Final Report

Oregon Major Contributing Cause Study

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Highlights

- In most states, and in Oregon prior to 1990, a disability is considered compensable even if it results from a combination of a work related incident and a preexisting condition or weakness.

- Through SB 1197 in 1990, Oregon adopted a standard that a disability is compensable only if work is the "major contributing cause." This provision was clarified, especially with respect to ongoing claims, by SB 369 in 1995.

- The major contributing cause standard is used in Oregon and three other states. It is the highest standard used anywhere in the U.S.

- Following the 1990 amendments, major contributing cause was given as the reason for about 36 percent of all denials. Following the 1995 amendments it was given as the reason for about 45 percent of all denials.

- Major contributing cause is used somewhat more frequently in more ambiguous types of cases, such as back sprains and strains, but its effect is not limited to those cases. In fact, major contributing cause has had a broad impact on the entire workers' compensation system regardless of the nature of injury or the gender, age, earnings, or occupation of the worker.

- Our analysis suggests that SB 1197 resulted in a reduction in benefits to workers and costs to employers of at least 6.4 percent. SB 369 resulted in a reduction of at least another 6.7 percent.

- During this same period of time, other factors were also reducing costs and benefits. These include increased safety efforts, return-to-work programs, fraud campaigns, national trends, and a very competitive insurance market.

- The savings in costs results much more from a drop in the number of claims rather than in the average cost paid per claim.

- The rate at which claims are denied by insurance carriers and self-insured employers has increased over this period of time, but the denial rate has not increased as much as the percentage of denials attributable to major contributing cause and has not increased as much as the overall reduction in costs and benefits.

- The greatest impact of SB 1197 and SB 369 has been through a reduction in the number of claims that are filed.

- The reduction in claims filed is attributable, in part, to the fact that major contributing cause claims were no longer compensable. Others factors contributing include; safety and return-to-work programs, antifraud campaigns,

and various other changes in the workers' compensation system that have taken place in Oregon.

- Physicians experienced in workers' compensation in Oregon believe that the major contributing cause standard is workable, although they emphasize that it requires medical expertise.

- Disputed Claim Settlements have become more frequent and are more likely to be found in cases involving major contributing cause.

- There have been several recent situations in which the courts in other states have dealt with situations similar to the major contributing cause issue in Oregon, that is, situations in which workers' compensation benefits are denied to a certain group of claims. Generally, the courts in these states have held that workers should be allowed to file civil actions against their employers under these circumstances.

- We estimate that if Oregon workers who were denied benefits based on major contributing cause are allowed to sue their employers, this will result in an increase in benefits awarded to workers equal to between one half of one percent and ten percent of the total value of all benefits now awarded.

- Because of increased attorney fees and costs, the actual increase in benefits received by workers would be less than the amounts listed above and the actual increase in costs to employers would be greater. There would also be more delay.

Contents

1 Introduction

1.1 The Study

In 1990, as part of SB 1197, the Oregon legislature provided that disabilities were compensable under the Oregon workers' compensation system only if work was the "major contributing cause." In 1995, as part of SB 369, the legislature added additional language to this section concerning claims that involved a "combined condition." Through a competitive bidding process, the Workers' Compensation Division of the Oregon Department of Consumer and Business Services contracted with the Workers' Compensation Center at Michigan State University to study the effects of those amendments on the workers' compensation system. This is the report of that study.

1.2 What we have done

Our study can be very briefly summarized as follows:

- We conducted an extensive analysis of a large amount of data that was provided to us by the Information Management Division of the Oregon Department of Consumer and Business Services.

- There is no place in any publicly available database (or any database that we are aware of) that indicates which cases were denied on the basis of MCC as opposed to some other reason. In order to identify such cases we sent experienced claims handlers to five different Oregon workers' compensation carriers. They reviewed a sample of claims with denials and categorized the reasons for the denials. We then analyzed the information about these cases.

- We conducted a review of the laws to determine how Oregon compared with other states with regard to the standard of compensability and exclusive remedy provisions related to that standard.

- We conducted an informal survey of physicians to determine their view of these issues.

- We used statistical and economic techniques to estimate the effect of these amendments in terms of benefits to workers and costs to employers.

- We have prepared a discussion of the cost that would result if it were eventually held that workers' compensation is not the exclusive remedy for workers involved in these situations.

1.3 Organization of this report

In this report we provide our findings at four different levels.

- On page iii, we offer a very brief summary that provides the highlights of our results.

- In section 2 “Summary and Discussion” we summarize all of our findings and discuss their implications.

- In sections 3 through 8 we provide a more detailed explanation of our findings and the methods we used to achieve them with regard to the more complicated aspects of our study.

- We include a series of appendices that provides some highly detailed or technical information.

In this section we provide some background and note a couple limitations of our study.

1.4 Background

A very brief historical review is necessary in order to understand the focus of the study. A more detailed discussion of the legal principles involved is found in section 5.

Like most states, Oregon adopted a workers' compensation law in the early part of the 20th Century. These laws provided benefits to workers who were injured on the job. They replaced the worker’s right to sue his or her employer. Prior to the enactment of workers' compensation laws, workers could only successfully sue their employers if they could prove that their employer was negligent, that the worker was free from negligence, and that they met certain other conditions. If they could prove these things, however, they were entitled to whatever damages a jury might award.

Under workers' compensation, workers are no longer required to prove fault on the part of the employer and are not denied benefits if their fault contributed to the disability. The benefits they can receive, however, are limited to certain specified cash benefits, medical care, and rehabilitation benefits.

Workers can get these limited benefits without regard to fault but they cannot sue their employer for negligence. Workers' compensation is their “exclusive remedy”.

The prior civil or “tort” system included a principle that “the tort-feasor takes his victim as he finds him”. By this it was meant that if Ms. A negligently knocked Mr. B on the head; Ms. A was responsible for all the consequences of that event, even if some of them grew out of the fact that Mr. B had an unusually thin skull and as a result a rather modest tap led to disastrous consequences.

This principle was in general carried over into workers' compensation, and it has generally been said, “an employer takes a worker as it finds him”. Over the years the situation has grown more complicated. The original workers' compensation laws only dealt with “accidental” injuries. Today they include occupational diseases and conditions that result from repeated actions that occur over a period of time. Nevertheless, most

jurisdictions have retained the standard that the employer "takes the worker as it finds him." Thus work does not ordinarily have to be the "cause" of a disability. In most states it is enough if it causes, contributes to, or combines with a preexisting condition to result in a disability.

Employers often feel that this is unfair. Assume Mr. C, had a prior injury or a clear preexisting weakness and suffers a mild or moderate incident at work that is followed by a very serious disability. Under this principle, as applied in many states, the employer is responsible for all the consequences of the disability.

Advocates for workers argue that this is only fair. They point out that by definition, the individual was working and earning wages before the incident at work and that following the incident he or she is no longer able to work (or if the worker is able to work, benefits are based on the reduced wages) and accordingly the employer should pay these benefits.

Prior to 1990, Oregon had a standard that required that work must be a "material cause." This was similar to but perhaps slightly more restrictive than the standard applicable in most jurisdictions at that time. SB 1197, which became effective in 1990, provided that disabilities were compensable only to the extent that work was the major contributing cause. SB 369, which became effective in 1995, further refined this standard. In the most general terms, the goal of this study is to understand and explain the effect of those bills on workers, employers, and the Oregon workers' compensation system. It is important to note that both bills, especially SB 1197, contained numerous other provisions. To the extent possible, we will sort out the affects of the major contributing cause provision from other provisions in the bills. We will also look at the affect these amendments may have on the protection of employers under the exclusive remedy provisions of the act.

1.5 Interviews

We began our study with two trips to Oregon in which we met with numerous representatives from the Department and Consumer Services including people from the Workers' Compensation Division and the Information Management Division. We met with representatives of insurance companies and employers including insured and self-insured employers. We met with attorneys who represent workers and attorneys who represent employers and we met with representatives of organized labor and injured workers.

Almost everyone we met with agreed that over the last ten to twelve years there has been a change in Oregon's law, which has made it more restrictive. Not surprisingly, advocates for workers and unions thought this had gone too far and was unfair. Advocates for employers and insurers thought that the law was too generous previously and that the tightening was necessary and appropriate. A few representatives of employers left open the possibility that perhaps "the pendulum had swung a little bit too far."

1.6 Terms and Definitions

During the interviews we explored with the various parties their understanding of the meaning of various terms and definitions. There was virtually unanimous agreement that "major contributing cause" referred to the abandonment of the "the employer takes the worker as it finds him" principle. And indeed, most people agreed that the work contribution must be at least fifty-one percent.

Beyond this, however, there was considerably less agreement. We asked people about the term "combined condition" and about the meaning and/or intent of SB 369, which was enacted in 1995. We also asked people about terms used to describe types of denials, such as current condition denial, aggravation denial, and backup denial. For some of these, such as aggravation denial and backup denial, the definition seems fairly clear. For others it does not.

It is not that people told us they did not know what these terms meant, indeed most people we talked to felt they had a very clear understanding of what these terms meant. The problem is that they did not all understand them in the same way. Sometimes the differences involved were subtle shadings, but sometimes they were very basic.

This uncertainty applies not only to technical definitions but also to the basic meaning and intent of the 1995 amendments found in SB 369. Some people felt that these only clarified provisions enacted by SB 1197 in 1990. While others felt strongly that they added further protection for employers.

When we would press people on these issues we would eventually be referred to the legislative history and to administrative and court decisions. We recognize that the legislative history is important, but we did not find it crystal clear. Eventually, most of these issues will be clarified through administrative and appellate court decisions. It will, however, take more time for these issues to arise in specific cases and work their way through the courts.

The issues relating to definitions have two important implications. First of all, the parties in Oregon should recognize that there is not unanimous agreement about these terms. Even among people who manage claims for employers and insurers there is not unanimous agreement concerning what is meant by a "combined condition denial". It is our understanding that the parties in Oregon are working together to resolve disputes over what the law should be. The parties to these negotiations should understand that they might be using some of these terms in different ways.

Secondly, where possible, we have avoided the use of terms that may cause confusion. Instead of attempting to isolate the affects of "combined condition denials", we have focused on how things were different after, as opposed to before, the 1995 amendments. We believe this provides the most reasonable answer to questions about the affect of those amendments.

1.7 Some Limitations of our Research

1.7.1 Disabling and Nondisabling claims

In Oregon, a worker does not receive cash benefits until after he or she has been off work for three days. Cases in which a worker has been off work for more than three days, and thus is entitled to cash benefits, are referred to as "disabling" claims. Other cases are referred to as "nondisabling" or medical only claims. Oregon employers and insurers are required to report to the Workers' Compensation Division all disabling claims, both those they accept and those they deny.

For nondisabling claims, however, Oregon employers and insurers are only required to report claims that are denied. Thus the databases of the Department of Consumer and Business Services contain information about denied nondisabling claims but not about nondisabling claims that were accepted and paid. This makes it very difficult to analyze the affects of these amendments on nondisabling claims. We know how many claims were denied but since we do not know how many were filed and accepted, we cannot directly tell the rate at which claims are denied.

In our review of files, we chose a sample that included both disabling and nondisabling claims. When looking at the overall system, however, we had very limited data concerning nondisabling claims. Where possible we have used other data from the Information Management Division and other sources to estimate the number of nondisabling claims and the changes these amendments have caused in that area.

1.7.2 The Delay

Delay is always a problem when analyzing changes in workers' compensation laws. A claim filed in 1996, based on a 1996 injury, may have a denial in 1996 but it may also have one or more denials in 1997 or even in 2000. If these denials are appealed, we may not know the results of the appeal for several years after the denial. This makes it harder for us to analyze the affects of the 1995 amendments than the 1990 amendments. It also makes it especially difficult to analyze appeals.

We have dealt with this problem in various ways. In some cases we have reported numbers for recent periods but added a caution that these are less reliable. In other cases we have used the trend we found in older claims to predict what the trend would be in more recent claims. This approach is explained in section 3.4. In other places, such as section 3.9 and 4.7.2, we have used different approaches or a different subset of claims to obtain accurate information about recent trends. In each case we explain in the text the techniques we have used.

1.8 The Amendments

Unfortunately, for the purpose of our analysis, the changes relating to major contributing cause were not the only changes involved in SB 1197 or SB 369. In addition to these amendments, SB 1197 enacted in 1990 involved:

- Changes relating to requirements for safety committees
- Changes to the Preferred Worker Program
- Several changes relating to insurance
- Required that medical evidence be supported by "objective findings"
- Changes to the procedures under which claims could be denied
- Changes relating to medical coverage
- Changes to benefits for scheduled injuries
- Numerous procedural changes

SB 369 enacted in 1995 included amendments dealing with how major contributing cause applied to combined conditions and also:

- Established a Work Redesign Program
- Expanded the definition of "objective findings"
- Included a provision dealing with the way in which the entire workers' compensation act should be interpreted
- Strengthened the exclusive remedy provision of the act
- Included changes dealing with medical care
- Made changes to the Employer-at-Injury Program
- Made changes in the level of benefits for unscheduled injuries
- Included numerous procedural changes

A good summary of all these changes is found in the report "Monitoring Legislative Reform" which is published by the Information Management Division. The report is available at www.cbs.state.or.us/imd/.

For many parts of this report, we measure changes in the system before and after the amendments. In those sections of the report, we cannot directly separate the effects of the major contributing cause amendments from the other amendments in those bills. In section 4, we are able to look specifically and separately at major contributing cause denials as opposed to denials for other reasons and in section 2.2, we attempt to bring together all of these factors.

1.9 The Team

We were fortunate to work together with an excellent team of researchers in conducting this study. For the most part, specific individuals were assigned to specific parts of the study. In general, however, all members of the team contributed to the overall product. The team included:

Principal Investigator (Sections 1 and 2)

Edward M. Welch, Director, Workers' Compensation Center, Michigan State University

Data Analysis, Analysis of File Review, and Tort Cost Analysis (Sections 3, 4, and 6)

Jeff Biddle, Professor, Economics, Michigan State University

File Review

Dena Pease, Retired Wharehouser

Law Review (Section 5)

Sara T. Harmon, Attorney Mediator, New Mexico Workers' Compensation Administration

Benefit and Cost Analysis (Section 7)

John F. Burton, Jr., Professor, School of Management and Labor Relations, Rutgers University

Terry Thomason, Associate Professor, Labor Research Center, University of Rhode Island

File Reviewers

Richard Frank, Management Consultant, Richard B. Frank & Associates

Karen E. Johnson,

Kris Kennet, K.L. Kennet Consulting

Lynn Soliday, CPDM

Assistance with Analysis of Tort Claim Cases (Section 6)

Carolyn Bruce-Erickson, Adjunct Professor, Michigan State University-Detroit College of Law

Staff of the Workers' Compensation Center

Joseph J. Becker, Administrative Assistant

Marian Erickson, Program Coordinator

1.10 The Department

The success of a project such as this is always greatly dependent on the availability and the cooperation of the state agency involved. We want to take this opportunity to express our appreciation for the support we received from the Department of Consumer and Business Services.

We want to acknowledge especially the help we received from IMD. We would mention a few people specifically: Mary Neidig, Department Director; John Shilts, who is now Administrator of the Workers' Compensation Division and who was project manager when we began; Carey Thompson, who took over as project manager after John became Division Administrator; Michael Manley, who was our primary contact with the Information Management Division; and Gary Helmer, within IMD who frequently assisted us with the project. All the people from the department with whom we had any contact were very helpful. Because they were the source of much of the data we used, we want to acknowledge the especially helpful cooperation we received from the IMD.

2 Summary and Discussion

2.1 Introduction

This section provides a summary and discussion of our major findings concerning the major contributing cause amendments to the Oregon Workers' Compensation law. Section 1 above, provides background about our study and discusses some of the limitations. This section should be read with that introduction.

Sections 3 through 8, which follow, provide the detailed findings upon which this summary is based. Throughout the summary we will make reference to the detailed sections.

2.2 Denials

2.2.1 Data Sources

The data for this section 2.2 come from two sources:

1. An analysis of all workers' compensation claims that were denied, which are discussed in detail in section 3, and

2. An analysis of claim files, which are discussed in detail in section 4.

The first data source gives us information about all claims and tells us, for example, what percentage of all claims were denied. The second data source is based on a file review of a sample of denied claims. From this review we are able to make comments about denied claims. This tells us, for example, what percentage of all denied claims were denied based on major contributing cause. Here we discuss various topics drawing upon the results of both sources of data.

In order to analyze the affects of SB 1197 and SB 369, we looked at the Oregon Workers' Compensation system for periods of time before and after the enactment of those bills in 1990 and 1995. As discussed in section 4.1, the matter is further complicated by the fact that during the late 1980s and early 1990s, SAIF was aggressively denying an unusual number of claims. It is not the purpose of this study to analyze that situation. Indeed, we would prefer to isolate our results from its impact. Accordingly, we have subdivided the time periods into periods that include and exclude the time during which SAIF was denying an unusual number of claims.

We ended up with the following five time periods:

1a	7/1/88 – 6/30/89	Before SB 1197	Before SAIF high denial period
1b	7/1/89 – 6/30/90	Before SB 1197	During SAIF high denial period
2a	10/1/90 – 6/30/92	After SB 1197	During SAIF high denial period
2b	7/1/92 – 5/31/95	After SB 1197	After SAIF high denial period
3	9/1/95 – 12/31/98	After SB 369	After SAIF high denial period

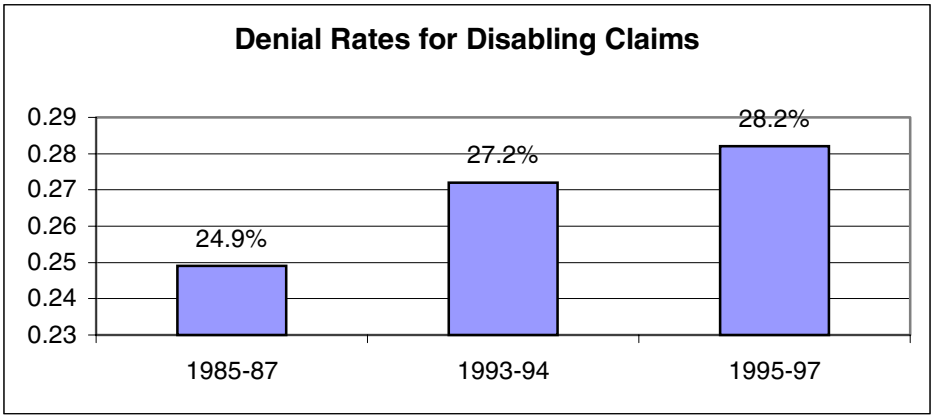
In section 4, we provide results for all five time periods wherever possible. In this summary section, however, we will focus on the three time periods outside of the SAIF "bubble".

2.2.2 Denial Rates

In the following sections we will often focus primarily on disabling as apposed to nondisabling claims. As explained in section 1.7.1 there is much better data available concerning disabling claims. Furthermore, these are often the most serious and the most frequently contested claims. In section 2.2.6, we will look at information that compares disabling and nondisabling claims.

Figure 2-1 shows the overall denial rate for claims filed in the time periods indicated. For all the claims filed in the 1985-87 time period, almost 25% received some kind of denial during the life of the claim. Following the 1990 legislation this increased to over 27%. Following the 1995 legislation this increased to over 28%. These are perhaps smaller increases than might have been expected.

Figure 2-1



2.2.3 MCC Denials

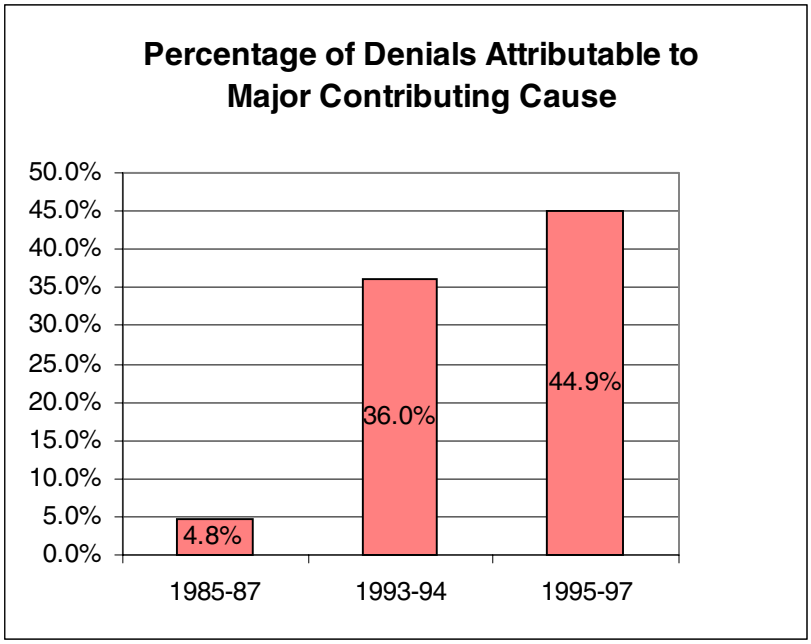
Table 2-1 and figure 2-2 are based on our file review data as discussed in section 4.3. Before the 1990 legislation, only a small number of denials were attributable to major contributing cause. These involved occupational disease claims. Following the 1990 legislation this jumped to about 36% of all denials and increased to almost 45% of all denials after the 1995 legislation. In table 2-1 we include information concerning denials for "insufficient evidence" and "lack of objective evidence". The "all other reasons" category is exactly that. It would include, for example, cases in which the carrier believed the injury happened at home rather than at work.

Thus the rate at which claims received a denial increased slightly following the 1990 and 1995 amendments. The proportion of all denials that were attributable to major contributing cause increased in both periods.

Table 2-1: Percent of Denials of Disabling Claims by Reason for Denial

Reason for Denial	1985-87	1993-94	1995-97
MCC	4.8%	36.0%	44.9%
Insufficient Evidence	29.5	20.8	12.7
Objective Evidence	6.5	2.5	5.1
All Other Reasons	59.1	40.6	37.3

Figure 2-2



2.2.4 Carrier Type

Sections 3.6 and 4.4.1 discuss denials by carrier type. Table 2-2 summarizes the change in denial rates by showing the percentage of cases with a whole claim denial by carrier type before and after the 1990 legislation. SAIF has always denied more claims than other groups and self-insureds fewer. This continued after the availability of major contributing cause denials and in fact the disparity between SAIF and other carriers increased.

Table 2-2: Change in Whole Claim Denial Rates by Insurer Type

Insurer Type	1987-88	1993-94
SAIF	17.1%	22.5%
Other Private Carrier	14.2%	17.0%
Self Insured	13.7%	16.7%

Table 2-3 shows, by carrier type, the percentage of disabling claim denials due to major contributing cause. SAIF uses major contributing cause more frequently than other carriers and self-insureds use it less often.

Table 2-3: Percentage of Disabling Claim Denials Due to MCC, by Insurance Type

	Period 2b	Period 3
SAIF Insured	46.8%	52.0%
Private Insurers	32.6%	43.9%
Self Insured	22.2%	32.8%

Thus SAIF denies more claims and uses major contributing cause more frequently. Self-insured employers tend to deny fewer claims and use major contributing cause the least.

2.2.5 Injury Type

We expected that we would find major contributing cause used more frequently for more ambiguous injuries such as strains and sprains and less frequently for clearly traumatic injuries. As discussed in sections 3.6 and 4.4.4, the pattern was not as clear as we expected. The correlation was least for the overall denial rate, discussed in section 3.6. Section 4.4.4 discusses the use of major contributing cause denials. We found that SAIF appears to use major contributing cause denials more in the more ambiguous cases. For

other carriers the correlation was somewhat less clear. The regression analysis of benefits and costs, discussed in section 7, did find a correlation between the nature of injury and the rate at which accepted claims decreased following the amendments.

Thus, major contributing cause appears to be used across the board for all types of injuries, although as expected it is used somewhat more for the more ambiguous injury types.

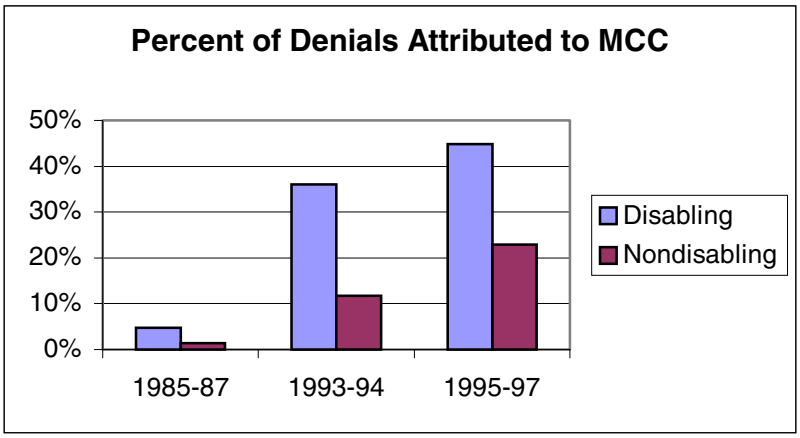
2.2.6 Disabling and Nondisabling Claims

Questions have arisen concerning how major contributing cause is used in nondisabling as compared to disabling claims. This issue is discussed in section 3.3.2 and 3.3.4. In section 4 we report separately information for disabling and nondisabling claims in many areas.

As discussed in section 1.7.1 and 3.3.2, it is more difficult to estimate the denial rate for nondisabling claims because accepted disabling claims do not need to be reported to the Workers' Compensation Division. In the file review, however, we were able to look at both disabling and nondisabling claims.

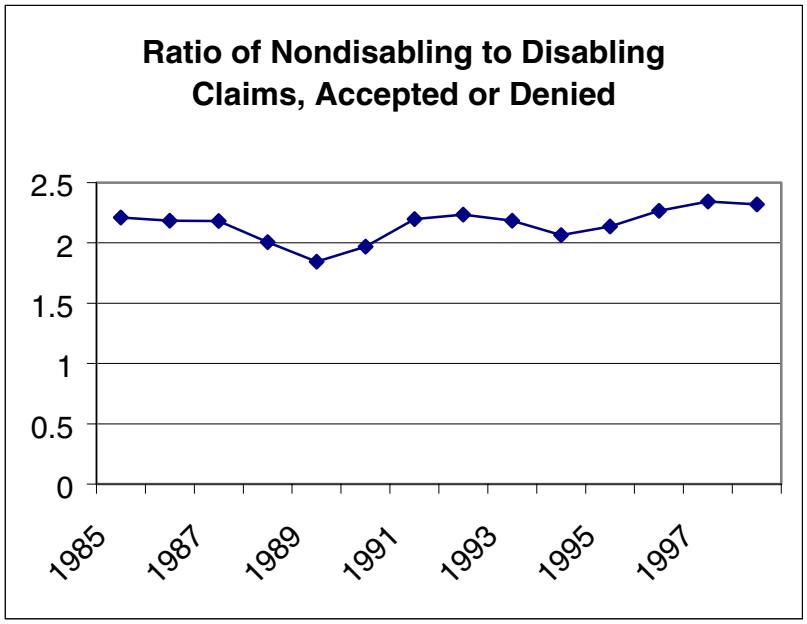
Figure 2-3 summarizes the situation by showing the portion of disabling and nondisabling denials attributed to major contributing cause. As can be seen, major contributing cause is used much more frequently in disabling cases. This is perhaps not surprising since disabling cases are more costly and go on for longer periods of time.

Figure 2-3



A question has arisen as to whether major contributing cause has resulted in some claims being converted from disabling to nondisabling claims. In other words, it has been suggested that carriers use major contributing cause to deny claims quickly before there is lost time and thus claims that previously might have been categorized as disabling are now categorized as nondisabling. Because of the lack of data about nondisabling claims, it is difficult to answer this definitively.

Figure 2-4



It may well be that this happens in some cases, perhaps what some might consider a significant number, but we did not find evidence that it is happening enough to have a noticeable overall effect on the system. As discussed in section 3.3.3 and shown in figure 2-4, the ratio of disabling to nondisabling claims varies somewhat over this period of time, but there is not a clear pattern and the variations are not large. There is an increase in nondisabling claims following 1995. This may, however, be attributable to the Employer-at-Injury Program. As a result of the incentives in this program, some employers may be taking injured individuals back to work before they miss more than three days.

2.2.7 Denial Types

Section 3.4 discusses whole versus partial denial rates. The denial rate is noticeably higher for whole rather than for partial denial rates. Also, the whole denial rate appears to have increased more than the partial denial rate. Furthermore, as shown in table 2-4 below, about 2/3 of all major contributing cause denials are initial whole denials.

A question arose as to how often major contributing cause is used to close a claim. The data in section 3.4 suggest that partial denial rates did increase following the 1995 amendments. Table 2-4 below also suggests that about 23% of major contributing cause denials are what we called “other partial” denials. These would be denials that occurred later in the claim. In section 3.9, we used a different measure to look at the extent to which the partial denial rate changed following the amendments. That measure suggested that in fact the partial denial rate had dropped. There is, thus, some conflicting evidence on this point. It would appear that major contributing cause denials are in fact used in this way in a significant number of cases. All things considered, however, it would appear that major contributing cause denials are used much more often as initial whole denials.

Section 4.5 provides detailed information on major contributing cause denials by type. Tables 2-4 and 2-5 summarize the results. Table 2-4 shows the percentage of all major contributing cause denials in disabling claims by denial type. Table 2-5 shows the percentage of each type of denial that was attributed to major contributing cause.

Table 2-4: Distribution of MCC Denials by Type of Denial

Denial Type	Period 2b	Period 3
Initial Whole	59.7%	67.1%
Initial Partial	0.0%	1.7%
Other Partial	27.7%	23.5%
Aggravation	12.5%	7.4%
Backup	0.0%	0.3%

Table 2-5: Percentage of Denials of Each Type Due to MCC

Type	Period 2b	Period 3
Initial Whole	32.4	41.2
Initial Partial	0.0	100.0
Other Partial	56.3	66.6
Aggravation	31.8	33.0
Backup	0.0	50.0

Thus for the most recent time period, about 67% of all major contributing cause denials were initial whole denials. When we look at all initial whole denials for this same period, about 41% were due to major contributing cause.

When looking at table 2-5 it must be kept in mind that initial whole denials represent the majority of all denials, thus in our sample for the most recent time period, half of the back up denials were attributable to major contributing cause but they represented only .3 percent of all major contributing cause denials.

2.2.8 Appeals and Outcomes

Section 3.4.3 looks at appeals and ultimate outcomes for all claims. As we might expect, the chance that a denial will be reversed increases following the legislation, but decreases over time. We would expect this because we would assume that following new legislation carriers will deny more claims without being sure which denials will be upheld on appeal. As time goes on, carriers should become more sophisticated and should deny only claims that are more likely to be denied on appeal.

Section 4.6 examines in more detail appeals and outcomes in denied claims. Table 2-6 shows the rate at which denials are appealed for disabling claims (because of the relatively small numbers in some categories, we have combined both post amendment time periods). The appeal rate before the 1990 amendments was just over 70 percent, in other words, 70 percent of all denials were appealed. For the post amendment time periods, the overall appeal rate actually decreased to about 65 percent. When we separate major contributing cause from other denials, we find that the appeal rate for major contributing cause denials is about 72 percent, noticeably higher than other denials.

Table 2-6: Appeal Rates for Denials of Disabling Claims

Period	Denial Type	Appealed
Pre-Legislation Periods	All	70.4%
Post-Legislation Periods	All	65.3%
	MCC	72.3%
	Non-MCC	61.7%

Table 2-7: Outcomes of Denials of Disabling Claims

Period	Denial Type	Ultimately Denied
Pre-Legislation Periods	All	41.8%
Period 3	All	51.2%
	MCC	47.3%
	Non MCC	54.3%

Table 2-7 shows the ultimate outcome of appealed denials, in other words, it shows that in the pre-amendment period, about 41 percent of all denials ultimately resulted in a denial. This increased to over 50 percent in the post-legislation period. However, non-major contributing cause denials were more likely to be upheld than major contributing cause denials.

2.2.9 Settlements

Sections 3.4 and 4.6 also report on disputed claim settlements. As shown in table 2-8, our analysis of all claims showed a steady increase in the portion of cases that were settled rising from 19 percent in the pre-amendment period to 24 percent in the most recent period. In this regard, the figures from the most recent period must be used with some caution. Many cases from this period are still open and could result in additional settlements.

Table 2-8: Settlement Rates for Denied Disabling Claims

	1985-87	**1993-94**	**1995-97**
Settled through DCS	.190	.236	.241

Our sample of denied claims showed a somewhat higher settlement rate but less change over time. Figure 2-9 shows the settlement rate for major contributing cause denials and other denials. Major contributing cause cases were more likely to result in a settlement.

Table 2-9: Settlement Rate for Denied Claims in Post-Legislation Periods

Denial Type	**Settled**
MCC	37.5%
Non MCC	28.8%

2.2.10 Gender, Age, Industry, and Occupation

As discussed in section 3.4 and sections 4.4.2 through 4.4.6, we conducted extensive analyses of the overall denial rate and of the distribution of the major contributing cause denials based on gender, age, industry, and occupation. One can suggest various theories under which the major contributing cause amendment should have affected the denial rate differently within these categories. We did not find any such pattern. To be sure there were some differences within the various categories but none were significant enough to indicate a specific pattern. There is some slight indication that denial rates have increased

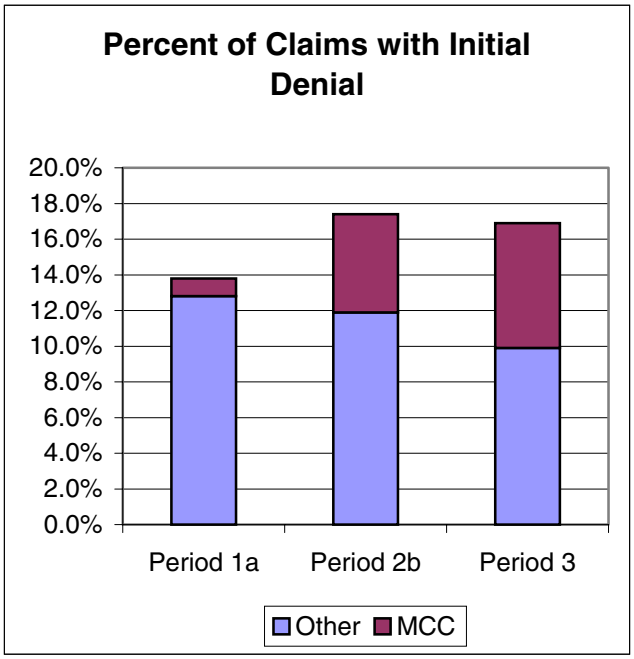
more for individuals who fall into low wage categories. Other than that, we did not find any evidence that major contributing cause has had differing affects based on gender, age, industry, or occupation.

2.2.11 Were the Post 1990 MCC Denials New Denials?

As shown above, during the post 1995 period about 45 percent of all denials were based on major contributing cause. During the period from before 1990 to after 1995, however, the overall denial rate for disabling claims increased by only about 3 percentage points from 24.9 percent to 28.2 percent. This suggests that not all of the major contributing cause denials were denials that would not have occurred but for the major contributing cause amendments.

The two figures just cited are not exactly comparable. The portion of denials attributable to major contributing cause is a percentage of all denials in a specific period. The overall denial rate is a percentage of cases that originated in a specific period and experienced a denial at any time. In order to make a more careful comparison of this issue, we used two different techniques. As discussed in section 4.7.1, we made a comparison looking only at initial denials. This allowed us to compare the reason for denial with the rate of denials in the same period of time. Figure 2.5 summarizes these findings. As shown, the overall denial rate for initial denials actually decreased after the 1995 amendments even though the percent of denials involving major contributing cause increased.

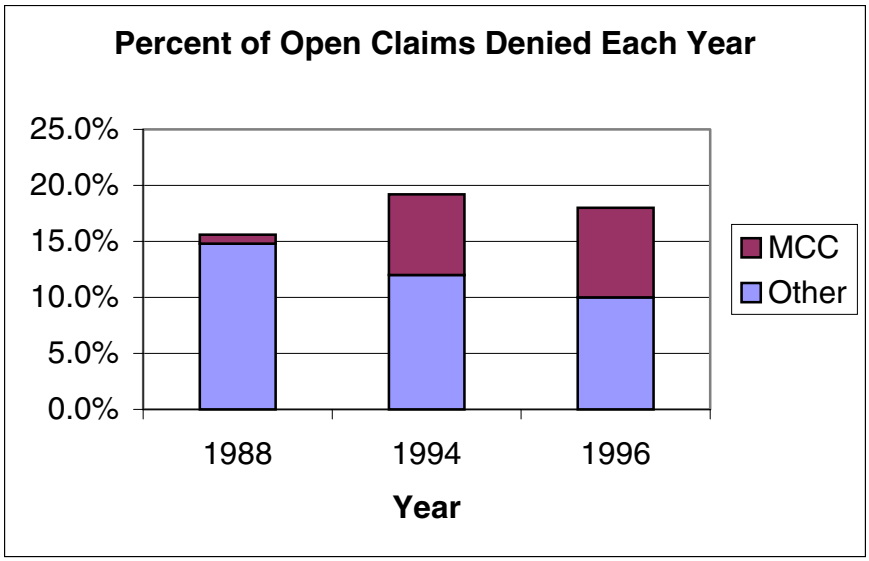
Figure 2-5



Another approach to this same issue is discussed in section 4.7.2. For this analysis, we estimated the total number of claims open (and thus susceptible to a denial) for a given time period, looked at the number of claims receiving a denial in that period, and the

number of cases in which the denial was attributable to major contributing cause. These findings are summarized in figure 2-6. The results are very similar to the initial denial rate. The major contributing cause denial increased over time. However, the overall denial rate increased after the 1990 legislation but decreased after the 1995 legislation.

Figure 2-6



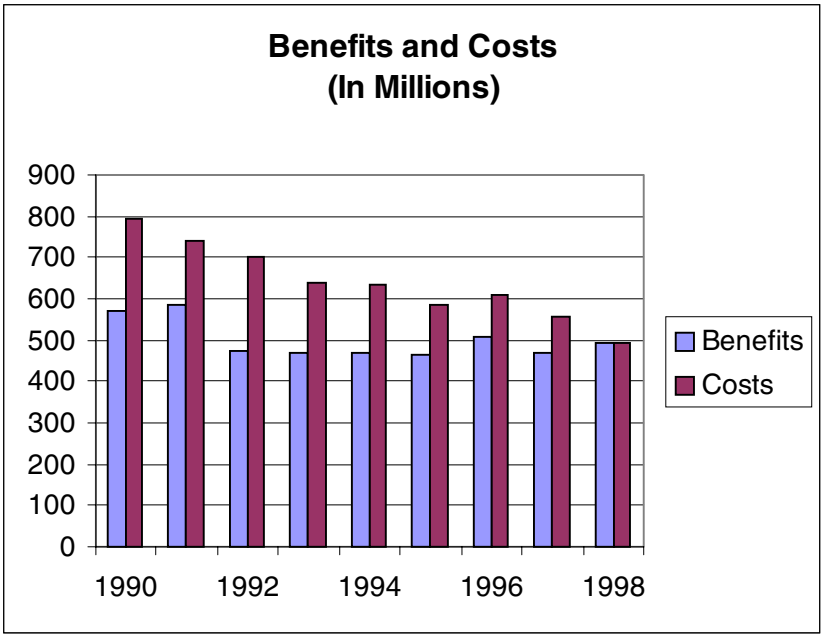
There are a couple of possible explanations for this. It is possible that the denial rates were falling for other reasons. Perhaps workers with claims in which there was a question of whether the injury happened at work or happened at home were less likely to file their claims. This type of behavior would result in fewer denials based on "arising out of and in course of". It is also possible that there were changes in the system, which made it more difficult to deny claims for other reasons. We are, however, not aware of any such circumstances.

It seems to us most likely that as major contributing cause became available as an option for denying a claim, claims adjusters used it instead of using some other reason for denial. In other words, if there was a case that involved both a question of whether the work related incident was the major contributing cause and also a question of whether the incident actually occurred at work or at home, claims adjusters chose to deny claims based on major contributing cause.

2.3 Benefits and Costs

In section 7 of this report, we attempt to analyze the affects that the 1990 and 1995 amendments have had on benefits and costs. During the period from 1990 to 1998 both the benefits received by Oregon workers and the costs of workers' compensation to Oregon employers have declined. The decline in costs to employers has been somewhat greater than the decline in benefits paid to workers. This is illustrated in figure 2-7.

Figure 2-7



To what extent is the decline in benefits and costs attributable to the legislation? We have attempted to answer this through a regression analysis. This is a statistical model that attempts to consider simultaneously a variety of factors, which may have been affecting total benefits paid to workers and costs incurred by employers. These factors are discussed in more detail in section 7. They include factors not related to the workers' compensation system such as: gender, age, occupation, industry, and body part injured. They also consider other changes taking place within the workers' compensation system such as changes in the mix or severity of temporary total cases, permanent partial cases, medical benefits, and numerous other factors that are listed. The model also includes a measure for the fact that SB 1197 became effective in mid 1990 and that SB 369 became effective in mid 1995. The model then analyzes the changes in all of these factors over the years and makes a determination of the extent to which each of the factors contributes to changes in total benefits and total costs.

For our study, we actually used two models. Our second model included an additional factor for trends over time. This was intended to take into consideration the fact that there are other things affecting the Oregon Workers' Compensation system, which we could not measure. In section 7 we report the results based on both Model I and Model II. In this summary section, we will report only the result for Model II, which includes the time trend. We feel this estimate is more accurate for a number of reasons including the fact that, as explained in section 3.3.1, some of the changes that took place in Oregon appear to parallel national trends. It also appears that many of the trends in Oregon began before 1990. Model II includes a factor to account for the fact that many of the changes we see after 1990 may simply be a continuation of trends begun before that.

The figures for Model I probably attribute to these legislative amendments some changes that were merely continuations of earlier trends. At the same time, to some degree, Model II probably misses some changes attributable to the amendments because they are hidden by trends over time. All things considered, we believe that Model II comes nearest to showing accurate results. However, it probably underestimates to some degree the effects of the amendments.

Figure 2-8

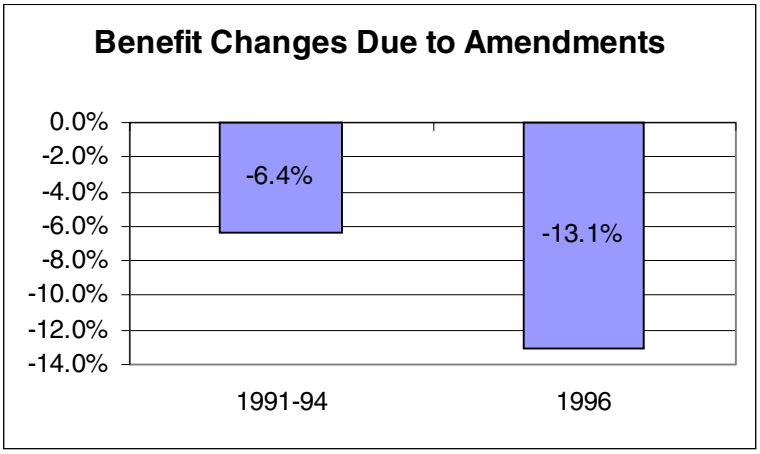


Figure 2-8 shows our Model II estimates of the affect of the amendments on benefits received for workers. In other words, we estimate that as a result SB 1197 during the period from 1991 to 1994 benefits to workers were 6.4 percent lower then they would have been had these amendments not passed. As a combined result of the 1990 and the 1995 amendments, we estimate that during 1996 benefits were slightly over 13 percent less than they would have been had neither amendment been adopted.

Figure 2-9

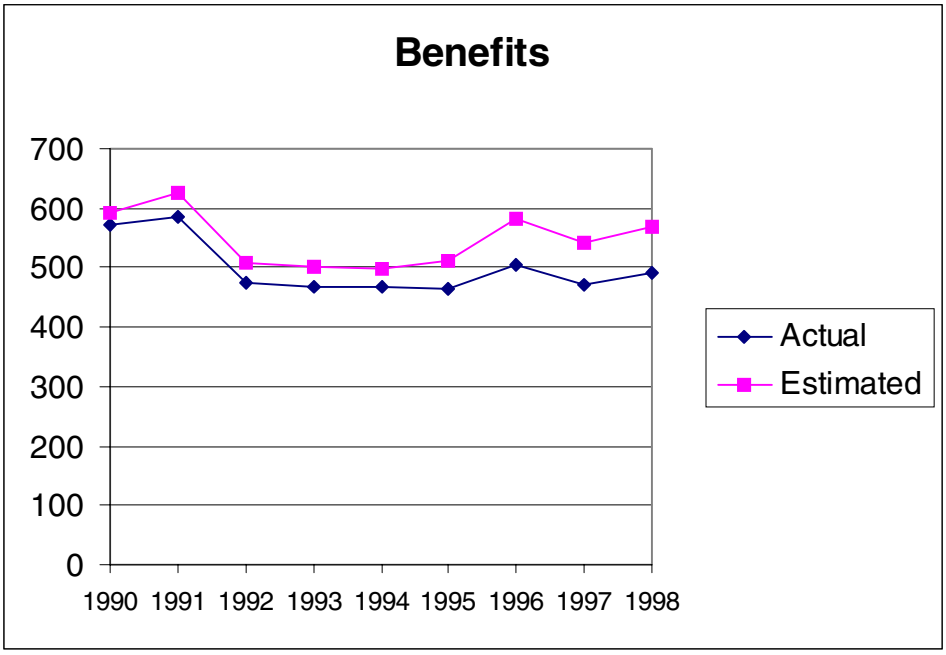
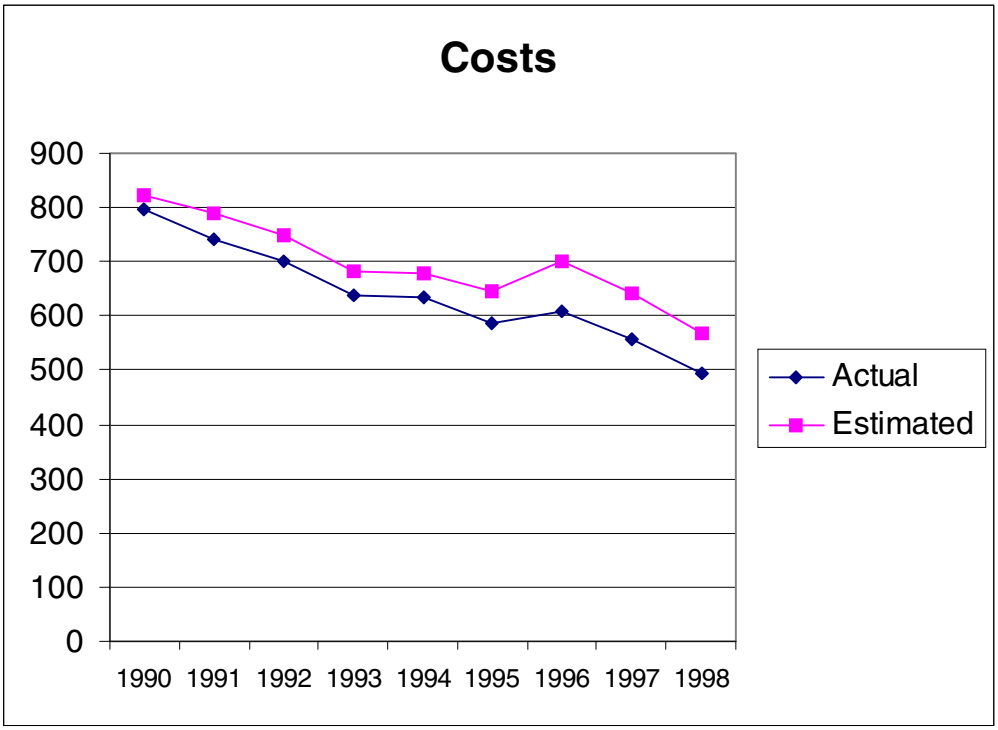


Figure 2-10



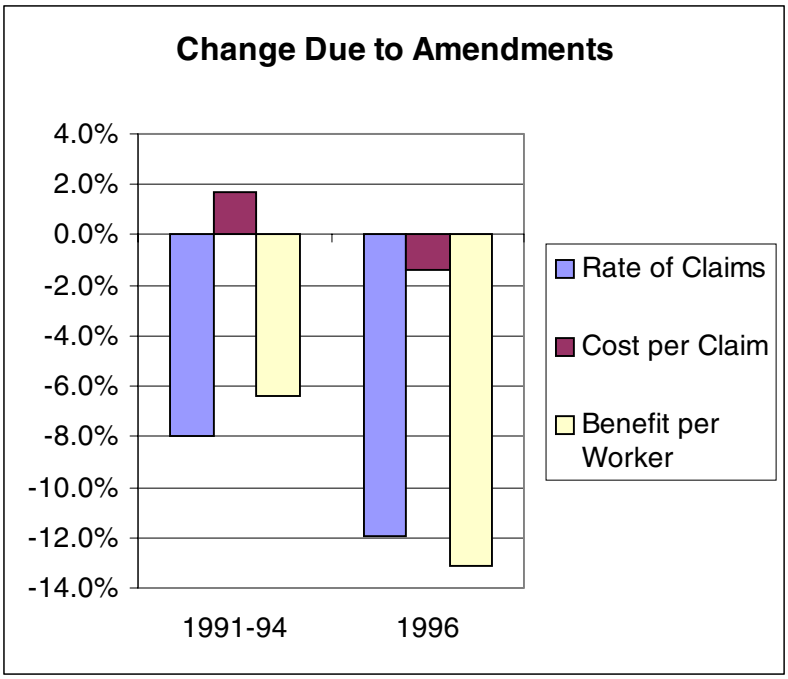
Figures 2-9 and 2-10 show the effects of the amendments on benefits and costs on a year-by-year basis. As discussed in section 7, this resulted in a reduction in benefits paid to workers of about $425 million and a savings of costs incurred by employers of about

$522 million. As indicated above it should be kept in mind that this uses the more conservative Model II. Model I gave us estimates that were much higher than this. While we believe Model II is the most appropriate estimate to use, we concede that it probably underestimates the effect to some degree.

A few other things should be pointed out about these results. First these models estimate the total affect of both bills. They are not able to isolate the effect of major contributing cause portions of those bills.

Also, the change is primarily attributable to a reduction in the number of claims. Figure 2-11 breaks down the components of figure 2-8 into frequency and severity. That is, it shows the rate of claims per worker, the average cost per claim, and the total combined affect. As can be seen, the reductions in benefits and costs were primarily related to reductions in the number of claims that were filed and only slightly related to a change in the cost for claims. In fact, for the 1991 to 1994 period, the average cost per claim actually increased.

