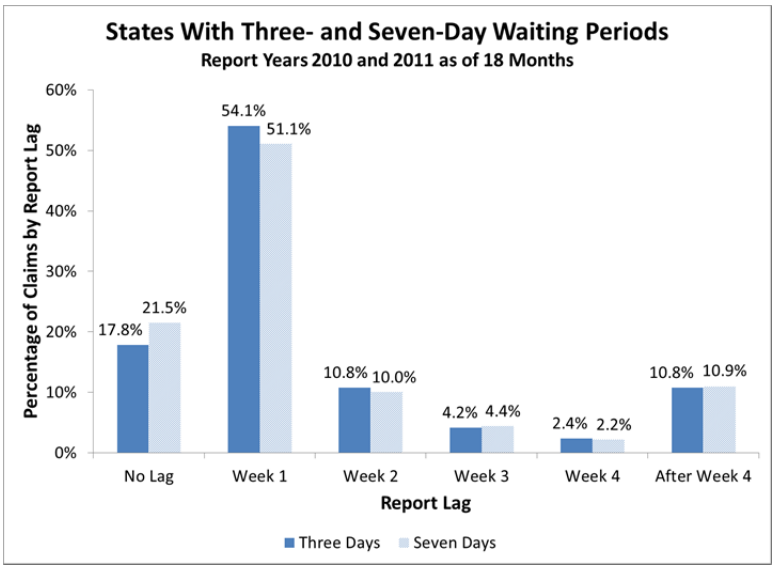


**Exhibit 9**

## INDEMNITY/MEDICAL SPLIT

The median medical cost share of case incurred losses declines as the report lag increases. Exhibit 10 shows that medical cost is about 60% of total cost for claims reported in the first three weeks after the injury. For claims reported in Week 4, the medical share drops to 54% and declines further to 48% after Week 4. This indicates that indemnity cost rises faster than medical cost for claims reported after Week 3. One possible explanation is that it takes longer for a worker to return to work when the claim is reported after Week 3, resulting in a longer period of wage replacement benefits.

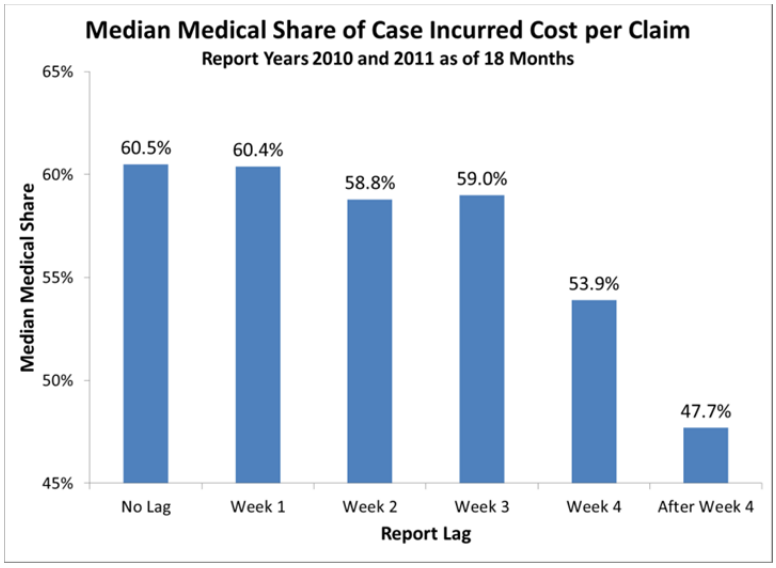


**Exhibit 10**

## ATTORNEY INVOLVEMENT

Involvement of attorneys becomes more common as the report lag increases, as indicated in Exhibit 11. Claims reported immediately involve an attorney 13% of the time. This increases to 32% for claims reported after Week 4. This suggests that the complexity of resolving a claim increases as the report lag increases.