Figure 2-11



Finally keep in mind that benefits and costs went down more than 13 percent. In fact they appear to have gone down by nearly 40 percent. What we are saying is that the decline attributable to these amendments was about 13 percent. The other factors contributing to the decline probably include other amendments, safety incentives, fraud programs, an overall national trend, and a very competitive insurance market.

2.4 Physicians Comments

The request for proposal for this project included the following request: Survey and report the views of attending and examining physicians as to the level of difficulty, validity and accuracy of their opinions regarding major contributing cause and combined conditions.

After consulting with the Division it was determined that this did not require a sampling that would provide a scientifically valid representation of the views of all Oregon physicians. Rather, it was agreed that the project plan should include a consultation with physicians who were especially knowledgeable about or leaders in medical aspects of workers' compensation in Oregon.

We asked various parties to suggest the names of physicians we should consult. We received suggestions from the Workers' Compensation Division, employers, insurers, attorneys representing employers, attorneys representing workers, and the Oregon Medical Association.

We wrote to thirty-five doctors asking them three questions:

1. Is it reasonable to ask physicians to offer an opinion on whether or not the work was the major contributing cause of a disability?

2. Do you believe that physicians are able to provide such opinions in a manner that is valid, accurate, and consistent?

3. Do you have any other comments on Oregon's use of the "major contributing cause standard" or the way in which Oregon handles combined conditions for the purpose of workers' compensation?

We received responses from 11 doctors. We invited the doctors to respond by writing on a form we provided them, sending us their written comments, or calling us and talking to us on the phone. We received replies in all three formats.

A listing of the responses is found in section 6. We would summarize these as follows:

In response to the question: Is it reasonable to ask physicians to offer an opinion on whether or not the work was the major contributing cause of a disability? All respondents agreed that it was but a couple cautioned that the physician must be free from bias (one indicated that treating doctors may tend to have a bias) and that the physicians must do this very carefully after having obtained all pertinent information.

In response to the question: Do you believe that physicians are able to provide such opinions in a manner that is valid, accurate, and consistent? All the respondents answered yes, but several indicated that it is difficult to do and one indicated that in some situations the results seem to be unfair.

When asked for other comments about major contributing cause and the way Oregon handles combined conditions, the responses were generally positive. The physicians pointed out problems with the system but most saw the current situation as an improvement over the past. A few felt that the pendulum had swung too far.

2.5 Law Review

2.5.1 The Issues

Under most workers' compensation systems, a disability is compensable if a work related cause aggravates or combines with a pre-existing condition to result in a disability. SB 1197 provided that in Oregon, the disability was compensable only if the employment was the major contributing cause. As part of this study, we reviewed how the Oregon standard compares to standards used across the United States.

If a disability is covered under workers' compensation, then the worker is not allowed to sue his or her employer. Workers' compensation is the "exclusive remedy." If the compensability standard excludes certain disabilities from the workers' compensation system, does this narrow the extent to which workers' compensation is the exclusive remedy? That issue is pending before the Oregon courts. As part of our study, we reviewed how other states have dealt with this question.

Our review of the law is presented in section 5 and summarized here.

2.5.2 Compensability

The broad Major Contributing Cause standard used in Oregon appears to us to be the most stringent standard used anywhere. A few jurisdictions have an even higher standard but apply it to a limited class of cases, such as those involving mental disabilities or certain occupational diseases. Oregon applies its Major Contributing Cause standard across the board to all claims. This is the highest broad standard we were able to identify in our review of laws. Oregon, however, is not unique in this regard. Arkansas, Florida, and South Dakota appear to have a similar standard. So far as we know, no other state has conducted an empirical analysis of their standard of the kind discussed in other parts of this report.

2.5.3 Exclusive Remedy

In general, when other states have excluded certain disabilities from coverage by raising the compensability standard, the courts in those states have held that employers lose the protection of the exclusive remedy provision of workers' compensation acts under those circumstances. This does not appear to be the case when states have raised the extent to which the worker must be disabled but does appear to be the case when, as in Oregon, they have excluded certain disabilities. States that have limited the exclusive remedy protection when compensability has been narrowed include New Mexico, Montana, Ohio, and Washington.

2.6 Cost of the Tort Alternative

As discussed in section 5.2, there is a possibility that the Oregon Supreme Court will hold that individuals that are denied workers' compensation benefits under major contributing cause may file civil or "tort" actions against their employers. In section 6, we attempt to estimate what the costs of such suits might be.

We emphasize that this estimate is much more speculative than the analyses contained in other sections of this report. There are a variety of factors that make this difficult. Some of these can be summarized as follows:

- To succeed in a tort action the individual would have to prove that the employer was negligent. This is not necessary in workers' compensation.
- Major contributing cause cases involve claims in which there is another factor contributing to the disability. This may decrease the value of the claims.
- Because civil tort actions are more time consuming and costly, it seems unlikely that every worker who could theoretically file such an action would do so.
- While we have a great deal of information about benefits paid under the workers' compensation system, there is very little data concerning benefits awarded in civil cases.

Keeping these limitations in mind, we did what we could to make an estimate. We found research from other areas about how often individuals who suffer an injury file a civil action against the people apparently responsible for that injury. Based on this, we estimate that somewhere between 5 percent and 40 percent of the people eligible to file a civil action would actually do so.

We reviewed reports from the Workers' Compensation Board involving fee disputes in third party cases. This gave us a set of about 120 cases, which involved an injury that was compensated under the Oregon Workers' Compensation System and also received an award or settlement in a civil action. The results of our review of these cases appeared quite similar to another study that compared the damages workers received under civil actions under the Federal Employers Liability Act and workers' compensation benefits paid for similar injuries. Based on these results, we believe that the damages awarded in a tort claim would range between 150 percent and 400 percent of the workers' compensation benefits workers now receive.

When these two factors are combined, we estimate that if workers were allowed to file civil actions against their employers, this would result in an increase in damages ordered for workers which were between one half of a percent and 10 percent of the value of the total benefits currently paid on all accepted disabling workers' compensation claims.

These figures do not take into consideration changes in the efficiency in the system. It is generally acknowledged that attorney fees and costs in tort actions are substantially higher than those in workers' compensation claims. Thus, the benefits actually received

by workers would be less than the figures listed above and the costs to employers would be more. In addition, civil systems are usually slower than workers' compensation and thus the payment of benefits would take longer.

2.7 Conclusions

As discussed above it appears that there was a reduction in benefits of at least 13 percent, which was attributable to the combination of the 1990 and 1995 amendments. By the late 1990s about 45 percent of all denials were based on major contributing cause.

At the same time, our various analyses of denial rates show an increase, but a smaller increase, in the rate at which claims are denied. Our comparisons of major contributing cause denials to all denials suggest that, to some extent, major contributing cause denials do not entirely represent new denials. To a substantial extent they appear to represent cases that would previously have been denied for some other reason and are now denied under major contributing cause. How does this all fit together?

The benefit and cost analysis does not separate out the major contributing cause amendments from the other amendments that occurred at the same time. As discussed in section 1.8, there were a number of other amendments in the same bills. Accordingly, it is likely that a portion of the decline in benefits and costs is attributable to other parts of the amendments that would not show up in denial rates. For example, there were new safety incentives, which hopefully resulted in fewer injuries.

If we consider 1) the benefit and cost analysis showed that the decreases were attributable primarily to a change in frequency rather than severity, 2) there has been a substantial decline in the number of claims filed, and 3) there has been only a relatively modest increase in the number of filed claims that are denied, then it seems clear that the most important factor has been the decrease in the number of claims filed.

It seems likely that some part of the decrease in the number of claims filed represents individuals who suffer what previously would have been considered a work-related injury but who now do not file a claim. We presume that this was after all the primary intent of the major contributing cause amendments. Some workers who have a history of back problems and suffer a flare up at work and would have filed a claim in the past, no longer file their claims.

In section 3.7, we attempted to analyze this issue by looking at whether the decrease in claims filed was correlated by category with an increase in denial rates. We found some support for such a correlation with SAIF claims, but not much support when looking at claims from other carriers. Accordingly, we are not able to point to specific evidence for this relationship.

Beginning in about 1989 there was an effort in Oregon to deal with fraudulent claims. There was also significant national publicity alleging there was a serious problem of claimant fraud in workers' compensation. It is quite likely that these fraud campaigns decreased the number of claims filed in two ways. One, for individuals who were

consciously and intentionally planning to file a fraudulent claim, it is likely that this discouraged some of them from doing so. Two, it also seems likely that those who had questionable or perhaps even clearly legitimate workers' compensation claims might have been deterred from filing them because there was so much publicity suggesting that workers' compensation claimants were “frauds.” It should be noted, however, that in Oregon the antifraud campaign began before 1990. Thus the trend factor in Model II of the Benefit and Cost Analysis should have controlled for this factor.

What we can say based on our analysis it this:

- Benefits and Costs appear to have gone down at least 6.35 percent as a result of SB 1197 and another 6.78 percent as a result of SB 369.

- Only a small portion of this can be explained by claims that are filed and denied.

- Most of it is attributable to a decrease in the number of claims filed per worker.

We believe that the decline in filed claims is attributable to a variety of factors including: safety efforts, fraud campaigns, national trends, and other factors not related to MCC. We also believe that the raising of the compensability standard to major contributing cause, a standard higher than that applied in all but a few other states, was a factor in the decline in the filing rate.

Benefits and costs in Oregon have gone down dramatically from the late 1980s to the present. A substantial portion of the trend began before SB 1197. Nevertheless, the amendments appear to have had a substantial impact on the Oregon system. The major contributing cause standard was an important part of this impact.

The impact of the major contributing cause standard is a very broad one. While major contributing cause appears to be used somewhat more frequently in soft tissue and other ambiguous types of claims, it is not limited to those claims. Its effect is felt across the entire system. It has cut across all claims regardless of injury type or the gender, age, or occupation of the worker.

By mid 1990 when SB 1197 became effective, there was already a downward trend in benefits and costs. There was at the same time great pressure on the people who manage workers' compensation for employers and insurers to reduce costs further. Major contributing cause gave them an effective tool they could use to do this. In 1995, SB 369 clarified for claims adjusters how major contributing cause could be used. This gave them even more confidence in using this tool to manage claims.

The availability and use of major contributing cause in managing claims combined with other factors to create an environment in which fewer claims were filed. Employers tend to see these as claims that should never have been in the system in the first place. Workers and their advocates see them as deserving claims that are no longer paid. We make no judgment on this latter point.

3 Data Analysis

Jeff Biddle

In 1990, as part of SB 1197, the Oregon legislature provided that losses to workers arising from work-related injuries and illnesses were compensable under Oregon workers' compensation law only if work was the "major contributing cause" of the injury or illness. Further, if a compensable injury combined with a pre-existing condition, the combined condition was compensable only to the extent that the compensable injury was the major contributing cause of the disability or the need for treatment. The intent of these provisions was to narrow the range of compensable injuries and illnesses. In 1995, as part of SB 369, the legislature added additional language to this section to clarify definitions and processes regarding the "major contributing cause" standard.

In this part of our report we describe the results of analyzing the extensive data on disabling claims routinely collected by the Oregon Department of Consumer and Business Services. The purpose of the analysis is to determine the effects of the major contributing cause and combined condition amendments (henceforth jointly referred to as MCC) of SB 1197 and SB 369 on the number of disabling claims filed and the probability that a claim was denied (the denial rate). We also examine available data on nondisabling claims and claim denials for evidence of the effects of the amendments. The analysis of nondisabling claims must be somewhat limited in scope, however, as the data on nondisabling claims are much less rich than the data on disabling claims.

3.1 Workers' Compensation in Oregon: Background

The Oregon workers' compensation program resembles in its basic outlines the workers' compensation programs that exist in every state. Employers are required to provide benefits determined by statute to workers suffering from work-related injuries or illnesses; whether or not the injury or illness was the employer's fault is not relevant. These benefits include full reimbursement for costs of medical care, payments to cover some fraction of wages lost as a result of the illness or injury, and vocational rehabilitation services. Employers typically deal with this requirement by purchasing insurance. In Oregon, employers can purchase insurance from private insurance companies or from the state accident insurance fund (SAIF) a state sponsored insurance company. Employers showing sufficient financial resources are permitted to self-insure. The premiums paid by most larger employers for workers' compensation insurance are experience rated, that is, the premiums paid by an employer will reflect the amount of workers' compensation benefit payments made to that employer's workers in the past. The behavior of insurers participating in the workers' compensation market (or of self-insured employers) is regulated by Oregon's Department of Consumer and Business Services in accordance with legislative guidelines.

Workers' compensation claims in Oregon can be divided into two broad classes: disabling claims and nondisabling claims. A work-related injury is "disabling", and thus can be the basis for a disabling claim, if it causes more than three days of lost work time, inpatient hospitalization, permanent disability, or death. If the disabling claim is accepted, the insurer typically pays the worker's medical bills as well as reimbursement for some of the earnings lost during injury-related time out of work. If the injury does not meet the criteria to be deemed "disabling," the worker may still file a nondisabling claim for full reimbursement of his or her medical expenses. Nondisabling claims, then, are associated with less serious injuries and illnesses than are disabling claims, and are less costly for insurers.

Although workers' compensation insurance in principle covers all work-related injuries regardless of fault, Oregon's workers' compensation law does provide insurers (or self-insured employers) with certain grounds for denying both the disabling and nondisabling claims of injured workers. For example, insurers may deny a claim on the basis that the worker has not provided sufficient evidence to show that the injury or illness underlying the claim was work-related. And, as mentioned above, the purpose of this study is to ascertain the impact of legislation that gave insurers additional grounds for denying workers' compensation claims.

Currently, over 1.5 million Oregon workers are covered by Oregon's workers' compensation law. Table 3-1 shows, for the years 1989 to 1998, the total number of workers covered by Oregon's workers' compensation law and the total numbers of disabling and nondisabling claims initially accepted and initially denied each year. In anticipation of some of the discussion and analysis that will occur later in this section, it should be noted that the terms "initial acceptance" and "initial denial" refer to the insurer's action regarding the claim at the time it is first reported to the Department of Consumer and Business Services. A claim that is initially denied by an insurer may later be accepted, and a claim that is initially accepted may later be denied.

Table 3-1: Covered Employment, Accepted Claims, and Denied Claims, 1989-98

Year	Covered Employment (in thousands)	Disabling Claims Initially Accepted	Disabling Claims Initially Denied	Nondisabling Claims Initially Accepted	Nondisabling Claims Initially Denied
1989	1214.9	38,762	8,703	78,347	9,302
1990	1258.6	34,829	8,751	74,510	11,382
1991	1258.6	29,547	8,206	69,723	13,294
1992	1280.5	29,160	6,893	67,242	13,438
1993	1317.1	29,856	6,275	65,431	13,601
1994	1378.8	30,502	6,564	63,228	13,429
1995	1431.6	29,111	6,433	61,724	14,292
1996	1487.3	27,712	5,881	61,423	14,833
1997	1547.8	27,003	5,477	60,880	15,365
1998	1559.8	26,043	5,376	58,214	14,709

A quick glance at the table reveals a few important trends. Although covered employment was rising over the period, the total number of claims filed, whether initially accepted or initially denied, was falling, in both the disabling and nondisabling categories. Also, the proportion of all claims filed that were initially denied was increasing.

3.2 Possible Impacts of SB1197 and SB369 on Claiming and Denial Behavior

There are a number of channels through which the major contributing cause and combined condition amendments of SB 1197 and SB 369 might have affected the number of claims filed and the proportion of those claims denied. First and most obviously, the amendments gave insurers reasons to deny claims that they would not have denied before the amendments, a fact which would be expected to raise the overall denial rate for both disabling and nondisabling claims. It is also possible, however, that the amendments would tend to lower the total number of claims made, whether accepted or denied. Making a claim takes a certain amount of time and effort, and in some cases workers who before the amendments would have responded to an injury or illness by making a claim would not do so after, feeling that their claim would likely be denied. Finally, if workers did respond to the amendments by filing fewer claims, the overall mix of claims actually filed would change. There would be relatively fewer of those types of claims that tended to be denied as a result of the change, and this would moderate the rise in the denial rate spoken of above as the initial effect of the amendments.

In order to determine which, if any, of these possible effects of the MCC amendments have actually occurred, the basic analytical approach we have adopted in this section is to calculate measures of total claims filed, rates of claim denial, and outcomes of claim denials over the period 1985 to 1998, and compare the levels of these measures before

and after the enactment of the amendments. We recognize that a number of other factors were probably influencing claim filing and claim denial behavior over the period, and that the effects of these other factors might obscure any impact of the amendments on our measures.

The amendments regarding MCC were part of larger pieces of legislation, other elements of which might have improved workplace safety or otherwise had an impact on claim filing behavior. SB 1197 required all employers with more than ten employees to establish a safety committee. To the extent that such committees were effective, the number of workplace injuries, and thus the number of workers' compensation claims filed, would be expected to fall after 1990. SB 369 expanded the Employer-at-Injury Program to cover workers with nondisabling claims, which might have shifted claims from the disabling to the nondisabling category, if workers whose injuries would in the past have led to the payment of temporary disability benefits were enrolled in the program before becoming entitled to such benefits. SB 369 also changed the definition of a disabling injury to exclude those injuries for which no temporary benefits were due and payable, unless there was a reasonable expectation that a permanent disability would result from the injury. In practice, this meant that a claim involving more than three days of lost work that was denied before 14 days had passed would be recorded as a denied nondisabling claim rather than a denied disabling claim.

The period during which SB 1197 was enacted was also a period during which the WCD, employers, and insurance carriers were stepping up efforts to eliminate fraud in the filing of workers' compensation claims. These efforts might have discouraged the filing of fraudulent claims, and also perhaps legitimate claims that workers feared might raise suspicions.

Other pieces of legislation during the period we are examining might also have affected claims and denial rates, in particular HB 2271, which became effective in 1988 and clarified that the worker had the burden of proving that an injury or illness was compensable. At a more general level, the demographics of the Oregon labor force changed over the 1985-98 period, as did the occupational and industrial structure of the Oregon economy. We employ various statistical strategies in an attempt to control for or otherwise disentangle the effects of these other factors from those of the amendments.

3.3 The Behavior of Filing Rates

The question addressed in this section of the report is whether the number of claims filed has fallen as a result of the amendments. We report preliminary results from our analysis of the behavior of annual filing rates (total number of claims filed, accepted or denied, per covered worker) over the period 1985-1998. Disabling claim filing rates and nondisabling claim filing rates are analyzed separately.[1]

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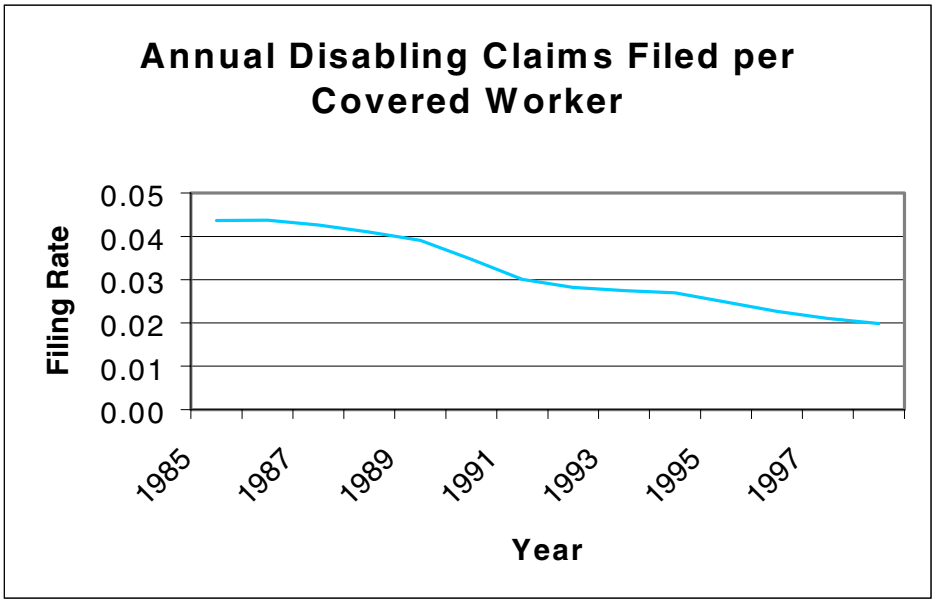
[1] It should be noted that the "filing rates" analyzed in this section (accepted claim plus denied claims pre covered workers) are different from the "claims rates" reported

Figure 3-1



3.3.1 Disabling Claims

Workers are less likely to file disabling claims today than they were in the years before 1988. Figure 3-1 graphs the annual disabling claim filing rate, that is, the number of disabling claims filed per covered worker, whether accepted or denied, over the 14-year period from 1985 to 1998. During that time the disabling claim filing rate fell by over 50% from .0437 to .0198. The question of interest for our purposes, however, is whether the timing or rate of the declines in the filing rate from year to year over this period suggest that the overall decline was due at least in part to the MCC amendments. One could perhaps make this case using the figure. SB 1197 became effective in July of 1990, and SB 369 in June of 1995. Both pieces of legislation were retroactive, that is, they allowed insurers to use the MCC standard to deny claims that had already been filed, but any effect of the amendments on the claim filing behavior of workers would logically have to occur after the enactment of the legislation.[2] From the last full year before SB 1197 (1989) to the first full year after (1991) the filing rate dropped from .039 to .030, which represents a third of the total decline from 1985 to 1998. This would suggest a possible impact of the amendments, if one believes that workers' claim filing behavior would react rather quickly to them. However, if one believes that workers would have required more than a few months to change their behavior in response to the

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regularly by The Department of Consumer and Business Services, which are calculated based on accepted claims per covered worker.

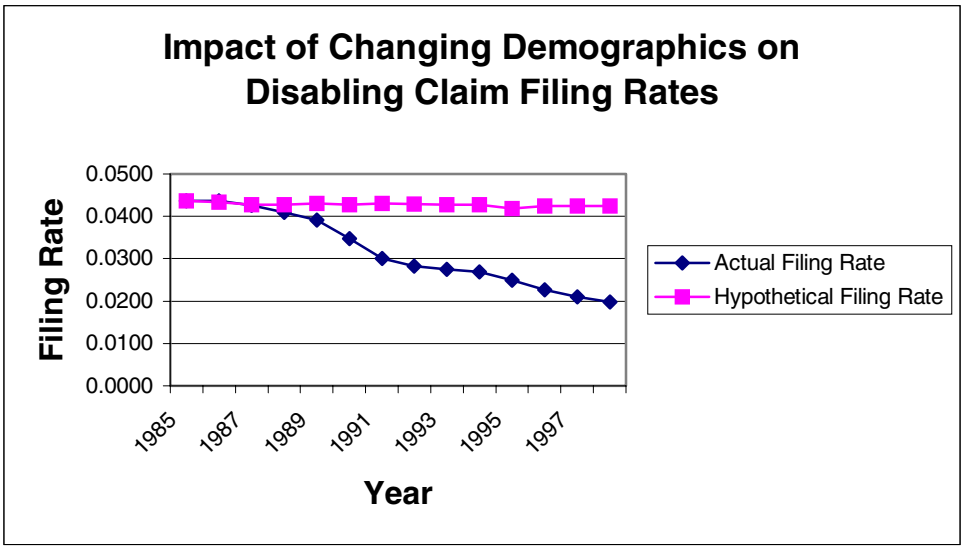
[2] Unless one assumes that workers reacted to the imminent passage of these retroactive amendments, which seems unlikely.

amendments, the figure provides less support for the idea that the amendments had an effect, as the claims rate declines very little from 1991 to 1994.

It may be that the effect of the amendments on the disabling claim filing rate is obscured in Figure 3-1 by the action of some of the other forces mentioned above, such as changes in the age and gender composition of the Oregon labor force. It is well known, for example, that younger and less experienced workers are more likely to file workers compensation claims than older workers. So, if the Oregon labor force were becoming older and more experienced over the period, the filing rate would be expected to fall. Figure 3-2, however, shows that these sorts of demographic changes have not been an important factor in lowering the disabling claim filing rate. Figure 3-2 includes a line depicting the actual claims rate over the 1985-98 period along with a "hypothetical filing rate." The hypothetical filing rate was created by first dividing the Oregon labor force into six age categories for each gender. The disabling claim filing rate during the 1985-87 period for each of these 12 categories was then calculated.[3] Each point on the hypothetical line then shows what the overall filing rate would have been if the filing rate within each category had stayed at its 1985-87 level as the relative sizes of those 12 categories were changing in Oregon between 1985 and 1998. As is clear from the graph, changes in the age and gender composition of the labor force alone would have had very little impact on the overall filing rate. The tendency for workers to file disabling claims must have been declining within each age-gender category.

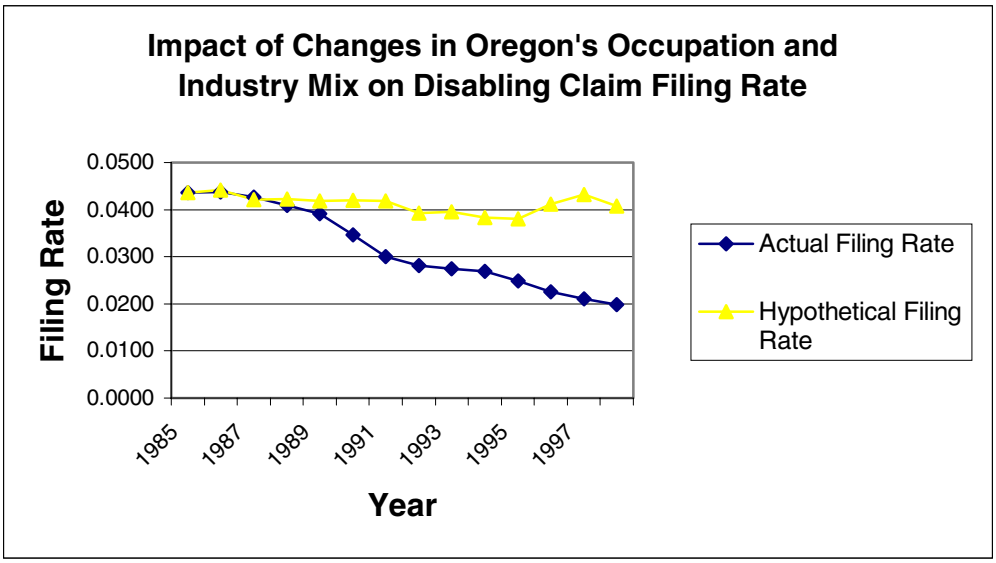
[3] The age categories were under 25, 25-34, 35-44, 45-54, 55-64, and over 65. Shares of the Oregon labor force in each age/gender category for each year were estimated using the Oregon respondents in the monthly CPS outgoing rotation groups. A cell's share was the sum of "usual weekly hours worked" for the workers in the cell as a proportion of the sum of usual weekly hours worked for the whole sample.

Figure 3-2



The decline in the filing rate might also have resulted in part from shifts in the structure of the Oregon economy towards safer occupations and industries. Figure 3-3 explores this possibility. Like figure 3-2, figure 3-3 graphs the actual filing rate along with a hypothetical rate. The annual hypothetical filing rates in figure 3-3 were constructed in the same fashion as those in figure 3-2, except that instead of age and gender categories, the Oregon labor force was divided into 22 occupation/ industry categories (eleven industry groups, each split into white collar-clerical and blue collar occupational components). The hypothetical filing rates show that changes in the occupational and industry mix in Oregon do explain some of the decline in the actual claims rate between 1985 and 1995: while the actual rate fell from about .044 to .025 during that time, changes in the occupational and industry mix alone would have led to a fall from .044 to .038. However, the hypothetical filing rate rises again after 1995 (relative growth of employment in the construction and manufacturing industries played a part in causing this increase), while the actual filing rate continued to fall.

Figure 3-3



Figures 3-2 and 3-3 indicate that the falls in the disabling claim filing rate were occurring across a wide range of demographic groups and across a variety of occupations and industries. It is possible, however, that this is not due to changes that are peculiar to Oregon and its workers' compensation system, but merely a reflection of national trends towards safer workplaces. OSHA statistics indicate a nationwide fall in the incidence of work-related injuries and illnesses involving days away from work (lost workday cases) during the nineties, and one would expect that such a fall would lead also to a fall in workers' compensation claims involving lost workdays.[4] To construct a measure of the impact of this national trend on Oregon's experience with lost workday cases over the 1985-1998 period, we calculated for each year a weighted average of the national incidence of lost workday cases per worker for that year in 66 industries, with weights equal to industry shares of Oregon's private sector employment for that year. (OSHA does not publish national statistics for the public sector).[5] Changes in this measure, then, reflect changes in the structure of Oregon's economy along with national, as opposed to Oregon-specific, changes in workplace safety and accident reporting behavior.

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[4] It should be noted that changes in the incidence of work-related injuries as reported to OSHA are not entirely due to changes in the actual number of such injuries, as they may also reflect changes in the injury reporting behavior of workers and employers. In particular, if a worker does not file a claim in association with a work-related injury, the employer may not report the incident as a work related injury. So, a fall in the OSHA measure of lost workday cases may reflect both a fall in the actual number of such incidents and a fall in claiming.

[5] Estimates of annual shares of covered employment in Oregon by two-digit industry were provided by The Department of Consumer and Business Services.

Figure 3-4

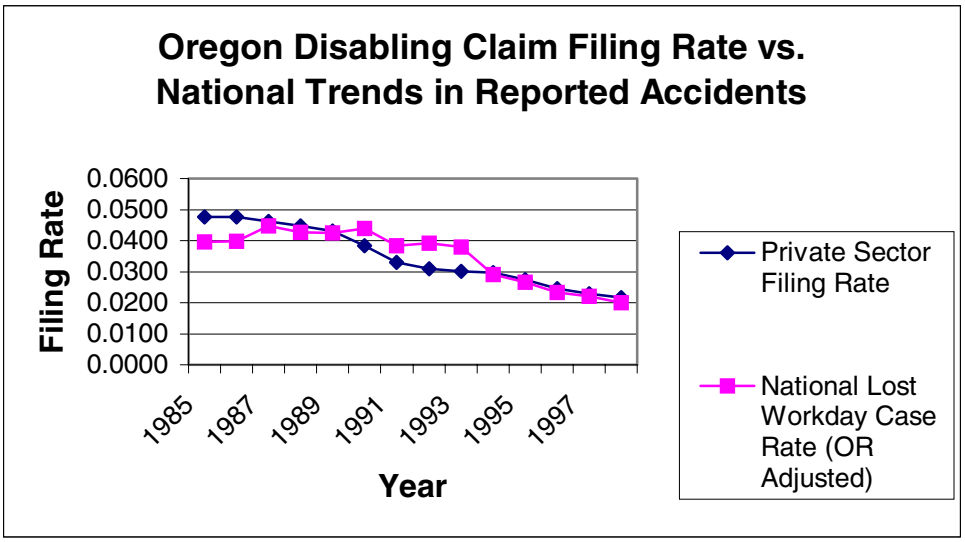


Figure 3-4 and table 3-2 compare this measure to the actual private sector filing rate. The private sector filing rate in Oregon fell from .048 to .022, or by 54%, between 1985 and 1998. Over the same period, had Oregon simply reflected national trends, its incidence of lost workday cases would have fallen by about 50%, from .0396 to .02. From 1989 to 1991, when the disabling claims rate was falling by 23% from .039 to .030, the national lost workday case rate fell by about 10%, and the lost workday case rate actually rose while the Oregon claims rate was falling between 1989 and 1990. This could be taken as evidence of an effect of SB 1197. However, the timing of the decrease in Oregon would make it easier to argue that the fall was due to the safety related provisions of SB 1197 rather than the MCC amendment, unless one believed that workers responded very quickly (i.e. within six months of enactment) to any increase in the use of MCC denials.[6] There is no evidence in the figure for the proposition that SB 369 had an impact on the disabling claims rate. Overall, the figure suggests that the decrease in Oregon's disabling claim filing rate from 1985 to 1998 was for the most part consistent with national trends in safety and accident reporting. This is not to say that the fall in the claims rate was not attributable in part to actions taken in Oregon by employers, unions, and state government; only that those actions led to a decline in reported accidents over the whole period that was slightly greater than the average decline experienced by all other states.

[6] The relative decline in filing from 1989-91 may also reflect the effects of the anti-fraud efforts referred to earlier.

Table 3-2: Oregon's Private Sector Disabling Claim Filing Rate and the Nationwide Fall in Lost Workday Cases, 1985-1998

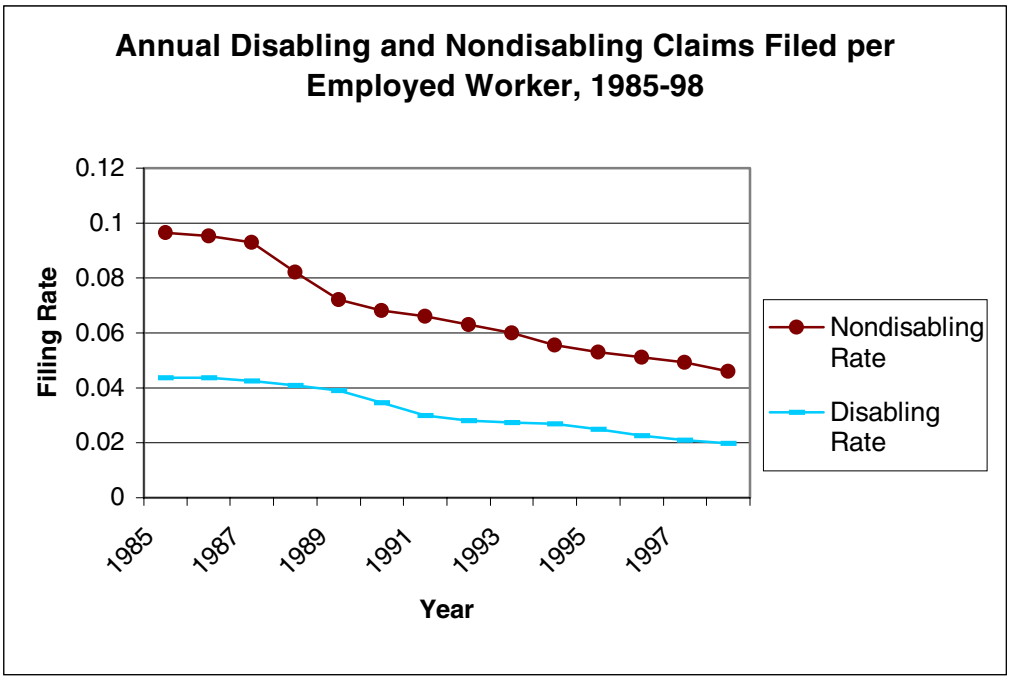
Year	Actual Filing Rate	National Incidence of Lost Workday Cases (Oregon Adjusted)	Year	Actual Filing Rate	National Incidence of Lost Workday Cases (Oregon Adjusted)
1985	0.0477	0.0396	1992	0.0309	0.0391
1986	0.0475	0.0397	1993	0.0301	0.0380
1987	0.0463	0.0448	1994	0.0297	0.0291
1988	0.0448	0.0426	1995	0.0275	0.0267
1989	0.0430	0.0424	1996	0.0245	0.0234
1990	0.0384	0.0440	1997	0.0229	0.0220
1991	0.0330	0.0383	1998	0.0217	0.0200

3.3.2 Nondisabling Claims

The available data on nondisabling claims are neither as rich nor as reliable as the data on disabling claims. All denied disabling claims are reported to WCD in some detail, but accepted nondisabling claims are not reported to WCD. There are, however, estimates available of the total number of nondisabling claims per year based on reports by insurers to NCCI.[7] Using these estimates, we have graphed in figure 3-5 the number of nondisabling claims (both accepted and denied) per covered worker, from 1985 to 1998. The figure also shows the disabling claims rate from figure 3-1.

[7] SAIF and private insurers report the total number of accepted nondisabling claims to NCCI. WCD then estimates the total number of accepted nondisabling claims by assuming that the ratio of disabling claims to nondisabling claims is the same for the self-insured employers as it is for the employers insured by SAIF and other private insurers.

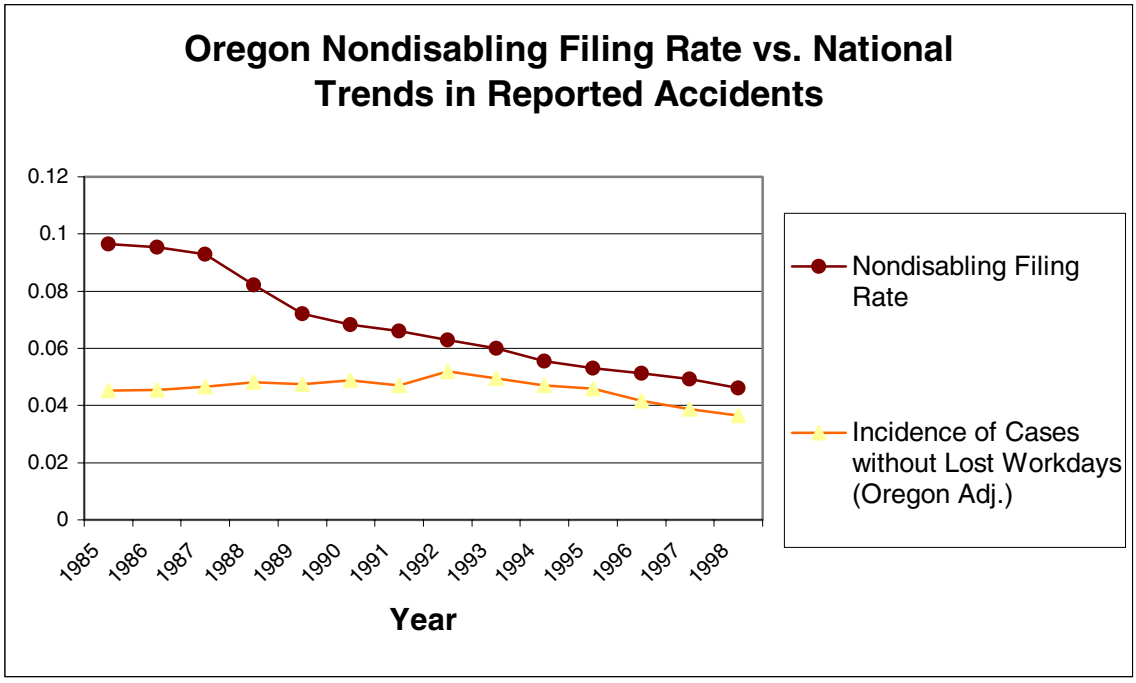
Figure 3-5



Between 1985 and 1998, the nondisabling claim filing rate fell by 52%, compared to the 55% decline in the disabling claim filing rate. Almost half of this decline occurred between 1985 and 1989, before SB 1197 went into effect. From 1989 to 1998, the decline in the nondisabling filing rate was 36%, compared to 49% for the disabling claim filing rate. Since there are no detailed data on accepted nondisabling claims, it is not possible to determine whether the decline in the nondisabling claims rate is due to factors such as the changing demographics of the Oregon labor force, or changes in the industrial/occupation mix in Oregon.

It is possible, however, to compare the trend of nondisabling claim filing in Oregon to nationwide trends in workplace safety and accident reporting, as was done in figure 3-4 for disabling claims. This is done in figure 3-6, which shows for each year from 1985 to 1998 a weighted average of the national incidence per worker of injury and illness cases not involving lost workdays in 66 industries, with weights equal to industry shares of Oregon's private sector employment for that year. Cases not involving lost workdays are used, because these are the sorts of less serious injuries and illnesses that are likely to generate nondisabling as opposed to disabling claims. The figure also reproduces the nondisabling claim filing rate from figure 3-5. It should be noted, however, that although the OSHA statistics underlying the measure of national trends in figure 3-6 come only from the private sector, we do not have separate data on private sector nondisabling claims for Oregon, so that the nondisabling claims rate in figure 3-6 pertains to both private and public sector.

Figure 3-6

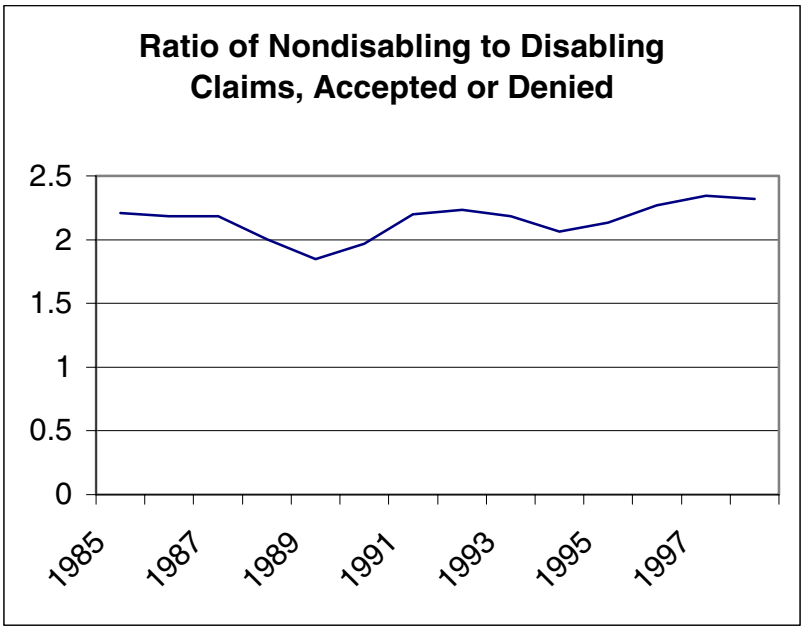


The match between Oregon's nondisabling claims rate and the national incidence of cases not involving lost workdays is not as close as the match between the disabling claims rate and the national rate of lost workday cases. From 1992 on, the trends in the two series are almost identical, but before that they are quite different, with the national measure rising slightly while the Oregon nondisabling claims rate is falling dramatically. The decline in the nondisabling claims rate before 1990 shown in figure 3-6 may be evidence of the effect of legislation like HB 2271. However, overall figure 3-6 offers no evidence in support of the idea that nondisabling claims were discouraged by the MCC amendments.

3.3.3 The Mix of Disabling and Nondisabling Claims

As noted above, it is plausible to argue that certain elements of SB 369 might have led to an increase in nondisabling claims relative to disabling claims. Figure 3.7 shows the ratio of total nondisabling claims filed to total disabling claims from 1985 to 1998.

Figure 3-7



The ratio of nondisabling to disabling claims does begin to increase in 1990, but this follows a four year decline. By 1991 it has reached its 1985 level, and rises above that level in the year 1996-1998. The increase in the ratio of nondisabling to disabling claims after 1995 may be due to the two aspects of SB 369 mentioned earlier: the change in the definition of a disabling claim, and the extension of the Employer-at-Injury Program to cover nondisabling claims.[8]

3.3.4 Conclusion

The guiding question of this section was whether the MCC amendments caused a decrease in the number of claims filed. The only evidence presented supporting an affirmative answer to this question is the behavior of the disabling claim filing rate between 1989 and 1991, as it experienced a decline that was sharper than would be predicted by its overall trend from 1985 to 1998, and greater than the decline in lost workday cases nationwide over the same period. However, to attribute this decline to the MCC amendment of SB 1197, one would have to assume that workers (and insurers) responded quickly to the amendment. It should be noted that our failure to find more evidence of a decline in filing due to the MCC amendments may be due to the limitations

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[8] In 1996 there were 1767 Employer at Injury "programs" arising from nondisabling claims, and 4310 from disabling. In 1997 it was 3906 nondisabling, 4449 disabling. In 1998 it was 5095 nondisabling, and 4974 disabling. If we assume that even half of the nondisabling claims giving rise to programs in these years would have become disabling claims had the EAIP not been extended, this would account for the increase in the ratio of nondisabling to disabling claims since 1995.

of the data and statistical methods used in this section. In section 3.7 the question of whether the MCC amendments lowered filing rates is addressed using more powerful statistical methods.

3.4 Denial Rates

3.4.1 Analyzing Denial Rates

In this section, we look into the question of whether denial rates have risen as a result of the MCC amendments. For the most part our attempt to answer this question involves the analysis of annual denial rates for disabling claims over the period 1985-97, although there is a brief discussion of the behavior of denial rates of nondisabling claims over the same period. Before presenting the results of the analysis, several matters of definition, classification, and data adjustment should be explained. We classify all denials by type, as either whole or partial, with aggravation denials and denials at closure being classified as partial denials. We also classify all denials by outcome, with all claims denied by insurers ultimately being accepted, partially accepted, or denied. We also know whether an ultimate outcome of partially accepted or denied was reached through a disputed claim settlement (DCS). All combinations of denial types and outcomes are possible, except for a partial denial type combined with a whole denial outcome. A claim can have more than one type of denial, that is, it can be wholly denied and later partially denied, but a claim can have only one type of outcome.

We have dated claims by their "set-up" date, which is the date the claim was entered into the WCD computer system. This date is within a day or two of when WCD received the claim, and is usually within 21 days of the date of injury. We use this date instead of the date of injury because the information on this variable in the WCD database is more consistent and reliable.

We have also adopted a dating convention for calculating annual rates of the various denial types and outcomes. In this convention, a denial rate for a type of denial or for a denial outcome assigned to a particular year has as its denominator the number of disabling claims filed (set up) in that year and as its numerator the number of those claims eventually experiencing that denial type or that denial outcome.[9] This convention is problematic because denials can occur several years after a claim is filed (about 20% of all denials occur in years later than the year in which the claims was set up), and because the amendments were retroactive. Thus, if the 1990 amendment led to increased denials by insurers, this might result in an increase in our measured denial rate for 1988 or 1989, as insurers could deny old claims under the new law. However, given the difficulty of precisely dating denials, and the conceptual difficulty of defining for the purposes of calculating a rate the number of claims that could possibly be denied in any particular

[9] A claim that experiences both a whole denial and a partial denial will contribute to the numerators of both the partial denial rate and the whole denial rate.

year, our convention seemed a workable compromise, provided that its limitations are kept in mind when interpreting the results.[10]

We have also adjusted the denial rates calculated from the raw WCD data to reflect changes over time in WCD data collection procedures and the possible lags between filing and denial already mentioned. First, there is no information on the original acceptance status of claims set up between 1985 and 1987. This means that a claim set up during those years, denied immediately, and then later accepted could appear as a claim that had never been denied. Likewise, a claim originally denied in whole and then partially accepted would look like a partial denial. IMD has analyzed denial data from 1988-91 to determine how many whole denials would have been miscounted as accepted or partially denied claims had original acceptance status been unavailable in those years as well. We took the average annual percentage undercount of whole denials that would have occurred in those four years and assumed that undercounting of the same magnitude occurred in 1985-87.[11]

A second problem for which we had to adjust the estimated claims rates is that WCD data on hearing orders and insurer reports is incomplete prior to 1990. Because of this, some claims that were partially denied during this period and later accepted because of an insurer reversal or a hearing may appear as claims that were never denied at all. To estimate the extent of the undercount due to incomplete hearing orders and insurer reports, IMD produced two counts of partial denials from 1985 to 1991: one done with the information from insurer reports and hearing orders, and one done without that information. The effect of an improvement in the insurer report and hearing order data in 1988 and again in 1990 showed up as an increase in the difference between the two denial counts. We used these changes in the difference between the two denial counts as the basis for an estimate of the undercounting that had occurred in years before 1990.[12]

Because of lags between the filing and set up of a claim and the denial of a claim, some claims filed in the nineties will eventually be denied but currently appear in the data as accepted. To adjust for this problem, we obtained data from IMD on all denied claims in their data as of 1999, with all initial denials of a claim occurring in a particular year

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[10] It should also be noted that the denial rates we calculate are defined differently from the denial rates typically reported in publications of the Department of Consumer and Business Services. Those denial rates are based on a claim's original acceptance status, that is, they measure the percentage of claims filed in a year that are initially denied by insurers, whereas our denial rates attempt to measure the percentage of claims filed in a year that are ever denied, whether initially or later.

[11] This procedure allowed for the undercount to differ depending on whether the whole denial was later accepted, partially accepted, led to a DCS, or was upheld.

[12] The procedure allowed for the undercount to be different depending on whether or not the partial denial was eventually reversed.

classified according to the year in which the claim was originally set up. Separate tabulations were made for whole claim denials and partial denials. To adjust our partial denial rates for denials that had not yet occurred as of the end of 1999, we then assumed that (almost) all denials on claims set up in 1988 had already occurred by 1999, and that the distribution of the length of time between set up and first partial denial has remained fairly stable since 1988.[13] Then, for example, if the data from 1988 claims indicate that 80% of all partial denials of 1988 claims had occurred by the end of 1992, we adjust the partial denial rates for 1995 claims upward by dividing by 0.8. We use a similar procedure to adjust whole claim denial rates, but lags between set up and denial are much shorter for whole denials, so the adjustments were much less important quantitatively.

Because the above-described adjustments involve several assumptions and approximations, we view with some caution our results on partial denial rates after 1994, and whole denial rates after 1996, where the most substantial adjustments were made.

Two more matters should be discussed before turning to the denial rates themselves. A first is that denial rates may have been affected by HB 2271, which made clear that the burden of proving compensability was on the claimant, and applied to all claims filed after the beginning of 1988. In examining denial rates, then, we divide the pre-SB 1197 period into periods before and after 1988.

A second matter of importance is the impact on denial rates of the behavior of the SAIF Corporation in the late eighties and early nineties. As documented in Weeks and Harmon (1992), a change in policy at SAIF during this period led to a dramatic increase in the number of claims denied. These increases were not observed for other insurers. SAIF's denial rate began to rise relative to that of other insurers around the second quarter of 1989, peaking in the second quarter of 1991. There was an investigation of SAIF's claim denial practices in the winter of 1991, after which the SAIF denial rate declined, leveling off around the first quarter of 1993. Because of the size of SAIF's share of the Oregon workers' compensation market, the behavior of overall denial rates during the period shortly before and shortly after the implementation of SB 1197 is dominated by the impact of the implementation and then reversal of SAIF's aggressive denial policy, making it difficult to identify any initial effect of the legislation. For that reason, we will report information on denial rates both with and without SAIF claims included.

3.4.2 Overall Denial Rate

Figure 3-8 shows overall denial rate from 1985 to 1997 for all claims and for non-SAIF claims. Recall that we define the overall denial rate for a year as the percentage of claims filed in that year that was ever either partially or wholly denied by the insurer. Denial rates are higher at the end of the period than at the beginning both for all claims and for non-SAIF claims. Also obvious from a comparison of the "All Insurers" line to the Non-

[13] Examination of the data on partial denials of claims set up in later years suggests that this is not an unreasonable assumption

SAIF line is the impact of SAIF's changes in denial policy described above. Table 3-3 divides the 1985-97 period into subperiods for a more careful look at the possible impact of the amendments. The average for the 1985-87 period portrays claims behavior before the burden of proof of compensability was moved to workers, while the 1988-89 period average is meant to capture the effect of this change. The average for the 1991-94 period is meant to reflect any impact of SB 1197. For the "All Claims" line of the table, this period is further divided into 1991-92 and 1992-93, as the claims rate from the earlier of these two periods will include the impact of SAIF's aggressive denial policy.

Figure 3-8

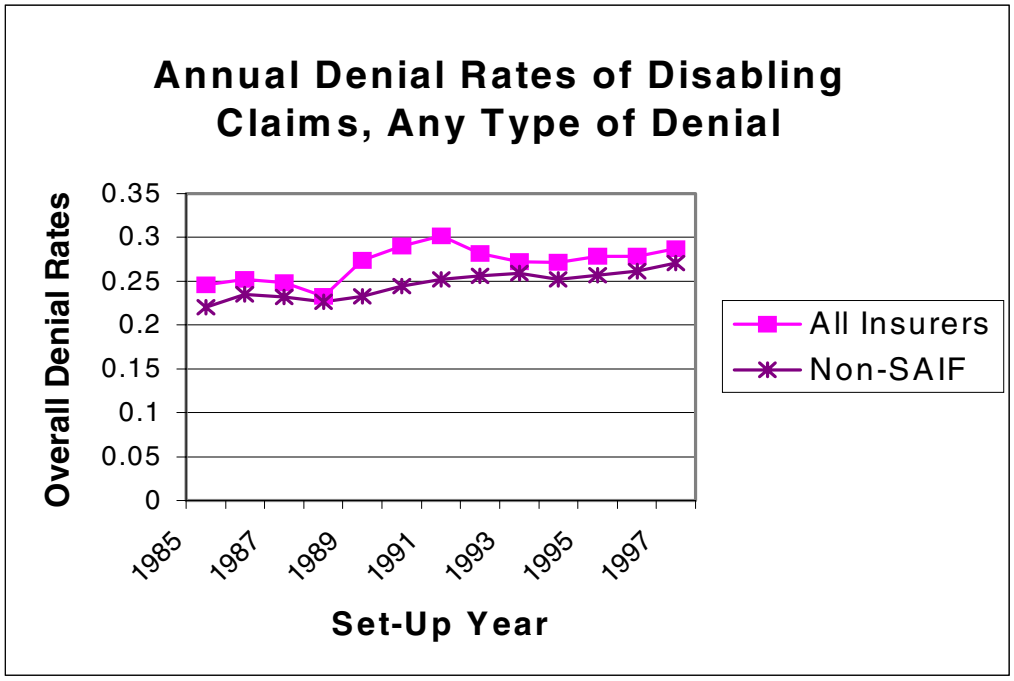


Table 3-3: Average Overall Denial Rates for Disabling Claims Filed in Relevant Subperiods

	1985-87	1988-89	1991-92	1993-94	1995-97
All Claims	.249	.252	.292	.272	.282
Non-SAIF	.229	.230	.255		.263

Table 3-3 provides no evidence that the 1988 law concerning burden of proof affected denial rates outside of SAIF. (There is some reason to believe that the SAIF policy change of the late eighties was in part a reaction to the burden of proof change – see e.g.,

Weeks and Harmon [1992] pp. 23-24) However, the table is consistent with the hypothesis that SB 1197 raised denial rates. The denial rate for non-SAIF claims was 2.6 percentage points or 11% higher in the 1991-94 period compared to the 1985-87 period. Likewise, for all claims the denial rate was 9% higher in the 1993-94 period (after the end of the aggressive denial period at SAIF) than in 1985-89. In the period following SB 369, denial rates were yet another percentage point higher.

Figure 3-9

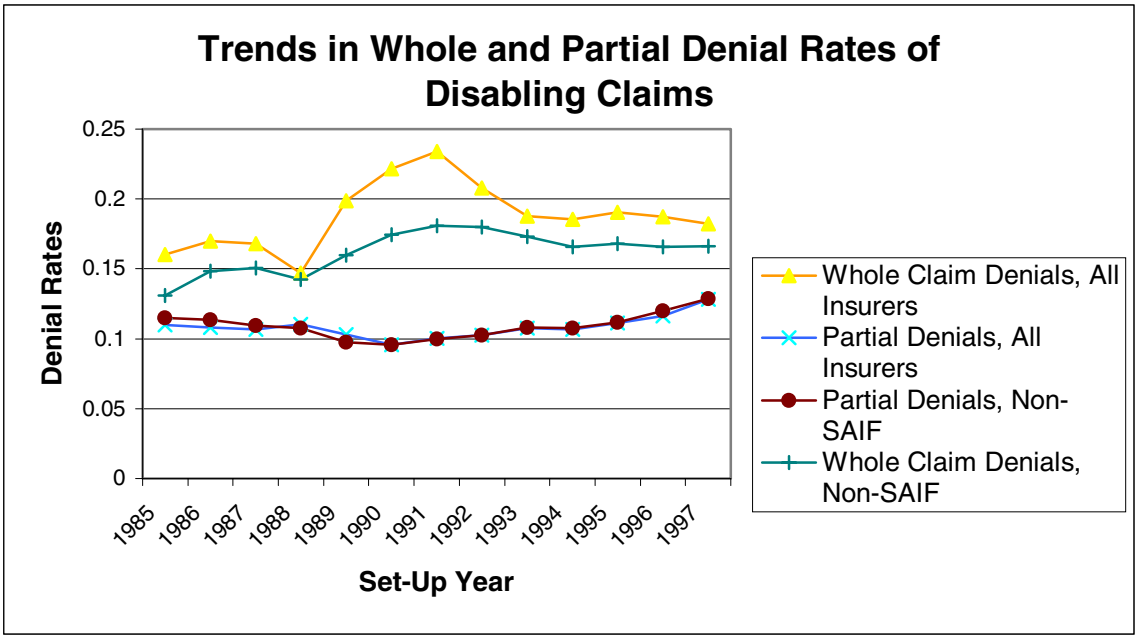


Figure 3-9 presents partial and whole denial rates separately both for all claims and for non-SAIF claims. This reveals a couple of interesting things. First, SAIF's aggressive denial policy seems only to have applied to whole claim denials. Partial denial rates for all claims and for non-SAIF claims are almost identical throughout the period. Second, the figure suggests that almost all of the increase in the denial rates from the pre-1988 period to the post 1992 period was due to an increase in whole claim denials. Partial denial rates for all claims and non-SAIF claims declined from around .11 in 1985 to .095 in 1990, then began to increase again, but did not reach pre-1988 levels until after 1995. It is conceivable that some sort of downward trend in partial denials caused by other forces could have been reversed by the 1990 legislation.

Table 3-4: Whole and Partial Denial Rates For Disabling Claims Filed in Relevant Subperiods

	1985-87	1988-89	1991-92	1993-94	1995-97
Whole Denial Rate, All Claims	.166	.173	.221	.187	.186
Whole Denial Rate, Non-SAIF Claims	.143	.152	.174		.167
Partial Denial Rate, All Claims	.108	.106	.102	.107	.118*
Partial Denial Rate, Non-SAIF Claims	.113	.103	.105		.120*

* Figures for these years less reliable because of lags between set-up and denial

Table 3-4, constructed in the same manner as table 3-3, makes this clearer. The partial denial rate is lower in the 1991-94 period that in the 1985-87 period both for all claims and for non-SAIF claims. For all claims, the whole denial rate is 12.5% higher in 1993-94 than in 1985-87, and for non-SAIF claims the increase from 1985-87 to 1991-94 is 21%. The evidence in the table also suggests that there might have been an effect on whole denials of the 1987 legislation.

3.4.3 Outcomes

The impact on the employers, workers, and insurers of an increase in denials depends in part on the extent to which the additional denials are later partially or fully reversed through hearings, insurer decisions, disputed claim settlements (DCS), etc. For that reason, we have categorized claims according to outcomes.

Our outcome categories are acceptance, partial acceptance and whole denial. Each of these outcomes can be reached in a variety of ways. If an insurer issues a whole denial of a claim, the worker may do nothing, in which case the final outcome of the claim is a whole denial, or the worker may challenge or appeal the denial. Once the whole claim denial is appealed, it may end up as an acceptance (the denial is withdrawn or overturned), a partial acceptance, or a whole denial. The partial acceptance outcome can be reached through a hearing order, or it may be part of a Disputed Claim Settlement (DCS) between the claimant and the insurer, in which the claimant receives some compensation in exchange for acceding to some aspect of the insurer's denial. Likewise, the whole denial outcome may come as a result of a hearing order, the withdrawal of the appeal by the worker, or a DCS. Clearly, a whole denial outcome that is agreed to as part of a DCS is different from a whole denial outcome that results from the worker's failure

to appeal, as the former involves at least some compensation to the worker. If an insurer issues a partial denial of a claim, the final outcome may be a partial acceptance (as a result of a DCS, of an appeal withdrawn or denied, or no reaction by the worker), or it may be an acceptance of the claim if the denial is withdrawn or the worker wins on appeal.

In addition to allowing us to distinguish between claims with final outcomes of accepted, partially accepted, and wholly denied, our data also identify whether claims reached the wholly denied outcome or the partially denied outcome as part of a DCS. The data do not tell us the nature of the settlement in a DCS, nor the amount of compensation actually received by the worker if the final outcome is partial acceptance, partial acceptance and DCS, or whole denial and DCS.

When insurers change their policies in ways that increases denials, whether or not this is done in response to legislation, it seems reasonable to suppose that the percentage of denied claims ending up in each of the outcome categories could change, as could the percentage of claims settled by DCS. Insurers will begin denying claims that workers, attorneys, etc., based on past experience, would have expected to have been accepted. This may generate more challenges by workers of the actions of insurers, and hearings may result in the reversal of more denials and/or more settlements as insurers test the implications of new laws. Tables 3-5 and 3-6 look at changes over the 1985-97 period in the mix of outcomes for claims denied by insurers, with table 3-5 looking at all claims, and table 3-6 looking at non-SAIF claims.

Table 3-5: Trends in Outcomes for All Denied Disabling Claims

	1985-87	**1988-89**	**1991-92**	**1993-94**	**1995-97[1]**
Proportion of All Claims with Some Type of Denial	.249	.252	.292	.272	.282
Percentage of All Denied Disabling Claims that were Eventually (as of 1/2000):					
Accepted	.138	.146	.178	.163	.140
Settled through DCS[2]	.190	.225	.222	.236	.241
Partially Accepted[3]	.258	.236	.167	.191	.196
Wholly Denied[3]	.413	.393	.433	.410	.423

[1] Figures for these years less reliable because of lags between set-up and denial.

[2] Involves claimant acceptance of either partial or whole denial of claim in exchange for some compensation.

[3] Claims in these categories were not settled through DCS.

The outcome categories of "accepted" and of "wholly denied" are unambiguous in that all claims in the former were accepted as legitimate workers' compensation claims with the worker receiving the corresponding compensation in full, while all claims in the latter resulted in the worker getting at most "interim compensation" for lost time between the injury and the denial. By contrast, the claims in the outcome categories "partial acceptance" and "settled through DCS" are more heterogeneous in terms of how the claimant fared, in that the claimant may have gotten a smaller or larger share of the compensation he or she would have gotten had the claim been accepted. Thus, trends over time in the share of claims ending up in these categories are less informative: for example, the share of claims resolved through DCS may stay unchanged, but the system may be growing more or less generous to workers, as the typical DCS becomes more or less generous to workers.

As a matter of fact, table 3-5 shows that the percentage of denials ending up as acceptances rose between the first and second period of the table, and again between the second and third. In the fourth period it fell again, and by the 1995-97 period had returned almost to 1985-87 levels. This pattern suggests the following explanation: SAIF's increase in denials beginning in the late eighties involved a greater willingness to make denials that would be reversed upon appeal, thus explaining the rise in the probability that an initially denied claim would ultimately be accepted. This probability peaked at the same time that SAIF's denial rate peaked. After 1992 SAIF was no longer denying claims as aggressively, but it and other insurers were dealing with a new law (SB 1197) that narrowed the scope of compensability. In working out exactly where this law drew the line between compensable and non-compensable claims, insurers leaned towards a narrower interpretation of compensability than the hearings boards and courts would eventually adopt. Thus, the 1993-94 probability that an initially denied claim would end up accepted is above the 1985-87 level. By the 1995-97 period, the probability that a denied claim ended up accepted was back to pre-1988 levels. Perhaps insurers had a better understanding of the implications of the MCC amendments, thus lowering the likelihood that an insurer would deny a claim that would ultimately be allowed, although data for this period is not altogether reliable – it could be that some claims set up in 1995-97 with outcomes of wholly denied as of 1/2000 will ultimately be accepted.

The share of denials that ended up as whole denials (with no DCS) displays neither a trend nor a clear discontinuity that can be associated with SB 1197 or SB 369. Finally, the table shows that the share of denied claims resolved through DCS increased steadily over the period, from before to after SB 1197 and from before to after SB 369.

Table 3-6: Trends in Outcomes for Non-SAIF Denied Disabling Claims

	1985-87	1988-89	1991-1994	1995-97[1]
Proportion of Non-SAIF Claims with Some Type of Denial	.229	.230	.255	.263
Percentage of All Non-SAIF Denied Claims that were Eventually (as of 1/2000):				
Accepted	.164	.152	.167	.145
Settled through DCS[2]	.216	.223	.247	.262
Partially Accepted[3]	.292	.249	.195	.207
Wholly Denied[3]	.328	.376	.391	.386

[1] Figures for these years less reliable because of lags between set-up and denial.

[2] Involves claimant acceptance of either partial or whole denial of claim in exchange for some compensation.

[3] Claims in these categories were not settled through DCS.

The table 3-6 results on non-SAIF claims are in accord with the speculation above concerning changes in the proportion of claims denied by insurers that end up being accepted. In the 1985-87 period, this proportion is higher for non-SAIF claims than for all claims (and thus, by implication, than for SAIF claims). In the 1988-89 period, however, when SAIF was beginning its aggressive denial period and seeing a rise in the percentage of its denials that were ultimately reversed, the non-SAIF insurers were experiencing a fall in this percentage. In the post SB 1197 period, the percentage is up again, as it would be if insurers believed that the legislation narrowed compensability more than did the boards and courts, and in 1995-97, it falls again.

The chance that a claimant denied by a non-SAIF carrier ended up with a wholly denied claim was higher after 1990 than before, and, as was the case with all denials, the share of claimants denied by non-SAIF carriers who ended up with DCSs increased over the period.

Tables 3-5 and 3-6 show changes both in the probability that a claim will be denied, and in the probabilities that denied claims will end up having various outcomes. Tables 3-7 and 3-8 show the combined result of these two types of changes by reporting the percentage of *all claims filed* in each period that ends up in the various outcome categories.

Table 3-7: Trends in Outcomes for All Disabling Claims, Denied or Not

	1985-87	1988-89	1991-92	1993-94	1995-97[1]
Percentage of All Claims That were Eventually (as of 1/2000):					
Accepted	.785	.786	.768	.772	.757
Settled through DCS[2]	.048	.057	.060	.085	.067
Partially Accepted[3]	.064	.059	.047	.032	.055
Wholly Denied[3]	.102	.100	.126	.111	.120

[1] Figures for these years less reliable because of lags between set-up and denial.
[2] Involves claimant acceptance of either partial or whole denial of claim in exchange for some compensation.
[3] Claims in these categories were not settled through DCS.

Table 3-8: Trends in Outcomes for Non-SAIF Disabling Claims, Denied or Not

	1985-87	1988-89	1991-1994	1995-97[1]
Percentage of All Non-SAIF Claims that were Eventually (as of 1/2000):				
Accepted	.808	.805	.788	.775
Settled through DCS[2]	.049	.052	.062	.068
Partially Accepted[3]	.067	.057	.050	.054
Wholly Denied[3]	.075	.086	.100	.102

[1] Figures for these years less reliable because of lags between set-up and denial.
[2] Involves claimant acceptance of either partial or whole denial of claim in exchange for some compensation.
[3] Claims in these categories were not settled through DCS.

Three fairly straightforward conclusions can be drawn from these two tables. First, the chance that a worker's claim would ultimately be accepted was lower after SB 1197 than before, and lower after SB 369 than before. In the 1985-89 period, a worker's disabling claim had about a 78.5% chance of ultimately being accepted. By 1993-94 this percentage had fallen by 1.3 points, and the 1995-97 rate was another 1.5 percentage points lower. As earlier tables have shown, the insurers' denial rate had risen by more than this, but the probability that an insurer's denial would be reversed had also risen. Comparing 1991-94 to 1985-87 for non-SAIF claims (table 3-8) shows a similar pattern: while the chance that a claim was denied by an insurer rose by 2.6 percentage points, the

chance that it ended being accepted fell by only 2 percentage points, from 80.8% to 78.8%.

Second, the probability that a claimant would end up wholly denied with no DCS was higher after SB 1197 than before, and higher after SB 369 than before. For all claims, the former increase was about 20 percent, from .102 before SAIF's aggressive denial period to close to .12 in the 1993-97 period. For non-SAIF claims the increase was steady over the 1985-1997 period from .075 to .102. Finally, claims filed after 1990 were more likely to be resolved by DCS than claims filed before 1990, whether filed with SAIF or with a non-SAIF carrier.

3.5 Other Factors

Was the Rise in Disabling Claims Denial Rates Due to Other Factors Besides the Amendments?

The previous section documented rises in denials rates for disabling claims in the post-1990 period along with other statistical evidence consistent with both SB 1197 and SB 369 having had an impact on the behavior of workers and insurers. However, as was noted in the introduction, a number of other factors were changing in the 1985-1997 period that might also have influenced worker and insurer behavior or otherwise affected overall denial rates. In this section we report the result of applying multiple regression analysis in an attempt to control for the effects of these other factors.

As in the previous section, the basic approach is to compare various denial rates across key subperiods, that is, periods before and after the enactment of one of the amendments. For the analysis reported in this section, however, we have made use of the WCD data on the characteristics of individual claimants (age, gender, earnings, occupation, industry, and years with employer) and the claims themselves (injury type, insurer type). Using regression analysis we are able to measure the relationship between these claim and claimant characteristics and the probability that a claim is denied. More importantly, the regression controls for effect on denial rates of changes between the two periods in the distribution of these characteristics in the population of claims filed, such as changes in the average age of claimants, changes in the proportion of all claims coming from various industries, changes in the share of claims coming from the employees of self-insured employers, and so on. This allows us to better isolate any change in denial rates that was due to the amendments. We control for the 1988 burden of proof change and SAIF's aggressive denial policy through the choice of claims included in the regression samples and the subperiods compared. The details of how we conducted the regression analysis are described in appendix A.

Table 3-9: Changes in Disabling Claim Denial Rates from Before to After SB 1197, Controlling for Changes in Other Factors

Denial Type and Claims Included	Periods Compared	Denial Rate Before	Denial Rate After	Estimated Change, Other Things Equal (Standard error)
All Denials, All Claims	1988 to 1993-94	.232	.266	.034 (.0025)
Whole Denials, All Claims	1988 to 1993-94	.147	.187	.042 (.0022)
All Denials, Non-SAIF Claims	1988-89 to 1991-94	.229	.251	.021 (.0021)
Whole Denials, Non-SAIF Claims	1988-89 to 1991-94	.151	.175	.025 (.0018)

Table 3-9 reports the results of regressions designed to measure the impact of SB 1197, which became effective in 1990. The first cell of each line describes the denial rate being examined (either the whole denial rate, or the "all denial" rate that includes partial denials also) and whether the sample included all claims or only non-SAIF claims. The second cell reports the set-up years used to define before and after periods. The third and fourth cells report the appropriate denial rate during the "before" period and "after" period, thus showing the actual change in the denial rate. The fifth column reports our regression estimate of how much the denial rate would have increased between the before period and the after period, had the general characteristics of claimants and claims for which we control remained unchanged.

The decisions we made defining the before and after periods for each comparison reported in the table should be explained. The adjustments for missing and incomplete data described at the beginning of section 3.4 were designed to be applied to overall annual claims rates, but cannot be applied at the level of the individual claim, which is the unit of analysis for the purposes of our regression models. For that reason, we excluded years for which these adjustments were quantitatively important, that is, the years 1985-87 for whole claim denials and the years 1995 and beyond for partial denials. Excluding years before 1988 also helps to avoid confusing the effect of SB 1197 with any impact on denial rates of the 1988 change in the burden of proof. When looking at all claims, we compared 1988 to 1993-94 so that we would not include the effects of SAIF's

aggressive denial period. When examining non-SAIF claims our before period was 1988-89, and our after period was 1991-94.

All four rows of the table indicate that there was an increase in claims denial rates from before SB 1197 to after, even after controlling for changes in other characteristics of claimants and claims. All the estimated changes are statistically significant. The estimated percentage change in denials is larger for whole denials than for all denials, as was the case for changes in actual denial rates reported in the previous section, and is larger for all claims than for non-SAIF claims. Also, as the third and fourth columns of the table makes clear, in each of the four comparisons the estimated changes in denial rates "other things equal" are almost identical to the actual changes in the appropriate denial rates. In other words, changes in the characteristics of claims and claimants alone from before to after 1990 would have caused very little change in denial rates.

For the "all claims" comparisons, our before and after periods are relatively short, and it is worth asking whether the change in claims rates from the before period to the after period is any larger than the typical fluctuations in claims rates one would expect from year to year. The answer appears to be yes. From 1985 to 1987, the average absolute change from year to year in both the all denial rate and the whole denial rate was about .004. Both rates dropped by about .01 between 1987 and 1988. Between 1993 and 1995, average annual changes in denial rates were less than .003 in absolute value. Similarly, average annual changes in denial rates for non-SAIF claims within the before and after periods are small compared to the changes between the periods. From 1985 to 1989, for example, the annual absolute change in the whole denial rate averaged .006, with the largest being .017. From 1991 to 1995, the average change was .004, and the largest was .007. [14]

Table 3-10 looks at the impact on denial rates of SB 369 by comparing periods before 1995 (when the amendment went into effect) to periods after 1995. Only whole claim denials are analyzed because of the problem of incomplete data on the partial denials of claims set up after 1994. Because there is some question about the completeness of whole claim denial data for claims after 1996, only a one-year "after" period is used.

[14] These calculations are done using denial rates unadjusted for incomplete or missing data, since unadjusted data are used in the regression analysis. The basic conclusions are unchanged if we use our adjusted annual denial rates.

Table 3-10: Changes in Disabling Claim Denial Rates from Before to After SB 369, Controlling for Changes in Other Factors

Denial Type and Claims Included	Periods Compared	Denial Rate Before	Denial Rate After	Estimated Change, Other Things Equal (Standard error)
Whole Denials, All Claims	1993-94 to 1996	.187	.184	-.01 (.0022)
Whole Denials, Non-SAIF Claims	1991-94 to 1996	.175	.163	-.016 (.0027)

In table 3-10, the estimated changes in whole claim denial rates holding constant observable claimant and claim characteristics are larger in absolute value than the actual changes, and indicate a small decline in whole claim denial rates from before the passage of SB 369 to after. Although the estimated declines are statistically significant, they are smaller than those in table 3-8 and not much larger than some of the year to year changes in whole denial rates within the before period.

Taken as a whole, the evidence presented in this section strengthens the case for the proposition that SB 1197 increased insurer denial rates by more than 10%, and increased whole claim denial rates by more than 15%. We are unable to determine, however, how much of this increase is due to the MCC amendments vs. other aspects of SB 1197. The evidence of both this and the previous section concerning effects of SB 369 is more equivocal. Tables 3-4 and 3-10 both indicate that SB 369 may have slightly decreased whole denial rates, but table 3-3 indicates that overall denial rates were higher after SB 369 than before as a result of increases in partial denial rates. However, the estimated partial denial rates for years after 1995 are not as reliable as those from years before, so one cannot rule out that the apparent increase in partial denial rates after SB 369 is due to the method used to adjust the estimated partial denial rates after 1995 for long lags between set-up and denial. The question of the impact of SB 369 on partial denial rates is examined using an alternative methodology in section 3.9.

3.6 Types of Claims

Did denial rates rise for some types of claims more than others as a result of SB 1197?

It is plausible to believe that the MCC amendments of SB 1197 might affect denial rates of some types of disabling claims more than others. Different insurers may respond differently to the amendments. Some ostensibly work-related health conditions are more likely than others to be the result of several causes, and these sorts of conditions may occur differentially across industries or at higher rates within certain demographic groups. Since the analysis of the previous sections has found the largest impact of SB 1197 to be on whole claim denials, in this section we present evidence on the change in whole claim denial rates before and after SB 1197 by insurer type, injury category, gender, age, occupation, industry, and earnings level.

Table 3-11: Change in Whole Denial Rates for Disabling Claims from Before to After SB 1197, by Insurer Type

Insurer Type	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
SAIF	.171	.225	.054 (31.2)
Private Carrier	.142	.170	.028 (19.7)
Self Insured	.137	.167	.030 (21.9)

Table 3-11 compares the change in whole claim denial rates for SAIF insured claims, claims handled by private carriers, and claims at self-insured employers. The before and after periods are chosen to minimize the impact of SAIF's aggressive denial policy on the comparisons. The before period includes 1987 as well as 1988 in order to get a larger sample. Although this means including a year for which some denial data were missing and that preceded the 1988 burden of proof change, these factors should have a roughly equal effect on the before rates of all three insurer types. The table shows that whole denial rates were higher at SAIF than for other insurers both before and after SB 1197, and also that they increased by a larger percentage amount from 1987-88 to 1993-94. The increases in denial rates at self-insured's and private carriers were about the same.

Table 3-12: Changes in Disabling Claim Denial Rates from Before to After SB 1197, by Gender

ALL CLAIMS			
Gender	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
Male	.141	.175	.034 (24.1)
Female	.174	.210	.036 (20.7)
NON-SAIF CLAIMS			
Gender	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% change)
Male	.142	.164	.022 (15.9)
Female	.170	.194	.024 (14.1)

Table 3-12 shows the change in whole claim denial rates by gender, for all claims and for non-SAIF claims. As before, a focus on non-SAIF claims is worthwhile because it allows us to define longer before and after periods. For both all claims and non-SAIF claims, claims by females were denied at a higher rate than claims by males both before and after 1990, but the increases in the denial rates are not markedly different by gender. (It should be noted that table 3-12 and the other tables in this section are not making "other things equal" comparisons. So, for example, denial rates might be higher for women's claims not because they are claims made by women, but because claims by lower paid workers are more likely to be denied, and women tend to be paid less than men).

Table 3-13: Changes in Disabling Claim Denial Rates from Before to After SB 1197, by Age

ALL CLAIMS			
Age	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
Under 30	.130	.165	.035 (26.9)
30-54	.163	.195	.032 (19.6)
55 and over	.170	.196	.026 (15.2)
NON-SAIF CLAIMS			
Age	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% change)
Under 30	.126	.156	.030 (23.8)
30-54	.162	.182	.020 (12.3)
55 and over	.190	.194	.004 (2.5)

Table 3-13 looks at changes in denial rates by broad age categories. Both panels of the table tell the same basic story: both before and after 1990, whole claim denial rates were higher for older workers, but the increase in the denial rate from the before to the after period was greatest for the youngest group and least for the oldest group.

Table 3-14 looks at changes in whole claim denial rates for various classes of disabling injuries. It is clear from the table that denial rates differ greatly, both before and after SB

1197, for different types of injuries. This variation, though interesting, is not our main concern, however. The question of greater interest is whether the change in whole denial rates from before to after the MCC amendments differed across injury types, that is, whether whole claim denial rates increased more for some types of injuries than others. An obvious hypothesis concerning the differential effects of the MCC amendments across injury type would be that denial rates would rise more for claims associated with conditions that were chronic and had origins that were difficult to verify than for claims resulting from acute and easily verifiable injuries.

The two panels of the table do not tell a consistent story, and neither offers strong support for the hypothesis just described. For example, the largest two categories are the first two -- sprains and strains of the back and other sprains and strains – which contain over half of all claims. Both types of claims, especially those involving backs, are of the sort that might plausibly generate more MCC denials. Looking at all claims, the denial rate for sprains and strains of the back rose by more in both absolute and percentage terms than the denial rate for other strains and sprains, while for non-SAIF claims the opposite is true. The denial rate for open wounds, which are acute and easily verifiable, fell by a small amount for all claims, but had a greater than average increase in percentage terms for the non-SAIF claims. If one looked only at the non-SAIF claims, one could say that SB 1197 seemed to increase the whole claim denial rate by about the same percentage for all injury types (except for the relatively small “other injuries and illnesses” category, which includes mostly diseases), but this statement would not apply as well to the “All Claims” part of the table. One can say that none of the injury categories defined for this table experienced an increase in the whole claim denial rate that was dramatically larger than the average increase for all injury types.

Table 3-14: Changes in Disabling Claim Denial Rates from Before to After SB 1197, by Injury Type

ALL CLAIMS			
Injury Type	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% Change)
All Claims	.152	.187	.035 (23.0)
Sprains and Strains of the Back	.142	.178	.036 (25.3)
Other Sprains and Strains	.134	.160	.026 (19.4)
Open Wounds	.061	.058	-.003 (-4.9)
Bruises, Burns, Head Injuries	.091	.092	.001 (11.0)
Other Traumatic Injuries	.122	.157	.035 (28.7)
Carpal Tunnel Syndrome	.243	.297	.054 (22.2)
Musculoskeletal and Connective Tissue Disorders	.213	.258	.045 (21.1)
All Other Injuries and Illnesses	.547	.521	-.026 (-4.7)
NON-SAIF CLAIMS			

Injury Type	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% Change)
All Claims	.151	.175	.024 (15.9)
Sprains and Strains of the Back	.148	.166	.018 (12.2)
Other Sprains and Strains	.129	.153	.024 (18.6)
Open Wounds	.044	.054	.010 (18.5)
Bruises, Burns, Head Injuries	.074	.088	.014 (18.9)
Other Traumatic Injuries	.122	.149	.027 (22.1)
Carpal Tunnel Syndrome	.228	.271	.043 (18.8)
Musculoskeletal and Connective Tissue Disorders	.207	.244	.037 (17.9)
All Other Injuries and Illnesses	.475	.480	.005 (10.5)

To the extent that one is willing to regard the changes in denial rates in tables 3-13 and 3-14 as reactions to SB 1197, the two tables suggest that perhaps SAIF responded differently than other insurers to the legislation. A cleaner look at this possibility is provided by table 3-15, in which the change in denial rates in the various age and injury categories is shown separately for SAIF and for non-SAIF claims, using the same before and after periods for each group of claims.

Table 3-15: Changes in Disabling Claim Denial Rates from 1987-88 to 1993-94 by Age and Injury Type, SAIF vs. Non-SAIF Claims

Claim Type	Change in Whole Claim Denial Rate, 1987-88 to 1993-94 (Percentage Change)	
	SAIF CLAIMS	**NON-SAIF CLAIMS**
All Claims	.054 (31.6)	.028 (19.9)
Claimant Age Under 30	.057 (38.8)	.028 (23.3)
Claimant Age 30-54	.050 (27.2)	.026 (17.2)
Claimant Age 55 and over	.036 (18.9)	.024 (15.1)
Sprains and Strains of the Back	.069 (44.8)	.023 (16.9)
Other Sprains and Strains	.049 (32.7)	.021 (16.9)
Open Wounds	-.020 (-21.7)	.012 (24.0)
Bruises, Burns, Head Injuries	-.017 (-12.9)	.003 (4.2)
Other Traumatic Injuries	.047 (35.9)	.027 (24.1)
Carpal Tunnel Syndrome	.138 (52.9)	.022 (9.3)

Musculoskeletal and Connective Tissue Disorders	.119 (53.1)	.019 (8.4)
All Other Injuries and Illnesses	.102 (17.2)	.064 (15.0)

The first line of the table confirms what has been implicit in most of the analysis in this section – that even if one excludes the aggressive denial period at SAIF, the absolute increase in the denial rate from before to after SB 1197 was larger at SAIF than at other insurers; almost twice as large in absolute terms in this comparison. In the section of the table that categorizes claims by the age of the claimant we observe for both SAIF and non-SAIF claims the same pattern observed in table 3-13 – denial rates rose most in both absolute and percentage terms for workers under 30 and the least for workers over 55. However, the table reveals fairly dramatic differences between SAIF and the non-SAIF insurers in the changes in denial rates for different injury types. Although the time periods being compared are different, the results concerning the non-SAIF claims are similar to those reported in table 3-14 – there is no tendency for denial rates to rise less for acute and traumatic injuries, and no important injury type experienced a rise in the denial rate that was appreciably larger in percentage terms than the overall increase. The SAIF column of the table, on the other hand, provides evidence consistent with the idea that the MCC amendments raised denial rates more for claims associated with chronic and difficult to verify conditions. The increase in the denial rate is much greater in both absolute and percentage terms for strains and sprains of the back, carpal tunnel syndrome, and musculoskeletal disorders, and about average for other sprains and strains. The denial rate actually fell for acute injuries like bruises, burns and head wounds, and for open wounds. Only the "other traumatic injuries" category, which includes things like broken bones and other traumas involving the upper and lower extremities, fails to conform to the pattern.

Table 3-16 shows changes in whole claim denial rates for all claims by industry group, while table 3-17 shows the same information for non-SAIF claims. There are a few notable results that appear in both tables. For both all claims and non-SAIF claims, the very large wholesale and retail trade group (which generates about a quarter of all claims) experienced an increase in the whole claim denial rate that was well above the average for all industries. The increase for the "other services" category (about 15% of all claims) is also greater than average in both tables, while the increase for manufacturing (about 15% of claims) was slightly below average.

Table 3-16: Changes in Whole Denial Rates for All Disabling Claims from Before to After SB 1197, by Industry

Industry	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
All Industries	.152	.187	.035 (23.0)
Agriculture, Forestry Fishing, Logging	.137	.176	.039 (28.4)
Mining and Construction	.156	.194	.038 (24.4)
Manufacturing	.154	.180	.026 (16.9)
Trans., Comm., Utilities	.132	.146	.014 (10.6)
Wholesale and Retail Trade	.132	.175	.043 (32.6)
Finance, Insurance, and Real Estate	.230	.249	.019 (.083)
Health Services	.165	.198	.033 (20.0)
Other Services	.172	.215	.043 (25.0)
Public Administration	.233	.229	-.004 (-1.7)

Table 3-17: Changes in Whole Denial Rates for Non-SAIF Disabling Claims from Before to After SB 1197, by Industry

NON-SAIF CLAIMS			
Industry	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% change)
All Claims	.151	.175	.024 (15.9)
Agriculture, Forestry Fishing, Logging	.154	.166	.012 (7.8)
Mining and Construction	.162	.183	.021 (13.0)
Manufacturing	.162	.180	.018 (11.1)
Trans., Comm., Utilities	.117	.137	.020 (17.1)
Wholesale and Retail Trade	.136	.166	.030 (22.1)
Finance, Insurance, and Real Estate	.216	.239	.023 (10.6)
Health Services	.166	.184	.018 (10.8)
Other Services	.162	.196	.034 (21.0)
Public Administration	.159	.187	.028 (17.6)

Table 3-18 breaks down the increase in claims by broad occupational categories. As with the breakdown by injury type reported in table 3-14, there is not a strong common pattern of percentage increases in whole denial rates by occupational category. It is the case that low skilled laborers and operators experienced an above average increase in denial rates whether one looks at all claims or only at non-SAIF claims.

Table 3-18: Changes in Whole Denial Rates of Disabling Claims from Before to After SB 1197, by Broad Occupation Category

ALL CLAIMS			
Occupation	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
All Occupations	.152	.187	.035 (23.0)
Prof., Admin., Managerial & Supervisory	.191	.201	.01 (5.2)
Clerical, Sales, Office Support	.191	.225	.034 (17.8)
Blue Collar non-Manufacturing	.161	.194	.033 (20.5)
Skilled Blue Collar Manufacturing	.136	.172	.036 (26.4)
Manufacturing Laborers/ Operators	.138	.176	.038 (27.5)
NON-SAIF CLAIMS			
Occupation	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% change)
All Occupations	.151	.175	.024 (15.9)

Prof., Admin., Managerial & Supervisory	.166	.185	.019 (11.4)
Clerical, Sales, Office Support	.173	.207	.034 (19.7)
Blue Collar non-Manufacturing	.154	.178	.024 (15.6)
Skilled Blue Collar Manufacturing	.146	.158	.012 (8.2)
Manufacturing Laborers/ Operators	.145	.169	.024 (16.6)

The higher than average increase in whole claim denial rates for less skilled laborers and operators suggests another dimension along which the change in denial rates from before to after SB 1197 might have varied: earnings. Table 3-19 divides claimants according to their weekly earnings at the time the claim was set up (adjusted for inflation and expressed in 1999 dollars). For both all claims and for non-SAIF claims, whole claim denial rates rose much more than average for the lowest earnings group, and much less than average for the highest earnings group. In the all claims part of the table, the three middle groups saw denial rates increase by about the average amount. For non-SAIF claims, the second to the highest earnings groups also had an increase in the whole claim denial rate that was far below the average for all claims.

Table 3-19: Changes in Whole Denial Rates of Disabling Claims from Before to After SB 1197, by Weekly Earnings Level

ALL CLAIMS			
Weekly Earnings (in 1999 Dollars)	Whole Claim Denial Rate, 1987-88	Whole Claim Denial Rate, 1993-94	Change (% change)
Less than $250	.149	.197	.048 (32.2)
$250-$350	.157	.193	.036 (22.9)
$350-$500	.164	.197	.033 (20.1)
$500-$650	.160	.193	.033 (20.6)
More than $650	.131	.146	.015 (11.4)
NON-SAIF CLAIMS			
Weekly Earnings (in 1999 Dollars)	Whole Claim Denial Rate, 1988-89	Whole Claim Denial Rate, 1991-94	Change (% change)
Less than $250	.153	.188	.035 (22.9)
$250-$350	.161	.186	.025 (15.5)
$350-$500	.156	.185	.029 (18.5)

$500-$650	.161	.176	.015 (9.3)
More than $650	.129	.137	.008 (6.2)

Although the tables reviewed in this section have provided some evidence that the impact of SB 1197 on whole claim denial rates was different for different types of claims, they do not provide a basis for very many broad generalizations about the types of workers most affected by the legislation. Whole claim denial rates increased more for younger workers and for workers in wholesale and retail trade, but these may just be manifestations of the fact that the increase in whole claims denial rates from before SB 1197 to after was much greater for low wage workers than for high wage workers.

3.7 Did Rising Denial Rates Discourage Claims? Another Look

We noted earlier that the MCC amendments, by increasing the probability that a claim would be denied, might have discouraged claiming by workers and lowered the total number of claims filed. The analysis of overall claims rates in section 3.3 failed to produce much evidence of a fall in the total number of claims filed that could be attributed to the amendments. There is, however, another possible source of evidence that the amendments discouraged claiming.

As has been documented in sections 3.4 and 3.5, denial rates for disabling claims were higher in the years after the enactment of SB 1197 than in the years before. Section 3.6 established that the magnitude of the increase in denial rates from before to after 1990 differed systematically depending on certain characteristics of the claimant, the employer, or the insurer. If workers in general responded to higher denial rates by filing fewer claims, then we would expect that the reduction in claims would be greater for the types of claims that experienced the larger increases in denial rates, other things equal. If, for example, the denial rate rose much more for claims by workers under 25 years of age than for other workers, we would expect the number of claims filed by workers under 25 to fall more in percentage terms than the number of claims filed by workers 25 and over, and the proportion of all claims made by workers under 25 years of age would fall as well.

To test whether this sort of phenomenon occurred, we divided disabling claims into categories based on claimant and employer characteristics, and then looked to see whether there was a tendency for the change in the proportion of all disabling claims in a particular category from before to after 1990 to be inversely related to the change in the whole claim denial rate in that category from before to after 1990. We used whole claim denial rates because the data are more reliable for these denials, and because most of the increase in denial rates after 1990 resulted from the increase in whole claim denials. We

did several variations of this test, and a description of the first one should better convey the logic of the analysis.

In the first version of the test we looked at non-SAIF disabling claims. The pre-legislation period was 1988-89, and the post legislation period was 1993-94, to allow time for workers to have noticed and responded to the effects of SB 1197. Claims were divided into four categories based on claimant age, nine based on employer industry, four based on the worker's time spent with the employer of injury (tenure), and five based on the weekly earnings of the worker at the time of injury, for 4 X 9 X 4 X 5 = 720 possible categories. For each category that had more then ten claims in it in both periods, we calculated the proportion or share of all claims that fell into that category during the before period and during the after period, and we also calculated the whole claim denial rate in each category for the before period and the after period. We then used correlation and regression analysis to see if there was a negative relationship between the change in the category shares and the change in the denial rates in the categories. We calculated a simple correlation between the two changes, but we also regressed the change in the category shares on the change in denial rates, holding constant age, industry, earnings, and tenure. The purpose of the regression was to control for possible spurious correlations between changes in the category shares and changes in denial rates, as would occur, for example, if aging of the labor force caused the shares of the categories with older workers to grow at the same time that insurers were increasing denial rates disproportionately for younger workers.

Table 3-20 reports the results of this and several other versions of the test. Each line of the table describes which claims were included in the test, how the before and after periods were defined, how the categories were defined, the number of categories (sample size) used for the test, and the sign and statistical significance of the correlation and regression coefficients. The regression coefficient is the coefficient on the change in the whole claim denial rate in an OLS regression that controls for the characteristics by which the cells were defined. A negative and significant correlation or regression coefficient is consistent with the hypothesis that increasing denial rates discourage filing.

Table 3-20: Tests of Whether Types of Disabling Claims with Larger Increases in Denial Rates were Less Likely to be Filed After SB 1197

Claims Included	Before Period	After Period	Categorized by:[a]	Usable Cells	Correlation	Regression Coefficient[b]
Non-SAIF	1988-89	1993-94	Age, Industry, Earnings, Tenure	485	Positive, Insignificant[a]	Positive, Insignificant
All	1988	1993-94	Age, Industry, Earnings, Tenure	492	Negative, Insignificant	*Negative, Significant*
Non-SAIF	1988-89	1993-94	Age, Injury Type, Earnings, Tenure	487	Positive, Insignificant	Positive, Insignificant
All	1988	1993-94	Age, Injury Type, Earnings, Tenure	489	Positive, Insignificant	Negative, Insignificant
SAIF	1987-88	1993-94	Age, Industry, Earnings, Tenure	387	*Negative, Significant*	*Negative, Significant*
SAIF	1987-88	1993-94	Age, Injury Type, Earnings, Tenure	400	Positive, Insignificant	Positive, Insignificant

[a] There are four age categories (under 25, 25-39, 40-54, over 55); nine industry categories (as defined in table 3-16); eight injury type categories (as defined in table 3-14); five earnings categories (as defined in table 3-19); and four tenure categories (less than one year with employer, 1-2 years, 2-5 years, more than five years).
[b] One-sided significance test at 5% level.
[c] Regressions include indicator variables controlling for age category, industry or injury type category, earnings category, and tenure category.

Our tests looking at non-SAIF claims produced no evidence of a fall in the types of claims for which denial rates increased the most. We did find evidence consistent with this when we considered all claims and controlled for industry, age, earnings, and tenure; but not when we controlled for injury type instead of industry. Similar evidence was found when the sample was limited to SAIF claims, and industry rather than injury type was controlled for.

To summarize the message of table 3-20, if one looks at SAIF claims, and if one does not control for injury type, then there is evidence supportive of the proposition that rising denial rates after 1990 discouraged claiming. The first "if" clause raises the question of whether there is reason to believe that rising denial rates would discourage claiming for workers injured at employers insured by SAIF, but not for other workers. One possible argument for this is that SAIF's aggressive denial policy of the late eighties and early nineties, and the relatively greater increases in denial rates at SAIF from before to after

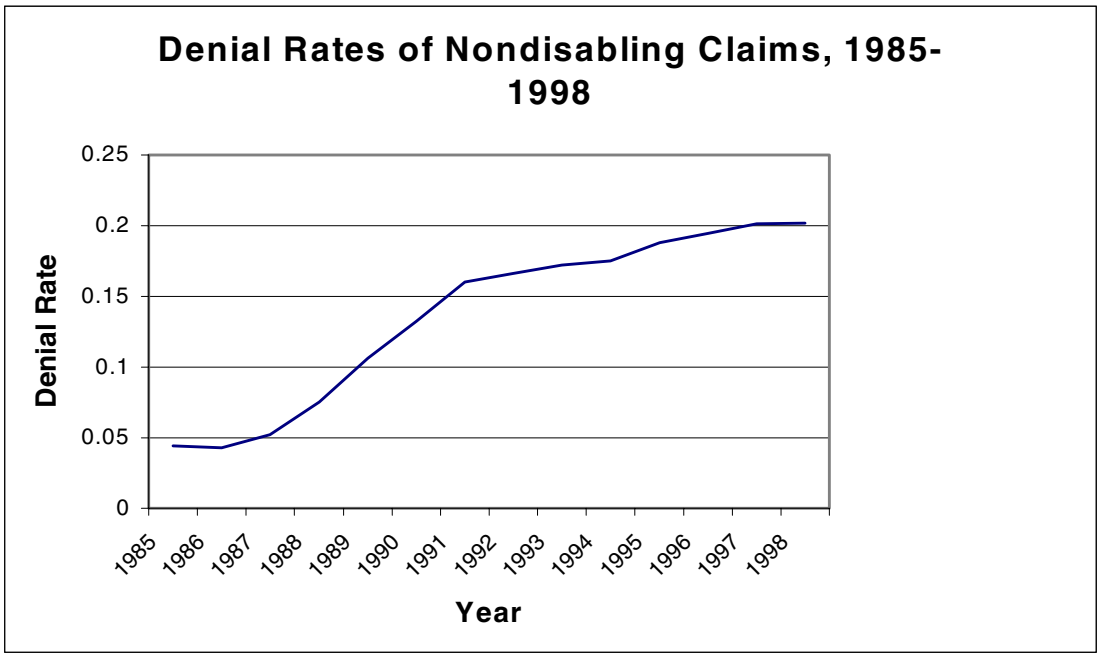
that period, had made workers at SAIF-insured employers more cognizant of changes in the probability that a disabling claim would be denied. The second "if" clause raises the question of how important it is to control for injury type in tests of the type summarized in table 3-20. The answer is that it is proper to control for injury type if one believes that the relationship between changes in the mix of injuries for which disabling claims are filed and changes in the denial rates for various injury types could be coincidental, rather than being the result of worker perceptions of differences in denial rates for different types of injury. At best, the evidence of table 3-20 leaves the question of whether SB 1197 discouraged claiming an open one.

3.8 Changes in the Denial Rate of Nondisabling Claims

The evidence in sections 3.4 through 3.7 has concerned only the denial rates of disabling claims. This is because of the lack of data on nondisabling claims that has been discussed elsewhere in this report. It is possible, however, to use actual counts of the total number of denied nondisabling claims each year and estimates of the number of nondisabling claims filed each year, both compiled by the Department of Consumer and Business Services, to estimate annual denial rates for all nondisabling claims. Figure 3-10 shows such estimates of the nondisabling claims denial rate for the year 1985-98.

The data indicate that the denial rate for nondisabling claims has risen dramatically since 1985, from less than 5% to 20%. The increase began, however, in 1987, before HB 2271 became effective. The increase continued at a rapid and steady rate until 1991, and then continued at a slower rate, to the point that the denial rate of 20% in 1998 was almost twice the denial rate in 1989, the year before SB 1197 became effective. The nondisabling claim rate does not show the rise and then fall in the late eighties and early nineties that characterized the disabling claims rate as a result of SAIF's aggressive denial policy. It is certainly possible that some of the post-1990 rise in the nondisabling claims denial rate can be attributed to SB1197 and SB 369, but without more detailed data on nondisabling claims, one cannot say much more than that.

Figure 3-10



3.9 SB 369 and Partial Denial Rates: An Alternative Analysis

The analysis of disabling claim denial rates reported in sections 3.4 and 3.5 indicated that the whole claim denial rate did not rise, and may have fallen, as a result of SB 369. They also indicated that the partial denial rate for disabling claims might have increased from before to after the enactment of SB 369. This evidence on the partial denial rate was not fully reliable, however, because estimated partial denial rates for years after 1995 were significantly influenced by the method used to adjust for the fact that all the partial denials of claims filed in those years might not have occurred at the time the data used in the analysis were compiled.

It is possible to define an alternative concept of the denial rate in a particular period that does not require adjustment for lags between claim filing and denial, because it focuses on the date the denial occurred, rather than the date the claim was filed. This measure has as its numerator the number of denials occurring in a particular period, and as its denominator the number of claims at risk for denial during the period, that is, claims that were open at some time during the period. That would include all claims set up during the period, but also all claims set up in previous periods that had not yet been closed, and all claims set up and closed in previous periods, but reopened in that period. We call this alternative concept of the denial rate the "current denial rate for open claims," and it measures the likelihood that a claim open in a particular year is denied by the insurer in that year.

Accurate measurement of the current denial rate for open claims for the years 1985-98 would require counts of the number of claims open at some time during each of those years. We do not have such counts, so we must estimate them using a process that we believe results in estimates of the current denial rate for open claims that are in general less reliable than the estimates we have produced of our basic denial rate concept. (Our process of estimating the number of claims open during a year is described in appendix A). Also, the process does not allow us to produce trustworthy estimates of denial rates for subtypes of claims, such as claims for injuries of certain types, or claims made by workers with certain demographic characteristics. However, because the current denial rate on open claims measure does not require any adjustment for the lag between the filing of a claim and the possible denial of that claim, it is probably more accurate in the years after 1995 than our basic denial rate concept, especially when applied to partial denials. Thus, examination of the current partial denial rate on open claims before and after the enactment of SB 369 can offer useful additional evidence on the question of whether that legislation affected the rate at which insurers issued partial denials of disabling claims.

Indeed, there is reason to suspect that SB 369 might have increased the partial denial rate by clarifying the situation in which a combined or current condition denial could be made. The legislation made clear that if a carrier accepted a claim in which a work-related injury combined with a pre-existing condition to cause a compensable disability, the carrier could later close the claim and issue a (partial) denial of further benefits when the work-related injury ceased to be the major contributing cause of the continuing disability. Such denials would show up in the data as partial denials.