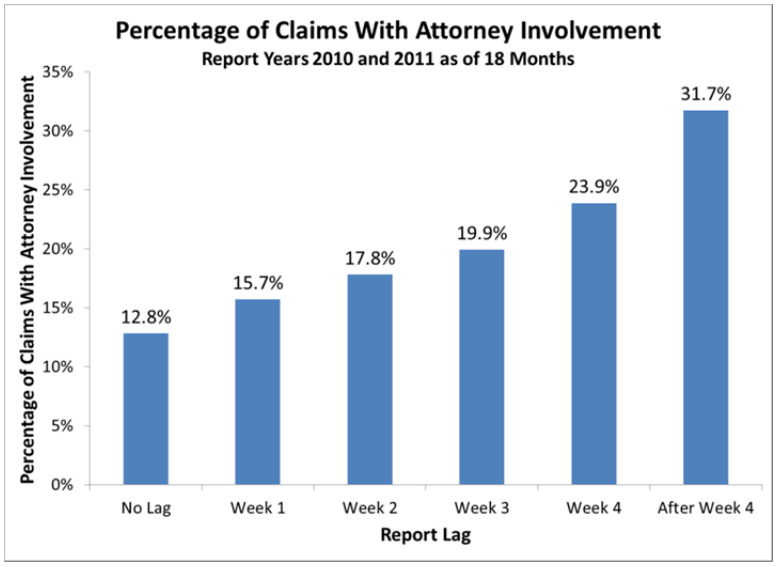


**Exhibit 11**

## USE OF LUMP-SUM PAYMENTS

The share of claims involving lump-sum payments in the first 18 months is shown in Exhibit 12. The share varies between 13% and 18% through the first four weeks, then increases to 25% for claims reported after Week 4.

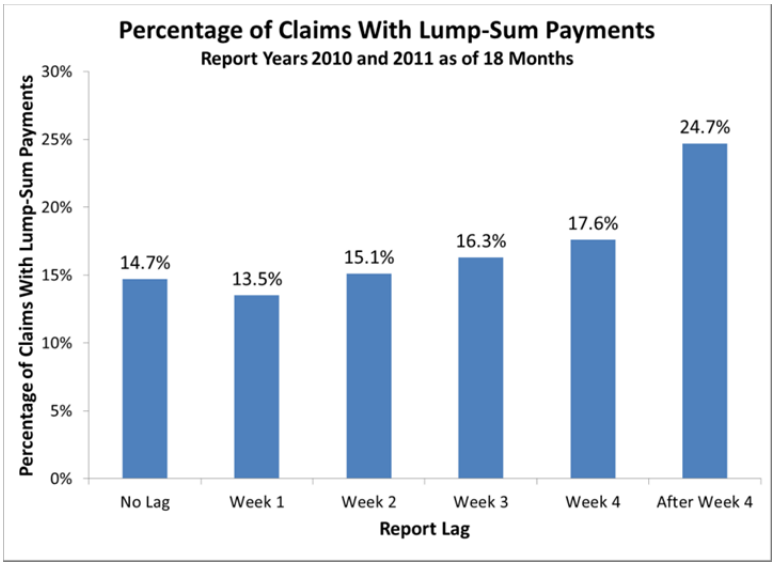


**Exhibit 12**

The share of total cost due to lump-sum payments tends to increase with report lag, as shown in Exhibit 13. Lump-sum payments are 31% of claim costs for claims reported on the day of the accident. For claims reported after Week 4, lump-sum payments are 59% of claim costs. While a claim can be settled with a lump-sum amount, not all lump-sum payments close a claim. A claimant may, for example, receive a lump-sum amount to catch up on periodic payments not previously received. This could explain at least some of the increase in the use of lump-sum payments as the report lag increases.

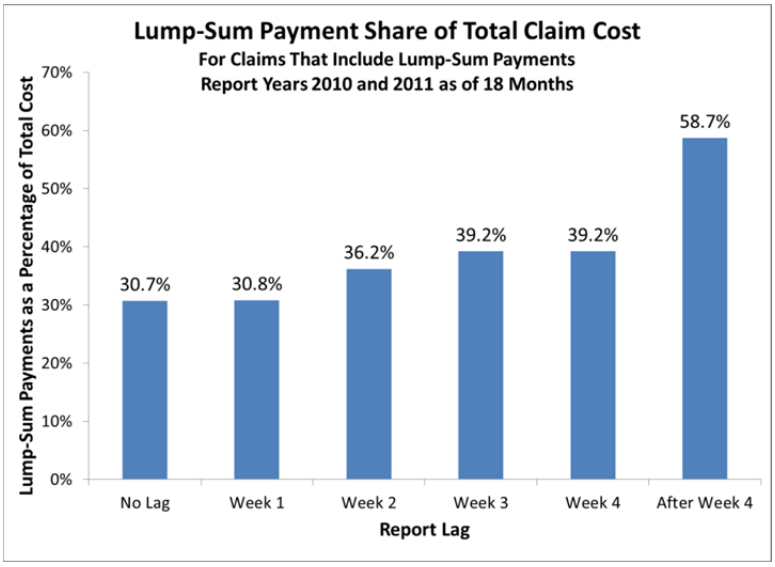


**Exhibit 13**

## CLOSURE RATIO

For the report lag ranges considered, the *closure ratio*, the ratio of the number of claims closed within 18 months of the report date to the total number of claims, is inversely related to the median claim cost. Exhibit 14 shows that the highest closure ratios are for claims reported in Weeks 1 and 2. Claims reported after Week 2 are less likely to be closed at 18 months than those reported in Weeks 1 and 2. This is another indication that claims reported after Week 2 take longer to resolve than claims reported in Weeks 1 or 2.