Figure 3-11

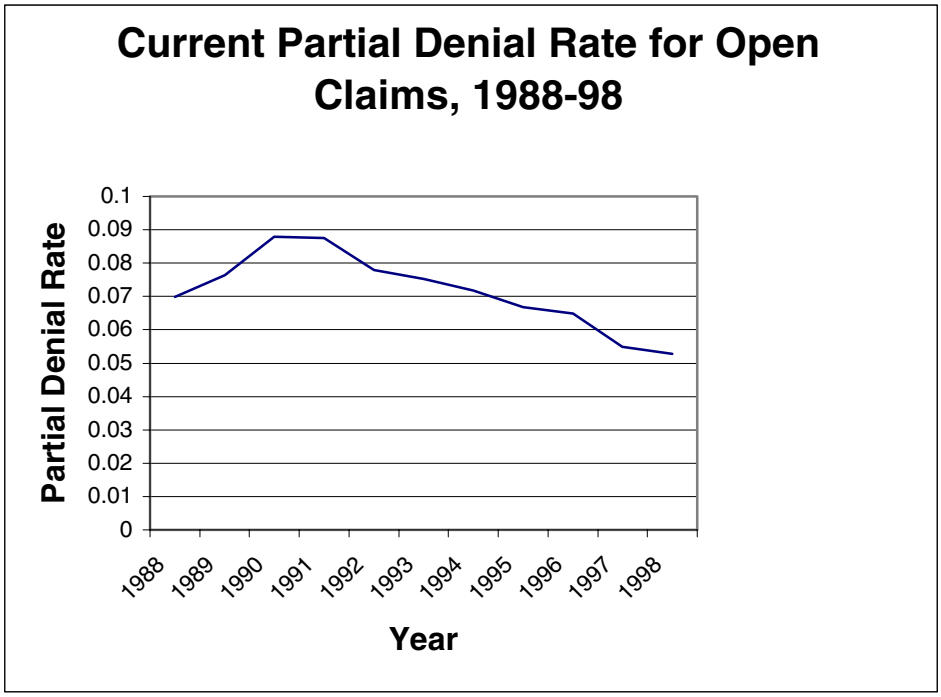


Figure 3-11 shows the current partial denial rate for open disabling claims from 1988 to 1998. It shows that after 1995, an open disabling claim was actually less likely than before 1995 to be partially denied by an insurer. The measure shown in the figure includes aggravation denials as partial denials, but a measure that excludes them is also lower after 1995 than before. Also, in the years 1994-1998, the partial denial rate on open claims declines more in percentage terms than the overall denial rate for open claims. This, taken with the evidence presented in section 3.4 and 3.5, lead us to conclude that SB 369 did not increase the likelihood that a disabling claim would be wholly or partially denied by an insurer.

4 Claim File Review

Jeff Biddle

4.1 The File Review

The primary focus of this study was to determine the effect of the Major Contributing Cause and Combined Condition standards on workers' compensation claims in Oregon. Unfortunately, there is no place in anyone's database that identifies when a claim was denied for this reason. Accordingly, it was necessary to physically review a sample of claim files to determine what percent of them had been denied for this reason. Our team of reviewers included experienced claims adjusters who reviewed a sample of files in which there was at least one denial. They made a determination of the reason for the denial and the type of denial. They noted whether there was an appeal and if so, the outcome of the appeal. They did not "audit" the files. They made no judgment as to whether the files were being handled appropriately. They simply noted the nature of and reasons for the denial.

The choice of files to review was motivated by the desire to examine enough files of different types from various time periods to allow us to answer the most pressing questions about the impact of the legislation. Accordingly, we developed a stratified sampling plan.

The first step was to assign denied claims to time periods based on the date of the first denial, and to define the time periods so that "before and after" comparisons could be made to assess the impact of the statutory changes. Key dates in defining time periods were the dates of enactment of SB 1197 and SB 396. We also had to consider that during the late 1980s and early 1990s, SAIF began an aggressive case management effort that resulted in a very large number of denials. It was not our intention to examine that situation. In fact, we wished to isolate the effect of that from our measurement of the impacts of statutory changes. The unusually high denial rate at SAIF appears to have occurred between July of 1989 and June of 1992. In order to isolate its effect, we created sub-periods within two of our time periods, which isolated SAIF's aggressive denial period from the other time periods. This leaves us with time periods before and after the 1990 legislation that were not affected by SAIF's unusually high denial rate.

We ended up with the following five time periods:

1a	7/1/88 – 6/30/89	Before SB 1197	Before SAIF high denial period
1b	7/1/89 – 6/30/90	Before SB 1197	During SAIF high denial period
2a	10/1/90 – 6/30/92	After SB 1197	During SAIF high denial period
2b	7/1/92 – 5/31/95	After SB 1197	After SAIF high denial period
3	9/1/95 – 12/31/98	After SB 369	

Within each time period, we wanted to be able to make comparisons between disabling and nondisabling claims, and between claims involving only a single whole denial, and claims involving other types of denials.

Finally, we wanted to be able to report results separately for SAIF, private insurers, and self-insurers. Accordingly, it was our goal to review files from two private insurers and two self-insurers. Before the study began, we were assured of the cooperation of SAIF. We also contacted Liberty Northwest, the largest private carrier in Oregon, who agreed to cooperate. Finding three other carriers was more difficult.

We contacted several private insurers before we found a second carrier that was willing to cooperate, and we contacted a large number of self-insurers before we found two that were willing to let us review their files. In some cases, carriers could not get permission from their home office. In others, the self-insured employer was willing to cooperate, but its TPA was not. In the other cases, the carriers agreed to cooperate until they found out just how much work was involved and then backed out.

We want to take this opportunity to express our appreciation to the five carriers who did cooperate. While the research team actually reviewed the files, we were very dependent on the carriers to pull the files for our review, to give us a place to work, and to assist us in other ways. The cooperating carriers were:

SAIF Corporation

Liberty Northwest Insurance

Safeco Insurance

Kroger Company, Self Insured Management Services, Inc., third party administrator for Kroger

Roseburg Forest Products

4.2 The Data

We had a sampling system that divided all denied claims into categories or cells based on date of first denial, carrier type, whether the claim was disabling or nondisabling, and whether the claim had a single whole claim denial or other types of denials. A typical cell, then, would be "nondisabling claims with a single whole claim denial from a self-insured employer first denied in period 1a." The goal of the sampling was to randomly select enough files from each cell to be able to draw reasonable statistical conclusions about all the denials in that cell.

Although files were drawn randomly within cells, the sizes of the cells in our sample were by design not proportional to the sizes of the same cells in the whole population of denials. The statistical results we report, however, have been adjusted to correct for this

situation and make our results representative of all denials occurring in Oregon during the periods being examined.[15]

The results of the file review were noted on a review sheet for each file, which was forwarded to East Lansing where it was analyzed. The first step in the analysis was to review all the reports for any problems or inconsistencies. As a result of this, a small number of file reviews were taken out of the sample because of missing or inappropriate values. There were also some cells that we were unable to fill because the carriers simply did not have enough denials within a chosen period. We eventually wound up with a sample of 1,301 claims for which we reviewed the file and successfully obtained usable data.

Many of the files we reviewed contained more than one denial. For the purposes of our analysis, we treated each of these denials separately. The file reviewers ultimately collected data on 1569 denials. In order to add data on claimant characteristics such as gender, age, occupation and industry to the information gathered by the file reviewers, the claims in the file review sample were linked to the data provided by the Department of Consumer and Business Services. Matches were found for the claims underlying 1542 of these 1569 denials, and it is this sample of 1542 denials that is used whenever results are reported in categories defined by claimant characteristic. It seems likely that coding error in the entry of file ID numbers can account for the small number of unmatched claims.

A description of the file review process in contained in appendix B.

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[15] We sampled from a database of denials provided by the Department of Consumer and Business Services. After the file review, it was discovered that a certain class of claims (claims that were initially accepted and later had one denial) had been excluded from the database due to a programming error. These claims would have contributed denials to the "other types of denials" categories in our sampling scheme.

After the error was discovered, we recalculated our analyses correcting for the error. This included a recalculation of the weights used in the analysis of the file review sample to reflect the true population of denials, rather than the sample of denials found in the erroneous database. We also investigated some of the ways this might have affected our results and found no reason to believe they were biased as a result of this error. In addition an analysis by IMD showed that the types of denials excluded by the error were not significantly different from the included "other types of denials" with respect to the demographics of the claimants and the tendency for MCC to be used as a reason for denial. The only exception was that the excluded denials seemed less likely to be appealed.

After consultation with IMD and WCD we are satisfied that our analyses were not adversely affected by this situation.

4.3 Reason for Denial

In coding reason for denial, the file reviewers used four categories. One of these categories included all claims that were denied because work was never or had ceased to be the major contributing cause of the disability or need for treatment underlying the claim. Henceforth, we refer to denials in this category as "MCC denials", and they include combined condition (CC) denials. They are the sorts of denials that were authorized by SB 1197 for claims arising from injuries, although they were permitted for claims arising from occupational diseases prior to 1990. Table 4-1 reports changes over time in the reasons given in denying disabling claims. Cell entries report the percentage of all denials in the period that fall into each of the four denial reason categories. The percentages in this table, and in all subsequent tables in the section, are calculated using the sample weights mentioned earlier.

Table 4-1: The Increase Over Time in MCC Denials of Disabling Claims

Reason for Denial	Period 1a (145 denials)	Period 1b (188 denials)	Period 2a (208 denials)	Period 2b (233 denials)	Period 3 (346 denials)
MCC	4.8%	1.2%	24.6%	36.0%	44.9%
Insufficient Evidence	29.5	47.8	27.8	20.8	12.7
Lack of Objective Evidence	6.5	2.7	9.8	2.5	5.1
All Other Reasons	59.1	48.2	37.8	40.6	37.3

The small number of MCC denials in the pre-1990 period are denials of claims arising from occupational diseases.[16] The share of all denials due to MCC jumps to 24.6% after

[16] In reporting on the file review, the reviewers characterized as major contributing cause denials a few denials that occurred before the 1990 amendments but were not occupational disease cases. In reviewing the data in East Lansing, we assumed this must be an error since technically such claims could not be denied for that reason prior to those amendments. We have since learned that a 1991 study by the department found that some claims were being denied because work was not the major contributing cause even before the amendments. For the purpose of this analysis, however, we have categorized these claims as insufficient evidence denials.

1990, and continues to increase in each of the subsequent periods. It appears that after 1990, the share of "all other" is holding steady as the share of MCC rises, while "insufficient evidence" is diminishing – MCC might be taking the place of IE as a reason for denial.

Table 4-2: The Increase Over Time in MCC Denials of Nondisabling Claims

Reason for Denial	Period 1a (91 denials)	Period 1b (80 denials)	Period 2a (86 denials)	Period 2b (90 denials)	Period 3 (102 denials)
MCC	1.4%	0.0%	8.1%	11.8%	22.9%
Insufficient Evidence	18.4	46.1	19.0	32.9	19.9
Lack of Objective Evidence	2.3	.5	6.8	13.7	15.8
All Other Reasons	77.9	53.4	66.1	41.6	41.5

Table 4-2 is constructed in the same fashion as table 4-1, but deals with nondisabling claims. As was the case with disabling claims, the use of MCC as a reason for denying nondisabling claims increases in each period following the legislation.

4.4 Types of Claims with MCC Denials

The goal of the next several tables in this section is to determine whether MCC denials occurred more for some types of claims than others. These tables report the percentage of all denials in a claim category that are MCC denials. They also exclude time periods 1a and 1b since there were few MCC denials during those periods.

4.4.1 Carrier Type

Tables 4-3 and 4-4 show the percentage of all denials that are MCC denials by insurance type. Table 4-3 reports results for disabling claims, and table 4-4 for nondisabling claims.

Table 4-3: Percentage of Disabling Claim Denials After 1990 Due to MCC, by Insurance Type

(Total denials in sample for each insurance type in each period is in parentheses under percentages)

	Period 2a	Period 2b	Period 3	All Post Legislation Periods
All Insurance Types	24.6%	36.0%	44.9%	36.0%
SAIF Insured	23.8 (68)	46.8 (74)	52.0 (132)	41.5
Private Insurers	29.0 (68)	32.6 (77)	43.9 (122)	35.6
Self Insured	14.7 (72)	22.2 (82)	32.8 (92)	24.5

When it comes to denials of disabling claims, all three-carrier types follow the pattern of an increasing percentage of MCC denials over time. The general increase over time in the percentage of denials due to MCC does not hold true for nondisabling claims for SAIF and self-insurers, however. Also SAIF, which is most likely to use MCC as a reason to deny a disabling claim, is least likely to use MCC in denying a nondisabling claim in the post-legislation period.

Table 4-4: Percentage of Nondisabling Claim Denials After 1990 Due to MCC, by Insurance Type

(Total denials in sample for each insurance type in each period is in parentheses under percentages)

	Period 2a	Period 2b	Period 3	All Post Legislation Periods
All Insurance Types	8.0%	11.8%	22.9%	15.9%
SAIF Insured	12.2 (33)	6.3 (32)	16.7 (36)	11.7
Private Insurers	0 (19)	15.0 (20)	30.6 (36)	19.3
Self Insured	20.6 (34)	15.8 (38)	13.3 (30)	15.5

4.4.2 Gender

Tables 4-5 and 4-6 report the percentage of all denied claims that were denied for MCC by gender. For disabling claims, there is no significant difference by gender in the percentage of denials due to MCC when reviewed files from all three post legislation periods are combined. The figures for nondisabling claims further support the idea that there is no tendency for MCC to be used as a reason for denial more often for claims made by men than for claims made by women. Thus, although there are variations from period to period, we found no significant pattern of MCC use based on gender. In most periods there were more MCC denials for women than for men, but as discussed in our data analysis, this is true for all denials.

Table 4-5: Percentage of Disabling Claim Denials After 1990 Due to MCC, by Gender

(Total denials in sample for each gender in each period is in parentheses under percentages)

	Period 2a	Period 2b	Period 3	All Post Legislation Periods
Male Claimant	20.3% (126)	29.9% (149)	50.3% (222)	34.3
Female Claimant	32.2 (78)	47.6 (90)	37.5 (120)	39.8

Table 4-6: Percentage of Nondisabling Claim Denials After 1990 Due to MCC, by Gender

(Total denials in sample for each gender in each period is in parentheses under percentages)

	Period 2a	Period 2b	Period 3	All Post Legislation Periods
Male Claimant	8.4% (58)	12.5% (59)	20.3% (65)	14.9%
Female Claimant	7.2 (28)	10.4 (31)	28.1 (36)	18.3

4.4.3 Age

Table 4-7: Percentage of Disabling Claim Denials After 1990 Due to MCC, by Age

(Total denials in sample for each age category in each period is in parentheses under percentages)

Age	Period 2a	Period 2b	Period 3	All Post Legislation Periods
Under 30	11.6% (52)	20.6% (37)	30.4% (54)	19.7%
30-50	27.8 (122)	41.7 (149)	45.3 (217)	39.7
Over 50	42.9 (34)	31.7 (47)	55.2 (75)	44.1

Table 4-8: Percentage of Nondisabling Claim Denials After 1990 Due to MCC, by Age

(Total denials in sample for each age category in each period is in parentheses under percentages)

	Period 2a	Period 2b	Period 3	All Post Legislation Periods
Under 30	3.1% (31)	20.1% (21)	12.6% (34)	12.1%
30-50	8.7 (47)	11.0 (55)	27.3 (58)	17.8
Over 50	24.6 (8)	0.0 (14)	34.6 (10)	16.9

Tables 4-7 and 4-8 look at the percentage of all denials in the post-1990 periods that are MCC denials in each of three age categories. There is a very clear pattern in table 4-7: The probability increases with age that a claim denial is a due to MCC as opposed to some other reason. This is true in every period except 2b, and is statistically significant in the combined sample for the three periods. No such pattern exists for the probability that a denial of a nondisabling claim is due to MCC, but it should be noted that some of the cell sizes underlying table 4-8 are very small.

4.4.4 Injury Type

The next three tables look at the percentage of all denials that are due to MCC classified by injury type, industry, and occupation. Because these sub-classifications can lead to small cell sizes for individual periods, we only report percentages for the combined period 2a, 2b, and 3 samples. Also, percentages for disabling and nondisabling claims are reported in the same table.

Table 4-9: Percentage of Claim Denials After 1990 Due to MCC, by Injury Type

(Total denials in sample for each injury/claim type in parentheses under percentages)

Injury Type	Disabling Claims	Nondisabling Claims
All Denials	36.0%	15.9%
Sprains and Strains of Back	31.1 (173)	9.8 (47)
Other Sprains and Strains	31.2 (216)	11.8 (55)
Open Wounds	9.9 (15)	15.4 (30)
Bruises, Burns, and Head Injuries	47.3 (114)	21.0 (26)
Other Traumatic Injuries	29.9 (50)	5.6 (28)
Carpal Tunnel, Musculoskeletal, and Connective Tissue Disorders	54.9 (82)	42.5 (37)
All other Injuries and Illnesses	32.1 (137)	10.6 (55)

Among the disabling claims, there are statistically significant differences across injury types in the probability that a denied claim was denied because of MCC as opposed to

some other reason, but the differences are not always what intuition would suggest. The denials of carpal tunnel and similar claims are more likely than average to be due to MCC, for example, but so too are denials of claims for bruises, burns and head injuries. And though a below average percentage of denials is due to MCC among claims involving traumatic injuries, it is perhaps surprising that the percentage is as high as it is.

One important commonality between the disabling claims and the nondisabling claims is the high likelihood that a denial of a carpal tunnel or similar claim will be attributed to MCC. Denials of back claims, whether disabling or nondisabling, are less likely than the average to be due to MCC.

4.4.5 Industry

Table 4-10: Percentage of Claim Denials After 1990 Due to MCC, by Industry

(Total denials in sample for each industry/claim type in parentheses under percentages)

Industry	Disabling Claims	Nondisabling Claims
All Industries	36.3%*	15.9%
Agriculture, Forestry, Fisheries, Logging	32.6 (178)	11.0 (69)
Mining and Construction	43.3 (65)	11.2 (14)
Manufacturing	40.4 (81)	23.3 (36)
Transportation, Communication, and Utilities	50.3 (55)	12.9 (16)
Wholesale and Retail Trade	27.3 (227)	15.6 (82)
Services and Public Administration	40.4 (171)	15.4 (60)

***Differs from "all claims" percentage for other tables because a few denials with missing industry codes are excluded.**

There are almost no statistically significant relationships between the broad industry in which a denied claimant works and the likelihood that his or her denial was due to MCC, whether the claim is disabling or not. Only the heterogeneous transportation, communications, and public utility industry among the disabling claims stands out.

4.4.6 Occupation

Table 4-11 shows that there is almost no difference across occupation category when it comes to the likelihood that a denied disabling claim is denied for MCC. Among nondisabling claims, however, there is a suggestion that for higher paid workers (managers, supervisors, administrators, skilled laborers) the likelihood that a denied claim is denied because of MCC is lower than average.

Table 4-11: Percentage of Claim Denials After 1990 Due to MCC, by Occupation

(Total denials in sample for each occupation/claim type in parentheses under percentages)

Industry	Disabling Claims	Nondisabling Claims
All Occupations	36.0%	15.9%
Prof, Admin., Managerial, &Supervisory	34.5 (86)	7.2 (51)
Clerical, Sales, Office Support	40.0 (167)	26.5 (51)
Blue Collar Non-Manufacturing	34.2 (166)	21.8 (72)
Skilled Blue Collar Manufacturing	34.5 (165)	6.5 (67)
Manufacturing Laborers and Operators	36.8 (536)	17.3 (208)

4.5 Denial Type

The next two tables deal with the question of which types of denials are most likely to be MCC denials. In the file review data, we divided all denials into the five denial type categories of initial whole denial, initial partial denial, other partial denial, backup denial, and aggravation denial. (Current condition denials are included under "other partial" denials). We also combined these five types of denials in two different ways for the purposes of analysis: first, a three way classification into initial whole denials, partial denials (initial partial plus other partial) and other denials (aggravation denials plus backup denials); and second, a two-way classification of initial denials (initial whole plus initial partial) vs. later denials (other partial plus aggravation plus backup). Because

almost all (98.8%) of the nondisabling claim files reviewed were initial whole denials, only disabling claims were used in the analysis of this section.

In table 4-12, each cell reports the percentage of all denials in a period that were of a particular type. In the interest of completeness the table presents information on all three denial type classifications in all five periods, plus summaries for all before periods and all after periods. Some changes in the percentages of all denials that are of each type can be seen from period to period, but the basic and important message of the table is this: *there are no significant changes in the distribution of denials by type from before to after the introduction of MCC denials.* In other words, our file review provides no reliable evidence that the legislation permitting MCC denials affected the overall mix of denial types experienced by workers. This is most easily seen by comparing the before and after columns of the table in the first panel. For example, before MCC, 68.2% of all denials in the file review were initial whole denials; after the percentage was 69.2%. Before MCC, 12.7% of denials were Aggravation Denials; after it was 13.1%.

Table 4-12: The Distribution of all Disabling Claim Denials by Type, before and After 1990

	Period 1a (142 Denials)	Period 1b (182 Denials)	Both "Before" Periods	Period 2a (204 denials)	Period 2b (228 denials)	Period 3 (343 denials)	All Three "After" Periods
Five-Way Classification Scheme							
Initial Whole	66.2%	69.6%	68.2%	67.3%	66.8%	73.1%	69.2%
Initial Partial	.9	.9	0.9	1.0	0.4	0.8	0.7
Other Partial	15.3	19.0	17.4	13.2	17.9	15.8	15.9
Aggra-vation	16.1	10.1	12.7	15.6	14.3	10.0	13.1
Backup	1.4	.4	0.8	3.0	0.7	0.3	1.2
Initial Whole vs. Partial vs. Other							

Initial Whole	66.2	69.6	68.2	67.3	66.8	73.1	69.2
Partial	16.2	19.9	18.3	14.2	18.3	16.6	16.6
Other	17.5	10.5	13.5	18.6	15.0	10.3	14.3
Initial vs. Later							
Initial	67.3	71.5	69.1	68.3	67.2	73.9	69.9
Later	32.7	28.5	30.9	31.7	32.8	26.1	30.1

Although the introduction of the MCC denial option may not have affected the proportion of whole vs. partial vs. aggravation denials, it is still worth asking whether insurers used the MCC reason with some types of denials more than others in the post 1990 period. Each cell in table 4-13 reports, for each post-1990 period, the percentage of all denials of a certain type that had MCC as a reason for denial.

Table 4-13: Percentage of Denials of Each Type Due to MCC After 1990

(Total denials in sample of each type in each period in parentheses under percentages)

Type	Period 2a	Period 2b	Period 3	All Post Legislation Periods
All Types	23.3%	35.4%	44.1%	36.0%
Initial Whole vs. Partial vs. Other				
Initial Whole	21.2 (97)	32.4 (107)	41.2 (199)	32.7
Partial	41.8 (51)	55.2 (67)	68.1 (91)	56.6
Aggravation or Backup	22.6 (56)	30.3 (54)	33.5 (53)	28.4
Initial vs. Later				
Initial Whole or Initial Partial	22.2 (101)	32.3 (108)	41.8 (202)	33.1
Other Partial, Backup, or Aggravation	29.2 (103)	44.5 (110)	53.6 (141)	42.8

Table 4-13 shows what previous tables in this section have shown, that the use of MCC as a reason for denial increased as time passed after 1990. However, it also shows that MCC was much more likely to be used as a reason for partial denials than for other types of denials to the point that by the third (post 1995) period, almost 70% of all partial denials were attributed to MCC. The difference between initial denials and later denials in the last panel of the table reflects mainly that the later denials include the "other partial" denials. The percentage of aggravation and backup denials due to MCC is not significantly different from the percentage of initial whole denials due to MCC.

It should be recalled, however, that the majority of all denials are of the "initial whole" type, so that even though the percentage of initial whole denials attributed to MCC is less than the percentage of partial denials attributed to MCC, the majority of all MCC denials are initial whole denials. This point is illustrated in table 4-14, which classifies the MCC denials in each period after the legislation by denial type.

Table 4-14: Distribution of MCC Denials by Type of Denial, Disabling Claims

Denial Type	**Period 2a** (51 Denials)	**Period 2b** (84 denials)	**Period 3** (161 denials)	**All Post-Legislation Periods**
Initial Whole	58.5%	59.7%	67.1%	62.8%
Initial Partial	3.5%	0.0%	1.7%	1.4%
Other Partial	20.8%	27.7%	23.5%	24.6%
Aggravation	10.6%	12.5%	7.4%	9.9%
Backup	6.6%	0.0%	0.3%	1.4%

4.6 Appeals

Are MCC denials more likely to be appealed than denials for other reasons? And if so, are those denials more or less likely to be upheld? Table 4-15 explores the first of these questions by looking at the appeal rates (the percentage of denials that are appealed) for denials of disabling claims before and after SB 1197.[17] (We do not report a similar

[17] File reviewers classified denials into one of 8 "outcome" categories: not appealed, appeal upheld, appeal overturned, appeal withdrawn, Disputed Claim Settlement (DCS), Claims Disposition Agreement (CDA), both DCS&CDA, and denial withdrawn. Claims in all but the not appealed and CDA categories were counted as having been appealed for the purposes of table 4-15, because CDAs are intended to be settlement agreements regarding aspects of a claim that have not been denied, while DCSs deal with aspects of claims that have been denied. The appeal rates published by the Department of Consumer and Business Services will differ from those in table 4-15, because they are appeal rates for original, whole claim denials only.

analysis for nondisabling claims as only 77 of the nondisabling claim denials in the sample were appealed, too few to make such an analysis worthwhile). In the pre-legislation period, an estimated 70.4% of denials of disabling claims were appealed. The difference between the percentage appealed in period 1a and the percentage appealed in 1b is not statistically significant, nor is the difference between the 70.4% overall appeal rate for the pre-legislation periods and the 65.3% rate for the post-legislation periods. However, the appeal rate for MCC denials in the post legislation periods was significantly higher than the appeal rate for all non-MCC denials in the post legislation periods, 72.3% compared to 61.7%. (We do not report separate results for each of the post legislation periods because of problems with small cell sizes, but within each of those periods there is a higher appeal rate for MCC denials than for other denials.)

Table 4-15: Appeal Rates for Denials of Disabling Claims

Period	Denial Type	Appealed	Not Appealed
Period 1a	All (142 denials)	69.8%	30.2%
Period 1b	All (182 denials)	70.9%	29.1%
Both "Before" Periods	All	70.4%	29.6%
All Three "After" Periods	All (773 denials)	65.3%	34.7%
	MCC (291 denials)	72.3%	27.7%
	Non-MCC (482 denials)	61.7%	38.3%

Table 4-16 looks at the ultimate outcome of a denial after whatever appeals that might have occurred have been settled, and compares the pre SB1197 period to the post SB 1197 period, as well as comparing the outcomes of MCC denials to the outcomes of denials that occur for other reasons in the post SB1197 period. Data from period 3 is reported separately because of concern that some claims denied during that period may not yet be resolved. The table looks at three possible outcomes of a denial: the aspect of the claim being denied is paid (ultimately accepted), that aspect of the claim is settled in some way (settled), and the aspect of the claim being denied is not paid (ultimately denied). We speak of "the aspect of the claim being denied" because we are counting denials here and there can be more than one denial per claim.

Table 4-16: Outcomes of Denials of Disabling Claims

Period	Denial Type	Ultimately Denied	Ultimately Accepted	Settled
Both Pre-Legislation Periods	All (324 denials)	41.8%	23.8%	34.4%
Periods 2a and 2b	All (433 denials)	44.7%	23.1%	32.2%
	MCC (134 denials)	32.4%	26.3%	41.3%
	Non MCC (299 denials)	50.2%	21.6%	28.2%
Period 3	All (340 denials)	51.2%	17.5%	31.3%
	MCC (157 denials)	47.3%	20.1%	32.6%
	Non MCC (183 denials)	54.3%	15.5%	30.2%

Table 4-16 shows that a denial of a disabling claim by an insurer in the post legislation period was more likely than a denial of a disabling claim in the pre-legislation period to end up as a denial, although this difference is not statistically significant. Looking at the results for periods 2a and 2b after the legislation, there was no significant difference in the likelihood that MCC denials occurring in these periods and non-MCC denials occurring in these periods would ultimately be *accepted*. However, MCC denials during this period were significantly more likely to lead to *settlements*, while non-MCC denials were more likely to end up staying *denied*. This may be because, as shown in table 4-15, non-MCC denials were less likely to be appealed in the first place. The difference between MCC and non-MCC denials with respect to likelihood of settlement narrows in period 3, but the difference regarding the likelihood of ultimate denial remains large, and the difference is statistically significant when all three post-1990 periods are taken together.

4.7 Were Post-1990 MCC Denials New Denials?

Were all the denials authorized by SB 1197, that is, MCC denials of injury claims, denials that would not have occurred if SB 1197 had not passed?

Previous tables have shown that since the passage of the 1990 legislation allowing MCC denials of injury claims, the use of MCC as a reason has increased steadily. It is not necessarily the case, however, that each MCC denial of an injury claim observed after the enactment of SB 1197 is a denial that would not have occurred had the law not been enacted. It is possible that some of the claims denied for the MCC reason would have been denied for some *other reas*on prior to 1990, but that in the post 1990 period the MCC reason was seen by the insurer as a more credible one.[18]

If every MCC denial of an injury claim after the enactment of SB 1197 was a new denial, that is, one that would not have occurred had the legislation not passed; and if the mix of claims filed and insurers' behaviors towards claims not involving MCC were unchanged, then the increase in the overall denial rate after the legislation would match the increase in the percentage of claims denied for MCC from before to after the legislation. For example, suppose that before the legislation, 120 out of every 1000 claims were typically denied, for an average denial rate of 12%, but none were denied for MCC. Then suppose that after the legislation, it was typical for 20 out of every 1000 claims to be denied because of MCC, so that the MCC denial rate could be said to be 2%. If each claim denied for MCC would not have been denied before the legislation, and other aspects of claiming and claim denial remained about the same, then we would still see 120 out of every 1000 claims denied for non-MCC reasons, so that the overall denial rate would be

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[18] The situation being described here may seem to contradict the logic of the instruction given to the file reviewers, that is, to code as MCC denials those denials in which were identified in the file as MCC denials, and would not have been denied prior to the 1990 amendments. However, in practice, this meant that the claim could not have been denied prior to *1990 using the reasons and justifications actually found in the file.* It is still possible that the carrier could have found and used some other reason to deny the claim had the MCC option not been available.

140 of every 1000 claims, or 14%. The increase in the overall denial rate from before to after the legislation would be the same as the increase in the MCC denial rate from before to after the legislation: 2 percentage points. By the same logic, if in the post legislation period we saw a one percentage point increase from one year to the next in the share of claims denied for MCC, we would also expect to see a one percentage point increase in the overall denial rate.

However, suppose some of the MCC denials in the post legislation period, say 10 out of every 1000, would have been denied for some other reason before the legislation. Then the increase in the overall denial rate from before to after the legislation would be only 1 percentage point – less than the increase in the MCC denial rate. And, if some of the increase in MCC denials from one post-legislation period to the next was just an increase in the tendency to use MCC rather than some other reason to deny a claim, then when we saw an increase in the number of claims out of every 1000 denied for MCC, we would not see as large an increase in the overall denial rate.

4.7.1 Analysis Using Initial Denials

Do increases in overall claims rates match up with increases in MCC denial rates in a way that suggests that all MCC denials of injury claims are denials that would not have occurred in the absence of the legislation? As we have discussed elsewhere in this report, attempts to calculate overall denial rates are complicated by the fact that denials can occur several years after a claim is filed. And although the file review data allow us to calculate the number of denials occurring in a particular period that are due to MCC, the fact that claims denied in a particular period may have been filed in some other period make it difficult to provide credible estimates of the percentage of claims filed in a particular period that were denied due to MCC. However, we can explore the above question if we focus only on initial denials of disabling claims, which make up 69% of all disabling claim denials, and 67% of MCC denials after the legislation. Initial denials, by definition, occur in the same period in which the claim is filed. Thus, we can use the WCD data to calculate the number of claims filed in a period and the percentage of those claims subject to initial denials and then use the file review data to estimate the proportion of the initial denials in the same period that are due to MCC. This analysis is carried out in tables 4-17 and 4-18.

Table 4-17: Initial Denials Rates and Initial MCC Denial Rates by Period, All Disabling Claims

	Period 1a	Period 1b	Period 2a	Period 2b	Period 3
Total Claims	47222	45567	65506	105897	105631
Total Initial Denials[1]	6525	9556	13740	18473	17833
Overall Initial Denial Rate	**13.8%**	**21.0%**	**21.0%**	**17.4%**	**16.9%**
Estimated Percent of Initial Denials Due to MCC[2]	7.2%	1.2%	22.2%	32.3%	41.8%
Estimated Number of Denials Due to MCC	522	114	3050	5967	7454
Estimated MCC Initial Denial Rate	**1.0%**	**0.2%**	**4.6%**	**5.6%**	**7.1%**

[1] Number of claims coded "D" for original acceptance status. Claims coded "N" (not applicable, .68% of claims) or with a missing code (.002% of claims) are assumed to be accepted.

[2] Based on file review of claims with Initial Whole or Initial Partial denial types.

The first row of table 4-17 lists the total number of disabling claims in our WCD sample for each of the periods covered by the file review. The second row lists the number of those claims that were initially denied for whatever reason, and the third row calculates the initial denial rate for the period. As with the other overall denial rates analyzed earlier in this report, the initial denial rate increases dramatically during SAIF's aggressive denial period, and then declines to a level that is a few percentage points above the level that prevailed before the aggressive denial period (period 1a).

The fourth row of table 4-17 uses information from the file review to estimate what percentage of all initial denials was attributed to MCC. This percentage is very small in period 1a and 1b, and high and rising through the periods after the legislation. In the fifth row of table 4-16, we estimate the total number of initial denials in the period that were

due to MCC, by multiplying the row four estimate by the total number of initial denials. Row 6 then calculates an initial MCC denial rate, which is the estimated number of MCC initial denials divided by the total number of claims for the period.

The aggressive denial period complicates somewhat the interpretation of the table. Overall, however, the table is not consistent with the scenario in which all MCC denials authorized by SB 1197 were denials that would not have occurred prior to the legislation. Consider a comparison of period 1a, before the aggressive denial period, to period 2b, after the aggressive denial period. The overall initial denial rate is 3.6 percentage points higher in 2b than in 1a, an increase consistent with the sorts of before/after increases reported for various denial rates earlier in the report. However, the estimated MCC denial rate has increased from 1.0% to 5.6%. If every initial MCC denial was one that would not have occurred before the legislation, and the rates of other types of denial were unchanged by the legislation, the difference in the total denial rate would also be 4.6 percentage points rather than 3.6 percentage points. Comparing period 3 to period 2b, the MCC initial denial rate continues to increase, but the overall initial denial rate falls.

Table 4-18: Initial Denials Rates and Initial MCC Denial Rates by Period, Non-SAIF Disabling Claims

	Period 1a	Period 1b	Period 2a	Period 2b	Period 3
Total Claims	31192	32019	47100	73137	72107
Total Initial Denials[1]	4019	4840	7643	11360	10840
Initial Denial Rate	**12.9%**	**15.1%**	**16.2%**	**15.5%**	**15.0%**
Estimated Percent of Initial Denials Due to MCC[2]	0.0%	1.4%	28.1%	26.9%	39.6%
Estimated Number of Denials Due to MCC	0	68	2148	3056	4293
Estimated MCC Initial Denial Rate	**0.0%**	**0.2%**	**4.6%**	**4.2%**	**6.0%**

[1] Number of claims coded "D" for original acceptance status. Claims coded "N" (not applicable, .68% of claims) or with a missing code (.002% of claims) are assumed to be accepted.

[2] Based on file review of claims with Initial Whole or Initial Partial denial types.

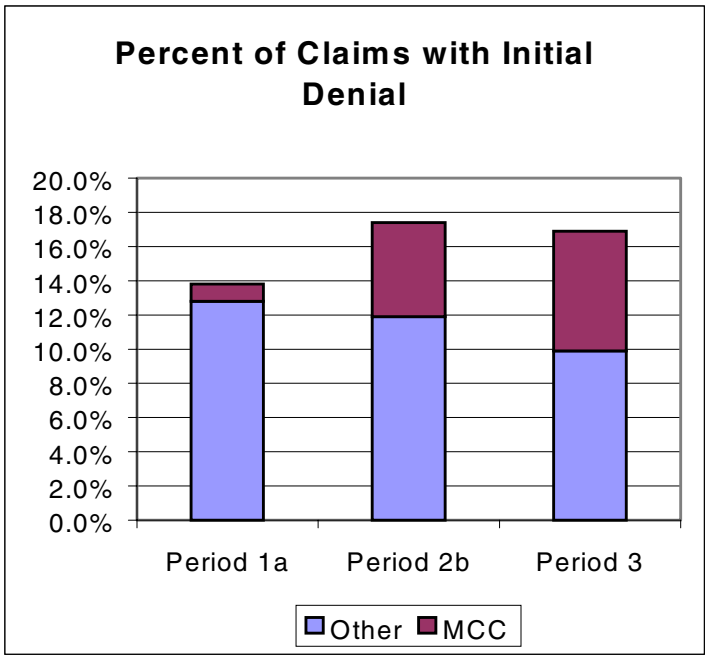
A similar pattern appears in table 4-18, which is constructed in the same fashion as table 4-17, but uses data only on non-SAIF claims. From period 1b before the legislation to period 2a after the legislation, the overall initial denial rate rose by only 1.1 percentage points even though an estimated 4.6% of claims in period 2a were initial MCC denials. Even if we use period 1a's 12.9% initial denial rate as a baseline, the increase in the overall initial denial rate of 3.2 percentage points from period 1a to period 2a is less than the increase in the initial MCC denial rate of 4.6 percentage points. Looking over the periods after the legislation, we see the initial MCC denial rate holding steady and then increasing while the overall initial denial rate is declining. Tables 4-17 and 4-18 cover only initial denials, and we have not controlled for other factors that might affect the initial denial rate, but the tables do provide compelling evidence that not all MCC denials of injury claims should be considered additional denials created by SB 1197.

This is further illustrated by Figure 4-1. By period 2b following SB 1197, the overall initial denial rate had increased by 3.6 percentage points over its level in Period 1a to 17.4% of all claims. Of these, 5.5% of the claims were being denied based on MCC. By Period 3 after SB 369, the overall initial denial rate had actually dropped from its level in period 2b. While 7.0% of all claims were being initially denied on the basis of MCC, only 16.9% of all claims were being initially denied for all reasons.

Thus it would appear that a substantial portion of claims denied on the basis of MCC were claims that would previously have been denied for some other reason. Taking this into consideration, our data suggest that SB 1197 increased that chance that a claim would be denied by about 3.6 percentage points but do not document any increase in the chance of a denial based on SB 369.[19]

[19] It should be noted that there are other possible explanations for this. For example, it is possible that the rate for all other denials was dropping for reasons not related to MCC. To that extent all, or at least a greater percentage, of the MCC denials would be new denials.

Figure 4-1



4.7.2 Analysis Using the Current Denial Rate for Open Claims

In section 3 we described an alternative measure of the denial rate that had as its numerator the number of denials occurring in a particular period, and as its denominator the number of claims at risk for denial during the period, that is, claims that were open at some time during the period. We called this alternative measure of the denial rate the "current denial rate for open claims."

It is possible to use the file review data to construct a corresponding "current MCC denial rate for open claims" (the percentage of open claims that are denied due to MCC in a period), one that is based on all types of MCC denials rather than simply initial denials. We can then re-examine from a different, and more complete, perspective the extent to which MCC denials authorized by SB 1197 were new denials. For what is true of our basic measure of the denial rate is true also of the current denial rate for open claims: if every MCC denial of an injury claim after the enactment of SB 1197 was a new denial, that is, one that would not have occurred had the legislation not passed; and if the mix of claims filed and insurers' behaviors towards claims not involving MCC were unchanged, then the increase in the current denial rate for open claims would match the increase in the percentage of open claims denied for MCC after the legislation. For that reason, we have done an analysis analogous to that reported in the previous subsection using current denial rates for open claims.

Table 4-19: Comparing Changes in Total Denial Rates and MCC Denial Rates using the "Current Denial Rate for Open Claims" Measure, All Disabling Claims

	1988	1994	1996
Total Claims Open During the Year[1]	69576	54928	52745
Total Denials Occurring in the Year	10888	11101	9588
Current Total Denial Rate for Open Claims	**15.6%**	**19.2%**	**18.2%**
Estimated Percent of All Denials Due to MCC[2]	4.8%	36.0%	44.9%
Estimated Number of Denials Due to MCC	523	3996	4305
Estimated Current MCC Denial Rate for Open Claims	**0.8%**	**7.2%**	**8.2%**

[1] Method of estimation described in appendix A.

[2] From table 4-1. Period 1a estimate is used for 1988, period 2b estimate for 1994, and period 3 estimate for 1996.

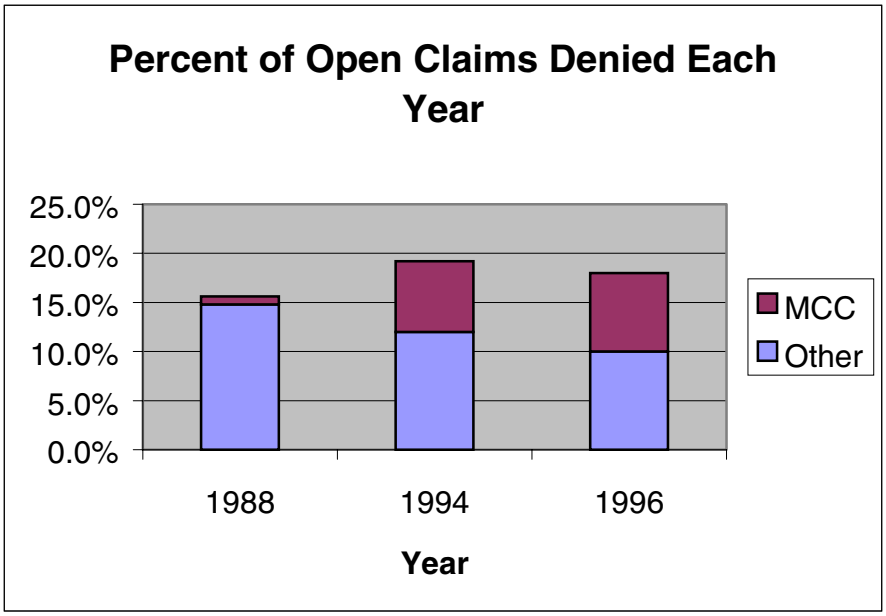
The key results of the analysis are contained in table 4-19, which is similar in construction to table 4-17. The table presents current denial rates (total and MCC) for open claims for 1988, 1994, and 1996. The year 1988 is the only year prior to the SAIF aggressive denial period for which an acceptably accurate estimate of the current denial rate for open claims could be constructed; 1994 represents the period after SAIF's aggressive denial policy but before the passage of SB 369 (rates for 1993 are almost identical); and 1996 represents the post-SB 367 period. The first row lists our estimates of the total number of disabling claims open at some point during the year, and the second lists the number of claims denied during that year, regardless of the year in which

they were set up. The third row calculates the current denial rate for open claims for the year. As with our other measures of the denial rate, the current denial rate for open claims is significantly higher after SB 1197 than before. It is lower in 1996, after SB 367, than in years before SB 367 (indeed, the measure continues to decline after 1996 to reach 16.2% by 1998).

The fourth row of table 4-19 uses information from the file review to estimate what percentage of all denials in a year were attributed to MCC, using the estimates reported in table 4-1 for the appropriate periods. In the fifth row of table 4-19, we estimate the total number of denials in the year that were due to MCC by multiplying the row four estimate by the total number of denials. Row 6 then calculates the current MCC denial rate for open claims, which is the estimated number of MCC denials in the year divided by the total number of claims open during the year.

The message of table 4-19 is quite similar to that of tables 4-17 and 4-18. The increase in the MCC denial rate is greater than the increase in the total denial rate from 1988 (before SB 1197) to 1994 (after SB 1197); and from 1994 to 1996, the total denial rate falls slightly, while the MCC denial rate continues to rise. Again, these results suggest that at least some of the MCC denials authorized by SB 1197 in this period would have been denials for some other reason before the legislation. Figure 4-2 shows this result graphically in a fashion parallel to figure 4-1.

Figure 4-2



The figure shows that while the percentage of open claims denied for MCC went up after SB 1197 and again after SB 369, the percentage of claims denied for other reasons went down.

It should be noted again that our interpretation of the findings of this and the previous subsection rest on the assumption that the denial rate would have remained about the same had the MCC amendments not passed. It is possible that there were non-legislative forces at work in the post 1990 period that acted to lower the number of denials made for non-MCC reasons, while the legislation increased the number of MCC denials that could be made.

5 Law Review

Sara T. Harmon

5.1 Statutory compensability standards

5.1.1 Introduction

Historically, accidental injuries have been compensable under workers' compensation if they arise out of and in the course of employment. In general this has been interpreted to mean that the work does not have to be the sole or major “cause” of a disability. It has usually been enough that the work contributed to or aggravated an underlying condition. Under English and American personal injury or “tort” law a person “took his victim as he found him.” Thus if I negligently hit someone on the head, I was responsible for all the consequences of my negligence. If it turned out that my victim had an especially weak skull and the results of the hit were much more disastrous that I would have expected, I was nevertheless responsible for those consequences. When workers' compensation replaced tort law, this principle was carried over. It was said that the employer “takes the worker as he finds him.” As will be seen, in recent years some jurisdictions, including Oregon, have moved away from this approach.

For occupational diseases, there has generally been an additional layer--the disease must be caused by conditions that are peculiar to the employment. There has to be a greater risk of contracting the disease as a result of the particular employment, when compared with other employments or non-employment life. Alternatively, a number of states have historically limited compensability to a statutory list of certain occupational diseases.

Typically the burden of proof has been on the worker to prove entitlement to workers' compensation benefits and typically the standard is by a preponderance of the evidence. Generally medical evidence is required to prove causation and doctors are asked to give their opinions to a “reasonable medical certainty” or on a “more probable than not basis.”

In recent years, some of these traditional standards have been displaced by legislation in a number of states, raising the compensability bar for workplace accidents and occupational diseases. A review of the national legislative trends suggests a continuum. At the higher end, are the four states that have a “major contributing cause” requirement—Oregon, Florida, Arkansas, and South Dakota. At the other end of the spectrum, there are many states that have retained the traditional standards. In the middle, are a number of states that have imposed a variety of constraints on compensability.

What follows is a review of the various statutory standards that diverge from the traditional norms, broken into categories loosely ranked from highest standard to lowest standard. The focus is primarily on causation standards, not burdens of proof, presumptions, or evidentiary requirements. However, there is some discussion of those factors because the causation standard cannot be adequately addressed in a vacuum.

The actual statutory language is often critical to a clear understanding of compensability standards. The danger in not looking at the precise language is that different standards may be incorrectly lumped together and variations may not be understood. In addition, states sometimes have different standards depending on the particular physical or mental condition involved. Therefore, numerous short quotations have been provided in the text. The statutory language in the four major contributing cause states is contained in the appendix C.

5.1.2 Causation standards

1. Sole cause

In Kansas, emphysema is compensable only if it is caused by employment "solely and independently of all other causes…." K.S.A § 44-5a01.

In Colorado, "`[a]ccident', `injury', and `occupational disease' shall not be construed to include disability or death caused by or resulting from mental or emotional stress unless it is shown by competent evidence that such mental or emotional stress is proximately caused solely by hazards to which the worker would not have been equally exposed outside the employment." C.R.S. 8-41-302.

2. Predominant or primary cause

For most psychiatric injuries, the California statute requires proof by a "preponderance of the evidence that actual events of employment were predominant as to all causes combined…." When a violent act is involved, a "substantial cause" standard is imposed. Cal. Lab. Code § 3208.3.

For psychological conditions, Idaho requires that the injury be the "predominant cause as compared to all other causes combined…." Idaho Code § 72-451.

Louisiana has a "predominant and major cause" requirement with respect to heart-related or perivascular injuries. La. R.S. 23:1021.

For mental/mental conditions, Maine requires proof that "[t]he work stress, and not some other source of stress, was the predominant cause of the mental injury." 39-A M.R.S. § 201.

Under the Massachusetts statute, "[p]ersonal injuries shall include mental or emotional disabilities only where the predominant contributing cause of such disability is an event or series of events occurring within any employment." Mass. Ann. Laws ch. 152, § 1.

The Montana statute limits compensability for "cardiovascular, pulmonary, respiratory, or other disease, cerebrovascular accident, or myocardial infarction" to cases where the accident is "the primary cause of the physical condition in relation to other factors contributing to the physical condition." "Primary cause" is defined as "a cause that, with a reasonable degree of medical certainty, is responsible for more than 50% of the physical condition." Mont. Code Ann. § 39-71-119.

In North Dakota, a physical/mental condition is compensable only "when the physical injury is determined with reasonable medical certainty to be at least fifty percent of the cause of the condition as compared with all other contributing causes combined, and only when the condition did not preexist the work injury." N.D. Cent. Code § 65-01-02 (a) (6). A similar approach is used for mental/physical conditions, i.e., "[i]njuries due to heart attack or other heart-related disease, stroke, and physical injury caused by mental stimulus." They are compensable only "when caused by the employee's employment with reasonable medical certainty, and only when it is determined with reasonable medical certainty that unusual stress is at least fifty percent of the cause of the injury or disease as compared with all other contributing causes combined. Unusual stress means stress greater than the highest level of stress normally experienced or anticipated in that position or line of work." N.D. Cent. Code § 65-01-02 (a) (3).

3. Major contributing cause

Only three other states have a major contributing cause (MCC) standard that is similar to Oregon's—Arkansas (1993), Florida (effective 1994) and South Dakota (1995). The text of the relevant language from all four states is contained in Appendix C.

In Oregon, "determining the `major contributing cause' involves evaluating the relative contribution of different causes of an injury or disease and deciding which is the primary cause." *Dietz v. Ramuda*, 130 Or. App. 397, 401, 882 P.2d 618 (1994), *rev. dismissed*, 312 Or. 416, 898 P.2d 768 (1995). The Arkansas statute defines "major cause" as "more than fifty percent (50%) of the cause." Ark. Code 11-9-102 (14)(A). South Dakota requires workers to prove that, of multiple potential causes, the employment is "a greater contributing cause" of "the condition complained of." *Brady Memorial Home v. Hantke*, 597 N.W. 2d 677, 681 (S.D. 1999). The Florida courts have interpreted "major contributing cause" to mean "the most preponderant cause." *Orange County MIS Dep't v. Hak*, 710 So. 2d 998, 999 (Fla. 1st DCA 1998).