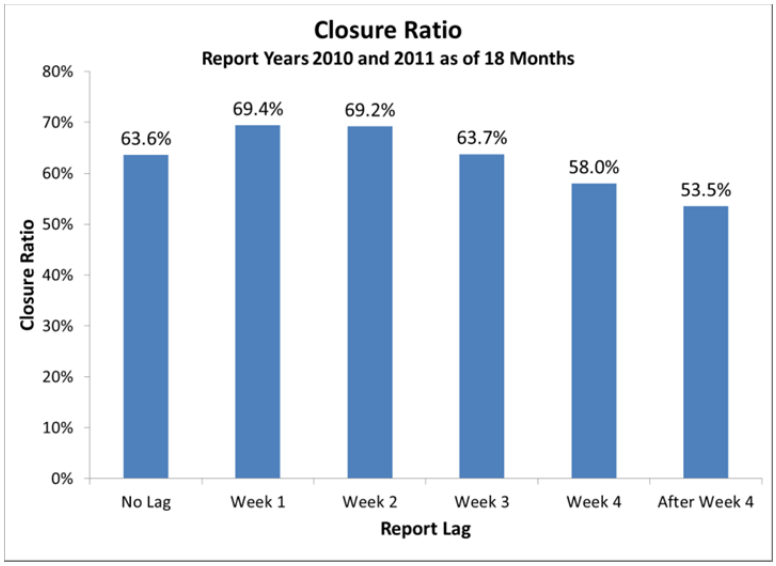


**Exhibit 14**

## PAID TO INCURRED RATIO FOR CLAIMS OPEN AT 18 MONTHS

The paid to incurred ratio on claims open at 18 months is shown in Exhibit 15. The ratio generally decreases with report lag. A lower paid to incurred ratio indicates that less of the expected final cost of the claim has been paid. This suggests that claims reported later take longer to resolve.

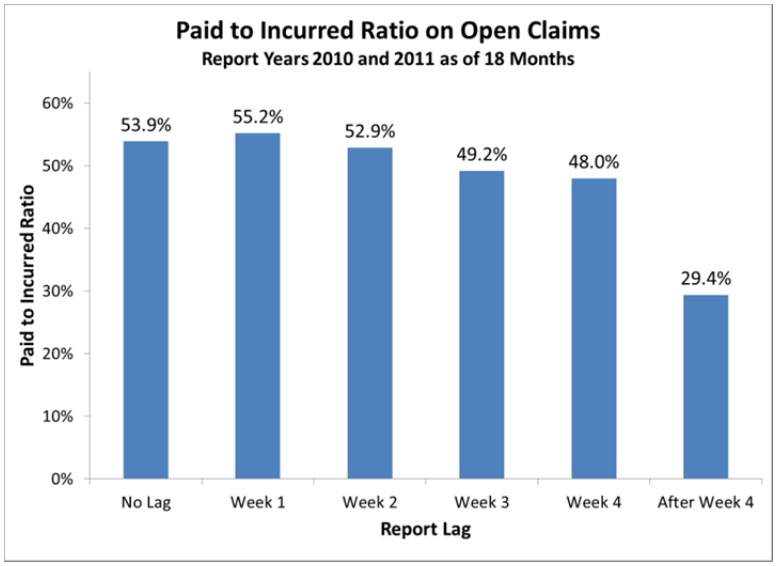


**Exhibit 15**

### AGING OF CLAIMS TO 30 MONTHS

The results presented thus far have been based on Report Years 2010 and 2011 valued at 18 months. To test whether the patterns observed might change as a report year matures, we compared Report Year 2010 at 18 months to Report Year 2010 at 30 months.

The general pattern of lowest median costs for claims reported in Weeks 1 and 2 holds for claims evaluated at 18 months and for claims evaluated at 30 months, as shown in Exhibit 16.