The Oregon MCC standard applies to both injuries and occupational diseases. The Arkansas MCC standard applies only to injuries. For occupational diseases, Arkansas imposes the higher "clear and convincing evidence" burden of proof. In Florida and South Dakota, the MCC standard applies only to injuries. A lower standard applies to occupational diseases. Fla. Stat. § 440.151 and S.D. Codified Laws § 62-8-1.

Massachusetts uses a modified major cause analysis, which does not rise to the level of predominant cause. The statute provides: "If a compensable injury or disease combines with a pre-existing condition, which resulted from an injury or disease not compensable under this chapter, to cause or prolong disability or a need for treatment, the resultant condition shall be compensable only to the extent such compensable injury or disease remains a major but not necessarily predominant cause of disability or need for treatment." Mass. Ann. Laws ch. 152, § 1.

4. Substantial contributing cause

Arizona excludes heart and perivascular conditions from coverage, unless “some injury, stress or exertion related to the employment was a substantial contributing cause of the heart-related or perivascular injury, illness or death.” A.R.S. § 23-1043.01

For most psychiatric injuries, the California statute imposes a "predominant" cause standard. However, if a worker's psychiatric injuries "resulted from being a victim of a violent act or from direct exposure to a significant violent act, the employee shall be required to demonstrate by a preponderance of the evidence that actual events of employment were a substantial cause of the injury.” The statute goes on to define "substantial cause" to mean “at least 35 to 40 percent of the causation from all sources combined.” Cal. Lab. Code § 3208.3.

Missouri uses a substantial factor test to determine compensability of both injuries and occupational diseases. Neither is compensable unless it is “clearly work related.” That means that the work must be a “substantial factor in the cause of the resulting medical condition or disability. An injury is not compensable merely because work was a triggering or precipitating factor.” Missouri also has a provision with respect to repetitive motion conditions which places responsibility on a prior employer if “the exposure to the repetitive motion which is found to be the cause of the injury is for a period of less than three months and the evidence demonstrates that the exposure to the repetitive motion with a prior employer was the substantial contributing factor to the injury….” § 287.020 R.S.Mo. and § 287.067 R.S.Mo.

In situations where an occupational disease aggravates a preexisting condition or where an occupational disease is subsequently aggravated by a non-occupational condition,

Nevada places the burden on the employer to prove, by a preponderance of the evidence, that the occupational disease is not a substantial contributing cause of the worker’s condition. If the employer is not able to meet that burden of proof, then the worker’s condition is compensable. Nev. Rev. Stat. Ann. § 617.366.

Under the North Dakota statute, a preexisting condition is excluded from coverage unless “the employment substantially accelerates its progression or substantially worsens its severity.” N.D. Cent. Code, § 65-01-02.

Under the Texas statute, heart attacks are compensable only if "the attack can be identified as occurring at a definite time and place and caused by a specific event occurring in the course and scope of the employee's employment." Additionally, the preponderance of the medical evidence must indicate, "that the employee's work rather than the natural progression of a preexisting heart condition or disease was a substantial contributing factor of the attack." There are also some constraints on the extent to which a heart attack caused by a mental stimulus will be compensable. Tex. Lab. Code § 408.008.

If the employment substantially increases the risk of sexual assault, an injured worker in Virginia may receive workers' compensation benefits and also sue the assailant, even if that person is the employer or co-employee. Va. Code Ann. § 65.2-301.

5. Significant contribution

This is a standard that is higher than "any contribution" standard previously found in most jurisdictions but significantly lower than major contributing cause. It can usually be met by testimony of a credible physician that the contribution of the work to the disability was "significant".

In Maine, "[i]f a work-related injury aggravates, accelerates or combines with a preexisting physical condition, any resulting disability is compensable only if contributed to by the employment in a significant manner." 39-A M.R.S. § 201.

Michigan covers mental disabilities and conditions of the aging process "if contributed to or aggravated or accelerated by the employment in a significant manner." MSA § 17.237(301).

The Mississippi statute applies the significant contribution test to all injuries. Only injuries that are "contributed to or aggravated or accelerated by the employment in a significant manner" are compensable. Miss. Code Ann. § 71-3-3.

6. Material contributing factor

The New Jersey statute provides as follows: "In any claim for compensation for injury or death from cardiovascular or cerebral vascular causes**,** the claimant shall prove by a preponderance of the credible evidence that the injury or death was produced by the work effort or strain involving a substantial condition, event or happening in excess of the wear and tear of the claimant's daily living and in reasonable medical probability caused in a material degree the cardiovascular or cerebral vascular injury or death resulting therefrom. Material degree means an appreciable degree or a degree substantially greater than de minimis." N.J. Stat. § 34:15-7.2 .

In addition, the term "compensable occupational disease" includes diseases "which are due in a material degree to causes and conditions which are or were characteristic of or peculiar to a particular trade, occupation, process or place of employment." N.J. Stat. § 34:15-31.

5.1.3 Compensability of particular conditions limited or excluded.

1. Compensability of aging process

Some states have specifically eliminated compensability for the natural aging process, conditions caused by daily living, the ordinary diseases of life, or degenerative conditions.

Under the Arkansas statute, the ordinary diseases of life to which the general public is exposed are not compensable. Ark. Code Ann. §11-9-601.

A number of states have occupational disease provisions requiring that the disease have its "origin" in a risk connected with the employment—Arizona, Georgia, Indiana, Iowa, Kansas, Missouri, Virginia, and West Virginia.

In Kansas, the terms "`[p]ersonal injury" and "injury" mean any lesion or change in the physical structure of the body, causing damage or harm thereto, so that it gives way under the stress of the worker's usual labor. It is not essential that such lesion or change be of such character as to present external or visible signs of its existence. An injury shall not be deemed to have been directly caused by the employment where it is shown that the employee suffers disability as a result of the natural aging process or by the normal activities of day-to-day living." K.S.A. § 44-508.

In Kentucky, a compensable injury or disease is defined as "any work-related traumatic event or series of traumatic events, including cumulative trauma, arising out of and in the course of employment which is the proximate cause producing a harmful change in the human organism evidenced by objective medical findings. `Injury' does not include the effects of the natural aging process, and does not include any communicable disease unless the risk of contracting the disease is increased by the nature of the employment." KRS § 342.0011.

Louisiana defines a compensable accident as "an unexpected or unforeseen actual, identifiable, precipitous event happening suddenly or violently, with or without human fault, and directly producing at the time objective findings of an injury which is more than simply a gradual deterioration or progressive degeneration." La. R.S. 23:1021.

Michigan limits compensability for conditions of the aging process to situations where the condition is "contributed to or aggravated or accelerated by the employment in a significant manner." MSA § 17.237(301).

In Missouri, "[o]rdinary, gradual deterioration or progressive degeneration of the body caused by aging shall not be compensable, except where the deterioration or degeneration follows as an incident of employment." § 287.020 R.S.Mo.

In Nebraska, "disability or death due to natural causes but occurring while the employee is at work" are specifically excluded from compensability, as are "injury, disability, or death that is the result of a natural progression of any preexisting condition." R.R.S. Neb. § 48-151.

Under the New Hampshire statute, "[c]onditions of the aging process, including but not limited to heart and cardiovascular conditions, shall be compensable only if contributed to or aggravated or accelerated by the injury." RSA 281-A:2.

The New Jersey statute provides that "[d]eterioration of a tissue, organ or part of the body in which the function of such tissue, organ or part of the body is diminished due to the natural aging process thereof is not compensable." N.J. Stat. § 34:15-31.

North Dakota excludes from compensability "[o]rdinary diseases of life to which the general public outside of employment is exposed or preventive treatment for communicable diseases." N.D. Cent. Code, § 65-01-02

Ohio excludes from compensability "[i]njury or disability caused primarily by the natural deterioration of tissue, an organ, or part of the body." ORC Ann. 4123.01.

South Carolina's occupational disease statute begins with a fairly typical definition, but then provides: "No disease shall be deemed an occupational disease when: (1) It does not result directly and naturally from exposure in this State to the hazards peculiar to the particular employment; (2) It results from exposure to outside climatic conditions; (3) It is a contagious disease resulting from exposure to fellow employees or from a hazard to which the workman would have been equally exposed outside of his employment; (4) It is one of the ordinary diseases of life to which the general public is equally exposed, unless such disease follows as a complication and a natural incident of an occupational disease or unless there is a constant exposure peculiar to the occupation itself which makes such disease a hazard inherent in such occupation; (5) It is any disease of the cardiac, pulmonary or circulatory system not resulting directly from abnormal external gaseous pressure exerted upon the body or the natural entrance into the body through the skin or natural orifices thereof of foreign organic or inorganic matter under circumstances peculiar to the employment and the processes utilized therein; or (6) It is any chronic disease of the skeletal joints." S.C. Code Ann. § 42-11-10.

Virginia restricts compensability for ordinary diseases of life such as hearing loss and carpal tunnel syndrome. Va. Code Ann. § 65.2-400. The worker must prove entitlement by clear and convincing evidence. § 65.2-401.

In Wyoming, illnesses and communicable diseases are not covered unless "the risk of contracting the illness or disease is increased by the nature of the employment." Wyoming also excludes preexisting conditions. And an injury resulting "primarily from the natural aging process or from the normal activities of day-to-day living, as established by medical evidence supported by objective findings" is not compensable. Wyo. Stat. § 27-14-102.

2. Reduction of benefits due to preexisting condition

An important component of the major contributing cause standard in Arkansas, Florida, Oregon, and South Dakota is that compensability is barred when an injury affects a preexisting condition, unless the injury is a major contributing cause of the condition complained of. New Hampshire and Wyoming appear to go further. The New Hampshire statute excludes from occupational disease coverage any disease that existed at the commencement of the employment. RSA 281-A:2. Wyoming does not cover "any injury or condition preexisting at the time of employment with the employer against whom a claim is made." Wyo. Stat. § 27-14-102.

Prior to 1971, the Idaho statute covered occupational diseases "or aggravation thereof." In 1971, the aggravation language was deleted. Litigation is currently ongoing

concerning whether the aggravation of a preexisting disease is compensable as an occupational disease.

Under the Georgia statute, "'injury' and 'personal injury' shall include the aggravation of a preexisting condition by accident arising out of and in the course of employment, but only for so long as the aggravation of the preexisting condition continues to be the cause of the disability; the preexisting condition shall no longer meet this criteria when the aggravation ceases to be the cause of the disability." O.C.G.A. § 34-9-1.

Many other states address preexisting conditions in a different fashion. They have a statutory mechanism for reducing benefits, rather than eliminating compensability entirely, when a preexisting condition is involved. Typically, the worker is only entitled to benefits based on the disability attributable to the employment, not the disability attributable to the preexisting condition.

In Alabama, if "the degree or duration of disability resulting from an accident is increased or prolonged because of a preexisting injury or infirmity, the employer shall be liable only for the disability that would have resulted from the accident had the earlier injury or infirmity not existed." Code of Ala. § 25-5-58**.**

Arizona, Delaware, Florida, Iowa, Kansas, Maryland, Michigan, and Utah all have statutory sections which provide that when an occupational disease combines in some fashion with another condition, the worker is only entitled to the compensation that would be payable if the occupational disease were the sole cause of the disability or death.

In California, if an injury or disease aggravates a prior disease, compensation is limited to the proportion of disability "reasonably attributed" to the work related injury. Cal. Lab. Code § 4750.5.

In Connecticut, "for aggravation of a preexisting disease, compensation shall be allowed only for that proportion of the disability or death due to the aggravation of the preexisting disease as may be reasonably attributed to the injury upon which the claim is based…." Conn. Gen. Stat. § 31-275.

The Idaho statute provides: "In cases of permanent disability less than total, if the degree or duration of disability resulting from an industrial injury or occupational disease is increased or prolonged because of a preexisting physical impairment, the employer shall be liable only for the additional disability from the industrial injury or occupational disease." Idaho Code § 72-406.

Under the Mississippi statute, once the worker reaches maximum medical recovery, compensation benefits are reduced if a preexisting condition is a "material contributing factor in the results following injury". Compensation is reduced by the proportion which the preexisting condition "contributed to the production of the results following the injury." Miss. Code Ann. § 71-3-7.

In Nebraska, the “aggravation of a preexisting occupational disease” is compensable but the employer is liable “only for the degree of aggravation of the preexisting occupational disease.” R.R.S. Neb. § 48-151.

3. Specific conditions excluded from basic coverage or benefits limited

Many states either exclude or place restrictions on the compensability of certain types of conditions. Traditionally, there have been limitations on hernias. And either by statute or case law, there have frequently been limitations on the compensability of heart conditions. Restrictions on a variety of conditions have increased in recent years.

The list of states which exclude or limit compensability of mental conditions includes Alabama, Alaska, Arizona, California, Colorado, Connecticut, Florida, Hawaii, Idaho, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Missouri, Montana, New Hampshire, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Texas, Utah, Washington, and Wyoming.

Arkansas limits benefits in heart and lung cases to situations where “it is shown that the exertion of the work necessary to precipitate the disability or death was extraordinary and unusual in comparison to the employee's usual work in the course of the employee's regular employment or, alternately, that some unusual and unpredicted incident occurred which is found to have been the major cause of the physical harm.” In addition, contagious or infectious diseases are excluded from coverage unless “contracted in the course of employment in, or immediate connection with, a hospital or sanitarium in which persons suffering from that disease are cared for or treated.” Ark. Stat. Ann. § 11-9-114.

In Colorado, "`[a]ccident’, `injury’, and `occupational disease’ shall not be construed to include disability or death caused by heart attack unless it is shown by competent evidence that such heart attack was proximately caused by an unusual exertion arising out of and within the course of the employment.” C.R.S. 8-41-302**.**

Under the Florida statute “A…disability or death due to the accidental acceleration or aggravation of a venereal disease or of a disease due to the habitual use of alcohol or controlled substances or narcotic drugs, or a disease that manifests itself in the fear of or dislike for an individual because of the individual's race, color, religion, sex, national origin, age, or handicap is not an injury by accident arising out of the employment.” Fla. Stat. § 440.02.

In addition, the Florida statute excludes from coverage "tuberculosis arising out of and in the course of employment by the Department of Health at a state tuberculosis hospital, or aggravated by such employment, when the employee had suffered from said disease at any time prior to the commencement of such employment." Fla. Stat. § 440.151.

The Georgia statute limits the compensability of heart and vascular conditions. Alcoholism is not compensable. Drug addiction is not compensable unless it results from treatment for a compensable injury. O.C.G.A. § 34-9-1. Partial loss of hearing due to noise is not compensable. O.C.G.A. § 34-9-280.

Kentucky restricts the compensability of black lung disease to workers who have at least a 20% respiratory impairment. KRS 342.732.

Louisiana excludes "[d]egenerative disc disease, spinal stenosis, arthritis of any type, mental illness, and heart-related or perivascular disease" from occupational disease coverage. La. R.S. 23:1031.1.

In Nevada, "[c]oronary thrombosis, coronary occlusion, or any other ailment or disorder of the heart, and any death or disability ensuing therefrom, shall be deemed not to be an injury by accident sustained by an employee arising out of and in the course of his employment." Nev. Rev. Stat. Ann. § 616A.265. Nevada also limits the compensability of "tenosynovitis, prepatellar bursitis, and infection or inflammation of the skin," requiring that "for 90 days next preceding the contraction of the occupational disease the employee has been: (a) A resident of the State of Nevada; or (b) employed by a self-insured employer, a member of an association of self-insured public or private employers, or an employer insured by a private carrier that provides coverage for occupational diseases." Nev. Rev. Stat. Ann. § 617.430.

Virginia excludes conditions of the "neck, back or spinal column" from occupational disease coverage. Va. Code Ann. § 65.2-400.

5.1.4 Burdens of proof

1. Preponderance of evidence

Whether explicitly stated in the statutory scheme or not, in most states (including Oregon) the worker must prove compensability by a preponderance of the evidence. A good working definition of that term is contained in several statutes. For example, the Minnesota statute defines the preponderance of the evidence as "evidence produced in substantiation of a fact which, when weighed against the evidence opposing the fact, has more convincing force and greater probability of truth." Minn. Stat. § 176.021. The Kansas statute has a similar definition: "`Burden of proof' means the burden of a party to persuade the trier of facts by a preponderance of the credible evidence that such party's position on an issue is more probably true than not true on the basis of the whole record." K.S.A. § 44-508.

Utah and Louisiana have notable variations on the preponderance of the evidence standard. Louisiana requires that a worker meet a somewhat higher burden in certain occupational disease cases. By statute, there is a rebuttable presumption that a disease contracted during the first twelve months of employment with a particular employer is non-occupational. That presumption can only be overcome "by an overwhelming preponderance of evidence." La. R.S. 23:1031.1. Utah limits compensability of mental conditions and places the burden on the worker to prove both medical and legal causation by a preponderance of the evidence. Utah Code Ann. § 39A-2-402.

2. Clear and convincing evidence

A few states impose a heightened burden of proof. In occupational disease cases, Arkansas requires the worker to prove the causal connection between employment and the disease by clear and convincing evidence. Ark. Stat. Ann. § 11-9-601.

Florida requires clear and convincing evidence for "mental or nervous injuries" and a "mental or nervous injury due to stress, fright, or excitement only" is not compensable. Fla. Stat. § 440.09.

Idaho not only limits the kinds of mental conditions that are compensable, it also requires the worker to prove by clear and convincing evidence that the psychological injury "arose out of and in the course of the employment from an accident or occupational disease…." Additionally, the injury must be the "predominant cause as compared to all other causes combined…." Idaho Code § 72-451.

Kansas limits compensability for emphysema to the situation where "it is proved, by clear and convincing medical evidence to a reasonable probability, that such emphysema was caused, solely and independently of all other causes, by the employment with the employer against whom the claim is made, except that, if it is proved to a reasonable medical probability that an existing emphysema was aggravated and contributed to by the employment with the employer against whom the claim is made, compensation shall be payable for the resulting condition of the workman, but only to the extent such condition was so contributed to and aggravated by the employment." K.S.A. § 44-5a01.

Louisiana requires clear and convincing evidence for mental and heart-related conditions. La. R.S. 23:1021.

The Maine statute provides that: "Mental injury resulting from work-related stress does not arise out of and in the course of employment unless it is demonstrated by clear and convincing evidence that: A. The work stress was extraordinary and unusual in comparison to pressures and tensions experienced by the average employee; and B. The work stress, and not some other source of stress, was the predominant cause of the mental injury." 39-A M.R.S. § 201.

Under its occupational disease statute, Oregon requires clear and convincing evidence to prove a mental disorder arose out of and in the course of employment. ORS § 656.802.

In South Dakota, claims for mental disability resulting from mental stress are not compensable. "A mental injury is compensable only if a compensable physical injury is and remains a major contributing cause of the mental injury, as shown by clear and convincing evidence." S.D. Codified Laws § 62-1-1.

Under the Virginia statute, ordinary diseases of life are only compensable if the worker proves entitlement by clear and convincing evidence. Va. Code Ann. Sec. 65.2-401.

Under the Wyoming statute, a mental injury is not covered "unless it is caused by a compensable physical injury, it occurs subsequent to or simultaneously with, the physical injury and it is established by clear and convincing evidence…." Wyo. Stat. § 27-14-102.

5.1.5 Presumptions

Statutory presumptions with respect to compensability are not the primary subject of this review. However, it is worth noting that a number of states have presumptions of compensability with respect to workplace deaths and certain conditions suffered by law enforcement personnel and firefighters. There are also a variety of statutory presumptions regarding whether an injury is compensable if alcohol or illegal drug use are implicated.

The Hawaii statute is unusual in that it establishes a rebuttable presumption, "in the absence of substantial evidence to the contrary…[t]hat the claim is for a covered work injury." HRS § 386-85.

The Illinois statute establishes a rebuttable presumption that a coal minor who is suffering from pneumoconiosis and worked as a coal miner for 10 years or more has a compensable occupational disease. § 820 ILCS 310/1.

Louisiana has established a rebuttable presumption that a disease is not compensable if the employment exposure was for less than twelve months. The presumption can only be overcome by the overwhelming preponderance of the evidence. La. R.S. 23:1031.1.

The South Dakota statute has a specific provision addressing liability in the event that a claim is denied under workers' compensation because it is not work related. Such "injury is presumed to be nonwork related for other insurance purposes, and any other insurer covering bodily injury or disease of the injured employee shall pay according to the policy provisions." S.D. Codified Laws § 62-1-13.

5.1.6 Objective Findings

Oregon's "objective findings" requirement is not a primary focus of this study of the major contributing cause. However, it does play a part in Oregon's heightened causation standard. A number of other states have enacted a similar requirement. The list includes Arkansas, Florida, Kentucky, Louisiana, Missouri, Montana, Nebraska, Nevada, North Dakota, and South Dakota. But the provisions do not necessarily all read the same. For example, the South Dakota standard simply states that: " In any proceeding…evidence concerning any injury shall be given greater weight if supported by objective medical findings." S.D. Codified Laws § 62-1-15. That is quite different from the Oregon requirement that compensability must be "established by medical evidence supported by objective findings." ORS § 656.005.

5.1.7 Conclusion

Statutory causation standards vary throughout the nation. This survey provides an overview of different approaches. Four states have a major contributing cause standard—Arkansas, Florida, Oregon and South Dakota. An important component of that standard is to eliminate workers' compensation benefits when the worker has a preexisting condition and employment is not a major contributing cause of the condition complained of. In contrast to the MCC standard, many states choose to reduce benefits rather than bar compensability when a preexisting condition is involved.

This survey shows that a few states use a higher standard than major contributing cause. But the higher standard typically applies to a very narrow group of cases, like mental conditions. Oregon's MCC standard excludes more conditions and disabilities than the standards found in most other states.

5.2 The impact of higher causation standards on the exclusive remedy shield.

5.2.1 Historical perspective

Prior to the introduction of workers' compensation laws employees could sue their employers for personal injuries, but they had to show that the employer was negligent and that they were free from negligence. If they could do that, they could receive as damages almost anything a jury would give. Workers' compensation was a trade off. Workers are compensated regardless of fault but the damages they receive are limited to certain wage replacement benefits, medical care, and in some cases vocational rehabilitation benefits. These workers' compensation benefits are the workers' "exclusive remedy." They cannot file a civil or "tort" action against their employer for personal injury.

In the years since workers' compensation acts were adopted throughout the nation, coverage has gradually been expanded. In 1972, the National Commission on State Workmen's Compensation Laws made a number of recommendations, including: mandatory coverage for all employers; universal coverage for all employees; full coverage for work-related diseases; a minimum set of benefits; and lifetime unlimited medical care.

In response to these recommendations, many states expanded benefits in the 1970's and early 1980's. Then, beginning in the late 1980's, the trend reversed. At that time**,** costs were going up and some employers were having a difficult time obtaining workers' compensation insurance. State legislatures responded by amending workers' compensation statutes in ways that tended to reduce the benefits available and make it more difficult to prove compensability. In some states, a parallel process occurred in the courts, even without legislative action. In recent years this has led to the following question. To the extent that a disability or class of disabilities is excluded from coverage under workers' compensation, does the employer lose the exclusive remedy protection? Stated differently, if the worker is denied a remedy in workers' compensation for certain

conditions, does this imply a restoration of his or her civil remedy? We will discuss here how several states have dealt with this situation.

We received court decisions from all 51 US jurisdictions. Most have not faced this issue. We discuss here the results in those that have.

5.2.2 Oregon

In 1990, the Oregon Legislature raised the bar for compensability. A condition is not compensable unless the employment is the "major contributing" cause. That statutory change was interpreted in ***Errand v. Cascade Steel Rolling Mills, Inc.***, 888 P.2d 544 (Or. 1995).

Mr. Errand had a preexisting condition--chronic infectious paranasal sinusitis--that predisposed him to airway irritation. That preexisting condition became symptomatic in his workplace, a manufacturing plant in which he was exposed to particulate matter. He sought medical treatment and filed a workers' compensation claim. The claim was denied. He appealed.

The referee found that Mr. Errand's work exposure was not the major cause of his chronic infectious paranasal sinusitis and upheld the claim denial. The Workers' Compensation Board agreed. Neither party took any further appeals. Instead, the worker sued his employer.

The employer asked the court to dismiss the lawsuit, arguing that the workers' compensation act was Mr. Errand's exclusive remedy. The trial court agreed with the employer, as did the Court of Appeals. But the Oregon Supreme Court concluded that the Act was only the exclusive remedy for *compensable* injuries and occupational diseases. Because the 1990 Oregon reform made Mr. Errand's condition non-compensable, he was permitted to seek redress outside the workers' compensation act.

The Oregon Legislature responded to ***Errand*** immediately, amending the statute to say that the workers' compensation act is the exclusive remedy for all "injuries, diseases, symptom complexes or similar conditions arising out of and in the course of employment", not just for *compensable* injuries. SB 369; ORS 656.012 and 656.018.

Advocates for workers argued that the new language violated the Oregon Constitution which provides "every man shall have remedy by due course of law for injury done in his person, property, or reputation." OR Const. Art I § 10. In ***Smothers v. Gresham Transfer, Inc.***, 941 P.2d 1065 (Or. Ct. App. 1997), petition for review allowed, 328 Ore. 40 (1998) the Court of Appeals held that the new language passed constitutional muster. The case is now pending before the Oregon Supreme Court.

In the meantime, because the statutory change made in 1995 in response to ***Errand*** was scheduled to sunset on December 31, 2000, and because the Oregon Legislature only meets every other year, the 1999 Legislature once again amended the exclusive remedy provisions. SB 460. That Bill created a new sunset date for the 1995 language--

December 31, 2004. This study was commissioned following that legislation. As part of this study, we have been asked to review the national trends with respect to workers suing their employers in the civil court system as a result of the elimination of a remedy within the workers' compensation system.

5.2.3 New Mexico

The general rule is that, if a particular injury does not come within the basic coverage of the workers' compensation act, the worker can sue the employer. See, 6 A. Larson & L. Larson, *Larson's Workers' Compensation Law*, §100.01 [1] & [4] & 100.04 at 100-2, 100-8, 100-22 (1999). The New Mexico case of ***Coates, et al., v. Wal-Mart Stores, Inc.***, 1999-NMSC-013 is illustrative.

Coates involved numerous incidents of sexual harassment inflicted on two employees by a supervisor. Management was aware of the incidents and did nothing other than finally transferring the supervisor to a different department. Even after the supervisor was convicted of assaulting, kidnapping and raping his girlfriend, his employment was not terminated. He was finally fired because his absence from work violated Wal-Mart's leave policy.

The two employees quit because of the harassment, then sued Wal-Mart, alleging negligent supervision and intentional infliction of emotional distress. Wal-Mart filed a motion for summary judgment, claiming that the workers' compensation act was the exclusive remedy. The District Court denied the motion, the case went to trial, and the jury found in favor of the plaintiffs on both counts. The jury awarded almost $2,000,000.00 in damages, including punitive damages, to the plaintiffs.

On appeal, Wal-Mart argued that the workers' compensation act is the exclusive remedy for *any* personal injury in the workplace. The Court disagreed, saying that a claim falls outside the workers' compensation act if the injuries are not compensable under the Act. The employees had psychological problems as a result of the harassment. In New Mexico, only primary and secondary mental impairments are compensable. Primary mental impairments must be the product of "sudden, emotion-provoking events of a catastrophic nature...as opposed to gradual, progressive stress-inducing causes such as...harassment...over [a] period of time." Secondary mental impairments must be caused by an accidental physical injury.

Because neither of these requirements was met here, the employees did not have compensable workers' compensation injuries and were free to sue their employer in tort.

5.2.4 Montana

In Montana, the Supreme Court reached a similar result in ***Stratemeyer v. Lincoln County*** (***Stratemeyer I***), 855 P.2d 506 (Mont. 1993) and ***Stratemeyer. v. Lincoln County*** (***Stratemeyer II***), 915 P.2d 175 (Mont. 1996).

Gary Stratemeyer had been a deputy sheriff for eight years. On May 4, 1990, he responded to an attempted suicide call. Upon his arrival, he found a 17-year-old girl who had shot herself in the head. Mr. Stratemeyer removed the girl from her father's arms and administered first aid until the ambulance arrived. He escorted the ambulance to the hospital, where he learned that the girl had died. He was then called away to another accident scene.

As a result of this incident, the worker suffered from post traumatic stress disorder. He filed a workers' compensation claim that was denied because the Montana Legislature had eliminated coverage for mental/mental claims in 1993.

In ***Stratemeyer I***, the Montana Supreme Court concluded that, under the 1993 amendment, the worker's injury was not compensable. Mr. Stratemeyer then sued his employer, alleging negligent failure to train, supervise, treat, and debrief him after the incident. The District Court dismissed the lawsuit based in part on the exclusive remedy. The Montana Supreme Court reversed.

Many states' exclusive remedy provisions focus on removing the common law remedy for personal injuries. The Montana exclusive remedy statute has a somewhat different focus. Section 39-71-411, MCA, provides:

For all employments covered under the Workers' Compensation Act ... an employer is not subject to any liability whatever for the death of or personal injury to an employee covered by the Workers' Compensation Act ....

The employer argued that, since the worker's *employment* was covered by the Act, the exclusive remedy provision applied even though the worker's *injury* was not compensable. The worker argued that the injury itself must be compensable before the exclusive remedy provision is triggered. The Court found the employer's argument unpersuasive, stressing that the "quid pro quo between employers and employees is central to the Act; thus, it is axiomatic that there must be some possibility of recovery by the employee for the compromise to hold." ***Stratemeyer II***, 276 Mont. at 75. Because there was no quid pro quo for stress claims, the employer could not benefit from the exclusive remedy shield.

5.2.5 Ohio

In ***Bunger v. Lawson***, 696 N.E.2d 1029 (Oh. 1998), the Ohio Supreme Court reached a similar result. Like Montana, the Ohio statute excludes mental/mental stress claims from coverage. The Worker was working alone at night at a Dairy Mart when she was robbed. As a result, she required treatment for post-traumatic stress. The Industrial Commission denied her workers' compensation claim. She sued her employer, alleging that the robbery and the subsequent psychological injury were due to the employer's negligence. The trial court dismissed the lawsuit, saying that the workers' compensation act was the exclusive remedy.

In reversing the trial court, the Ohio Supreme Court said:

"If a psychological injury is not an injury according to the statutory definition of "injury," then it is not among the class of injuries from which employers are immune from suit. Any other interpretation is nonsensical, and leads to an untenable position that is unfair to employees. The lower court's interpretation would force us to say that for compensation purposes psychological injury is not an injury, but for immunity purposes it is. It is an absurd interpretation that seems borrowed from the pages of Catch-22." ***Bunger v. Lawson***, 696 N.E.2d 1029, 1031 (Oh. 1998).

The court suggested that the Legislature might want to consider including stress claims within the coverage of the workers' compensation act.

5.2.6 Washington

Much the same analysis has been applied in Washington. ***McCarthy v. DSHS***, 759 P.2d 351 (Wash. 1988) is illustrative. When Washington's Industrial Insurance Act was enacted in 1911, it only covered industrial injuries, not occupational diseases. Washington courts therefore routinely held that workers could sue their employers for negligence with respect to occupational diseases that were not covered under the Act.

It was only when the Washington Legislature expanded coverage to include occupational diseases in 1937 that employer immunity was extended to cover occupational diseases. But in the 1980's the Washington courts began to interpret the causation standard for occupational diseases more narrowly. The worker in ***McCarthy*** was not able to satisfy that higher standard.

McCarthy involved an employee at the State Department of Social and Health Services. From 1978 to 1980 she was required to work in an office environment, which exposed her continuously to tobacco smoke. She complained, but her employer did nothing. Eventually, she developed chronic obstructive pulmonary disease (COPD). By 1980, the condition was totally disabling, forcing her to terminate employment.

She filed a workers' compensation claim, which was denied. She appealed to the Board of Industrial Insurance Appeals, which concluded that her condition was not compensable under either an industrial injury or occupational disease theory. No further appeals were taken.

Instead, the worker sued her employer, alleging negligence, based on the employer having breached its duty to provide a working environment reasonably free from tobacco smoke. The trial court dismissed the lawsuit, apparently concluding that workers' compensation was the exclusive remedy. Both the Court of Appeals and Supreme Court disagreed with the trial court.

In an analysis similar to that used by the Montana Supreme Court several years later in ***Stratemeyer***, the Washington Supreme Court said that a worker cannot be barred from suing an employer for negligence at common law unless a substitute remedy has been provided under the workers' compensation act. There must be one remedy or the other.

Otherwise, the employer's end of the bargain that is at the heart of the creation of the workers' compensation system has not been held up.

The Court made the distinction between the situation where the occupational disease does not come within the basic coverage of the workers' compensation act and the situation where the worker has simply failed to prove some element of the claim. In the former instance, the employer loses the protection of the exclusive remedy and the worker may sue the employer in tort. In the latter instance, however, the employer retains the protection of the exclusive remedy even though the worker receives no workers' compensation benefits.

5.2.7 Georgia

Like the ***McCarthy*** case***, Synalloy Corp. v. Newton***, 326 S.E.2d 470 (Ga. 1985) also involved a change in the compensability of occupational diseases. Prior to 1971, the Georgia statute only covered listed diseases. After 1971, it covered both the listed diseases and any disease where the worker could prove all five statutory elements:

(i) A direct causal connection between the conditions under which the work is performed and the disease;
(ii) That the disease followed as a natural incident of exposure by reason of the employment;
(iii) That the disease is not of a character to which the employee may have had substantial exposure outside of the employment;
(iv) That the disease is not an ordinary disease of life to which the general public is exposed;
(v) That the disease must appear to have had its origin in a risk connected with the employment and to have flowed from that source as a natural consequence.
O.C.G.A. § 34-9-280

Additionally, an occupational disease claim is only compensable if there is some showing of a disability. O.C.G.A. § 34-9-281 (b) (1).

The former employees of Synalloy sued the company alleging that the employer had negligently exposed them to a known carcinogen, beta-naphthylamine, and failed to warn them of the dangers of exposure. The employees argued that they could sue in tort because "in no instance have all five of the statutory elements combined to create a compensable claim."

The Georgia Supreme Court disagreed, concluding that the employees' claims came within the coverage of the workers' compensation act. They were not yet compensable, however, because there was no disability. "While workers' compensation is the exclusive remedy of Synalloy's employees, there can be no claim without disability. As no plaintiff yet has become disabled, as required by O.C.G.A. § 34-9-281 (b) (1), none has at this time a workers' compensation claim." ***Synalloy***, 326 S.E.2d at 473.

5.2.8 Kentucky

The Kentucky Supreme Court reached a similar result in ***Shamrock Coal v. Maricle***, 5 S.W.3d 130 (Ky. 1999). In 1996, the Kentucky Legislature amended the workers' compensation act to eliminate benefits for workers who had less than a 20% respiratory impairment as a result of black lung disease. Within 30 days of the passage of that bill, the employer laid off the 19 plaintiffs. All of them would have been entitled to benefits under the prior law but none of them were entitled to benefits under the new law because they did not meet the new threshold respiratory impairment requirement.

They sued the employer, alleging negligence in the mining operations, gross disregard for workers' health, safety, and welfare, intentional violation of safety standards and intentional infliction of emotional distress. The employer sought the protection of the exclusive remedy. The trial court denied the employer's motion to dismiss. The Court of Appeals affirmed. But the Supreme Court reversed, holding that the statute did not violate the constitutional guarantee of a remedy. The Court's analysis echoes that used by the Georgia Supreme Court in ***Synalloy***. Black lung disease as a condition is still compensable under the Kentucky workers' compensation act. The Legislature has merely limited compensability to the situation where the disability rises to a certain level. According to the Kentucky Supreme Court, the Legislature can reduce workers' compensation benefits without depriving employers of the exclusive remedy shield.

5.2.9 Louisiana

Louisiana has provided fertile ground for challenges to the exclusive remedy when an injury or disease does not come within the basic coverage of the workers' compensation act. Louisiana's statute used to cover only listed occupational diseases. Louisiana courts routinely allowed workers to sue their employers if they contracted a non-listed disease.

Even more interesting for our purposes is Louisiana's statutory presumption that a disease contracted during fewer than twelve months of employment is non-occupational. La. R.S. 23:1031.1. A worker can only overcome that presumption by an "overwhelming preponderance of the evidence."

In ***O'Regan v. Preferred Enterprises***, 2000 La. LEXIS 762 the worker was exposed to methoxyethanol when she worked for a dry cleaner for four months. She was later diagnosed with a form of aplastic anemia. She filed a workers' compensation claim, which was denied because she was unable to overcome the statutory presumption.

So the worker sued her employer in tort. Her employer attempted unsuccessfully to raise the exclusive remedy shield. The Louisiana Supreme Court concluded that by establishing the presumption of non-compensability, the Legislature had "withdrawn the quid pro quo between labor and industry for this class of laborers", i.e., those employed for fewer than twelve months. The Court allowed the worker to sue her employer in tort.

There is another issue that has been dealt with in Louisiana that is of interest. In 1990, the Louisiana Legislature increased the level of proof needed for heart-related or perivascular injuries. Louisiana now requires "clear and convincing evidence that: (i)

The physical work stress was extraordinary and unusual in comparison to the stress or exertion experienced by the average employee in that occupation, and (ii) The physical work stress or exertion, and not some other source of stress or preexisting condition, was the predominant and major cause of the heart-related or perivascular injury, illness, or death." La.R.S.23:1021(7)(e). This provision has been interpreted to permit workers to sue their employers in tort.

The workers in ***Ellis v. Normal Life of Louisiana***, 638 So.2d 422 (La. Ct.App. 1994) and ***Hunt v. Womack***, 616 So.2d 759 (La. Ct. App. 1993) both sustained heart attacks at work. Ellis died and her husband filed a wrongful death suit against her employer, contending that stress and understaffing at the group home for retarded adults where his wife worked caused or contributed to her death. Hunt was a carpenter, engaged in the construction of a chemical plant when he suffered his heart attack. He sued his employer for negligent failure to provide a safe workplace, alleging that the extreme heat, lack of breaks, and lack of air circulation caused his heart attack. He argued that his preexisting arteriosclerosis precluded him from recovering workers' compensation benefits. In both cases, the Court of Appeals held that the employers were not entitled to the exclusive remedy shield because of the 1990 legislation.

5.2.10 Conclusion

Recent decisions seem to fall into three categories:

When a condition is specifically removed from basic workers' compensation coverage, like mental/mental claims in Montana and Ohio, state courts have held that the worker is free to sue the employer.

If a worker is unable to meet a threshold causation standard or overcome a presumption of non-compensability, state courts have held that the employer is deprived of the exclusive remedy shield.

So far the only situation in which states have been able to successfully limit compensability and continue to grant the protection of the exclusive remedy has been where a condition must reach a certain level of disability before it becomes compensable. Under those circumstances legislatures have been able to limit workers' compensation benefits without affecting the exclusive remedy. But when they have removed any possibility of recovery under workers' compensation, workers have been held free to seek a remedy outside of the Act.

6 Physicians Survey

The request for proposal for this project included the following request: Survey and report the views of attending and examining physicians as to the level of difficulty, validity and accuracy of their opinions regarding major contributing cause and combined conditions.

After consulting with the Division it was determined that this did not require a sampling that would provide a scientifically valid representation of the views of all Oregon physicians. Rather, it was agreed that the project plan should include a consultation with physicians who were especially knowledgeable about or leaders in medical aspects of workers' compensation in Oregon.

6.1 The Survey

We asked various parties to suggest the names of physicians we should consult. We received suggestions from the Workers' Compensation Division, employers, insurers, attorneys representing employers, attorneys representing workers, and the Oregon Medical Association.

We wrote to thirty-five doctors asking them three questions:

1. Is it reasonable to ask physicians to offer an opinion on whether or not the work was the major contributing cause of a disability?

2. Do you believe that physicians are able to provide such opinions in a manner that is valid, accurate, and consistent?

3. Do you have any other comments on Oregon's use of the "major contributing cause standard" or the way in which Oregon handles combined conditions for the purpose of workers' compensation? We received responses from 11 doctors.

We invited the doctors to respond by writing on a form we provided them, sending us their written comments, or calling us and talking to us on the phone. We received replies in all three formats.

6.2 Summary

A listing of the responses is found below. We would summarize these as follows:

In response to the question: Is it reasonable to ask physicians to offer an opinion on whether or not the work was the major contributing cause of a disability? All respondents agreed that it was but a couple cautioned that the physician must be free from bias (one indicated that treating doctors may tend to have a bias) and that the physicians must do this very carefully after having obtained all pertinent information.

In response to the question: Do you believe that physicians are able to provide such opinions in a manner that is valid, accurate, and consistent? All the respondents answered yes, but several indicated that it is difficult to do and one indicated that in some situations the results seem to be unfair.

When asked for other comments about major contributing cause and the way Oregon handles combined conditions, the responses were generally positive. The physicians pointed out problems with the system but most saw the current situation as an improvement over the past. A few felt that the pendulum had swung too far.

6.3 Listing of responses

Below we list the responses we received from physicians. It was our intention that physicians should respond to us anonymously. Accordingly, we have not identified the individuals who provided the specific responses. We have also listed the responses by question rather than grouping them together by respondent. Most of the physicians responded to the specific questions, some offered more general statements. These are included at the end of the listing below. For the physicians who responded by phone we tended to engage in a more open discussion. We have summarized the views they offered at the end of the listings below.

1. Is it reasonable to ask physicians to offer an opinion on whether or not the work was the major contributing cause of a disability?

- Yes, this is well within the scope of current injury assessment.

- I am not sure the treating physician is able to objectively give an opinion as to MCC. Often, the family practitioner has assumed that role under managed care. Frankly, many just don't know the pathology well enough. Also, the treating doctor may have some bias in favor of the worker. Perhaps an independent panel would be more fair and consistent.

- It is not only reasonable, but an essential responsibility of the evaluating physician.

- I think it is reasonable to ask physicians to offer an opinion on whether or not work was the MCC of a disability when all the information has been gathered. Too often I evaluate a patient on the basis of their history alone, which is clearly not verifiable by me at that time. Subsequent reports may be gathered that support or refute the patient's history. Clearly, the physician should be able to judge whether the magnitude of the event that allegedly caused the injury justifies the current disability in question.

- Yes

- Yes

- Only if the physician has read unbiased investigation reports, i.e. from co-workers, etc. and/or "hypothetical" question responses in court under oath.

2. Do you believe that physicians are able to provide such opinions in a manner that is valid, accurate, and consistent?

- Yes

- I do feel the MCC clause has introduced an unfair element to the system. The 55 year-old who strains his back but has considerable degenerative arthritis in the lumbar spine will often not recover from the back pain, though the reason is probably his pre-existing DJD. DJD is, in all likelihood, not related to occupational exposure. Thus, he is left with a bad back and is cut off from the system. One can visualize many similar scenarios.

- Yes, if they are thorough and completely objective and optimally trained and highly ethical. Reasoning for opinions also important for all parties involved.

- I do believe that physicians are able to provide opinions, at least in an anatomic sense. The main problem stems from non-measurable pain symptoms and how that colors the patient's performance. I believe there is an injustice in measuring only the patient's bending ability in regards to their permanent partial disability in a lumbar disc herniation case, for instance. The limitations the patients experience from pain and fatigue in a previously effected radiculopathy may play a significant role in their performance ability on return to work that is more difficult to measure with the current rating system.

- Yes

- Yes, though some claims are difficult to reach an opinion and different physicians can disagree on this point.

- Yes but only with above information. Treating physician is not able to provide accurate opinions.

3. Do you have any other comments on Oregon's use of the "major contributing cause standard" or the way in which Oregon handles combined conditions for the purpose of workers' compensation?

- It is important to separate disability (time loss) from impairment in these assessments.

- Of course, the real problems began when the lawyers insinuated themselves into the no-fault Workers' Compensation System. But that is another story.

- The attached information (from ACOEM/ABIME course, Advanced Topics in Impairment & Disability Evaluations) provides sound standards/guidelines.

- In regards to Oregon's use of the MCC standard, injuries need to be 51% or more responsible for the patient's condition. I think this is often difficult to judge and is quite subjective on the physician's part, especially if there are outside physical influences as well as work activities and degenerative disc disease that contribute to a patient developing a disc herniation. The fact that a medical problem develops at work is often times an issue that workers' compensation has trouble avoiding some degree of responsibility for, even if it is completely unrelated to that work activity. For instance, I was questioned by an attorney in regards to a man who was quite overweight and had severe COPD, was working for a trucking firm and stopped in the woods to defecate. In the act of trying to bend over and wipe himself while squatting in the woods, he developed a compression fracture in the back, which has subsequently disabled him. Because it happened at work, there is some responsibility there that I still fail to understand. There are certainly inconsistencies and injustices in the system, but I think an effort has been made to reduce the subjective and minimally contributory effects of work activities in some instances, which may be fairer to the employer and avoid abuse by the employee.

- This approach seems to work.

- I think it is a fair way to look at a workers comp claim.

- The treating physicians & psychologists are not in a position to opine.

Physician X

He points out that there are two factors that interfere with doctors making a judgment about issues such as this. If a doctor has a relationship with a patient, and the patient believes that the work caused his or her disability, the doctors tend to want to please the patient. This tends to influence their judgment to find things work-related.

He points out that this varies with time, but right now workers' compensation in Oregon pays above the market for medical procedures. This encourages physicians to find things to be work-related.

He also says that IMEs are influenced by the fact that many physicians do these for a living. Their opinions are sometimes colored by economics.

In response to the first question, he says it is reasonable to ask doctors about this. He thinks they can make reasonable and consistent judgments.

He points out, however, that he thinks the opinions offered are not always accurate.

He describes the situation in which a worker suffers a sprain-strain of his neck. Most workers will recover from a sprain or a strain within three months. When patients do not, physicians tend to say that the disability is now the result of their degenerative disc disease. He believes there is absolutely no evidence to support this. The disk disease was not painful before. It is unlikely that the disk disease is causing the pain now.

He believes that in these cases, the fact is that we simply do not know why these patients continue to have pain. He believes that a lot of them really do continue to have pain, but we have no medical scientific explanation of it.

When, under these circumstances, the physician testifies that it is the result of the degenerative disk disease, the physician is just pleasing the insurance company.

He does believe that the major contributing cause standard is an improvement over the material contributing cause standard. He says that clearly resulted in paying workers' compensation to some cases that did not deserve it.

Physician Y

His view of the system is that hearing officers modify what the legislature intended. He thinks they need a medical advisor or medical panel to advise them.

He points out that people walk the pendulum too far. For years it has been in favor of workers; now it is in favor of insurance companies.

He thinks that major contributing cause is "being used to death" right now. It is like "aggravation" in the past. It creates needs for more IMEs and raises the sophistication needed for examiners.

He complains that every three months, he gets a new bulletin from the division, explaining how to do things. Apparently, a recent bulletin said that no single individual should do no more than three percent of the IMEs. He feels this is unfair because you need to do a certain amount in order to make it worthwhile to keep up with the law.

I asked him if the MCC standard is a reasonable one to assess. He replies he thinks it is but that it has further complicated the whole process. He worries that doctors will drop out of the process.

He complains about delays and determination in payments. He thinks this is related to the removal of penalties in about 1990. He says that as a result of the delay, some good people leave the system, and some other people become more involved in the system. He says that the more of your hunting and fishing buddies you have told about your claim, the more you feel you need to hang on to it.

He says that MCC is a good way to go. It is better than "the low man concept," meaning that you pay anything that "comes in the door." He makes reference to the age issue, but it is not clear what he means.

He reiterates that the system is too complicated and that it discourages some physicians from taking part.

He gives carpal tunnel syndrome as an example. In his view, the good people are denied. The people with weak claims persist for a long time and are eventually paid. He points out that the delay in receiving treatment can result in a worsening condition.

He emphasizes that the surgery takes only eight minutes, and the people should be back to work in one week. He says that these people should be recognized for their problem, treated promptly, and return to work.

He also points out that the delay in making determinations is resulting in a delay in payment to providers and that the group health care, such as Blue Cross, will not make payments in the mean time.

Physician Z

I think it is reasonable to ask physicians to offer opinions, based on the history and physical they have obtained during their evaluation, on whether or not the work was the major contributing cause of disability. I believe the problem occurs when patients give misleading histories or the carrier starts acquiring information that creates doubts in the patient's history. I believe that with appropriate information, physicians can provide opinions that are valid, accurate and consistent. I do feel very strongly that, if physicians are going to be asked to review histories, information other than the one that they have from their original evaluation, then they should be compensated appropriately and generously.

A conflict of interest arises when the patient does not have another insurance and needs to come up with a story that classifies the problem as a Workmen's Compensation issue. The conflict of interest that arises when a doctor involves a substantial amount of time in a patient and then finds that if he or she does not deem it Workmen's Compensation type case then there may not be appropriate remuneration.

This can be fairly well addressed by two approaches. (1) Pay handsomely for opinions regarding major contributing cause. (2) Strive to put a 24-hour health care coverage plan in place that is affordable so that patients will have coverage on way or the other.

I hope this information is helpful. I would very much appreciate the results of your survey.

7 Benefits And Costs

Terry Thomason and John F. Burton, Jr.

7.1 Introduction

The purpose of this study is to determine if several changes in the Oregon workers' compensation statute during the 1990s affected the benefits paid to workers and the costs to employers and to provide estimates of the overall magnitude and distribution of any such effects. This study is based on an analysis of workers' compensation claims involving injuries that occurred between 1986 and 1996 and that resulted in payment of cash benefits. The results of this study should be considered in conjunction with other complementary research being prepared as part of the *Oregon Major Contributing Cause Study* being conducted by the Workers' Compensation Center of Michigan State University.

7.2 Changes In The Oregon Workers' Compensation Statute

The Oregon legislature passed a series of amendments to the workers' compensation statute that made it harder for workers to quality for benefits between 1987 and 1995. These include HB 2271, which increased or clarified the burden of proof on workers in order to qualify for benefits. HB 2271 was enacted in 1987 and was effective for accidents that occurred on January 1, 1988 or later.

The 1990 Oregon legislature enacted SB 1197, which *inter alia* provided that claims were compensable under the Oregon workers' compensation statute only if work was the "major cause" of the permanent disability or need for treatment. This provision is generally referred to as the major contributing cause (MCC) requirement. SB 1197 also required the worker to provide medical evidence based on "objective findings" in order to establish compensability. The statute had an effective date of July 1, 1990 and was made applicable to all cases with accident dates of July 1, 1990 or later as well as cases with prior accident dates that were still active as of July 1, 1990 except for cases then in litigation.

The 1995 Oregon legislature enacted SB 369, which *inter alia* amended the workers' compensation statute to provide further restrictions on claims that involved a "combined condition." This provision was effective June 7, 1995 and applied to accidents occurring on or after that date as well as cases with prior accident dates that were active as of June 7, 1995, including cases in litigation as of that date. Because some of our statistical analysis relies on data in six-month periods, we will treat SB 369 as if the effective date were July 1, 1995.

As described elsewhere in the *Oregon Major Contributing Cause Study*, there were other changes in the Oregon workers' compensation program that also potentially affected the compensability of certain claims during the period of our study. In particular, the SAIF Corporation engaged in an aggressive strategy of denying claims from about mid-1989

until about mid-1992. Because of the importance of the SAIF Corporation in the Oregon workers' compensation market, the denial rates for the entire workers' compensation market was affected.

We will rely on statistical controls to account for the effects of HB 2271 after January 1988 and for the aggressive denial policy of SAIF between mid-1989 to mid-1992. However, our main focus is on the effects of SB 1197 and SB 369, and so we will focus on three time periods in our primary statistical analysis:

(1) January 1986 – June 1990 (Pre SB 1197)

(2) July 1990 – June 1995 (SB 1197 only)

(3) July 1995 – December 1996 (SB 1197 plus SB 369)

In addition, in Sections 7.5 and 7.6 we will provide information on 1997-98 in our analysis of the aggregate effects of SB 1197 and SB 369 on benefits paid to workers and costs to employers.

7.3 A Model Of Benefits Paid To Workers

7.3.1 The Simplest Version of the Model

The essence of our study is three equations pertaining to claims in the Oregon workers' compensation program with accident dates between 1986 and 1996. Two are based on statistical analyses of Oregon claims data and the third is a product of the other two equations.

(1A) Frequency of claims per worker per year = Function of (Control Variables plus Variables Measuring Significant Periods in Oregon Between 1986 and 1996)

(2A) Average benefits per claim = Function of (Control Variables plus Variables Measuring Significant Periods in Oregon Between 1986 and 1996)

(3A) Average benefits per worker per year = (1A) Frequency of claims per worker per year X (2A) Average benefits per claim

7.3.2 An Initial Elaboration of the Model

A complete set of definitions of the dependent variables, control variables, and variables measuring significant periods in Oregon between 1986 and 1996 are included in Appendix D. This section provides an abbreviated presentation of the material.

(1B) Frequency of claims per worker per year

Dependent variable

Frequency. The number of claims paying cash benefits with accident dates in each six-month period between January – June 1987 and July – December 1996 in each Oregon industry divided by the total number employees in the industry during the same six-month period.[20]

Frequency was used as the dependent variable in regressions including these independent variables:

Control Variables include

Benefit Index. The expected workers' compensation benefits per worker in the year of the accident. Expected to have a positive relationship with frequency (i.e., higher benefits are expected to be associated with more claims).

Wages. Weekly wages in year of accident. Expected to have a positive relationship with frequency.

Variables measuring significant periods in Oregon between 1986 and 1996

SAIF Effect. Variable with a value of 1 for each six months period from 7/1/89 to 6/30/92. Expected to have a negative relationship with frequency.

HB 2271 Effect. Variable with a value of 1 for each six months period from 1/1/88 to 12/31/96. Expected to have a negative relationship with frequency.

SB 1197 Effect. Variable with a value of 1 for each six months period from 7/1/90 to 12/31/96. Expected to have a negative relationship with frequency.

SB 369 Effect. Variable with a value of 1 for each six months period from 7/1/95 to 12/31/96. Expected to have a negative relationship with frequency.

(2B) Average benefits per claim

Dependent Variables include[21]

Temporary Total Disability (TTD) Benefits Duration in TTD Case. TTD duration in each compensable claim that paid only TTD benefits.

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[20] For the purpose of this analysis, all disabling claims designated as "closed" (i.e., not open) and "accepted" (i.e., as opposed to denied) with the exception of denied claims that had been resolved with a disputed claims settlement.

[21] For the purpose of the cost analysis, data was restricted to closed, accepted, disabling claims, and open claims that had been resolved with a DCS.

Temporary Total Disability (TTD) Benefits Duration in Permanent Partial Disability (PPD) Case. TTD duration in each compensable claim that paid PPD benefits.

Probability of PPD Case. The proportion of compensable claims that paid PPD benefits.

Severity of Scheduled PPD Case. The number of degrees of scheduled permanent disability in each PPD case.

Severity of Unscheduled PPD Case. The number of degrees of unscheduled permanent disability in each PPD case. For claims in which no unscheduled permanent disability benefits were paid, the number of degrees was set equal to zero.

Medical Benefits. The amount of dollars of medical benefits in each case.

Probability of Vocational Rehabilitation (VR) Benefits. The probability that a claim received VR benefits.

Amount of VR Benefits in VR Benefits Case. The amount of VR benefits in dollars in each VR case.

These dependent variables were used in regressions with the following independent variables:

Control Variables include

Replacement Rate. The claimant's weekly TTD benefit divided by his or her weekly wage. Expected to have a positive relationship with average benefits per claim.

Gender. Variable with a value of 1 if the claimant is a female. Expected to have a negative relationship with average benefits per claim.

Age. Age of claimant at date of injury measured in days. Expected to have a positive relationship with average benefits per claim since older workers typically experience greater wage loss than younger workers.

Hospitalization. Variable with a value of 1 if the claimant was hospitalized. Expected to have a positive relationship with average benefits per claim.

Occupation. Four variables with a value of 1 if worker was employed in a particular occupation. No prior expectation about relationship with average benefits per claim.

Industry. Eleven variables with a value of 1 if worker was employed in a particular industry. No prior expectation about relationship with average benefits per claim.

Body Part Injured. Twenty-one variables with a value of 1 if worker had a particular body part injured No prior expectation about relationship with average benefits per claim.

Variables measuring significant periods in Oregon between 1986 and 1996

The variables measuring significant periods in Oregon between 1986 and 1996 are the same as the variables used in the statistical analysis of frequency.

(3B) Average benefits per worker per year

Claim rates (i.e., the number of indemnity claims per worker per year) were predicted for each of the 1378 industry-year observations in the data set using the results of the regression equation (1B) described in Section 7.3.2 and an average predicted claim rate was calculated for the entire data set. This average predicted claim rate was then multiplied by the average per claim benefit payment that was predicted using the results of the regression equations for (2B described in Section 7.3.2 to produce an average expected benefit payment per worker per year. This can be represented by the following equation:

$$\frac{Benefits}{Worker/Year} \equiv \frac{Claims}{Worker/Year} x \frac{Benefits}{Claim}$$

7.3.3 A Further Elaboration: Model I and Model II

We rely on two variants of regression models when estimating (1B) the frequency of claims per worker per year as well as two variants of regression models estimating (2B) average benefits per year. Consequently, we have four estimates of (3B) average benefits per worker per year, which are based on the results of the regression models for (1B) and (2B).

The difference between the estimates depends on whether an additional control variable is included in the regression equations for (1B) and (2B), namely:

Note on modeling logic. Because many of the industry-half-year period observations had zero claims reported, we used a negative binomial regression procedure where the dependent variable was a count of all claims in the industry-half-year period and the number of employees in that period served as an exposure variable. Since past research (Thomason 1993) indicates that PPD severity and probability are related, we used the two stage Heckman procedure to account for sample selection effects in the estimation of PPD severity. For similar reasons, we used the two-stage Heckman procedure to estimate TTD duration, DCS and vocational rehabilitation costs.

Time trend. In the regressions in which the frequency of claims per worker per year is the dependent variable, the time trend variable has a value of one in the six months period from January 1 –June 30, 1986 and increases by one in each succeeding six months period. In the regressions in which the average benefits per year is the dependent variable, the variable has a value of zero on January 1, 1960 and increases by one in each succeeding day until the date of accident in the individual claim.

Model I does not include time trend variable, which assumes that all changes in Oregon workers' compensation program over time are accounted for by the other independent variables included in the regressions. Model II includes the time trend variable, which assumes that there were changes over time in the Oregon workers' compensation market that were not accounted for by the other independent variables in the regressions. For example, if there was a long-term trend towards a lower claims rate in the Oregon workers' compensation program because of improved concern for safety among Oregon employers, Model I is likely to attribute some of reduction in claims rates due to this general improvement in safety to the effect of the legislative changes. Model II should at least partially control for these secular improvements in safety, so the regression coefficients for the legislative changes should do a better job of isolating the net impact of the legislative changes on the frequency and average cost of claims.

There also can be reasons for a secular increase in claims over time, such as an increased recognition of carpal tunnel syndrome as a cause of disability. Again, Model I could attribute some of that secular increase to the legislative changes, while Model II is more likely to net out the effect of the legislative changes on the frequency and average costs of claims.

The Model II estimates are obviously more conservative than those produced by Model I, in that the Model II estimates control for time-related changes in the claims rates that may be wrongly attributed to the legislation in Model I. On the other hand, it is possible that the some of the effects of the legislation are being captured by the trend variable in Model II. For statistical purposes, we treat SB 1197 as effective on July 1, 1990 and SB 369 as effective on July 1, 1995. However, as previously noted, these laws were retroactive for certain claims with earlier injury dates and thus the trend variable may be absorbing the retroactive effects of the legislation. Further complicating the analysis is the possibility that there are unobserved, time-related effects that have a non-linear impact on claims rates (e.g., employers' safety programs may have grown slowly until 1990 and then rapidly proliferated), in which case Model II may still overestimate the effect of SB 1197 and HB 369. We will consider the plausibility of the Model I and Model II results in our conclusions.

7.4 Empirical Results For Benefits Based On Our Analysis Of Accepted Claims

Additional information on the data set used for our empirical analysis, the specifications of the regressions, and descriptions of the estimating techniques are included in Appendix E.

7.4.1 Changes in Frequency of Claims

Model I for the Total Sample of Claims

Table 7-1 provides information on the predicted frequency of compensated workers' compensation claims in Oregon based on the regressions estimating equation 1B for Model I (that is, without a time trend variable). (The full set of regression coefficients on which the information in the Total row of table 7-1 is based is presented in table APPC.1 in Appendix F). The predicted claim rates for every period and injury type were based on all industry-year observations in the sample, regardless of period. To predict the claims rate for the 1986 – 1989 period, we set the values of SB 1197 and SB 369 significant period variables equal to zero for all observations, leaving the values of other variables in the regression equation unchanged. The regression equation coefficients were then used to predict the average claim rate for the period. Similarly, for the 1991 – 1994 period, we predicted the claims rate using all sample observations, after setting the value of SB 1197 to one and the value of SB 369 to zero. Finally, we predicted the 1996 claims rate after setting the value of both SB 1197 and SB 369 to one for all observations.

The "Total" row in table 7-1 pertains to all disabled claims, without regard to type of injury. For 1986-1989, the average predicted claims rate per year for Oregon workers was 3.7856%. This predicted claims rate took into account the effect of all of the control variables and significant period variables discussed in Section 7.3.2. After July 1, 1990, when SB 1197 became effective, we estimate that the annual claims rate was 17.08% lower than it was in the pre-SB 1197 period. This 17.08% reduction is shown in the 1991-94 column for the total row in Table 7-2 reflecting the effect of SB 1197 during that entire year. In 1990, SB 1197 was in effect for only half the year, and thus the 8.54% reduction is half of the full-year effect (8.54% = 17.08% X 0.5).

After July 1, 1995, when we are treating SB 369 as having become effective, the regressions including the SB 369 significant period variable indicates that the annual claims rate was 10.94% lower than would have been predicted based on all of the other explanatory variables in the regression (including the significant period variable measuring the effect of SB 1197). In essence, we estimate that the average claim rate fell by an additional 10.94 % (relative to its level in 1991-1994). In 1996, when SB 369 and SB 1197 were both in effect for the entire year, the combined effect of these laws was to reduce the annual claims rate by 28.02% below the claims rate in 1986-1989, before either law was enacted. In 1995, SB 369 was in effect for only half the year, and so the 22.55% reduction shown in the total row in table 7-1 is half way between the 17.08% reduction in 1991-94 (when SB 1197 was in effect but not SB 369) and the 28.02% reduction in 1996 (when SB 1197 and SB 369 were both in effect for the entire year.

Model I for Eight Types of Injuries

Table 7-1 also presents information on predicted claims rates for eight specific types of injuries. The sum of the claim rates for the eight types of injuries is the claims rate for the total sample. The results for each type of injury can be interpreted in a manner similar to the interpretation of the results for the total sample. For example, the predicted

claims rate for back strains and sprains was 0.9339% of all workers per year in 1986-1989. The claims rate for backs fell by 19.57% (relative to the 1986 – 1989 level) in 1991-94, when SB 1197 was in effect for the entire year. And in 1996, when SB 1197 and SB 369 were both in effect for the entire year, back claims were 37.56 % below the claims rate during 1986 –1989.

The results for the eight types of injuries can be used to assess the plausibility of the statistical analysis. The effects of SB 1197 and SB 369 could be expected to have a greater effect on certain types of injuries than on others. Specifically, the legislative changes requiring the injury to be the major contributing cause of the disability and for the medical evidence to be based on objective findings could have been expected to have the following effects on the frequency of claims relative to the average reduction in claims for the total sample:

Back Strains & Sprains	Greater than average effect
Other Strains and Sprains	Greater than average effect
Carpal Tunnel Syndrome	Greater than average effect
Musculoskeletal Diseases	Greater than average effect
Trauma Injuries	Less than average effect
Open Wounds	Less than average effect
Other injuries	Not clear
Other diseases	Not clear

Among the four types of injuries for which a greater than average effect was expected, the results in the 1996 column indicate that the decline in claims relative to 1986-89 was greater than the total sample decline of 28.02% for all four of the types. Between the two conditions for which a smaller than average effect was expected, the decline was less than the total sample decline of 28.02%. Thus among all six types of injuries for which declines relative to the total sample average was predicted, the actual decline corresponded to the predictions for all six of the injury types. This is reasonably persuasive evidence to support the plausibility of the model.

Model II for the Total Sample of Claims

Table 7-2 provides information on the frequency of compensated workers' compensation claims in Oregon based on the regressions estimating equation 1B for Model II (that is, including a time trend variable). The full set of regression coefficients on which the information in the Total row of table 7-2 is based is presented in table APPB.2 Appendix E).

The "Total" row in table 7-2 reports the predicted claims rate for all injury types. For 1986-1989, the average predicted claims rate per year for Oregon workers was 3.5046%. This predicted claims rate took into account the time trend variable as well as the effect of all of the control variables and significant period variables discussed in Section 7.3.2. After July 1, 1990, when SB 1197 became effective, the predicted claims rate fell by 7.95 percent relative to the pre-SB 1197 period. This 7.95% reduction is shown in the 1991-94 columns for the total row in table 7-2. In 1990, SB 1197 was in effect for only half the year, and thus the 3.98% reduction is half of the full-year effect (3.98% = 7.95% X 0.5).

After July 1, 1995, when we are treating SB 369 as having become effective, the predicted annual claims rate fell by an additional 3.98% so that the combined effect of both laws was to reduce the claims rate by 11.93% relative to its 1986-1989 level. This is the figure shown in the 1996 column for the total row in table 7-1. In 1995, SB 369 was in effect for only half the year, and so the 9.94% reduction shown in the total row in table 7-2 is half way between the 7.95% reduction in 1991-94 (when SB 1197 was in effect but not SB 369) and the 11.93% reduction in 1996 (when SB 1197 and SB 369 were both in effect for the entire year).

Model II for Eight Types of Injuries

Table 7-2 also presents information on predicted claims rates for eight specific types of injuries in regressions including a control variable for time. The sum of the claim rates for the eight types of injuries is the claims rate for the total sample. The results for each type of injury can be interpreted in a manner similar to the interpretation of the results for the total sample. For example, the predicted claims rate for back strains and sprains was 0.8445% of all workers per year in 1986-1989. Then in 1991-94, when SB 1197 was in effect for the entire year, the claims rates for backs was 7.36% lower than the claims rate for back sprains and strains during the pre-SB 1197 period. And in 1996, when SB 1197 and SB 369 were both in effect for the entire year, back claims were 17.77 % below the claims rate than the predicted rate for the 1986 – 1989 period when neither law was in effect.

The results for the eight types of injuries can be used to assess the plausibility of the statistical analysis. The effects of SB 1197 and SB 369 could be expected to have a greater effect on four types of injuries and a less than average effect on two other types of injuries, as was previously indicated.

The results in table 7-2 found these relationships for five of the six injury types. The exception was for Open Wounds, where we expected SB 369 and SB 1197 to have a smaller effect in reducing the claims rate than they do on the total claims rate, but the evidence indicates that claims for Open Wounds declined 14.51% in 1996 compared to an overall decline of 11.93% in claims for all injury types combined. Despite this exception, we feel the individual injury type results in table 7-1 and table 7-2 support the plausibility of our statistical approach.

Summary of Model I and Model II for Total Sample of Claims

The information in the "Total" rows of table 7-1 and table 7-2 has been transferred to table 7-A in order to provide a convenient summary of the range of estimated effects of SB 1197 on SB 369 on the frequency of claims.

Table 7-A

Oregon claims rates in years shown as percent reduction from estimated claims rates if legislation had not been enacted for total sample of claims:

	1990	1991-94	1995	1996
Model I	8.54%	17.08%	22.55%	28.02%
Model II	3.98%	7.95%	9.94%	11.93%

The Model II results (which are obviously the "most conservative" but not necessarily the most accurate numbers) suggest that the combined effect of SB 1197 and SB 369 was to reduce claims in 1996 by about 12 percent below what they otherwise would have been.

7.4.2 Changes in Average Benefits Per Claim

In this section we discuss our estimates of the effect of SB1197 and SB 369 on the average cost of a claim. These estimates are based on the regression analyses described in Section 7.3. (The full set of regression coefficients on which the information in table 7-3 and table 7-4 is based is presented in Appendix G). Specifically, we use the regression equation estimates and all of the observations in the data set, including those claims that have been resolved with a CDA, to predict the impact of MCC legislation. The impact of the legislation is estimated by varying the values of the two legislative significant period variables for the purpose of predicting each cost component under each legislative regime.[22]

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[22] We did not estimate the impact of SB 1197 or SB 369 on the cost of CDAs as CDAs were not possible under the pre 1197 legislative regime. However, we used data on the characteristics of CDA claims to estimate the expected cost of these claims if they had not been resolved with a CDA, i.e., if the claim had been resolved with a DCS or closed with an award of some type (e.g., TTD or PPD benefits). In other words, we used the regression equation estimates described in Section 7.3 to estimate the value of each of the dependent variables in Section 7.3 for all CDAs. These estimates constituted some of the observations used to yield the cost predictions described in Section 7.5. Essentially, this procedure assumes that no claims are resolved with a CDA, i.e., that all claims are either settled with a DCS or are eventually adjudicated as a TTD or PPD, and that all CDAs were resolved as compensable disabling claims – although not a PTD or fatal claims. As such, we probably overestimate claim costs.

For example, to estimate the probability and amount of a DCS award during the 1986 – 1989 period when neither law is in effect, we set the value of both the SB 1197 and the SB 369 significant period variables to zero and then predicted the DCS probability and amount, using all 304,251 observations in the data set. The values of the control variables remain unchanged for the purpose of predicting the dependent variables. Similarly, to predict DCS probability and amount for the 1991-1994 period, we set the value of the SB1197 significant time variable to one and the value of the SB 369 significant time variable to zero, leaving the values of the other variables unchanged. In other words, the predicted values hold constant all predictors, except the two legislative significant period variables.

As previously indicated, the value of each cost component was estimated using two different regression specifications, the more conservative of which (Model II) included a trend variable (the date of injury) that controls for changes related to time.

Predictions are made for each of the cost components described in Section 7.3: DCS awards, vocational rehabilitation costs, medical benefits, TTD duration, unscheduled PPD severity (in degrees), and scheduled PPD severity (in degrees). The values of the former three variables (DCS awards, VR costs, and medical benefits) were converted to 1996 dollars.

To translate the latter three variables (TTD duration, scheduled and unscheduled PPD severity) into cost figures, it was necessary to multiply the average predicted duration or severity by a per day or per degree benefit. We used the average weekly TTD benefit, the average per degree unscheduled PPD benefit, and the average per degree scheduled PPD benefit in effect during the pre-SB 1197 period. These per day and per degree benefits were held constant over all years in our analysis and were combined with the average predicted duration and severity variables to yield an average cost of cash benefits for each claim type: TTDs and PPDs. (As indicated, the costs of vocational rehabilitation and medical benefits were estimated separately, and DCS claims were treated as a separate category.) We did not attempt to estimate the cost of fatal and PTD claims for two reasons: (1) these claims represent a very small portion of the universe of workers' compensation claims and (2) because they are such a small number of claims, statistical estimates of the impact of the legislation on costs are unreliable.

After estimating the cost of the various claim types and cost components separately (as well as the probability that a particular type of cost would be incurred), we combined these predicted cost component estimates into a single estimate of the average expected cost of a disabling workers' compensation claim under each legislative regime. This average expected cost is per claim is reported in the bottom row of table 7-3 for Model I and in the bottom row of table 7-4 for Model 2.

The Model I results in table 7-3 indicate that the expected total costs per claim in 1996 were $7,572.03, which is 40.47% less than the estimated cost of claims in 1986-89. As expected, smaller declines in expected costs per claim were found in the Model II results in table 7-4. For example, the expected total costs were $$10,826.77 in 1996, which is

only 1.37% less than the predicted costs in 1986-89. A compilation of the declines (or increases) in expected costs per claim for Model I and Model II is presented in table 7-B.

Table 7-B

Model I and Model II results: increases or decreases in Oregon average benefits per claim in years shown as percent of average benefits per claim if legislation had not been enacted.

	1990	1991-94	1995	1996
Model I	-11.42%	-22.05%	-31.34%	-40.47%
Model II	+0.84%	+1.74%	+0.53%	-1.37%

The Model II results suggest that SB 1197 and SB 369 had very little effect on the average cost per claim, which could result from the reduced number of claims being the more serious claims.

7.4.3 Changes in Average Benefits Per Employee

In this section, we report the impact of SB 1197 and SB 369 on the average cost of workers' compensation claims per employee. We obtain these results by multiplying the predicted claims rate for each period (as reported in table 7-1 and table 7-2) by the predicted average cost per claim for each period (as reported in table 7-3 and table 7-4). Since we estimate both claims rate and cost variables using two regression specifications, we have four different estimates of the expected per employee cost of workers' compensation. These are shown in table 7-5.

The range of estimates of the effect of SB 1169 and SB 369 is considerable. Use of Model I results for both frequency and average cost indicate that benefits per worker as of 1996 were 57.15% below what they would have been if the legislation had not been passed. Use of Model II results for both frequency and average cost indicate that benefits per worker as of 1996 were 13.13% below what they would have been if the legislation had not been passed. We return to the plausibility of these estimates in our conclusion in Section 7.9.

7.5 The Effects Of The Statutory Changes On Benefits Received By Oregon Workers

7.5.1 Aggregate Effects

Table 7-6 provides data on the benefit payments by type of insurance arrangements for Oregon workers from 1986-1998 based on data published by the Social Security Administration (SSA) or the National Academy of Social Insurance (NASI). The benefits include medical and cash benefits actually paid in the years shown and are in current dollars. Although there are year-to-year fluctuations around the trends, in

general, total benefits increased from $452 million in 1986 to a peak of $587 million in 1991, then declined to $463 million in 1995, and then increased to $493 million in 1998.

Table 7-6 also provides information on the dollar amounts and shares of benefit payments accounted for by the three primary insurance arrangements in Oregon. The State Fund (SAIF) accounted for the largest share of benefit payments in most years from 1986 to 1991, but then SAIF's share dropped to about one-third of the benefit from 1992 to 1998. Private carriers accounted for about 40 percent of Oregon benefits from 1986 to 1991, and accounted for about half of all benefit from 1992 to 1998. Self-insuring employers accounted for about 15 percent of benefit payments in Oregon throughout most of the 1986 to 1998 period, although the share declined somewhat in recent years (probably reflecting the aggressive pricing by private carriers since the mid-1990s.

Table 7-7 uses the information from table 7-6 on total benefits by year in combination with the information from table 7-5 on the effects of SB 1197 and SB 369 to estimate the dollar amounts of the reductions in benefits paid to Oregon workers as a result of these laws. Panel A of table 7-7 presents estimates based on the results in table 7-5 suggesting that the largest effect of the legislation, namely the Model I estimates of the effects of the laws on frequency and the Model I estimates of the effects of the laws on average cost. Column (1) in Panel A reports the actual benefits paid to Oregon workers in each year, as already shown in table 7-6. In 1990, for example, Oregon workers were paid $573 million in cash and medical benefits. Column (2) in Panel A provides the Model I/ Model I results from table 7-5. In 1990, the estimated effect was to reduce benefits paid to Oregon workers by 18.99%. By 1996, the results in table 7-5 indicate that the combined effects of SB 1197 and SB 369 was to reduce benefits paid to Oregon workers by 57.15 percent. Since these laws remained in effect after 1996, we assume that benefits were also reduced by 57.15 percent in 1997 and 1998.

Column (3) of Panel A of table 7-7 uses the information from columns (1) and (2) to estimate the benefits that Oregon workers would have received in the laws had not been enacted. In 1990, we estimate that Oregon workers would have received $707 million in benefits had SB 1197 not been in effect. Column (4) shows the estimates of the reduction in benefits paid to Oregon workers as a result of the laws. In 1990, we estimate that benefits paid to Oregon workers were reduced by $134 million as a result of the legislation. Finally, column (5) shows the cumulative reduction in benefits paid to Oregon workers as a result of SB 1197 (and to SB 369 after 1995). The cumulative amount of reduction of benefits was $134 million in 1990 and reached $3.595 billion by 1998.

Panel B of table 7-7 presents estimates based on the results in table 7-5 suggesting the smallest effect of SB 1197 and SB 369, namely the Model II estimates of the effects of the laws on frequency and the Model II estimates of the effects of the laws on average costs. The Model II / Model II effects are shown in column (2) of Panel B of table 7-7. The balance of Panel B uses these estimates effects to calculate the reduction in benefits paid to Oregon workers resulting from the legislation using the same process previously discussed for Panel A. The Panel B data suggest that SB 1197 and SB 369 reduced

benefits paid to Oregon workers by $19 million in 1990, and that the cumulative effect of the legislation was to reduce benefits by $425 million between 1990 and 1998.

The estimated reductions in benefits paid to Oregon workers between 1990 and 1998 as a result of SB 1197 and SB 369 thus range from about $425 million to about $3.6 billion, depending on which Models are used to produce the estimates. We will examine the plausibility of these estimates in the concluding section of our study.

7.5.2 Disaggregated Effects

To obtain a better understanding of the impact of SB 1197 and SB 369 on specific claimant groups, we disaggregated predicted claims rates and per claim costs by claimant age, gender, and occupation under each legislative regime using a similar methodology as was used to generate the aggregate estimates presented in table 7-7, table 7-8, and table 7-9. We then combined the average claim rate and per claim benefit costs predictions to produce estimates of the predicted benefit costs per employee, once again using a methodology similar to that used to produce the aggregate estimates reported in table 7-5.

The results of this analysis are reported in tables 7-8, 7-9, and 7-10. Once again, these tables present four different estimates. Model I estimates do not include a trend variable, while Model II estimates do.

Age

Table 7-8 shows predicted benefit costs per employee for five age categories. As might be expected, the per claim benefit costs rise significantly between the first (aged 25 or less) and second (ages 25-34) categories and between the third (ages 35-44) and fourth categories (ages 45-54), and then fall between the fourth and fifth (aged 55 and older) categories. The two increases in benefit costs are primarily due to increases in the per claim costs, an expected result since older claimants recover more slowly from the effects of injury than do younger claimants. The fall in benefits is primarily due to a reduction in the probability of injury.

Interestingly, the effect of SB 1197 and SB 369 on different age categories depends on the specification used to predict claim costs and rates. When models that do not control for trend are employed, there is little difference in the effect of MCC across age categories. However, when the predictions are generated by models that control for trend, then it is clear that SB 1197 and SB 369 had a much greater impact on middle-aged claimants (particularly those aged 45 to 54) than on either older or younger claimants.

Gender

The results of our analyses disaggregated by gender are presented in table 7-9. These results show that benefit costs for male claimants is substantially greater than those for female claimants. This is almost entirely due to differences in claim frequency. The results in this table also show that there is very little difference between the genders with respect to the impact of SB 1197 and SB 369.

Occupation

The results of our analyses disaggregated by occupation are presented in table 7-10. These results show that there are substantial differences among occupation in the predicted cost of benefits per employee. Benefit costs for clerical, sales, and office support occupations and for professional, managerial, and technical occupations are much less than those for skilled, non-service, blue-collar jobs and for operators, fabricators and laborers. These differences are primarily due to differences among these occupational categories with respect to the claims rate.

As was the case for the disaggregated age effects, the differential estimated impact of SB 1197 and SB 369 on per employee costs by occupational category varies substantially across Models. When the estimates fail to control for trend in the rate regressions (Model I), there is little difference among occupational categories. However, when the specification controls for trend (Model II), it appears that the Oregon legislation had a substantially greater effect on claims by managerial, professional, and technical employees than on other occupational categories.

7.6 The Effects Of The Statutory Changes On Costs For Oregon Employers

We make the assumption for this analysis that the provisions of SB 1197 and SB 369 did not have an independent effect on the spread between benefits paid and insurance premiums. We therefore project that a 10 percent decrease in benefit paid to workers will result in a 10 percent decrease in insurance costs to employers. We recognize that spread between benefits paid to workers and costs to employers varies over time and is affected by certain types of legislative and regulatory changes. In particular, the nature of regulations of the private insurance market can affect the costs of workers' compensation insurance, which is a subject we examine in a forthcoming book (Thomason, Schmidle, and Burton 2000). However, we are unaware of any reason for the spread to be affected by the legislative changes that are the focus of this study.

Although we assume that SB 1197 and SB 369 have equal percentage effects on benefits and costs, we have relied on completely separate sources of information for data on the aggregate workers' compensation benefit payments to Oregon workers and for data on the employers' costs of workers' compensation. As a result, the aggregate dollar amounts of the effects of the Oregon legislation can be much different for benefits than for costs.

7.6.1 Aggregate Effects

Table 7-11 provides our estimates of the employers' costs of workers' compensation in Oregon from 1986 to 1998. Column (1) of table 7-11 contains data on the Net (Direct) Earned Premium for Oregon as reported in various issues of the NCCI *Annual Statistical Bulletin.* The premiums include the calendar year experience of SAIF as well as private carriers. Net premium reflects the impact of rate departures, experience rating, schedule rating, retrospective rating, and premium discounts. Net premium does not, however, reflect the dividends paid to Oregon employers. Column (2) of table 7-11 contains the

dividend ratio, which is the percentage of net earned premium returned to employers as dividends. As the data indicate, the dividends paid to Oregon employers varied considerably over the period form 1986 to 1998. Column (3) shows the Net Costs for Employers Purchasing Insurance after taking into account the effects of dividends.

Column (4) of table 7-11 indicates the amount of workers' compensation benefits paid by self-insuring employers as reported by SSA/NASI and shown in table 7-11 An estimate of costs for self-insurers was constructed by using self-insurers benefit payments with a loading for administration expenses. We have adopted the procedure used by the NASI in recent years, which assumes that administrative costs for self-insuring employers are equivalent to 11 percent of benefit payments. We use that procedure to calculate the costs of workers' compensation for self-insuring employers for Oregon employers, which means that the costs in column (5) of table 7-11 are 111% of the benefits paid by self-insuring employers shown in column (4) of the table.

The total costs of workers' compensation for Oregon employers are shown in column (6) of table 7.11, which is sum of the net costs for employers purchasing insurance in column (3) and the self-insurers' costs in column (5). We estimate that Oregon employers' costs of the workers' compensation program were $560 million in 1986. These costs increased to a peak of $796 million in 1990, and then declined in almost every year until reaching $494 million in 1998.

Table 7-12 uses the information from table 7.11 on total employer costs by year in combination with the information from table 7-5 on the effects of SB 1197 and SB 369 to estimate the dollar amounts of the reductions in workers' compensation costs paid by Oregon employers as a result of these laws. Panel A of table 7-12 presents estimates based on the results in table 7-5 suggesting the largest effect of the legislation, namely the Model I estimates of the effects of the laws on frequency and the Model I estimates of the effects of the laws on average cost. Column (1) in Panel A of table 7-12 reports the workers' compensation costs paid by Oregon employers in each year, as already shown in table 7-11. In 1990, for example, Oregon employers expended $796 million on workers' compensation. Column (2) in Panel A contains the Model I/ Model I results from table 7-5. In 1990, the estimated effect was to reduce costs for Oregon employers by 18.99%. By 1996, the results in table 7-5 indicate that the combined effect of SB 1197 and SB 369 was to reduce employers' costs in Oregon by 57.15 percent. Since these laws remained in effect after 1996, we assume that costs were also reduced by 57.15 percent in 1997 and 1998.

Column (3) of Panel A of table 7-12 uses the information from columns (1) and (2) to estimate the costs that Oregon workers would have experienced if the laws had not been enacted. In 1990, we estimate that Oregon employers would have expended $982 million on workers' compensation had SB 1197 not been in effect. Column (4) shows the estimates of the reduction in costs for Oregon workers as a result of the laws. In 1990, we estimate that costs for Oregon employers were reduced by $187 million as a result of the legislation. Finally, column (5) shows the cumulative reduction in costs for Oregon employers as a result of SB 1197 (and after 1995, also due to SB 369). The cumulative

amount of reduction of costs was $187 million in 1990 and reached $4.401 billion by 1998.

Panel B of table 7-12 presents estimates based on the results in table 7-5 suggesting the smallest effect of SB 1197 and SB 369, namely the Model II estimates of the effects of the laws on frequency and the Model II estimates of the effects of the laws on average costs. The Model II / Model II effects are shown in column (2) of Panel B of table 7-7. The balance of Panel B uses these effects to estimate the reduction in costs for Oregon employers resulting from the legislation using the same process previously discussed for Panel A. The Panel B data suggest that SB 1197 and SB 369 reduced costs for Oregon employers by $26 million in 1990, and that the cumulative effect of the legislation was to reduce costs by $522 million between 1990 and 1998.

The estimated reductions in the costs of workers' compensation for Oregon employers between 1990 and 1998 as a result of SB 1197 and SB 369 thus range from about $522 million to about $4.4 billion, depending on which Models are relied upon to produce the estimates. We will examine the plausibility of these estimates in the concluding section of our study.

7.6.2 Disaggregated Effects

As was the case for age, gender, and occupation (see Section 7.4.2), we also examined the predicted costs of claims by industrial sector. The results of these analyses are presented in table 7-13, which presents the per employee costs of benefits for six industrial classifications. As can be seen, the data suggest that the per employee benefit costs vary substantially among industries, primarily due to differences in claim rates.

As was true for both age and occupation, the results indicate that the estimated impact of SB 1197 and SB 369 depends on the regression specifications used to generate the estimates and that predictions generated from Models that control for trend in the claims rate regression exhibit greater inter-industry variability than predictions generated from other models. Specifically, the Model II-Model II estimates suggest that the combined effect of SB 1197 and SB 369 was greater in manufacturing and in transportation, communication, and utilities than in other industrial sectors.

7.7 Workers' Compensation Cash Benefits Paid To Workers In Oregon Compared To Other Jurisdictions

7.7.1 Cash Benefits Paid per 100,000 Workers

Data are available from a forthcoming article by Burton and Blum (2000) on the dollar amounts of benefits paid per 100,000 workers in Oregon as well as nationally (44-jurisdictions). The data are available for 1985 to 1996 and will be presented for three measures of benefits: cash benefits, medical benefits, and total (cash plus medical) benefits. The analysis here is confined to an analysis of the payments for cash benefits, since other factors than the legislative changes in SB 1197 and SB 369, such as the

effectiveness or lack thereof of managed care, have probably affected the payments for medical benefits.[23]

The data in column (1) of table 7-14 show that the national average of cash benefits per 100,000 workers increased from $19.9 million in 1985 to $31.8 million in 1990; then rapidly declined until 1995 when the cash benefit payments were $20.0 million per 100,000 workers; and then increased slightly in 1996 to $20.2 million per 100,000 workers. The Oregon cash benefits, shown in column (3), were $40.5 million per 100,000 workers in 1985. As shown in column (5) this Oregon figure was 202.3% of the national average. Oregon payments increased between 1985 and 1987 but at a slower rate of growth than the national average, so by 1987 Oregon cash benefits were 187.7% of the national average. From 1988 to 1996, as shown in column (4), Oregon cash benefits per 100,000 workers dropped every year but 1992 (when there was a slight increase). Moreover, between 1988 and 1996, the drop in cash benefits was faster in Oregon than nationally in every year but 1992. As a result of the relatively steep drop in the state's payments, Oregon's cash benefits per 100,000 workers dropped (in an irregular pattern) from 187.0% of the national average in 1987 to 80.6% of the national average in 1996.

Another way to demonstrate the rapid decline in payment of cash benefits per 100,000 workers Oregon is to contrast the payments of $16.3 million per 100 workers in 1996 (the year with the lowest payments) with the payments of $43.3 million per 100,000 workers in 1987 (the peak year). Between 1987 and 1996, cash benefits paid per 100,000 workers declined by over 61 percent in Oregon.

7.7.2 Permanent Partial Disability Benefits

The type of cash benefit that appears to have been particularly affected by legislative changes in the Oregon workers' compensation program in the 1980s and 1990s is permanent partial disability (PPD) benefits.

Table 7-15 provides information on the frequency, average cost per case, and total cost per 100,000 workers of cash benefits for permanent partial disability cases. Panel A is taken from an article by Burton (1997), which presents information for 45 states for policy year 1985-86 to 1992-93. Column (1) shows that the frequency of permanent partial cases per 100,000 workers in Oregon peaked at a high of 1,749 per year in 1987-88 and then declined every year to a low of 1,226 in 1992-93. As shown in column (2), Oregon had 245.2% as many PPD cases as the national average in 1987-88, but only had 154.4% as many as the national average in 1992-93.

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[23] The data on medical costs per 100,000 workers in Oregon suggest that the state's costs increased from 98.6% of the national average in 1991 to 193.4% of the national average in 1996. This apparently rapid deterioration of the relative costs of medical benefits in Oregon seems implausible, but worthy of a separate study.

The average cost of cash benefits per PPD case in Oregon varied from a high of $20,160 in policy period 1986-87 to a low of $16,442 in 1991-92, as shown in column (3) of Panel A of table 7-15. During the policy years encompassed by Panel A (namely 1985-86 to 1992-93), the average cost per PPD case in Oregon was consistently below the national average, as shown in column (4). In 1992-93, the Oregon's average PPD cash benefit was 72.2% of the national average.

The total cost of PPD benefits per 100,000 workers (which is the product of the frequency per 100,00 cases and the average cost per case) for Oregon in shown in column (5) of table 7-15. The highest cost was in 1987-88, when PPD cash benefits were $34.8 million per 100,000 workers (which was 192.5% of the national average that year). In 1992-93, the total cost of PPD benefits per 100,000 workers in Oregon was $23.3 million, which was 123.8% of the national average.

The data in Panel A of table 7-15 were from an article that had allocated each state's policy year to tables with corresponding policy years for the other states. The data in Panel B of table 7-15 are roughly comparable. The data are from successive issues of the *Annual Statistical Bulletins* (*ASB)* published by the NCCI. Each *ASB* contains state data from different policy years, which to some degree limits the validity of the comparisons in Panel B. However, the comparisons should be reasonably accurate for our purposes, especially since the Oregon data would not be affected by a more refined analysis.

The frequency of PPD cases in Oregon declined rapidly between 1993 and 1996, as shown in column (1) of Panel B of table 7-15. Indeed the rate of 700 claims per 100,000 workers in 1996 was over 38% below the 1,135 claims per 100,000 in 1993 (and was down more than half from the claims rate in the 1980s as shown in Panel A). Despite the decline in the absolute number of PPD claims per 100,000 workers in Oregon between 1993 and 1996, the frequency appears to be at least 50% higher than the national average in each year in that interval.

The average cost per PPD claim in policy years 1993 to 1996 in Oregon fluctuated around $15,000 (table 7-15, Panel B, column (3)), which was about 60 to 70% of the national average for corresponding years (column (4)). The total costs of PPD cases per 100,000 workers in Oregon (column (5) continued to decline during the 1993 to 1996 period, and was only 103.7% of the national average in 1996.

The combined results of Panels A and B of table 7-15 indicate that the frequency of PPD cases in Oregon dropped from rates that were over 200% of the national average in policy periods 1985-86 to 1987-88 to rates that were about 60% to 70% above the average in policy years 1993 to 1996. Concurrently, the average cost of a PPD case in Oregon dropped from about 80% of the national average in policy periods 1985-86 to 1986-87 to an average of about 60% to 70% of the national average from policy period 1987-88 through policy period 1996. As a result of these declines in frequency and average costs relative to other states, the total costs of cash benefits per 100,000 workers in Oregon dropped from roughly 200% of the national average in policy periods 1985-86 to 1987-88 to only slightly more than 100% of the national average in policy years 1995-96.

7.8 The Costs Of Workers' Compensation Insurance In Oregon Compared To Other Jurisdictions

The costs of workers' compensation insurance for Oregon employers can be compared to the insurance rates in other jurisdictions in order to provide further information on the state's program.

7.8.1 1975-95 Comparisons Based on Upjohn Institute Study

We have calculated the average employers' costs of workers' compensation insurance for 71 insurance classifications for (47) jurisdictions (including the District of Columbia) for the rates in effect on January 1 of each year between 1975 to 1995. (The methodology and results are presented in Thomason, Schmidle, and Burton (forthcoming 2000). One of our measures of costs is "adjusted manual rates," which is a measure that begins with manual rates (or pure premiums) and takes into account the modifying effects of factors such as premium discounts, experience rating, schedule rating, and dividends. The results for the U.S, Oregon, and the contiguous states to Oregon (namely California, Idaho, and Washington) are presented in table 7-16 and Figure VIII.A.1.

The data in table 7-16 indicate that Oregon employers were paying $1.666 per $100 of payroll for workers' compensation insurance in 1975, which can be restated as Oregon employers paying workers' compensation insurance premiums equal to 1.666% of payroll on workers' compensation premiums in 1975. Oregon insurance rates increased until 1978 (when they represented 2.801% of payroll), then declined until 1983 (when rates were 1.544% of payroll), then generally increased with some temporary declines until 1991, when Oregon employers were expending 3.023 percent of payroll on workers' compensation premiums. Subsequent to 1991, the insurance rates paid by Oregon employers rapidly declined, until they reached a low of 2.275 percent of payroll in 1995.

The data in table 7-16 and the comparisons in Figure VIII.A.1 indicate that from 1975 to 1990, Oregon's insurance rates were always higher than the national average and after from 1984 to 1991 were always higher than the average for the contiguous states. After the end of those periods of higher than average rates, however, Oregon's insurance rates were consistently lower than insurance rates among contiguous states and the national average. In 1995, the final year included in table 7-16, the insurance premiums for the Oregon employers in the 71 insurance classification averaged 2.275% of payroll, compared to the national average of premiums representing 2.973% of payroll. Restated, the cost of workers' compensation insurance in Oregon in 1995 was 76.52% of the national average.

7.8.2 1995-99 Comparisons Based on Projections

We do not have data on the employers' costs of workers' compensation insurance after 1995 using the methodology in our Upjohn Institute study. In order to provide a rough idea of what has happened to insurance rates in Oregon and nationally after 1995, we have relied on data from the 2000 edition of the *Annual Statistical Bulletin (ASB)* published by the NCCI.

Table 7-17 provides our calculations of developments through December 1999, the latest date with data available for national developments from the 2000 edition of the *ASB*. The January 1995 figures for the percentage of payroll expended on workers' compensation insurance in the U.S. and in Oregon are shown in the first row of the table. The data in columns (2) and (4) on changes in insurance rates during the years 1995 to 1999 are taken from the 2000 edition of the *ASB*. We have used these data on changes in insurance rates to project the adjusted manual rates in the U.S. and Oregon shown in the December 1995 through December 1999 entries in columns (1) and (3) in table 7-17. The data indicate that between January 1995 and December 1999 adjusted manual rates declined by 20.5% nationally and by 29.4% in Oregon. As a consequence, Oregon's workers' compensation insurance costs for employers dropped from 76.5% of the national average to 68.0% in 1999.

The employers' costs of workers' compensation insurance in Oregon relative to the national average of costs can be followed over an extended period (from 1975 to 1999) by linking the results in tables 7-16 and 7-17. During the time periods of greatest interest to the present study, Oregon's costs of insurance were about 140% of the national average in 1985-87, declined quickly to about 110% of the national average by 1990, continued a rapid decline until 1993, when Oregon's costs had dropped to about 70% of the national average, and then Oregon's costs fluctuated between about 70% to 80% of the national average between 1994 and 1999.

7.9 Conclusions

There is considerable evidence that the statutory changes in the workers' compensation statute in Oregon since the mid-1980s have significantly reduced payment to workers and reduced costs to employers. There is a considerable range of estimates in our analysis of the effects of the statutory changes on the frequency and average costs per claim of compensated claims as summarized in table 7-5. The statistical results that do not control for time trends (Model I – Model I) suggest that benefits were 57% lower in 1996 than they would have been in the absence of the enactment of SB 1197 and SB 369. The statistical results that control for time trends (Model II – Model II) suggest that benefits were 13% lower in 1996 than they would have been if the two statutes had not been enacted.

Data from other sources indicate that cash benefits paid to Oregon workers declined much more rapidly in Oregon than in most states after the late 1980s. As shown in table 7-14, cash benefits in Oregon per 100,000 workers dropped from about 200% of the national average in 1985 to about 115% of the national average in 1990 to about 80% of the national average in 1996. Permanent partial disability benefits paid to Oregon workers followed a similar pattern: as shown in table 7-15, PPD benefits per 100,000 workers dropped from about 200% of the national average in the mid-1980s to about 120% of the national average in the late 1980s to about 100% of the national average in the mid-1990s.

The data on the employers' costs of workers' compensation insurance presented in the previous section present a pattern similar to those for benefit payments per 100,000

workers. Costs dropped quickly from the mid-1980s until 1990, when they were about 110% of the national average, and then declined further at a rapid pace until 1993, when Oregon's costs were about 70% of the national average, and thereafter fluctuated between 70% and 80% of the national average for the balance of the 1990s.

The data on benefits paid per 100,000 workers and on the employers' costs of workers compensation suggest that much of the declines in benefits and in costs took place prior to 1990, and (except for those claims that were affected by the retroactive provisions of the legislation) SB 1197 and SB 369 can not be responsible for those declines since they took place before the legislation was in effect. However, there were also substantial declines in the payments of cash benefits and employer costs that occurred after 1990, in both cases amounting to a decline of about 30% to 40% relative to the national average by 1998.

This suggests that the Model II – Model II estimates presented in Section 7.4 – that Oregon benefits in the mid-1990s were about 13% below what they would have been if SB 1197 and SB 369 had not been enacted -- are conservative estimates of the effects of these laws on the benefits paid to Oregon workers and on the costs of the workers' compensation program for Oregon employers. On the other hand, the Model I – Model I estimates presented in Section 7.4 – which suggest that Oregon benefits in the mid-1990s were more than 50% below what they would have been if SB 1197 and SB 369 had not been enacted – are implausibly large. Our judgment based on the evidence we have developed is that by the mid-1990s the Oregon legislation had reduced costs and benefits by about 20% to 25% below what the amounts would have been if SB 1197 and SB 369 had not been enacted.