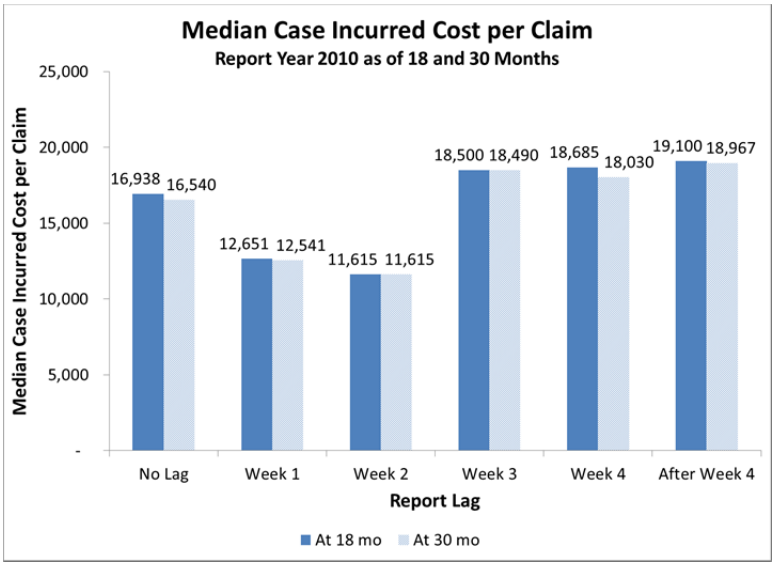


**Exhibit 16**

## CONCLUSION

This study included workplace injuries with lost work-time other than Fatal or Permanent Total claims and excluded claims for occupational disease or cumulative injury. For these claims, median costs are lowest for claims that are reported after the day of the accident but within two weeks of the accident. This pattern holds for all four of the most common types of injury (sprains and strains, fractures, contusions, and lacerations).

Claims reported on the day of the accident are some of the most costly claims. This is expected because serious injuries often require immediate medical care, which triggers notification to the insurer. Claims with more than a two-week delay in reporting are characterized by a lower medical share of total cost, greater attorney involvement, more use of lump-sum payments, lower paid to incurred ratio at 18 months, and a lower closure rate at 18 months. These characteristics suggest that claims with a delay of more than two weeks are more complex to settle, take longer to close, and involve a longer period before the injured worker can return to work.

## ACKNOWLEDGEMENTS

Barry Lipton, John Robertson, and Nedzad Arnautovic contributed to this study.

**Reference**

[1] Glen-Roberts Pitruzzello, “The High Cost of Delays: Findings on a Lag-Time Study,” *Issues Report*, Summer 2000, NCCI

## Appendix A—Detailed Claim Information Sampling Ratios by State and Claim Status

Insurers submitting DCI data are required to use a procedure to select a random sample from their eligible claims so that a claim has an expected probability of being selected equal to the applicable sampling ratio for the state of jurisdiction and claim status. The sampling ratios for Report Years 2010 and 2011 are provided below.

| Sampling Ratios | | |
|---|---|---|
| **State** | **Open Claims** | **Closed Claims** |
| Alabama | 71% | 3% |
| Alaska | 100% | 5% |
| Arizona | 30% | 2% |
| Arkansas | 93% | 4% |
| Colorado | 34% | 1% |
| Connecticut | 28% | 2% |
| District of Columbia | 100% | 9% |
| Florida | 12% | 2% |
| Georgia | 23% | 2% |
| Hawaii | 76% | 3% |
| Idaho | 91% | 3% |
| Illinois | 8% | 1% |
| Indiana | 32% | 1% |
| Iowa | 36% | 2% |
| Kansas | 37% | 3% |
| Kentucky | 39% | 2% |
| Louisiana | 42% | 3% |
| Maine | 100% | 5% |
| Maryland | 29% | 2% |
| Massachusetts | 14% | 1% |
| Michigan | 28% | 1% |
| Minnesota | 20% | 1% |
| Mississippi | 63% | 4% |
| Missouri | 14% | 1% |
| Montana | 80% | 4% |
| Nebraska | 63% | 4% |
| Nevada | 81% | 3% |
| New Hampshire | 100% | 4% |
| New Jersey | 14% | 1% |
| New Mexico | 85% | 5% |
| New York | 6% | 1% |
| North Carolina | 19% | 2% |
| Oklahoma | 28% | 2% |
| Oregon | 28% | 1% |
| Pennsylvania | 11% | 1% |
| Rhode Island | 100% | 3% |
| South Carolina | 28% | 3% |
| South Dakota | 100% | 8% |
| Tennessee | 21% | 2% |
| Utah | 79% | 2% |
| Vermont | 100% | 7% |
| Virginia | 32% | 2% |
| West Virginia | 34% | 2% |
| Wisconsin | 28% | 1% |

## Appendix B—Weighted Median

The weighted median of a finite set of numbers is the smallest element x for which the cumulative weight of elements less than or equal to x is greater than 50% of the total weight. In the event that an element exists where the cumulative weight of elements less than or equal to x is exactly equal to 50%, we then take the average of x and the next larger value.