7.10 Tables to section 7

Table 7-1
Predicted Claim Rates Not Controlling for Trend, By Type of Injury and Period, 1986-1996

Type of Injury	1986 - 1989	1990	1991-1994	1995	1996
Back Strains & Sprains	0.9339%	0.8425%	0.7512%	0.6672%	0.5832%
		-9.78%	-19.57%	-28.56%	-37.56%
Other Strains & Sprains	1.0302%	0.9488%	0.8673%	0.7726%	0.6778%
		-7.91%	-15.81%	-25.01%	-34.21%
Trauma Injuries	0.5560%	0.5260%	0.4961%	0.5211%	0.5461%
		-5.39%	-10.77%	-6.27%	-1.78%
Open Wounds	0.3020%	0.2795%	0.2570%	0.2447%	0.2324%
		-7.45%	-14.89%	-18.97%	-23.06%
Other Injuries	0.3413%	0.3185%	0.2956%	0.2768%	0.2579%
		-6.69%	-13.39%	-18.92%	-24.45%
Carpal Tunnel Syndrome	0.1295%	0.1195%	0.1096%	0.0907%	0.0718%
		-7.69%	-15.38%	-29.98%	-44.58%
Musculo Skeletal Disases	0.1463%	0.1306%	0.1149%	0.1084%	0.1020%
		-10.74%	-21.48%	-25.89%	-30.31%
All Other Diseases	0.3229%	0.2713%	0.2196%	0.2341%	0.2487%
		-16.00%	-32.00%	-27.50%	-22.99%
Total	3.7856%	3.4624%	3.1391%	2.9321%	2.7251%
		-8.54%	-17.08%	-22.55%	-28.02%

Table 7-2
Predicted Claim Rates Controlling for Trend, By Type of Injury and Period, 1986-1996

Type of Injury	1986 - 1989	1990	1991-1994	1995	1996
Back Strains & Sprains	0.8445%	0.8134%	0.7824%	0.7384%	0.6944%
		-3.68%	-7.36%	-12.57%	-17.77%
Other Strains & Sprains	0.9677%	0.9274%	0.8872%	0.8188%	0.7505%
		-4.16%	-8.32%	-15.38%	-22.45%
Trauma Injuries	0.5293%	0.5167%	0.5041%	0.5469%	0.5897%
		-2.37%	-4.74%	3.34%	11.42%
Open Wounds	0.2907%	0.2759%	0.2610%	0.2548%	0.2485%
		-5.10%	-10.19%	-12.35%	-14.51%
Other Injuries	0.3105%	0.3099%	0.3093%	0.3090%	0.3088%
		-0.19%	-0.38%	-0.47%	-0.56%
Carpal Tunnel Syndrome	0.1256%	0.1180%	0.1104%	0.0927%	0.0749%
		-6.04%	-12.07%	-26.20%	-40.33%
Musculo Skeletal Disases	0.1461%	0.1305%	0.1149%	0.1085%	0.1021%
		-10.68%	-21.37%	-25.75%	-30.13%
All Other Diseases	0.2868%	0.2590%	0.2313%	0.2695%	0.3077%
		-9.68%	-19.35%	-6.04%	7.28%
Total	3.5046%	3.3653%	3.2259%	3.1563%	3.0866%
		-3.98%	-7.95%	-9.94%	-11.93%

Table 7-3
Predicted Benefits Per Claim Not Controlling for Trend, By Component and Period, 1986 - 1996

	1986 - 1989	1990	1991 - 1994	1995	1996
DCS Settlements					
(1) Probability of DCS Claim	5.38%	5.08%	4.78%	4.49%	4.21%
(2) Average award per DCS claim	$6,983.84	$5,699.18	$4,414.51	$3,720.16	$3,025.80
(3) Expected benefit per claim (All Claims)	$375.39	$289.41	$211.07	$167.17	$127.27
Medical Benefits					
(1) Probability of Non-DCS claim	94.62%	94.92%	95.22%	95.51%	95.79%
(2) Probability of Medical Benefits (Non-DCS Claims)	100.00%	100.00%	100.00%	100.00%	100.00%
(2) Average medical benefits per claim (Non-DCS Claims)	$7,175.89	$6,453.37	$5,730.86	$5,123.33	$4,515.81
(3) Expected benefit per claim (All Claims)	$6,790.18	$6,125.66	$5,456.85	$4,893.11	$4,325.87
Vocational Rehabilitation					
(1) Probability of Non-DCS claim	94.62%	94.92%	95.22%	95.51%	95.79%
(2) Probability of Vocational Rehabilitation (Non-DCS Claims)	4.81%	3.96%	3.11%	2.29%	1.47%
(3) Average vocational award benefits	$41,463.74	$39,590.72	$37,717.69	$34,439.76	31161.82
(4) Expected benefit per claim (Non-DCS claims)	$1,993.75	$1,567.42	$1,231.15	$862.78	$504.61
(5) Expected benefit per claim (All claims)	$1,886.59	$1,487.82	$1,172.29	$824.01	$483.39
Temporary Total Disability Claims					
(1) Probability of Non-DCS claim	94.62%	94.92%	95.22%	95.51%	95.79%
(2) Probability of TTD claim (Non-DCS Claims)	68.86%	70.16%	71.46%	72.70%	73.94%
(3) Average duration (TTD claims)	23.65	23.28	22.90	22.56	22.21
(4) Expected duration (Non-DCS claims)	16.29	16.33	16.37	16.40	16.42
(5) Benefit per day	$44.06	$44.06	$44.06	$44.06	$44.06
(6) Expected benefit per claim (Non-DCS claims)	$717.63	$719.58	$721.10	$722.52	$723.57
(7) Expected benefit per claim (All claims)	$679.06	$683.04	$686.62	$690.06	$693.14
Permanent Partial Disability Claims					
TTD Benefits					
(1) Probability of Non-DCS claim	94.62%	94.92%	95.22%	95.51%	95.79%
(2) Probability of PPD claim (Non-DCS Claims)	30.90%	29.61%	28.33%	27.12%	25.92%
(3) Average TTD duration (PPD claims)	130.58	121.40	112.23	106.19	100.15
(4) Expected duration (Non-DCS claims)	40.34	35.95	31.79	28.80	25.96
(5) Benefit per day	$44.06	$44.06	$44.06	$44.06	$44.06
(6) Expected TTD benefit per claim (Non-DCS claims)	$1,777.50	$1,583.91	$1,400.70	$1,268.94	$1,143.59
Unscheduled PPD Benefits					
(7) Average unscheduled degrees (PPD claims)	27.85	26.99	26.12	25.05	23.98
(8) Expected uns. degrees (Non-DCS claims)	8.61	7.99	7.40	6.79	6.21
(9) Benefit per Unscheduled Degree	$100.00	$100.00	$100.00	$100.00	$100.00
(10) Expected uns. PPD benefit per claim (Non-DCS claims)	$860.59	$799.14	$739.92	$679.37	$621.40
Scheduled PPD Benefits					
(11) Average scheduled degrees (PPD claims)	11.95	10.58	9.20	8.19	7.18
(12) Expected sch. degrees (Non-DCS claims)	3.69	3.13	2.61	2.22	1.86
(13) Benefit per Scheduled Degree	$141.17	$141.17	$141.17	$141.17	$141.17
(14) Expected sch. PPD benefit per claim (Non-DCS claims)	$521.21	$442.12	$368.02	$313.62	$262.66
Total PPD Benefits					
(15) Expected total PPD Benefits per claim (Non-DCS claims)	$3,159.30	$2,825.17	$2,508.64	$2,261.93	$2,027.65
(16) Expected total PPD Benefits per claim (All claims)	$2,989.48	$2,681.71	$2,388.70	$2,160.28	$1,942.36
Total Benefit Benefits					
Expected Total Benefits per Claim (All Claims)	$12,720.69	$11,267.64	$9,915.53	$8,734.62	$7,572.03

Table 7-4
Predicted Benefits Per Claim Controlling for Trend, By Component and Period, 1986 - 1996

	1986 - 1989	1990	1991 - 1994	1995	1996
DCS Settlements					
(1) Probability of DCS Claim	5.34%	5.07%	4.79%	4.52%	4.25%
(2) Average award per DCS claim	$5,157.10	$5,259.33	$5,361.55	$5,961.29	$6,561.02
(3) Expected benefit per claim (All Claims)	$275.63	$266.58	$256.96	$269.44	$278.65
Medical Benefits					
(1) Probability of Non-DCS claim	94.66%	94.93%	95.21%	95.48%	95.75%
(2) Probability of Medical Benefits (Non-DCS Claims)	100.00%	100.00%	100.00%	100.00%	100.00%
(2) Average medical benefits per claim (Non-DCS Claims)	$6,218.29	$6,240.46	$6,262.63	$6,276.35	$6,290.08
(3) Expected benefit per claim (All Claims)	$5,885.94	$5,924.15	$5,962.49	$5,992.67	$6,022.93
Vocational Rehabilitation					
(1) Probability of Non-DCS claim	94.66%	94.93%	95.21%	95.48%	95.75%
(2) Probability of Vocational Rehabilitation (Non-DCS Claims)	3.94%	4.26%	4.59%	4.27%	3.95%
(3) Average vocational award benefits	$39,358.92	$39,133.11	$38,907.30	$36,805.28	34703.25
(4) Expected benefit per claim (Non-DCS claims)	$1,549.92	$1,667.90	$1,794.77	$1,660.28	$1,453.15
(5) Expected benefit per claim (All claims)	$1,467.08	$1,583.36	$1,708.75	$1,585.24	$1,391.44
Temporary Total Disability Claims					
(1) Probability of Non-DCS claim	94.66%	94.93%	95.21%	95.48%	95.75%
(2) Probability of TTD claim (Non-DCS Claims)	69.33%	70.28%	71.22%	72.18%	73.15%
(3) Average duration (TTD claims)	23.74	23.30	22.86	22.46	22.06
(4) Expected duration (Non-DCS claims)	16.46	16.37	16.28	16.21	16.14
(5) Benefit per day	$44.06	$44.06	$44.06	$44.06	$44.06
(6) Expected benefit per claim (Non-DCS claims)	$725.12	$721.37	$717.26	$714.34	$711.09
(7) Expected benefit per claim (All claims)	$686.36	$684.81	$682.88	$682.06	$680.89
Permanent Partial Disability Claims					
TTD Benefits					
(1) Probability of Non-DCS claim	94.66%	94.93%	95.21%	95.48%	95.75%
(2) Probability of PPD claim (Non-DCS Claims)	30.46%	29.51%	28.55%	27.60%	26.65%
(3) Average TTD duration (PPD claims)	116.83	118.33	119.84	122.38	124.92
(4) Expected duration (Non-DCS claims)	35.58	34.91	34.22	33.78	33.30
(5) Benefit per day	$44.06	$44.06	$44.06	$44.06	$44.06
(6) Expected TTD benefit per claim (Non-DCS claims)	$1,567.76	$1,538.28	$1,507.54	$1,488.34	$1,467.01
Unscheduled PPD Benefits					
(7) Average unscheduled degrees (PPD claims)	25.90	26.55	27.20	27.35	27.50
(8) Expected uns. degrees (Non-DCS claims)	7.89	7.83	7.77	7.55	7.33
(9) Benefit per Unscheduled Degree	$100.00	$100.00	$100.00	$100.00	$100.00
(10) Expected uns. PPD benefit per claim (Non-DCS claims)	$788.97	$783.44	$776.68	$755.01	$733.07
Scheduled PPD Benefits					
(11) Average scheduled degrees (PPD claims)	10.60	10.27	9.95	9.78	9.61
(12) Expected sch. degrees (Non-DCS claims)	3.23	3.03	2.84	2.70	2.56
(13) Benefit per Scheduled Degree	$141.17	$141.17	$141.17	$141.17	$141.17
(14) Expected sch. PPD benefit per claim (Non-DCS claims)	$455.72	$427.97	$401.08	$381.10	$361.57
Total PPD benefits					
(15) Expected total PPD benefits per claim (Non-DCS claims)	$2,812.45	$2,749.69	$2,685.30	$2,624.45	$2,561.65
(16) Expected total PPD benefits per claim (All claims)	$2,662.13	$2,610.31	$2,556.61	$2,505.83	$2,452.85
Total Benefit benefits					
Expected Total benefits per Claim (All Claims)	$10,977.14	$11,069.21	$11,167.69	$11,035.24	$10,826.77

Table 7-5
Predicted Benefits per Worker, By Type of Estimate and Period, 1986 - 1996

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Model I -- Model I	$481.55	$390.13	$311.26	$256.11	$206.34
		-18.99%	-35.36%	-46.82%	-57.15%
Model I Rate & Model II Average Cost	$415.55	$383.25	$350.56	$323.56	$295.03
		-7.77%	-15.64%	-22.14%	-29.00%
Model II Rate & Model I Average Cost	$445.81	$379.19	$319.87	$275.69	$233.72
		-14.94%	-28.25%	-38.16%	-47.57%
Model II -- Model II	$384.70	$372.51	$360.26	$348.30	$334.18
		-3.17%	-6.35%	-9.46%	-13.13%

Table 7-6
Oregon Workers' Compensation Benefits
1986-1998 (In Millions of Dollars)

	Total	Private Carriers		State Fund		Self-Insurance	
	$	$	%	$	%	$	%
1986	451.637	185.637	41.1%	196.000	43.4%	70.000	15.5%
1987	509.584	201.584	39.6%	230.000	45.1%	78.000	15.3%
1988	555.769	217.505	39.1%	245.264	44.1%	93.000	16.7%
1989	576.080	236.038	41.0%	244.042	42.4%	96.000	16.7%
1990	572.785	250.785	43.8%	227.000	39.6%	95.000	16.6%
1991	586.623	236.623	40.3%	250.000	42.6%	100.000	17.0%
1992	476.050	232.047	48.7%	161.646	34.0%	82.357	17.3%
1993	468.459	224.950	48.0%	162.466	34.7%	81.043	17.3%
1994	468.017	234.719	50.2%	157.823	33.7%	75.475	16.1%
1995	462.822	228.562	49.4%	159.607	34.5%	74.653	16.1%
1996	505.761	254.310	50.3%	174.266	34.5%	77.185	15.3%
1997	470.828	239.823	50.9%	166.455	35.4%	64.551	13.7%
1998	492.854	260.300	52.8%	168.744	34.2%	63.810	12.9%

Sources: Social Security Administration and National Academy of Social Insurance

Table 7-7
Oregon Workers' Compensation Benefits, 1990-1998
Actual and Estimated If No Legislative Changes
(In Millions of Dollars)

Panel A: Model I/Model I

	Actual (1)	Model I/Model I Effect (2)	Estimated Benefit If No Legislation (3) = (1)/[1-(effect)]	Reduction In Benefits (4) = (3) - (1)	Cumulative Reduction In Benefits (5)
1990	572.785	-18.99%	707.055	134.270	134.270
1991	586.623	-35.36%	907.523	320.900	455.170
1992	476.050	-35.36%	736.463	260.413	715.583
1993	468.459	-35.36%	724.720	256.261	971.844
1994	468.017	-35.36%	724.036	256.019	1,227.864
1995	462.822	-46.82%	870.293	407.471	1,635.335
1996	505.761	-57.15%	1,180.306	674.545	2,309.880
1997	470.828	-57.15%	1,098.782	627.954	2,937.833
1998	492.854	-57.15%	1,150.184	657.330	3,595.164
Total	4,504.199		8,099.363	3,595.164	

Panel B: Model II/Model II

	Actual (1)	Model II/Model II Effect (2)	Estimated Benefit If No Legislation (3) = (1)/[1-(effect)]	Reduction In Benefits (4) = (3) - (1)	Cumulative Reduction In Benefits (5)
1990	572.785	-3.17%	591.537	18.752	18.752
1991	586.623	-6.35%	626.399	39.776	58.528
1992	476.050	-6.35%	508.329	32.279	90.807
1993	468.459	-6.35%	500.223	31.764	122.571
1994	468.017	-6.35%	499.751	31.734	154.305
1995	462.822	-9.46%	511.180	48.358	202.663
1996	505.761	-13.13%	582.204	76.443	279.106
1997	470.828	-13.13%	541.991	71.163	350.270
1998	492.854	-13.13%	567.347	74.493	424.762
Total	4,504.199		4,928.961	424.762	

Table 7-8
Predicted Benefits Per Employee, 1986 - 1996
By Age, Period, and Type of Estimate

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Claimants Aged Less Than 25 Years					
Model I -- Model I	$273.78	$223.64	$178.93	$135.42	$97.75
		-18.31%	-34.64%	-50.54%	-64.29%
Model I Rate & Model II Average Cost	$230.41	$222.19	$214.04	$191.59	$168.29
		-3.57%	-7.11%	-16.85%	-26.96%
Model II Rate & Model I Average Cost	$254.97	$219.36	$185.16	$146.70	$111.71
		-13.97%	-27.38%	-42.47%	-56.19%
Model II -- Model II	$214.59	$217.94	$221.49	$207.55	$192.32
		1.56%	3.22%	-3.28%	-10.38%
Claimants Between Ages 25 and 34					
Model I -- Model I	$516.64	$429.74	$353.52	$278.92	$213.48
		-16.82%	-31.57%	-46.01%	-58.68%
Model I Rate & Model II Average Cost	$450.30	$429.05	$407.72	$363.23	$317.10
		-4.72%	-9.45%	-19.34%	-29.58%
Model II Rate & Model I Average Cost	$460.58	$414.54	$370.01	$313.36	$260.25
		-10.00%	-19.66%	-31.96%	-43.50%
Model II -- Model II	$401.44	$413.88	$426.74	$408.07	$386.57
		3.10%	6.30%	1.65%	-3.70%
Claimants Between Ages 35 and 44					
Model I -- Model I	$513.33	$411.59	$324.33	$284.72	$246.52
		-19.82%	-36.82%	-44.53%	-51.98%
Model I Rate & Model II Average Cost	$441.96	$401.10	$359.76	$351.44	$340.71
		-9.25%	-18.60%	-20.48%	-22.91%
Model II Rate & Model I Average Cost	$487.26	$403.02	$329.71	$298.92	$267.24
		-17.29%	-32.33%	-38.65%	-45.15%
Model II -- Model II	$419.52	$392.76	$365.73	$368.96	$369.36
		-6.38%	-12.82%	-12.05%	-11.96%
Claimants Between Ages 45 and 54					
Model I -- Model I	$591.31	$456.25	$341.44	$279.49	$224.05
		-22.84%	-42.26%	-52.73%	-62.11%
Model I Rate & Model II Average Cost	$506.76	$439.67	$371.74	$336.42	$299.60
		-13.24%	-26.64%	-33.61%	-40.88%
Model II Rate & Model I Average Cost	$575.71	$450.76	$344.11	$285.76	$233.05
		-21.70%	-40.23%	-50.36%	-59.52%
Model II -- Model II	$493.39	$434.38	$374.65	$343.96	$311.64
		-11.96%	-24.07%	-30.29%	-36.84%
Claimants Aged 55 Years and Older					
Model I -- Model I	$476.79	$394.07	$321.76	$288.99	$256.82
		-17.35%	-32.52%	-39.39%	-46.14%
Model I Rate & Model II Average Cost	$415.64	$384.80	$353.74	$350.40	$345.01
		-7.42%	-14.89%	-15.69%	-16.99%
Model II Rate & Model I Average Cost	$447.35	$384.98	$329.14	$307.96	$284.69
		-13.94%	-26.42%	-31.16%	-36.36%
Model II -- Model II	$389.97	$375.92	$361.85	$373.40	$382.46
		-3.60%	-7.21%	-4.25%	-1.92%

Table 7-9
Predicted Benefits Per Employee, 1986 - 1996
By Gender, Period, and Type of Estimate

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Male Claimants					
Model I -- Model I	$647.77	$515.24	$402.25	$336.66	$276.40
		-20.46%	-37.90%	-48.03%	-57.33%
Model I Rate & Model II Average Cost	$554.47	$503.45	$452.09	$426.33	$397.61
		-9.20%	-18.46%	-23.11%	-28.29%
Model II Rate & Model I Average Cost	$598.57	$500.01	$413.53	$363.17	$313.72
		-16.47%	-30.91%	-39.33%	-47.59%
Model II -- Model II	$512.36	$488.57	$464.76	$459.90	$451.30
		-4.64%	-9.29%	-10.24%	-11.92%
Female Claimants					
Model I -- Model I	$266.14	$219.89	$179.49	$144.82	$114.00
		-17.38%	-32.56%	-45.59%	-57.17%
Model I Rate & Model II Average Cost	$230.48	$216.52	$202.46	$182.88	$162.55
		-6.05%	-12.16%	-20.65%	-29.47%
Model II Rate & Model I Average Cost	$249.43	$215.11	$184.11	$154.45	$127.21
		-13.76%	-26.19%	-38.08%	-49.00%
Model II -- Model II	$216.01	$211.82	$207.67	$195.05	$181.39
		-1.94%	-3.86%	-9.70%	-16.03%

Table 7-10
Predicted Benefits Per Employee, 1986 - 1996
By Occupation, Period, and Type of Estimate

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Managerial, Professional, and Technical Occupations					
Model I -- Model I	$142.79	$107.70	$77.99	$65.35	$53.84
		-24.57%	-45.38%	-54.23%	-62.29%
Model I Rate & Model II Average Cost	$122.73	$104.61	$86.26	$80.47	$74.33
		-14.77%	-29.72%	-34.44%	-39.44%
Model II Rate & Model I Average Cost	$134.11	$104.79	$79.69	$69.23	$59.35
		-21.86%	-40.58%	-48.38%	-55.75%
Model II -- Model II	$115.28	$101.78	$88.13	$85.25	$81.94
		-11.71%	-23.55%	-26.05%	-28.92%
Clerical, Sales, and Office Support Occupations					
Model I -- Model I	$130.30	$108.96	$89.99	$74.47	$60.39
		-16.38%	-30.94%	-42.85%	-53.66%
Model I Rate & Model II Average Cost	$110.04	$104.94	$99.84	$93.14	$85.95
		-4.63%	-9.27%	-15.36%	-21.89%
Model II Rate & Model I Average Cost	$122.59	$106.67	$91.93	$78.86	$66.53
		-12.99%	-25.01%	-35.67%	-45.73%
Model II -- Model II	$103.53	$102.74	$101.98	$98.63	$94.70
		-0.76%	-1.49%	-4.73%	-8.53%
Blue-Collar Service Occupations					
Model I -- Model I	$260.52	$211.60	$169.26	$137.60	$108.93
		-18.78%	-35.03%	-47.18%	-58.19%
Model I Rate & Model II Average Cost	$220.88	$207.45	$194.03	$180.92	$166.53
		-6.08%	-12.16%	-18.09%	-24.61%
Model II Rate & Model I Average Cost	$232.74	$205.43	$179.42	$157.31	$134.79
		-11.73%	-22.91%	-32.41%	-42.08%
Model II -- Model II	$197.33	$201.40	$205.67	$206.84	$206.07
		2.07%	4.23%	4.82%	4.43%
Skilled Blue-Collar, Non-Service Occupations					
Model I -- Model I	$1,062.99	$922.10	$795.11	$639.26	$501.20
		-13.25%	-25.20%	-39.86%	-52.85%
Model I Rate & Model II Average Cost	$917.89	$901.11	$884.45	$791.45	$695.40
		-1.83%	-3.64%	-13.78%	-24.24%
Model II Rate & Model I Average Cost	$976.12	$896.23	$817.77	$691.05	$574.31
		-8.18%	-16.22%	-29.20%	-41.16%
Model II -- Model II	$842.88	$875.83	$909.67	$855.58	$796.84
		3.91%	7.92%	1.51%	-5.46%
Operators, Fabricators, & and Laborers					
Model I -- Model I	$1,326.93	$1,170.22	$1,025.48	$814.60	$629.03
		-11.81%	-22.72%	-38.61%	-52.60%
Model I Rate & Model II Average Cost	$1,155.05	$1,159.47	$1,164.53	$1,036.19	$903.61
		0.38%	0.82%	-10.29%	-21.77%
Model II Rate & Model I Average Cost	$1,250.70	$1,149.18	$1,047.81	$861.13	$692.72
		-8.12%	-16.22%	-31.15%	-44.61%
Model II -- Model II	$1,088.69	$1,138.62	$1,189.89	$1,095.37	$995.09
		4.59%	9.29%	0.61%	-8.60%

Table 7-11

Oregon Employers' Costs of Workers' Compensation Insurance, 1986-1998
(In Millions of Dollars)

	Net (Direct) Earned Premium Private Carrier and State Fund (1)	Dividend Ratio (2)	Net Cost for Employers Purchasing Insurance (1) x [100 % - (2)] (3)	Self-Insurance Benefits (4)	Estimate of Self-Insurance Costs (4) x 1.11 (5)	Total Costs (3) + (5) (6)
1986	488.167	1.1%	482.797	70.000	77.700	560.497
1987	568.731	0.6%	565.319	78.000	86.580	651.899
1988	589.552	1.3%	581.888	93.000	103.230	685.118
1989	642.760	1.3%	634.404	96.000	106.560	740.964
1990	717.575	3.8%	690.307	95.000	105.450	795.757
1991	655.928	4.1%	629.035	100.000	111.000	740.035
1992	643.608	5.5%	608.210	82.357	91.416	699.626
1993	591.092	7.0%	549.716	81.043	89.958	639.673
1994	593.811	7.0%	552.244	75.475	83.777	636.021
1995	592.278	15.1%	502.844	74.653	82.865	585.709
1996	581.884	10.1%	523.114	77.185	85.675	608.789
1997	561.699	13.6%	485.308	64.551	71.652	556.960
1998	554.674	23.7%	423.216	63.810	70.829	494.045

Source of data in Column 1:

1994-1998 - 2000 NCCI *Annual Statistical Bulletin*
1990-1993 - 1996 NCCI *Annual Statistical Bulletin*.
1986-1989 - 1992 NCCI *Annual Statistical Bulletin*.

Table 7-12
Oregon Employers' Costs of Workers' Compensation Insurance, 1990-1998
Actual and Estimated If No Legislative Changes
(In Millions of Dollars)

Panel A: Model I/Model I

	Actual (1)	Model I/Model I Effect (2)	Estimated Cost If No Legislation (3) = (1)/[1-(effect)]	Reduction In Costs (4) = (3) - (1)	Cumulative Reduction In Costs (5)
1990	795.757	-18.99%	982.295	186.538	186.538
1991	740.035	-35.36%	1,144.856	404.821	591.359
1992	699.626	-35.36%	1,082.342	382.716	974.075
1993	639.673	-35.36%	989.594	349.920	1,323.995
1994	636.021	-35.36%	983.944	347.923	1,671.918
1995	585.709	-46.82%	1,101.371	515.662	2,187.580
1996	608.789	-57.15%	1,420.745	811.956	2,999.535
1997	556.960	-57.15%	1,299.789	742.829	3,742.365
1998	494.045	-57.15%	1,152.965	658.919	4,401.284
Total	5,756.616		10,157.899	4,401.284	

Panel B: Model II/Model II

	Actual (1)	Model II/Model II Effect (2)	Estimated Cost If No Legislation (3) = (1)/[1-(effect)]	Reduction In Costs (4) = (3) - (1)	Cumulative Reduction In Costs (5)
1990	795.757	-3.17%	821.808	26.051	26.051
1991	740.035	-6.35%	790.214	50.179	76.230
1992	699.626	-6.35%	747.065	47.439	123.668
1993	639.673	-6.35%	683.046	43.373	167.042
1994	636.021	-6.35%	679.147	43.126	210.168
1995	585.709	-9.46%	646.906	61.197	271.365
1996	608.789	-13.13%	700.805	92.016	363.381
1997	556.960	-13.13%	641.142	84.182	447.563
1998	494.045	-13.13%	568.718	74.673	522.235
Total	5,756.615		6,278.850	522.235	

Table 7-13
Predicted Benefits Per Employee, 1986 - 1996
By Industry, Period, and Type of Estimate

Estimate	1986 - 1989	1990	1991-1994	1995	1996
Primary Sector					
Model I -- Model I	$992.03	$826.83	$682.51	$591.00	$504.03
		-16.65%	-31.20%	-40.42%	-49.19%
Model I Rate & Model II Average Cost	$863.76	$815.49	$767.03	$740.76	$709.31
		-5.59%	-11.20%	-14.24%	-17.88%
Model II Rate & Model I Average Cost	$899.14	$795.66	$700.33	$647.60	$589.16
		-11.51%	-22.11%	-27.98%	-34.48%
Model II -- Model II	$782.88	$784.75	$787.06	$811.70	$829.11
		0.24%	0.53%	3.68%	5.91%
Construction					
Model I -- Model I	$1,077.27	$888.39	$725.07	$643.31	$563.63
		-17.53%	-32.69%	-40.28%	-47.68%
Model I Rate & Model II Average Cost	$925.44	$859.76	$793.26	$778.02	$757.15
		-7.10%	-14.28%	-15.93%	-18.18%
Model II Rate & Model I Average Cost	$1,048.34	$881.43	$735.75	$659.56	$583.89
		-15.92%	-29.82%	-37.09%	-44.30%
Model II -- Model II	$900.59	$853.03	$804.95	$797.67	$784.37
		-5.28%	-10.62%	-11.43%	-12.91%
Manufacturing					
Model I -- Model I	$567.01	$446.00	$343.00	$282.46	$227.89
		-21.34%	-39.51%	-50.18%	-59.81%
Model I Rate & Model II Average Cost	$502.33	$448.37	$393.68	$361.56	$327.61
		-10.74%	-21.63%	-28.02%	-34.78%
Model II Rate & Model I Average Cost	$531.44	$434.91	$351.32	$300.86	$253.60
		-18.16%	-33.89%	-43.39%	-52.28%
Model II -- Model II	$470.82	$437.22	$403.23	$385.12	$364.58
		-7.14%	-14.35%	-18.20%	-22.56%
Transportation, Communication, & Utilities					
Model I -- Model I	$572.76	$480.97	$399.83	$348.23	$298.97
		-16.03%	-30.19%	-39.20%	-47.80%
Model I Rate & Model II Average Cost	$488.51	$463.72	$438.81	$425.15	$409.23
		-5.07%	-10.17%	-12.97%	-16.23%
Model II Rate & Model I Average Cost	$576.67	$482.26	$399.03	$346.13	$295.92
		-16.37%	-30.80%	-39.98%	-48.69%
Model II -- Model II	$491.85	$464.96	$437.93	$422.60	$405.05
		-5.47%	-10.96%	-14.08%	-17.65%
Wholesale & Retail Trade					
Model I -- Model I	$223.23	$184.94	$151.24	$123.86	$99.06
		-17.15%	-32.25%	-44.51%	-55.62%
Model I Rate & Model II Average Cost	$189.74	$180.56	$171.37	$159.44	$146.61
		-4.84%	-9.68%	-15.97%	-22.73%
Model II Rate & Model I Average Cost	$210.48	$181.56	$155.06	$131.78	$109.74
		-13.74%	-26.33%	-37.39%	-47.86%
Model II -- Model II	$178.90	$177.26	$175.70	$169.63	$162.42
		-0.92%	-1.79%	-5.19%	-9.21%
Services					
Model I -- Model I	$356.53	$281.88	$218.16	$168.82	$126.06
		-20.94%	-38.81%	-52.65%	-64.64%
Model I Rate & Model II Average Cost	$303.41	$274.62	$245.62	$215.06	$183.56
		-9.49%	-19.04%	-29.12%	-39.50%
Model II Rate & Model I Average Cost	$308.75	$267.28	$229.31	$192.40	$158.27
		-13.43%	-25.73%	-37.68%	-48.74%
Model II -- Model II	$262.74	$260.40	$258.17	$245.10	$230.45
		-0.89%	-1.74%	-6.71%	-12.29%

Table 7-14

Workers' Compensation Cash Benefits Paid To Oregon Workers Compared to National Payments, 1985-1996 (Dollar Amounts are Benefits per 100,000 Workers)

Year	National Average of Dollar Amounts (1)	Change from Previous Year (2)	Oregon Dollar Amounts (3)	Change from Previous Year (4)	Oregon Benefits as Percentage of National Average (5) = (3)/(1)
1985	19,994,142	--	40,450,322	--	202.3%
1986	21,686,725	8.5%	43,524,360	7.6%	200.7%
1987	24,070,018	11.0%	45,008,067	3.4%	187.0%
1988	26,777,769	11.2%	43,317,764	-3.8%	161.8%
1989	30,657,907	14.5%	38,343,099	-11.5%	125.1%
1990	31,788,575	3.7%	36,666,112	-4.4%	115.3%
1991	28,791,944	-9.4%	28,673,452	-21.8%	99.6%
1992	25,843,136	-10.2%	29,246,680	2.0%	113.2%
1993	22,954,373	-11.2%	23,265,030	-20.5%	101.4%
1994	21,941,091	-4.4%	20,427,780	-12.2%	93.1%
1995	20,001,465	-8.8%	17,536,968	-14.2%	87.7%
1996	20,218,460	1.1%	16,298,152	-7.1%	80.6%

Table 7-15
Frequency, Average Cost, and Total Cost of Permanent Partial Disability Benefits in Oregon

Year	Frequency		Average Cost		Total Cost per 100,000 Workers	
	Oregon (1)	As % of US Average (2)	Oregon (3)	As % of US Average (4)	Oregon (5)	As % of US Average (6)
			Panel A: Policy Years 1985-86 to 1992-93			
1985-86	1,541	208.7%	18,870	87.8%	29,078,670	203.9%
1986-87	1,500	210.6%	20,160	79.0%	30,240,000	189.1%
1987-88	1,749	245.2%	19,913	69.1%	34,827,837	192.5%
1988-89	1,487	186.0%	19,166	65.5%	28,499,842	138.9%
1989-90	1,498	177.4%	17,770	55.5%	26,619,460	116.2%
1990-91	1,320	143.7%	18,300	58.8%	24,156,000	102.7%
1991-92	1,261	144.6%	16,442	54.2%	20,733,362	95.6%
1992-93	1,226	154.4%	18,990	72.2%	23,281,740	123.8%
			Panel B: Oregon Policy Periods 1993 to 1996			
1993	1,135	176.2%	15,899	76.0%	18,045,365	134.0%
1994	903	159.8%	16,165	74.6%	14,596,995	119.3%
1995	761	165.8%	14,598	62.0%	11,109,078	102.8%
1996	700	167.1%	15,015	62.1%	10,510,500	103.7%

Figure VIII.A.1
Adjusted Manual Rates, Oregon, US Average, Average of Contiguous States, 1975-95

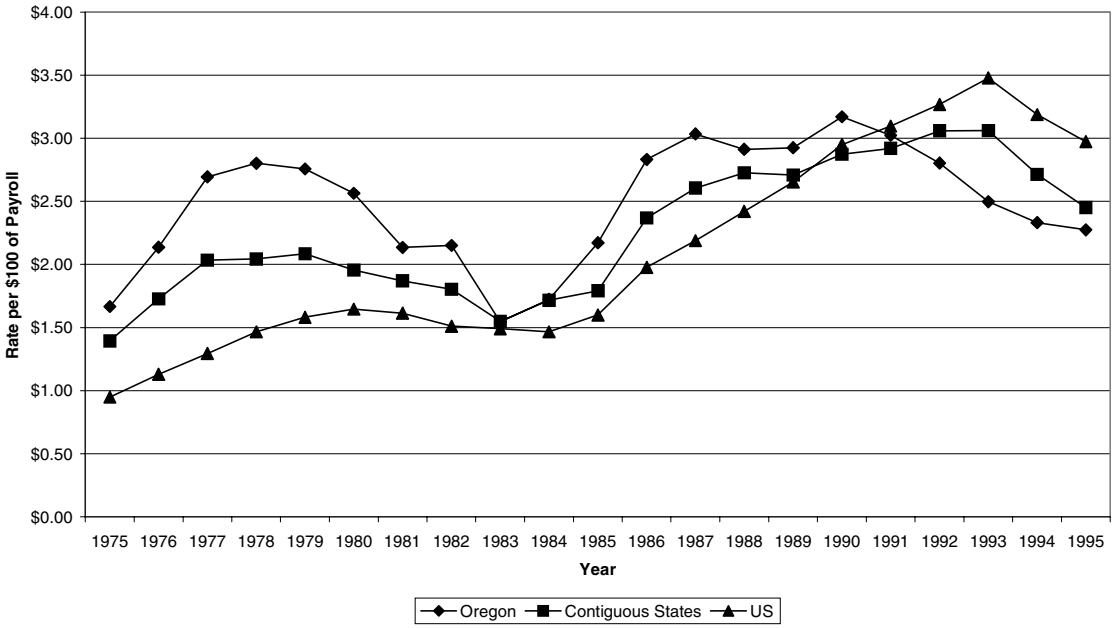

Table7-16
Adjusted Manual Rates, Selected Jurisdictions, 1975 - 1995

Year	Idaho	Washington	California	Contiguous States	US	Oregon	Oregon As Percentage Of National Average
1975	$1.122			$1.394	$0.949	$1.666	175.65%
1976	$1.320			$1.728	$1.130	$2.136	189.04%
1977	$1.373			$2.034	$1.294	$2.694	208.16%
1978	$1.285			$2.043	$1.466	$2.801	191.09%
1979	$1.413			$2.085	$1.582	$2.756	174.21%
1980	$1.347			$1.956	$1.645	$2.564	155.85%
1981	$1.606			$1.871	$1.613	$2.135	132.32%
1982	$1.455			$1.803	$1.511	$2.151	142.39%
1983	$1.452	$1.652		$1.549	$1.490	$1.544	103.65%
1984	$1.467	$1.958		$1.716	$1.466	$1.724	117.58%
1985	$1.551	$1.652		$1.791	$1.599	$2.171	135.83%
1986	$1.666	$1.958	$3.017	$2.368	$1.977	$2.831	143.21%
1987	$2.064	$1.879	$3.449	$2.607	$2.189	$3.034	138.62%
1988	$2.315	$1.839	$3.836	$2.725	$2.420	$2.911	120.29%
1989	$2.198	$1.838	$3.876	$2.709	$2.653	$2.924	110.21%
1990	$2.428	$1.941	$3.954	$2.873	$2.951	$3.171	107.45%
1991	$2.409	$2.001	$4.244	$2.919	$3.096	$3.023	97.62%
1992	$2.663	$2.031	$4.744	$3.060	$3.267	$2.802	85.77%
1993	$2.838	$2.053	$4.856	$3.061	$3.478	$2.497	71.80%
1994	$2.633	$2.086	$3.805	$2.714	$3.188	$2.331	73.13%
1995	$2.394	$1.981	$3.150	$2.450	$2.973	$2.275	76.52%

Table 7-17
Employers' Costs of Workers' Compensation per $100 of Payroll
1995-1999, U.S. and Oregon

	US: 48 States Weighted (1)	Change During Year (2)	Oregon (3)	Change During Year (4)	Oregon as Percentage of National Average (5)
January 1995	2.973	--	2.275	--	77.8%
December 1995	2.869	-3.5%	2.275	--	80.6%
December 1996	2.728	-4.9%	2.234	-1.8%	83.3%
December 1997	2.526	-7.4%	2.000	-10.5%	80.5%
December 1998	2.405	-4.8%	1.688	-15.6%	70.6%
December 1999	2.364	-1.7%	1.607	-4.8%	68.4%
Cumulative		-20.5%		-29.4%	

Source: 1995 date from Table VIII A.1
1995-1996 changes from NCCI 2000 *Annual Statistical Bulletin*

8 Cost of Tort Claims

Jeff Biddle

8.1 The Issue

As discussed in more detail in section 5.2, workers' compensation is ordinarily the exclusive remedy for workers injured on the job. It is possible to argue that if the workers' compensation system does not provide a remedy for a certain class of individuals with work-related injuries, then it cannot be the exclusive remedy and thus the injured workers are not barred from filing a lawsuit. In 1995, the Oregon Supreme Court ruled in the *Errand vs. Cascade Steel Rolling Mills* 888 P.2d 544 (Or. 1995) case that workers whose injuries or illnesses were found to be not compensable under the major contributing cause standard could sue their employers in civil court. In SB 369, the legislature responded to this decision by explicitly stating that the workers' compensation system was the only recourse of a worker with a work-related injury or illness, even if that injury or illness was found to be not compensable under the major contributing cause standard. As this is being written, another case is pending before the Oregon Supreme Court (*Smothers v. Gresham Transfer, Inc.*, 941 P.2d 1065 (Or. Ct. App. 1997), *petition for review allowed*, 328 Ore. 40 (1998)) in which the court could again rule that individuals who are denied workers' compensation benefits because work was not the major contributing cause of their disability may file a civil or "tort" action against their employer. This section will discuss the possible benefits that would be received by workers and costs that would accrue to employers should this civil or tort alternative become available.

8.2 Considerations

There are many factors, which must be taken into consideration in attempting to estimate the benefits and costs that would result from allowing workers to file civil actions against their employers. Some of these considerations impose serious limitation on our ability to make such estimates. These are discussed below.

First of all, we should point out that workers' compensation is a no fault system. The worker is entitled to benefits from the employer regardless of who is at fault in causing the injury. Any tort-based compensation system would require the worker to prove that the employer was at least partially at fault. Thus even though workers' compensation was no longer the exclusive remedy, workers could only sue successfully if they could establish that the employer was in some way at fault.

Moreover, when workers' compensation laws were passed during the first part of the last century, civil actions involved a "contributory negligence" standard. Under this standard, if the worker was in any way at fault, he or she could not succeed in a suit against the employer. Since then, the civil laws in most states, including Oregon, have developed some form of "comparative negligence" standard. Under such a standard a victim can sue another party even if the victim was partially at fault, but the damages are reduced based

on the comparative negligence of the parties. It is not one hundred percent clear that comparative negligence would apply to a work related injury. For the discussion below, however, we have assumed that it will. The data we have to deal with are very meager and they are based on the civil justice system, as it is presently constituted. Accordingly, any attempt at analysis requires us to assume that the civil law applicable to torts arising from these injuries would be the same as the civil law that is generally applied to other tort actions.

It should also be noted that major contributing cause claims are not typical of all work related injuries nor are they typical of all non-work related injuries, which are discussed in the other studies we review here. By definition, these all involve cases in which the worker suffers from some other condition, which contributes to his or her disability or need for medical treatment. Furthermore, they only involve cases in which, at least in the judgment of the carrier, the work related injury was no longer the major contributing cause of the worker's problem. It seems logical that courts or juries in these cases are likely to award smaller damages than in identical cases that do not involve those issues. As with numerous other issues in this section, we have not applied any numerical value to this factor. It should, nevertheless, be kept in mind.

Our discussion will run mainly in terms of the damages that would be awarded to workers. This is somewhat different from either the cost to employers or the benefits that workers would receive. Any system designed to provide compensation for injured workers involves transaction costs, so that the benefits received by employees are less than the cost to employers. The extent to which the benefits to workers fall short of the costs to employers depends on the efficiency of the system for providing compensation.

It is generally agreed that tort claims take much longer to process and involve transaction costs that are much higher than those involved in workers' compensation cases. A few, but certainly not a majority, of workers' compensation cases involve attorneys. It seems likely that all civil actions would involve attorneys on the part of both employers and workers. It would be difficult to estimate the cost for employers' attorneys, but it is safe to assume that the cost of dealing with a civil suit for compensation would be at least as great as the cost of dealing with an appeal of a denied workers' compensation claim. In general we can assume that attorneys for workers would charge a fee equal to one-third of the recovery. This is higher than the attorney fees usually charged in workers' compensation cases. In addition to fees there would be costs in processing the cases. Here again the costs in civil cases are usually higher than the costs in workers' compensation cases. Thus attorneys would be necessary for both workers and employers in all civil cases, whereas they are often not necessary in workers' compensation cases and the fees and costs paid by both employers and workers would ordinarily be higher in civil cases. We do not attempt to estimate these transactions costs associated with a hypothetical tort system for compensating workers, but the presence of these costs must be borne in mind when thinking about how much injured workers would benefit from having a tort option.

There are a number of quantitative measures underlying our damage estimates that we will discuss below. These include the number of potential tort claimants, the percentage of such claimants that are likely to file a suit, and the damages that would be awarded.

We want to emphasize, however, that our attempt to estimate these quantities must be rough and tentative, because there are few real world situations one can look at that are comparable to the hypothetical situation in which a denied workers' compensation claimant contemplates suing his or her employer. As discussed in section 5.2, a few other states have situations somewhat similar to the one in Oregon. In those, however, the exception is usually narrower (often confined to a class of disability such as mental claims). Moreover, as far as we know no one has done any economic analysis of the situation of those states. Indeed, as with Oregon those statutes are of fairly recently origin. The first cases are still working their way through the system. Accordingly it would be too early to conduct an analysis of the outcomes.

Another possible source of useful information is the state of Texas, where employers are allowed to "opt out" of the workers' compensation system. Unfortunately, we are not aware of any study that has estimated the cost in civil judgments for employers who chose to opt out.

Under the Federal Employers' Liability Act, employees injured while working for railroads must seek compensation through a tort-based process, but a routinized procedure has developed that makes it relatively easy for the injured worker to receive compensation, so that the case of the injured railroad worker is not exactly analogous to the case of the denied Oregon claimant who would have to turn to the courts for compensation. Still, it is possible to make use of some information from the FELA experience.

In general, however, we can only offer speculation concerning some of the factors affecting the potential costs to employers, and only very rough estimates of others. We emphasize that the figures discussed in this section are much different in nature from those in the rest of the report (in the other areas there is a much more extensive empirical basis for our estimates). Nevertheless, we hope that this discussion and the estimates we offer will be of some value to the parties in Oregon.

8.3 Potential Claimants

We assume that the number of workers who could potentially sue their employers should the tort option become available in Oregon is best approximated by the number of workers whose claims are currently denied on the basis of major contributing cause. There are at least two potential problems with this assumption.

First, it seems theoretically possible that an individual with a work related injury in Oregon whose workers' compensation claim would not have been denied could decide not to file a workers' compensation claim at all, but instead file a civil action alleging negligence, and also alleging that work was not the major contributing cause of his or her disability. (In most states, a worker can sue a negligent employer in a tort action if the

injury did not arise out of the employment, and in many states that worker need not first file a workers' compensation claim and then have it denied before pursuing the tort action.)

While this is theoretically possible, we believe that it would be quite uncommon for a worker to file a civil action unless the employer or insurer had first taken the position that the worker was not entitled to benefits because of major contributing cause. First of all, although workers' compensation benefits would likely be smaller than a civil award, they are faster and more certain. Secondly, the worker would be confronted with a difficult dilemma in such a case. He or she would first have to prove that there was some other factor that contributed to his or her disability and that the work related incident was not the major contributing cause of the disability. Later in the same lawsuit the worker would be going to the court or jury asking for damages based on this same disability. This would seem to place the worker in a difficult conflict. It is possible that there would be a few cases in which the employer was clearly negligent and the damages horrendous, where a worker might desire to file a civil case even if the carrier had not denied benefits. While these would probably be very big cases, we believe they would also be very unusual.

Second, some claims that would currently be denied by carriers might not be denied if the tort option became available. We assume above that most workers would not file a civil action unless their workers' compensation claim had been denied. As discussed, it appears that the costs to employers would be substantially higher in civil actions than in workers' compensation claims. Accordingly, it seems likely that at least to some extent, employers would choose not to deny some claims involving major contributing cause in order to avoid civil actions.

More specifically, it seems likely that employers would want to develop methods for predicting whether a particular claimant who could be denied would sue following denial, and the likely cost of the suit to the carrier in legal fees, settlements, and/or judgments. If this estimate exceeded the estimate of the benefit costs saved by denying the claimant (net of the administrative costs of making the denial), the employer would not deny the claim; otherwise they would.

The matter is even more complicated than this. The above paragraphs describe the situation from the employer's point of view and would be true of large employers who were self-insured for both workers' compensation and liability. However, most medium and all small employers are insured for both. In many cases an employer would have a different insurance carrier for its workers' compensation and liability coverages. The counter balancing incentive not to deny workers' compensation claims would not be present under those circumstances.

We do not attempt to place any quantitative values on these factors but we point out that they should be kept in mind.

8.4 The Propensity to Sue

What fraction of denied claimants would actually seek compensation through the tort system? Arguably, many would not sue their employer. Some of the denied claimants would feel that the employer was not at fault, or at least that they could not prove negligence on the employer's part. Other simply might not want to incur the additional time, trouble and legal costs of a civil suit.

As noted above, there are few real world situations one can examine to infer how many of Oregon's denied workers' compensation claimants might choose to sue their employer, because this option is not available to workers whose claims are denied in most other states. There are, however, estimates available of the percentage of people with non-work related injuries who initiate a suit against the party that they feel was at fault, and these provide perhaps the best available source of information on the propensity to sue of the hypothetical individual whose workers' compensation claim was denied, but who had the option to sue. The best such estimates are based on the study by Hensler et. al. (1991), which involved interviews conducted during 1988 and 1989 of a group of over 2500 randomly selected individuals who had experienced a disabling injury during the previous year. Of those interviewed, 540 were injured in non-work, non-motor vehicle accidents that took place on another's property or involved a consumer product, that is, situations in which there might be someone to sue.[24] Of these 540 accident victims, only 5% took action of any sort to collect from another party to the accident, and only 1% hired a lawyer (Hensler et. al. 1991, table 5.4). Of the 239 people in this group considered to have more serious injuries, only 9% considered taking action, and only 2% hired a lawyer (Hensler et. al., table 5.6). One reason uncovered by the study for the relatively low number of people seeking compensation from others for their accident related losses was that even among those injured by a product or on the property of another, over half felt the accident to be largely their own fault (Hensler et. al. 1991, tables 6.9, 6.10).

The Hensler et. al. study also included victims of automobile accidents. These potential claimants are in a different situation than people injured by a product or on the property of another, in that almost all drivers have automobile insurance, which provides a fairly simple and widely understood method for seeking compensation. Still only 54% of the surveyed people injured in motor vehicle accidents even considered seeking compensation from another for their injury related losses, and only 39% actually took some sort of action to seek compensation.

A similar study by Kritzer, Bogart and Vidmar (1991) was based on interviews with individuals who had suffered injuries or property damage leading to losses of more than $1000, and who believed the incident causing the losses to be largely the fault of another – clearly a group more likely to sue than those in the Hensler et. al. study. There were 80 cases of non work-related, non-motor vehicle incidents. Of these 80 people, 72% made

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[24] We ignore the work related injuries, because those individuals have access to the workers' compensation system.

some attempt to get compensation from the party or parties believed to be at fault, but only 15% hired a lawyer.

One can only speculate about how comparable in terms of litigiousness the injury victims in these studies are to the hypothetical worker who has the option to sue following the denial of his or her workers' compensation claims. Since workers' compensation is a no-fault system, there is no guarantee that the denied claimants will feel the employer is actually at fault for their losses. They may be more prone to sue than the people in the studies, as they would have already invested a lot of time and effort into getting compensation from the employer, and may fall prey to the sunk cost fallacy that having come so far they should not give up. On the other hand, they may feel exhausted, and want to "cut their losses."

It seems to us that the studies suggest a range of about 5% to 40% as the proportion of potential litigants who would actually sue. Further, the actual proportion would approach the upper end of this range only if the process of seeking compensation through the court system following a denied claim developed to the point that it was widely understood by workers and perceived by them to be fairly straightforward, as a result of the activity of labor unions, for example, or aggressive marketing by trial lawyers.

8.5 Damages

Once again, it is hard to find appropriate data on the average damages arising from a work-related injury, because in the United States, most injured workers are compensated through a workers' compensation system. As mentioned above, under federal law (FELA), railroad employees with financial losses arising from work related injuries must seek compensation through civil action. Although a standard set of procedures has been developed to facilitate the settlement of these claims by workers and employers, it is still the case that both parties know that a jury trial will take place should a settlement not be reached, and this affects the behavior of both parties and the ultimate settlement outcomes. (Transportation Research Board, 1994, p. 61) Likewise, should denied claimants in Oregon be given the right to sue the employer, it is reasonable to suppose that many of these suits would be settled, but settlements would depend on expectations of the potential outcomes of a jury trial.

A study published by the Transportation Research Board used several alternative empirical approaches in an attempt to determine the relationship between the values of settlements received by injured railroad workers and the amount of benefits they would have received had they been covered by workers' compensation. One approach compared a random sample of workers' compensation claims from 13 states to a sample of settlements paid by one railroad to its injured employees over a four-year period. The claims were grouped by injury type, showing, for example, that the average railroad worker with a head injury received 52% of what was received by the average workers' compensation claimant with a head injury, while the average railroad worker with a neck injury received 104% of the benefits received by the average workers' compensation claimant with a neck injury. Taking an unweighted average of these ratios for the six

injury types considered gives a figure of 102% -- the railroad workers received slightly more than similarly injured workers' compensation claimants.

A second approach used detailed information on a sample of 38 injury cases from the files of one railroad, and calculated what the injured workers in these cases would have been entitled to under the workers compensation systems of Washington State and Michigan. Separate calculations were made for injuries involving less than 90 days of lost work, more than 90 days of lost work, and no return to work. Most workplace injuries fall into the first category, but most of the costs associated with workers' compensation claims arise from injuries falling in the second and third categories.

The study found that:

> The greatest disparity between the FELA payments and the state estimates was for the return-to-work claims with fewer than 90 days lost. Estimates of the percentage of the FELA settlement that would be paid in each of the systems are 9 for Michigan (and) 11 for Washington State. . .
>
> For the return-to-work claims with more than 90 days lost, the results are more uniform. Injury compensation under FELA is, for the most part, in the range of 3 to 6 times the workers' compensation estimates for each claim, and the average of the sub samples is 2.5 to 4 times the estimates.
>
> FELA benefits for the no return-to-work claims are on the average 1.5 to 3 times the level of the estimates for the workers' compensation system (Transportation Research Board 1994, p. 135).