### Example 1

| Data Set | | Data Set Sorted | | Cumulative Weight | Percentage of Total Weight |
|---|---|---|---|---|---|
| Element | Weight | Element | Weight | | |
| 27,878 | 12.0 | 967 | 15.0 | 15.0 | 6.3% |
| 25,016 | 12.0 | 6,682 | 30.0 | 45.0 | 18.9% |
| 17,998 | 22.5 | 6,761 | 18.0 | 63.0 | 26.5% |
| 40,578 | 30.0 | 11,080 | 21.0 | 84.0 | 35.4% |
| 6,761 | 18.0 | 14,050 | 10.5 | 94.5 | 39.8% |
| 44,315 | 9.0 | 17,669 | 24.5 | 119.0 | 50.1% |
| 17,669 | 24.5 | 17,998 | 22.5 | 141.5 | 59.6% |
| 967 | 15.0 | 25,016 | 12.0 | 153.5 | 64.6% |
| 26,640 | 10.5 | 26,640 | 10.5 | 164.0 | 69.1% |
| 6,682 | 30.0 | 27,878 | 12.0 | 176.0 | 74.1% |
| 11,080 | 21.0 | 32,554 | 16.5 | 192.5 | 81.1% |
| 48,832 | 6.0 | 40,578 | 30.0 | 222.5 | 93.7% |
| 32,554 | 16.5 | 44,315 | 9.0 | 231.5 | 97.5% |
| 14,050 | 10.5 | 48,832 | 6.0 | 237.5 | 100.0% |

Weighted Median = 17,669

### Example 2

| Data Set | | Data Set Sorted | | Cumulative Weight | Percentage of Total Weight |
|---|---|---|---|---|---|
| Element | Weight | Element | Weight | | |
| 16,432 | 16.5 | 1,515 | 4.5 | 4.5 | 3.0% |
| 1,515 | 4.5 | 2,870 | 13.5 | 18.0 | 12.0% |
| 3,957 | 7.5 | 3,957 | 7.5 | 25.5 | 17.0% |
| 5,674 | 13.5 | 4,912 | 7.5 | 33.0 | 22.0% |
| 4,912 | 7.5 | 5,674 | 13.5 | 46.5 | 31.0% |
| 40,460 | 12.0 | 9,071 | 12.0 | 58.5 | 39.0% |
| 2,870 | 13.5 | 16,432 | 16.5 | 75.0 | 50.0% |
| 20,205 | 9.0 | 20,205 | 9.0 | 84.0 | 56.0% |
| 9,071 | 12.0 | 25,068 | 6.0 | 90.0 | 60.0% |
| 31,897 | 12.0 | 29,591 | 3.0 | 93.0 | 62.0% |
| 47,151 | 19.5 | 31,897 | 12.0 | 105.0 | 70.0% |
| 29,591 | 3.0 | 40,460 | 12.0 | 117.0 | 78.0% |
| 25,068 | 6.0 | 43,011 | 13.5 | 130.5 | 87.0% |
| 43,011 | 13.5 | 47,151 | 19.5 | 150.0 | 100.0% |

Weighted Median = (16,432 + 20,205)/2 = 18,319

## Appendix C—Waiting Period by State

The waiting period is the number of days a worker must be unable to work before indemnity benefits begin. The waiting periods were taken from NCCI's 2014 ***Annual Statistical Bulletin***.

| State | Waiting Period (Days) |
|---|---|
| Alabama | 3 |
| Alaska | 3 |
| Arizona | 7 |
| Arkansas | 8 |
| Colorado | 3 |
| Connecticut | 3 |
| District of Columbia | 3 |
| Florida | 7 |
| Georgia | 7 |
| Hawaii | 3 |
| Idaho | 5 |
| Illinois | 3 |
| Indiana | 7 |
| Iowa | 3 |
| Kansas | 7 |
| Kentucky | 7 |
| Louisiana | 7 |
| Maine | 7 |
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| Montana | 4 |
| Nebraska | 7 |
| Nevada | 5 |
| New Hampshire | 3 |
| New Jersey | 7 |
| New Mexico | 7 |
| New York | 7 |
| North Carolina | 7 |
| Oklahoma | (a) |
| Oregon | 3 |
| Pennsylvania | 7 |
| Rhode Island | 3 |
| South Carolina | 7 |
| South Dakota | 7 |
| Tennessee | 7 |
| Utah | 3 |
| Vermont | 3 |
| Virginia | 7 |
| West Virginia | 3 |
| Wisconsin | 3 |

(a) Three days until August 26, 2011; seven days after August 26, 2011, until February 1, 2014; then three days