The study authors felt that the results for the cases with fewer than 90 days of time loss were driven by data anomalies, so we will ignore those results. Thus, we conclude that the ratio of benefits paid to railroad workers under a tort system to benefits paid to similarly injured workers' compensation claimants falls in a range between 1 and 6.

Another observable class of civil suits in which workers attempt to recover losses arising from work-related injuries is so-called third party suits against people other than the employer who might have been partially at fault for the injury, such as manufacturers of defective tools or equipment. The problem with such data is that it usually includes only the outcomes of those suits that were decided by a court or jury and not those that were settled. Also, one usually does not know how much the injured worker was entitled to in workers' compensation benefits as a result of the work related injury that led to the third party suit.

However, we have developed a data set that partially addresses these two problems. In Oregon, if an injured worker files a third party suit and receives an award of damages or a settlement, the worker is required to reimburse the workers' compensation carrier for part or all of the workers' compensation benefits he or she has received. Occasionally, a dispute will arise between the worker and the carrier as to how much money the worker is required to pay back to the state. These disputes are settled by the Oregon Workers' Compensation Board.

By conducting a West Law search, we were able to identify all board decisions in such cases that were issued from 1987 through 1999. In 120 of these cases we were able to identify the civil award and to estimate with reasonable accuracy the value of workers' compensation benefits paid to the individual. There are several positive features of these data. First, they include the results of civil suits that were settled out of court, as well as those that led to a jury award. Second, they show for a set of about 120 work related injuries both the value of the benefits the worker was entitled to under the workers' compensation system and the value of compensation the worker was able to receive through the tort system for *the same injury*. Third, they are cases from Oregon. Fourth, they are cases in which the injured worker felt it worthwhile to pursue a tort action, arguably making them similar to the hypothetical set of cases in which a denied workers' compensation claimant would find it worthwhile to sue.

An important disadvantage of the data set is that it only includes cases in which there was a dispute about how much money the injured worker had to return to the carrier, and this may make the sample unrepresentative of all third party suits in unpredictable ways. It is also true that in some of these cases the amount of workers' compensation benefits was not exactly specified. We believe, however, that we were able to make reasonable estimates in the cases that were included in our sample. We acknowledge these limitations but believe this is the best available source of comparable damages awarded in a civil and workers' compensation system.

We recorded for all the cases the size of the award as a percentage of the amount of workers' compensation benefits received. This percentage ranged from 15% to over 2000%, but for half of the cases it fell between 141% and 422%. The unweighted average of the percentage over all cases was 388%, and when we simply divided the total amount paid out in awards and settlements by the total amount paid out in workers' compensation benefits, we obtained a figure of 307%.

These results are quite consistent with our conclusions concerning the results of the FELA study discussed above: that the injured worker who seeks compensation through a tort system will on average receive a settlement or award that is between 100% and 600% of what he or she would receive in workers' compensation benefits. Indeed, in light of the additional information provided by the data from Oregon third party suits, we believe it is safe to narrow this range to 150% to 400%.

Up to this point, we have spoken mainly in terms of damages awarded in tort actions. It is appropriate to reiterate that this is different from both the costs to employers and the benefits received by workers. The costs to employers would be greater than these damages because there would be additional attorney fees and costs. The benefits to workers would be less than these damages because they too would pay attorney fees and costs. In this sense a tort system would be less efficient than the workers' compensation system.

It is also generally agreed that tort systems are slower and more costly to the public than workers' compensation systems. This adds to the inefficiency.

Although we feel confident in asserting that litigation costs for both parties would be higher under a civil system, we are unable to estimate to any reasonable degree how much higher these costs will be. We also have no data about attorney fees for employers. We do know, however, that the plaintiff attorney fee in civil suits is generally 1/3 of the amount recovered. When this 1/3 attorney fee is applied to the figures discussed above, the amount received in workers' third party suits is only 204% of what they received in workers' compensation benefits.

Also, in examining the benefit to workers of allowing denied claimants to sue their employers, the uncertainty involved in the outcomes of civil actions should be mentioned. Insurance companies dealing with dozens or hundreds of civil suits could be content to concern themselves with the average size of judgments or settlements when considering the costs of tort actions – unusually large settlements or awards will in time be balanced out by unusually small ones. For individual injured workers, however, the uncertainty as to whether his or her award or settlement will be very large or very small can be more troublesome. And the data both from the Transportation Research Board study of FELA and from the Oregon third party suits show that the individual worker pursuing a tort action faces a great deal of uncertainty. The Transportation Research Board study cites classes of injuries for which payments to workers under FELA are less than they would have received under a typical workers' compensation system, and in the Oregon third party data, after netting out attorneys' fees, 22% of the claimants received less from their lawsuit than they had received in workers' compensation benefits.

8.6 Estimate of the Cost to Employers of Allowing Denied Claimants to Sue

We have arrived at an estimate of how much benefits awarded to workers would change if claimants whose claims were denied under major contributing cause were given the right to sue their employer in civil court. The estimate combines our estimates discussed above concerning the frequency with which these workers would file civil actions and the likely awards in civil actions and information from that statistical models used to estimate the workers' compensation benefits described in section 7. The estimate is expressed as a percentage of the benefits awarded to workers. The denominator is the workers' compensation benefits paid for disabling claims in the system, as it currently exists. The numerator is the total damages that would be awarded in civil actions by denied claimants.

We conclude that if workers' compensation claimants who were denied benefits based on major contributing cause were allowed to sue their employers in civil court, the damages they would receive would range between half a percent and ten percent of the value of the total benefits paid on all accepted disabling claims.

We wish to emphasize again that this estimate is very rough. Even the boundaries of the range should be regarded as quite approximate. The 10 percent figure assumes that 40% of potential plaintiffs would sue, and would receive on average in award or settlement four times as much as their workers' compensation benefits would have been had their claim not been denied. The half percent figure assumes that only 5% would sue, and

would receive only 1.5 times as much on average as they would have received in workers' compensation benefits.

It should also be noted that the cost estimates are based in large part on what is currently going on in the Oregon system – current denial rates, DCS rates, etc. These could change considerably after the introduction into the system of such a dramatic change as a tort option for denied claimants.

Finally, we emphasize that this does not take into consideration any loss of efficiency to the system. Because of attorney fees and litigation costs, the total costs to employers would be greater than the damages awarded and the benefits received by workers would be less. In addition, it is very likely that the benefits awarded under the civil system would be paid significantly later than benefits paid under the workers' compensation system.

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Appendices

Oregon Major Contributing Cause Study

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9 Appendices

Appendix A,

Data Analysis

I. Details of the Regression Analysis Described in Section 3.5 and Reported in table 3.9.

For the regression analysis described in section C, we estimated ordinary least squares regressions using the data provided by the Department of Consumer and Business Services on individual disabling claims. The dependent variable was whether or not the claim had experienced a certain type of denial. The independent variables were defined as follows:

Female - indicator variable equaling one if the claim was filed by a female

Age - Claimant's age at the time the claim was set up

Age Squared - the square of age

Govemp - an indicator variable equaling one if the claimant was an employee of state or local government

Oldinj - an indicator variable equaling one if more than a year passed between the date of injury and the date the claim was set up.

Insurer type variables - indicator variables identifying whether the employer was insured by SAIF, a private insurer, or self-insured.

Industry variables - indicator variables dividing the sample into 12 industry groups: agriculture; forests and fisheries; mining and construction; logging; ground transportation; air transportation, communication, and utilities; finance, insurance, and real estate; health services; other services; wholesale and retail trade, manufacturing, and public administration. Claims with missing values for industry code were assigned the same industry as a randomly chosen claim with the same employer ID number. If that procedure failed, they were assigned the same industry as a randomly chosen claim from the same county and with a claimant of the same sex. If that procedure failed, the observation was eliminated from the sample.

Injury type variables – indicator variables dividing the sample into 8 injury types: sprains and strains of the back; other sprains and strains; open wounds; bruises, burns, and head injuries; all other traumatic injuries; carpal tunnel syndrome; other musculoskeletal and connective tissue disorders; all other injuries and illnesses. If an observation was missing a value for injury type, it was assigned the injury type of a randomly chosen observation with the same body part code. If that procedure failed, the observation was eliminated from the sample.

Tenure variables – indicator variables dividing the sample into five groups based on years with employer at the time of the injury: fewer than 12 months, 12 months to two years; two years to five years; six years to ten years, and more than ten years. If an observation was missing a value for years with employer, it was assigned the same value as a randomly chosen case with the same sex, age, and insurer type. If that procedure failed, the observation was eliminated from the sample.

Occupation variables – indicator variables dividing the sample into 5 occupational groups: professional, managerial, administrative and supervisory workers; clerical and sales workers; blue collar service workers (protective services, health services, food services, etc.); skilled manufacturing workers; and low skilled, non-service laborers and operators. Claims with missing occupational codes were assigned the same occupation as a randomly chosen claim with the same value for sex and four-digit industry. If that procedure failed, the observation was eliminated from the sample.

Weekearn—the weekly earnings in dollars of the claimant. Cases for which weekearn was missing were assigned the predicted value of weekearn based on a regression of weekearn on year dummies, female, govemp, oldinj, age, age squared, industry, injury, and occupation variables, using the part of the sample for which weekearn was available. If that procedure failed, the observation was eliminated from the sample.

Later – an indicator variable identifying whether the claim was set up after 1990 for the regressions reported in table 3-9, and after 1995 for the regressions reported in table 3-10. It is the coefficient of this variable that is reported in last column of those two tables. table App-1 provides more details on the results of the six regressions described in tables 3-9 and 3-10.

Table App-1: Factors Affecting the Probability of Claim Denial

Dependent Variable equals one if claim was denied, zero otherwise

Numbers in cells are estimated coefficients of independent variables. An * next to an estimate indicates that the estimate was NOT statistically significant at the .05 level.

Independent Variable	Table 3-9 Regressions				Table 3-10 Regressions	
	All Denials, All Claims	Whole Denials, All Claims	All Denials, Non-SAIF Claims	Whole Denials, Non-SAIF Claims	Whole Denials, All Claims	Whole Denials, Non-SAIF Claims
Female	.035	.012	.034	.010	.015	.011
Govt. Employee	-.03	-.023	-.036	-.037	-.019	-.031
Old Injury	.18	.14	.18	.12	.092	.11
Age	.013	.006	.012	.006	.006	.006
Age Squared	-.0001	-.00006	-.0001	-.00006	-.00006	-.00006
Weekly Earnings	-.00006	-.00007	-.0001	-.0001	-.00006	-.00008

Table App-1 (Cont.)

Independent Variable	Table 3-9 Regressions				Table 3-10 Regressions	
	All Denials, All Claims	Whole Denials, All Claims	All Denials, Non-SAIF Claims	Whole Denials, Non-SAIF Claims	Whole Denials, All Claims	Whole Denials, Non-SAIF Claims
Industry Variables (Excluded Industry: Wholesale and Retail Trade						
Agriculture	.015*	-.0004*	.033	.017	.008*	.031
Forest/Fisheries	.073	.055	.072	.070	.039	.057
Mining/ Construction	.036	.034	.048	.042	.032	.039
Logging	.015	.012	.020	.015	.010	.007*
Ground Transportation	.0004*	.001*	.002*	.0007*	-.005*	-.002*
Air Trans, Communication, Utilities	-.047	-.03	-.033	-.022	-.027	-.018
FIRE	.041	.036	.041	.036	.033	.040
Services	.022	.022	.026	.024	.031	.030
Health Services	.014	.007*	.005*	.005*	.011	.008*
Public Admin.	.048	.059	.049	.060	.042	.058
Manufacturing	.017	.013	.021	.018	.009	.017
Injury Type Variables (Excluded Category: Sprains and Strains other than of Back)						
Carpal Tunnel	.10	.11	.094	.10	.13	.11
Back Sprains&Strains	.026	.020	.025	.019	.017	.013
Open Wounds	-.15	-.089	-.15	-.091	-.097	-.096
Musculoskeletal Disorders	.09	.085	.087	.080	.090	.078
Burns, Bruises, and Head Injuries	-.08	-.059	-.082	-.060	-.066	-.06
Other Traumatic Injuries	-.004*	-.006*	-.003*	-.003*	.007*	.005*

All Other Injuries and Illnesses	.29	.35	.29	.34	.34	.32
Years with Employer (Excluded category: More than 120 months)						
Less than 12 months	.087	.053	.082	.050	.055	.058
12-24 Months	.044	.012	.040	.013	.013	.019
25-60 months	.027	.005*	.024	.006*	.007*	.011
61-120 months	.018	.004*	.012	.0002*	.006*	.006*
Insurance Type (Excluded Category: non-SAIF Private Insurers						
SAIF Insured	.031	.032	--	--	.053	--
Self Insured	-.010	-.006	-.007	-.004	-.001*	-.007
Occupation (Excluded Category: Laborers and Operators)						
Prof., Managerial, Tech., Supervisory	.005*	.009	.006	.008	.003*	.005*
Clerical and Sales	.019	.017	.012	.011	.022	.016
Blue Collar Service Workers	.0017*	.004*	-.004*	-.002*	-.0002*	-.005*
Skilled Blue Collar	-.01	-.009	-.009	-.008	-.013	-.013
Sample Size	119,991	119,991	165,254	165,254	106,304	125,264

II. Details on the Sampling Plan Used in the File Review and the Construction of Sample Weights.

A. Insurer Types

Our goal was to be able to report results for three types of WC insurers: SAIF, Private Insurers, and Self Insured Employers. As described in the text, the cooperation of SAIF was assured from the beginning of the study. The logistics of physically visiting numerous sites to review files and the difficulty of obtaining the cooperation of private insurers and self insured employers resulted in our being able to examine the files of only two non-SAIF private insurers and two self-insured employers. For the purposes of reporting results by insurer type and constructing weights to report results for the state as a whole, we made the assumption that the denied claim files we examined from the two private carriers were representative of the denied claim files of all private carriers, and that the denied claim files we examined at the two self insured employers were representative of the denied claim files of found at all self insured employers.

B. Types of Denied Claim Files Sampled at Each Insurer.

As described in the text, the sample was designed to include examples of denied claims from five different time periods, to include both disabling and nondisabling claims, and, within the class of disabling claims, to include both claims with a single whole denial and claims involving either other types of denials or

multiple denials. This created for each carrier a set of 15 file types or categories to be included in the sample:

1. Period 1a, disabling claim, single whole denial

2. Period 1a, disabling claim, other or multiple denial types

3. Period 1b, disabling claim, single whole denial

4. Period 1b, disabling claim, other or multiple denial types

5. Period 2a, disabling claim, single whole denial

6. Period 2a, disabling claim, other or multiple denial types

7. Period 2b, disabling claim, single whole denial

8. Period 2b, disabling claim, other or multiple denial types

9. Period 3, disabling claim, single whole denial

10. Period 3, disabling claim, other or multiple denial types

11. Period 1a, nondisabling claim, single whole denial

12. Period 1b, nondisabling claim, single whole denial

13. Period 2a, nondisabling claim, single whole denial

14. Period 2b, nondisabling claim, single whole denial

15. Period 3, nondisabling claim, single whole denial

Using data on all denied claims provided by the Department of Consumer and Business Services, we generated a list of all denied claims for each of the five insurers, and then for each insurer, sublists of all claims fitting each of the 15 categories (the claims were sorted into time periods based on the date of the first denial of the claim). We then drew random samples of claims from each of the 75 sublists. The size of the sample drawn for each category at each insurer was determined by the following considerations: 1) we felt we had the resources to examine about 1400 files (drawing approximately one third from each insurer type), 2) we wished to split the sample between disabling and nondisabling claims in a ratio of roughly 3:1, 3) we wished to split the sample of disabling claims evenly between those involving only a single whole denial and those involving other types of denials or multiple denials, 4) and sample lists had to be large enough to allow for the fact that when the reviewers arrived on site to conduct the review, they would not be able to find all the files on their list, and some files found would not have the characteristics expected. In case a claim involved more than one denial, file reviewers considered each denial a separate observation, provided that it fit into one of our time periods. Thus, although the reviewers were supplied with a list of randomly drawn claim files, they were creating a random sample of denials.

When the file reviewers had completed their work, the sample of **denials** was distributed across insurer types and file types in a manner described in table App-2. It should be noted that the likelihood that the reviewers would be unable to find a file in the carrier's records was greater for the pre-legislation periods. This may cause the sample to be biased in unpredictable ways.

Table App-2

The Distribution of 1569 Denials in the File Review Sample Across Insurance Types and File Types

File Type (Numbers Keyed to List Above)	All Insurance Types	SAIF	Other Private Insurers	Self Insured Employers
1	76	26	24	26
2	69	25	26	18
3	68	25	23	20
4	120	42	36	42
5	70	25	19	26
6	138	43	49	46
7	81	28	24	29
8	152	46	53	53
9	151	52	55	44
10	195	80	67	48
11	91	32	28	31
12	80	32	20	28
13	86	33	19	34
14	90	32	20	38
15	102	36	36	30
All File Types	1569	557	499	513

C. Sample Weights

We constructed sample weights in order to make the sample of denials of disabling claims within each period representative of the population of denials of disabling claims in that period, and to make the sample of denials of nondisabling claims in each period representative of the population of denials of nondisabling claims in that period. If we let

NP_{ij} = the number of denials of type i in period j in the population

NS_{ij} = the number of denials of type i in period j in the file review,

then each denial of type i in period j was assigned a weight equal to (NP_{ij} / NS_{ij}) rounded to the nearest integer, where a denial type is defined by whether the claim involved was disabling or nondisabling, whether the claim had only one whole denial vs. other types of or multiple denials, and the type of carrier issuing the denial. The population of denials is assumed to be contained in the data provided to by the Department of Consumer and Business Services. In making the measures of statistical significance discussed in section 4 of the text, these weights would be rescaled to sum to one over the relevant portion of the sample.

III. Constructing the "Open Claims" variable.

In order to estimate the number of disabling claims open for some time during a particular year, which is used to calculate the current denial rate on open claims, we made use of a spreadsheet provided by the Department of Consumer and Business Services that showed the distribution of all disabling claims set up in a year by the year of first closure, for all years from 1985 to 1998. Thus, the spreadsheet showed that of all disabling claims set up in 1985, 100% were open at some time in 1985 (had a first closure in 1985 or after), 37% were open in 1986 (had a date of first closure during or after 1986), and so on. This information allowed us to take a year, say 1990, and determine how many claims filed in 1985 were open in 1990 (or technically, had not closed for the first time by the end of 1989), how many claims filed in 1986 were open in 1990, etc. We did not have data for total number of disabling claims filed (accepted or denied) before 1985, so to determine the number of claims open in 1988, we used the following formula:

Open Claims in 1988 = claims set up in 1988+.36*(claims set up in 1987) +.07*(claims set up in 1986) + .02*(claims set up in 1985) + .01*(estimated claims set up in 1984)

The coefficients in this equation are based on the observed ages of claims still open in 1989 and 1990, and the estimated number of claims set up in 1984 was based on the assumption that the percentage growth in the total number of claims between 1984 and 1985 was equal to the percentage growth in the number of claims accepted between 1984 and 1985. A similar procedure was used to estimate the number of claims open in 1987.

Our open claims series undercounts the true number of claims open in a year because it does not count claims that might have closed for the first time in an earlier year, and then reopened in that year. Based on a count of the number of claims set up in previous years that were currently reopened as of April 2000 (also provided by the Department of Consumer and Business Services), that undercount is probably between 4% and 5%. If the extent of the undercount has not changed much through the years (that is, if the trends regarding claim reopenings have not changed dramatically), then our measures of how denial rates on open claims have changed over the 1987-1998 period will not be much affected.

Appendix B

File Review Procedures

Denial Classification

We classified denials by reason for denial as follows:

Insufficient Evidence—This refers to the 1987amendments, which increased or at least clarified the burden of proof on workers. Cases will only go in this category if they would not have been denied prior to the 87 amendments, and they do *not* relate to major contributing cause or combined condition.

Major Contributing Cause—Cases will go in this category if they would not have been denied prior to the 1990amendments. They are identified in the file as MCC denials, and the file review indicates that MCC was the primary reason for the denial.

Objective Evidence—Cases will go in this category if: the case would not have been denied prior to the 1990 amendments, there is an indication it was denied because of lack of objective evidence, the file review indicates this was the primary reason for denial, and the case did not involve an MCC issue.

All Other—everything else

Denial Type

Cases were coded for denial type as follows:

IW Initial Whole Denial

IP Initial Partial Denial

BU Back Up Denial

AD Aggravation Denial

OP Other Partial Denial

Other Information

For each file we noted whether it was an *injury* or an *occupational disease* and the *outcome* of any *appeal*.

Coding

In General

We had a column for comments, but we encouraged the reviewers to remember that for the most part we will be counting codes. Accordingly, it was important for the reviewers to "force" cases into specific categories.

We also reminded reviewers that a case should not be classified as an MCC denial if it would have been denied under the older material cause standard.

Multiple Denials

If a file involved multiple denials, or multiple reasons for a denial, we first determined if there are multiple denial dates. If there is only one denial date, we did not create a new record. All the new information was entered on the same row. The reviewers categorized these based on the primary reason for the denial and noted that it was a multiple denial.

If there were multiple denial dates, a new record (a new row in the table) was inserted under the first one, and we added information for each denial date in a separate row. All of the original information from the original row was copied into the new one.

Format

We began with an excel table provided by IMD, and we inserted columns that carry the information we add.

Denial Date – The date of the denial.

Reason – The reviewers entered a code representing the reason for the denial as follows:

MCC Major Contributing Cause

IE Insufficient Evidence

OE No Objective Evidence

AO All Other

Type – Reviewers entered a denial type:

IW Initial Whole Denial

IP Initial Partial Denial

BU Back Up Denial

AD Aggravation Denial

OP Other Partial Denial

Multiple – Reviewers entered an "M" in this column if there were multiple denials or multiple reasons for a denial on a single date. (They already indicated the primary reason for the denial.)

Occupational Disease – Reviewers indicated whether the case involved an injury (I) or an occupational disease (OD).

Outcome

Reviewers entered one of the following outcomes:

NA No Appeal

AD An appeal that upheld the denial

AO An appeal that overturned the denial

DCS Disputed Claim Settlement

CDA Claim Disposition Agreement

D&C DCS and CDA

AW Appeal Withdrawn

DW Denial Withdrawn

Appendix C

Law Review

This Appendix contains the relevant statutory language from the four "major contributing cause" states--Arkansas, Florida, Oregon, and South Dakota.

Arkansas

Ark. Code § 11-9-102 Definitions.

As used in this chapter, unless the context otherwise requires:

(4)(A) "Compensable injury" means:

(i) An accidental injury causing internal or external physical harm to the body or accidental injury to prosthetic appliances, including eyeglasses, contact lenses, or hearing aids, arising out of and in the course of employment and which requires medical services or results in disability or death. An injury is "accidental" only if it is caused by a specific incident and is identifiable by time and place of occurrence;

(ii) An injury causing internal or external physical harm to the body and arising out of and in the course of employment if it is not caused by a specific incident or is not identifiable by time and place of occurrence, if the injury is:

(a) Caused by rapid repetitive motion. Carpal tunnel syndrome is specifically categorized as a compensable injury falling within this definition;

(b) A back injury which is not caused by a specific incident or which is not identifiable by time and place of occurrence; or

(c) Hearing loss which is not caused by a specific incident or which is not identifiable by time and place of occurrence;

(4)(D) A compensable injury must be established by medical evidence supported by "objective findings" as defined in subdivision (16) of this section.

(4)(E) Burden of Proof. The burden of proof of a compensable injury shall be on the employee and shall be as follows:

(i) For injuries falling within the definition of compensable injury under subdivision (4)(A)(i) of this section, the burden of proof shall be a preponderance of the evidence; or

(ii) For injuries falling within the definition of compensable injury under subdivision (4)(A)(ii) of this section, the burden of proof shall be by a preponderance of the evidence, and the resultant condition is compensable only if the alleged compensable injury is the major cause of the disability or need for treatment.

(4)(F) Benefits.

(i) When an employee is determined to have a compensable injury, the employee is entitled to medical and temporary disability as provided by this chapter.

(ii) (a) Permanent benefits shall be awarded only upon a determination that the compensable injury was the major cause of the disability or impairment.

(b) If any compensable injury combines with a preexisting disease or condition or the natural process of aging to cause or prolong disability or a need for treatment, permanent benefits shall be payable for the resultant condition only if the compensable injury is the major cause of the permanent disability or need for treatment.

(iii) Under this subdivision (4)(F), benefits shall not be payable for a condition which results from a nonwork-related independent intervening cause following a compensable injury which causes or prolongs disability or a need for treatment. A nonwork-related independent intervening cause does not require negligence or recklessness on the part of a claimant….

(14)(A) "Major cause" means more than fifty percent (50%) of the cause.

(B) A finding of major cause shall be established according to the preponderance of the evidence;…

(16)(A)(i) "Objective findings" are those findings which cannot come under the voluntary control of the patient.

(ii) When determining physical or anatomical impairment, neither a physician, any other medical provider, an administrative law judge, the Workers' Compensation Commission, nor the courts may consider complaints of pain; for the purpose of making physical or anatomical impairment ratings to the spine, straight-leg-raising tests or range-of-motion tests shall not be considered objective findings.

(B) Medical opinions addressing compensability and permanent impairment must be stated within a reasonable degree of medical certainty;

Ark. Code § 11-9-114 Heart or lung injury or illness.

(a) A cardiovascular, coronary, pulmonary, respiratory, or cerebrovascular accident or myocardial infarction causing injury, illness, or death is a compensable injury only if, in relation to other factors contributing to the physical harm, an accident is the major cause of the physical harm.

(b)(1) An injury or disease included in subsection (a) of this section shall not be deemed to be a compensable injury unless it is shown that the exertion of the work necessary to precipitate the disability or death was extraordinary and unusual in comparison to the employee's usual work in the course of the employee's regular employment or, alternately, that some unusual and unpredicted incident occurred which is found to have been the major cause of the physical harm.

(2) Stress, physical or mental, shall not be considered in determining whether the employee or claimant has met his burden of proof.

Ark. Code § 11-9-601**.** Compensation generally

…(c) (1) Where an occupational disease is aggravated by any other disease or infirmity, not itself compensable, or where disability or death from any other cause, not itself compensable, is aggravated, prolonged, accelerated, or in any way contributed to by an occupational disease, the compensation payable shall be reduced and limited to the proportion only of the compensation that would be payable if the

occupational disease were the sole cause of the disability or death as the occupational disease, as a causative factor, bears to all the causes of the disability or death.

…(c)(2)(e) (1) (A) "Occupational disease", as used in this chapter, unless the context otherwise requires, means any disease that results in disability or death and arises out of and in the course of the occupation or employment of the employee, or naturally follows or unavoidably results from an injury as that term is defined in this chapter.

(c)(2)(e)(1)(B) However, a causal connection between the occupation or employment and the occupational disease must be established by clear and convincing evidence.

(c)(2)(e)(2) No compensation shall be payable for any contagious or infectious disease unless contracted in the course of employment in, or immediate connection with, a hospital or sanitarium in which persons suffering from that disease are cared for or treated.

(c)(2)(e)(3) No compensation shall be payable for any ordinary disease of life to which the general public is exposed.…

Florida

Fla. Stat. § 440.09

(1) The employer shall pay compensation or furnish benefits required by this chapter if the employee suffers an accidental injury or death arising out of work performed in the course and the scope of employment. The injury, its occupational cause, and any resulting manifestations or disability shall be established to a reasonable degree of medical certainty and by objective medical findings. Mental or nervous injuries occurring as a manifestation of an injury compensable under this section shall be demonstrated by clear and convincing evidence.

(a) This chapter does not require any compensation or benefits for any subsequent injury the employee suffers as a result of an original injury arising out of and in the course of employment unless the original injury is the major contributing cause of the subsequent injury.

(b) If an injury arising out of and in the course of employment combines with a preexisting disease or condition to cause or prolong disability or need for treatment, the employer must pay compensation or benefits required by this chapter only to the extent that the injury arising out of and in the course of employment is and remains the major contributing cause of the disability or need for treatment..…

Fla. Stat. § 440.02
Definitions.

When used in this chapter, unless the context clearly requires otherwise, the following terms shall have the following meanings:

(1) "Accident" means only an unexpected or unusual event or result that happens suddenly. A mental or nervous injury due to stress, fright, or excitement only, or disability or death due to the accidental acceleration or aggravation of a venereal disease or of a disease due to the habitual use of alcohol or controlled substances or narcotic drugs, or a disease that manifests itself in the fear of or dislike for an individual because of the individual's race, color, religion, sex, national origin, age, or handicap is not an injury by accident arising out of the employment. If a preexisting disease or anomaly is accelerated or aggravated by an accident arising out of and in the course of employment, only acceleration of death or acceleration or aggravation of the preexisting condition reasonably attributable to the accident is compensable, with respect to death or permanent impairment….

(18) "Injury" means personal injury or death by accident arising out of and in the course of employment, and such diseases or infection as naturally or unavoidably result from such injury….

(35) "Arising out of" pertains to occupational causation. An accidental injury or death arises out of employment if work performed in the course and scope of employment is the major contributing cause of the injury or death.

Fla. Stat. § 440.151 Occupational diseases.

(1) (a) Where the employer and employee are subject to the provisions of the Workers' Compensation Law, the disablement or death of an employee resulting from an occupational disease as hereinafter defined shall be treated as the happening of an injury by accident, notwithstanding any other provisions of this chapter, and the employee or, in case of death, the employee's dependents shall be entitled to compensation as provided by this chapter, except as hereinafter otherwise provided; and the practice and procedure prescribed by this chapter shall apply to all proceedings under this section, except as hereinafter otherwise provided. Provided, however, that in no case shall an employer be liable for compensation under the provisions of this section unless such disease has resulted from the nature of the employment in which the employee was engaged under such employer and was actually contracted while so engaged, meaning by "nature of the employment" that to the occupation in which the employee was so engaged there is attached a particular hazard of such disease that distinguishes it from the usual run of occupations, or the incidence of such disease is substantially higher in the occupation in which the employee was so engaged than in the usual run of occupations, or, in case of death, unless death follows continuous disability from such disease, commencing within the period above limited, for which compensation has been paid or awarded, or timely claim made as provided in this section, and results within 350 weeks after such last exposure. …

(c) Where an occupational disease is aggravated by any other disease or infirmity, not itself compensable, or where disability or death from any other cause, not itself compensable, is aggravated, prolonged, accelerated or in anywise contributed to by an occupational disease**,** the compensation payable shall be reduced and limited to such proportion only of the compensation that would be payable if the occupational disease were the sole cause of the disability or death as such occupational disease**,** as a causative factor, bears to all the causes of such disability or death, such reduction in compensation to be effected by reducing the number of weekly or monthly payments or the amounts of such payments, as under the circumstances of the particular case may be for the best interest of the claimant or claimants….

(2) Whenever used in this section the term "occupational disease**"** shall be construed to mean only a disease which is due to causes and conditions which are characteristic of and peculiar to a particular trade, occupation, process, or employment, and to exclude all ordinary diseases of life to which the general public is exposed, unless the incidence of the disease is substantially higher in the particular trade, occupation, process, or employment than for the general public.

Oregon

ORS § 656.005. Definitions.

…(7)(a) A "compensable injury" is an accidental injury, or accidental injury to prosthetic appliances, arising out of and in the course of employment requiring medical services or resulting in disability or death; an injury is accidental if the result is an accident, whether or not due to accidental means, if it is established by medical evidence supported by objective findings, subject to the following limitations:

(A) No injury or disease is compensable as a consequence of a compensable injury unless the compensable injury is the major contributing cause of the consequential condition.

(B) If an otherwise compensable injury combines at any time with a preexisting condition to cause or prolong disability or a need for treatment, the combined condition is compensable only if, so long as and to

the extent that the otherwise compensable injury is the major contributing cause of the disability of the combined condition or the major contributing cause of the need for treatment of the combined condition.

…(19) "Objective findings" in support of medical evidence are verifiable indications of injury or disease that may include, but are not limited to, range of motion, atrophy, muscle strength and palpable muscle spasm. "Objective findings" does not include physical findings or subjective responses to physical examinations that are not reproducible, measurable or observable.

…(24) "Preexisting condition" means any injury, disease, congenital abnormality, personality disorder or similar condition that contributes or predisposes a worker to disability or need for treatment and that precedes the onset of an initial claim for an injury or occupational disease, or that precedes a claim for worsening pursuant to ORS 656.273.

ORS § 656.225. Compensability of certain preexisting conditions.

In accepted injury or occupational disease claims, disability solely caused by or medical services solely directed to a worker's preexisting condition are not compensable unless:

(1) In occupational disease or injury claims other than those involving a preexisting mental disorder, work conditions or events constitute the major contributing cause of a pathological worsening of the preexisting condition.

(2) In occupational disease or injury claims involving a preexisting mental disorder, work conditions or events constitute the major contributing cause of an actual worsening of the preexisting condition and not just of its symptoms.

(3) In medical service claims, the medical service is prescribed to treat a change in the preexisting condition as specified in subsection (1) or (2) of this section, and not merely as an incident to the treatment of a compensable injury or occupational disease….

656.262. Processing of claims and payment of compensation; payment by employer; acceptance and denial of claim; reporting claims; penalty for unreasonable payment delay; cooperation by worker and attorney in claim investigation.

…(6) (c) An insurer's or self-insured employer's acceptance of a combined or consequential condition under ORS 656.005 (7), whether voluntary or as a result of a judgment or order, shall not preclude the insurer or self-insured employer from later denying the combined or consequential condition if the otherwise compensable injury ceases to be the major contributing cause of the combined or consequential condition.

…(7) (b) Once a worker's claim has been accepted, the insurer or self-insured employer must issue a written denial to the worker when the accepted injury is no longer the major contributing cause of the worker's combined condition before the claim may be closed.

ORS § 656.268. Claim closure; termination of temporary total disability benefits; reconsideration of closure; procedure, penalty and attorney fee on reconsideration; medical arbiter to make findings of impairment for reconsideration; credit or offset for fraudulently obtained or overpaid benefits.

(1) One purpose of this chapter is to restore the injured worker as soon as possible and as near as possible to a condition of self support and maintenance as an able-bodied worker. The insurer or self-insured employer shall close the worker's claim, as prescribed by the Director of the Department of Consumer and Business Services, and determine the extent of the worker's permanent disability, provided the worker is not enrolled and actively engaged in training according to rules adopted by the director pursuant to ORS 656.340 and 656.726, when:

…(b) The accepted injury is no longer the major contributing cause of the worker's combined or consequential condition or conditions pursuant to ORS 656.005 (7). When the claim is closed because the accepted injury is no longer the major contributing cause of the worker's combined or consequential condition or conditions, and there is sufficient information to determine permanent impairment, the likely impairment and adaptability that would have been due to the current accepted condition shall be estimated;….

ORS § 656.273. Aggravation for worsened conditions; procedure; limitations; additional compensation.

(1) After the last award or arrangement of compensation, an injured worker is entitled to additional compensation for worsened conditions resulting from the original injury. A worsened condition resulting from the original injury is established by medical evidence of an actual worsening of the compensable condition supported by objective findings. However, if the major contributing cause of the worsened condition is an injury not occurring within the course and scope of employment, the worsening is not compensable….

ORS § 656.802. "Occupational disease" defined.

(1)(a) As used in this chapter, "occupational disease" means any disease or infection arising out of and in the course of employment caused by substances or activities to which an employee is not ordinarily subjected or exposed other than during a period of regular actual employment therein, and which requires medical services or results in disability or death, including:

(A) Any disease or infection caused by ingestion of, absorption of, inhalation of or contact with dust, fumes, vapors, gases, radiation or other substances.

(B) Any mental disorder, whether sudden or gradual in onset, which requires medical services or results in physical or mental disability or death.

(C) Any series of traumatic events or occurrences, which requires medical services or results in physical disability or death.

(b) As used in this chapter, "mental disorder" includes any physical disorder caused or worsened by mental stress.

(2)(a) The worker must prove that employment conditions were the major contributing cause of the disease.

(b) If the occupational disease claim is based on the worsening of a preexisting disease or condition pursuant to ORS 656.005 (7), the worker must prove that employment conditions were the major contributing cause of the combined condition and pathological worsening of the disease.

(c) Occupational diseases shall be subject to all of the same limitations and exclusions as accidental injuries under ORS 656.005 (7).

(d) Existence of an occupational disease or worsening of a preexisting disease must be established by medical evidence supported by objective findings.

(e) Preexisting conditions shall be deemed causes in determining major contributing cause under this section.

(3) Notwithstanding any other provision of this chapter, a mental disorder is not compensable under this chapter unless the worker establishes all of the following:

(a) The employment conditions producing the mental disorder exist in a real and objective sense.

(b) The employment conditions producing the mental disorder are conditions other than conditions generally inherent in every working situation or reasonable disciplinary, corrective or job performance evaluation actions by the employer, or cessation of employment or employment decisions attendant upon ordinary business or financial cycles.

(c) There is a diagnosis of a mental or emotional disorder which is generally recognized in the medical or psychological community.

(d) There is clear and convincing evidence that the mental disorder arose out of and in the course of employment.

(4) Death, disability or impairment of health of firefighters of any political division who have completed five or more years of employment as firefighters, caused by any disease of the lungs or respiratory tract, hypertension or cardiovascular-renal disease, and resulting from their employment as firefighters is an "occupational disease." Any condition or impairment of health arising under this subsection shall be presumed to result from a firefighter's employment. However, any such firefighter must have taken a physical examination upon becoming a firefighter, or subsequently thereto, which failed to reveal any evidence of such condition or impairment of health which preexisted employment. Denial of a claim for any condition or impairment of health arising under this subsection must be on the basis of clear and convincing medical evidence that the cause of the condition or impairment is unrelated to the firefighter's employment.

South Dakota

S.D. Codified Laws 62-1-1 Definition of terms.

Terms used in this title, unless the context otherwise plainly requires, shall mean:

…(7) "Injury" or "personal injury," only injury arising out of and in the course of the employment, and does not include a disease in any form except as it results from the injury. An injury is compensable only if it is established by medical evidence, i s subject to the following conditions:

(a) No injury is compensable unless the employment or employment related activities are a major contri buting cause of the condition complained of; or

(b) If the injury combines with a preexisting disease or condition to cause or prolong disability, impairment, or need for treatment, the condition complained of is compensable if the employment or employment related injury is and remains a major contributing cause of the disability, impairment, or need for treatment.

(c) If the injury combines with a preexisting work related compensable injury, disability, or impairment, the subsequent injury is compensable if the subsequent employment or subsequent employment related acti vities contributed independently to the disability, impairment, or need for treatment.

The term does not include a mental injury arising from emotional, mental, or nonphysical stress or stimuli. A mental injury is compensable only if a compensable physical injury is and remains a major contributing cause of the mental injury, as shown by clear and convincing evidence. A mental injury is any psychological, psychiatric, or emotional condition for which compensation is sought….

S.D. Codified Laws § 62-8-1. Definition of terms

Wherever used in this chapter:

…(4) "Injurious exposure" and "harmful quantities" where used in this chapter shall be construed as synonymous terms and shall mean that concentration of toxic material which would, independently of any other cause whatsoever (including the previous physical condition of the claimant) produce or cause the disease for which claim is made.

…(6) "Occupational disease**"** means a disease peculiar to the occupation in which the employee was engaged and due to causes in excess of the ordinary hazards of employment and includes any disease due or attributable to exposure to or contact with any radioactive material by an employee in the course of his employment….

S.D. Codified Laws § 62-1-1.3. Presumption that certain non-compensable injuries are nonwork related -- Coverage under other insurance policy

If an employer denies coverage of a claim on the basis that the injury is not compensable under this title due to the provisions of subsections 62-1-1 (7) (a), (b), or (c), such injury is presumed to be nonwork related for other insurance purposes, and any other insurer covering bodily injury or disease of the injured employee shall pay according to the policy provisions. If coverage is denied by an insurer without a full explanation of the basis in the insurance policy in relation to the facts or applicable law for denial, the director of the Division of Insurance may determine such denial to be an unfair practice under chapter 58-33. If it is later determined that the injury is compensable under this title, the employer shall immediately reimburse the parties not liable for all payments made, including interest at the category B rate specified in § 54-3-16.

S.D. Codified Laws § 62-8-3. Contracted and incurred defined

The terms "contracted" and "incurred," as used in this chapter when referring to an occupational disease**,** shall be deemed the equivalent of the phrase "arising out of and in the course of," as used in the workers' compensation law.

S.D. Codified Laws § 62-8-12. Conditions of liability -- Burden of proof

The burden of proof shall be upon the claimant to establish each and every fact under § 62-8-11 by competent medical evidence.

S.D. Codified Laws § 62-1-15. Evidence of injury supported by medical findings

In any proceeding or hearing pursuant to this title, evidence concerning any injury shall be given greater weight if supported by objective medical findings.

Appendix D

DEFINITIONS OF DEPENDENT VARIABLES, CONTROL VARIABLES, AND SIGNIFICANT TIME PERIOD VARIABLES

The definitions of the dependent variables, control variables, and variables measuring significant periods in Oregon between 1986 and 1996 are:

(1B) Frequency of claims per worker per year

Dependent variable

Frequency. Number of claims paying cash benefits with accident dates in each of the 20 six-month periods between January – June 1987 and July – December 1996 in each of 68 or 69 (depending on the year) two-digit SIC industries divided by the total number employees in the corresponding two-digit industry during the same six month periods.

There are 1,378 observations using this measure of a dependent variable (20 six-month periods X 68 or 69 two-digit industries.

Control Variables

Benefit Index. Expected workers' compensation benefits per worker using actuarial assessment of generosity of Oregon workers' compensation statute in year of accident. Benefits are in constant (1996) dollars. Expected to have a positive relationship with frequency (i.e., higher benefits are expected to be associated with more claims).

Wages. Weekly wages in two-digit industry in year of accident. Wages are in constant (1996) dollars. Expected to have a positive relationship with frequency.

Changes in Employment. Percentage change in employment from previous year in two-digit industry. Expected to have a positive relationship with frequency because rapidly growing industries are likely to have more accidents.

Variables measuring significant periods in Oregon between 1986 and 1996

SAIF Effect. Variable with a value of 1 for each six months period from 7/1/89 to 6/30/92. Expected to have a negative relationship with frequency.

HB 2271 Effect. Variable with a value of 1 for each six months period from 1/1/88 to 12/31/96. Expected to have a negative relationship with frequency.

SB 1197 Effect. Variable with a value of 1 for each six months period from 7/1/90 to 12/31/96. Expected to have a negative relationship with frequency.

SB 369 Effect. Variable with a value of 1 for each six months period from 7/1/95 to 12/31/96. Expected to have a negative relationship with frequency.

(2B) Average benefits per claim

Dependent Variables

The following ten dependent variables are separately estimated for each of the relevant claims in the sample. (For most regressions, there were 289,414 observations. For regressions involving Disputed Claim Settlement (DCS) claims, there were additional 14,837 observations, for a total of 304,251 observations.) The results are then used to construct an estimate of the expected benefits in each case in a procedure that will be illustrated in Section 7.5 of this study.

Temporary Total Disability (TTD) Benefits Duration in TTD Case. TTD duration in each compensable claim that paid only TTD benefits.

Temporary Total Disability (TTD) Benefits Duration in Permanent Partial Disability (PPD) Case. TTD duration in each compensable claim that paid PPD benefits.

Probability of PPD Case. The proportion of compensable claims that paid PPD benefits.

Severity of Scheduled PPD Case. The number of degrees of scheduled permanent disability in each PPD case. For claims in which no scheduled permanent disability benefits were paid, the number of degrees was set equal to zero.

Severity of Unscheduled PPD Case. The number of degrees of unscheduled permanent disability in each PPD case. For claims in which no scheduled permanent disability benefits were paid, the number of degrees was set equal to zero.

Probability of Disputed Claim Settlement (DCS) Case. The probability that a claim was resolved with a DCS.

Amount of Benefits in DCS Case. The amount of benefits in dollars in each DCS case. This includes the payments for medical, vocational rehabilitation, and cash benefits made prior to the award as well as the amount of the DCS award itself.

Medical Benefits. The amount of dollars of medical benefits in each case.

Probability of Vocational Rehabilitation (VR) Benefits. The probability that a claim received VR benefits.

Amount of VR Benefits in VR Benefits Case. The amount of VR benefits in dollars in each VR case.

Independent Variables

Replacement Rate. The claimant's weekly TTD benefit as determined by his or her weekly wage, divided by this weekly wage. Expected to have a positive relationship with average benefits per claim.

Gender. Variable with a value of 1 if the claimant is a female. Expected to have a negative relationship with average benefits per claim.

Government Employee. Variable with a value of 1 if the claimant is a government employee. No prior expectation about relationship with average benefits per claim.

Age. Age of claimant at date of injury measured in days. Expected to have a positive relationship with average benefits per claim since older workers typically experience greater wage loss than younger workers.

Age Squared. Age of claimant at date of injury measured in day times age. No prior expectation about relationship with average benefits per claim.

Hospitalization. Variable with a value of 1 if the claimant was hospitalized. Expected to have a positive relationship with average benefits per claim.

Benefits Paid by Private Carrier. Variable with a value of 1 if the benefits are paid by private carrier (as opposed to SAIF or self-insuring employer). No prior expectation about relationship with average benefits per claim.

Benefits Paid by SAIF. Variable with a value of 1 if the benefits are paid by SAIF (as opposed to private carrier or self-insuring employer). No prior expectation about relationship with average benefits per claim after controlling for SAIF effect variable (discussed below).

Occupation. Four dummy variables with a value of 1 if worker was employed in a particular occupation (as opposed to the other three occupations with designated with dummy variables or the omitted occupation, which is operators, fabricators, and laborers). No prior expectation about relationship with average benefits per claim.

Industry. Eleven dummy variables with a value of 1 if worker was employed in a particular industry (as opposed to the other 10 industries designated with dummy variables or the omitted industry, which is wholesale and retail trade). No prior expectation about relationship with average benefits per claim.

Nature of Injury. Eight dummy variables with a value of 1 if worker had particular nature of injury category (as opposed to the other seven nature of injury categories designated with dummy variables or the omitted nature of injury, which is rheumatism except back). No prior expectation about relationship with average benefits per claim.

Body Part Injured. Twenty-one dummy variables with a value of 1 if worker had a particular body part injured (as opposed to the other 20 body part categories designated

with dummy variables or the omitted body part category, which is multiple injuries). No prior expectation about relationship with average benefits per claim.

Variables measuring significant periods in Oregon between 1986 and 1996

SAIF Effect. Variable with a value of 1 for any claim with a date of injury between7/1/89 and 6/30/92 and zero otherwise. Expected to have a negative relationship with benefits.

HB 2271 Effect. Variable with a value of 1 for any claim with a date of injury between 1/1/88 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

SB 1197 Effect. Variable with a value of 1 for any claim with a date of injury between 7/1/90 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

SB 369 Effect. Variable with a value of 1 for any claim with a date of injury between 7/1/95 and 12/31/96 and zero otherwise. Expected to have a negative relationship with benefits.

(3B) Average benefits per worker per year

Claim rates (i.e., the number of compensation claims per worker per year) were predicted for each of the 1378 industry-year observations in the data set using the results of the regression equations described in Section 1B and an average predicted claim rate was calculated for the entire data set. This average predicted claim rate was then multiplied by the average per claim benefit payment that was predicted using the results of the regression analyses described in Section 2B to produce an average expected benefit payment per worker per year. This can be represented by the following equation:

$$\frac{Benefits}{Worker/Year} \equiv \frac{Claims}{Worker/Year} x \frac{Benefits}{Claim}$$

Appendix E:

ADDITIONAL METHODOLOGICAL AND EMPIRICAL MATERIAL

Data Set

The data set was restricted to those closed, accepted, disabling claims with a date of injury between January 1, 1986 and December 31, 1996, inclusive, that had a duration between date of injury and date of closure of less than 1095 days (three years x 365 days). Claims missing information on occupation, industry, body part, nature of injury or any other independent or dependent variable were eliminated. Also eliminated were fatal and permanent total disability claims, as well as denied claims that did not result in a DCS. The excluded claims included those coded as TTD that lacked data on TTD duration; PPD claims lacking data on PPD severity; and claims, other than DCS or CDA claims, lacking data on medical costs.

In addition, CDA claims were eliminated from the data set for the purpose of estimating all of the regression equations described below, and DCS claims were eliminated for the purpose of estimating all of the regression equations except the probability of DCS and the DCS amount. However, as indicated, both CDA and DCS claims were included for the purpose of predicting claim cost components.

The number of 1986 to 1996 compensable claims included in the data set after use of these exclusion rules was 304,251.

Average benefits per claim.

Regression analysis was used to estimate the following dependent variables: (1) the probability of DCS; (2) the amount of the DCS award; (3) medical costs; (4) the probability that the claimant received some vocational rehabilitation assistance; (5) the amount of vocational rehab assistance received; (6) PPD (TTD) probability; (7) the duration of disability for TTD claims; (8) TTD duration for PPD claims; (9) unscheduled PPD severity (in degrees) for all PPD claims; and (10) scheduled PPD severity (in degrees) for all PPD claims.

Two different Models of specifications were used to estimate all dependent variables. The two specifications differed in that Model II included the claimant's date of injury while Model I did not. Both specifications included the following independent variables: (1) claimant gender; (2) the replacement rate (i.e., the weekly TTD benefit divided by the claimant's weekly wage); (3) a dummy indicating whether or not the claimant was a government employee; (4) the claimant's age; (5) the claimant's age squared; (6) a dummy indicating whether or not the claimant had been hospitalized; (7) four occupational dummy variables; (8) eleven industry dummy variables; (9) eight nature of injury dummies; (10) 21 body part dummies; (11) a dummy variable indicating the period during which SAIF pursued an aggressive claims management approach; (12) significant period variables indicating the period during which the following legislation was in effect: (a) HB 2271/HB 2900, (b) SB 1197, and (c) SB 369.

The probability equations were estimated with a probit (i.e., through a maximum likelihood estimation procedure that assumes the error term is normally distributed).[25] With the exception of the medical cost equation, which was estimated using OLS, all other variables were estimated using a two-step Heckman procedure where the first step estimates the probability that the dependent variable will be observed. For example, the DCS amount equation was estimated using a Heckman procedure that first estimated the probability of the claim was resolved with a DCS and then estimated the DCS award conditional on the DCS occurring. The following two-step Heckman procedure was used to estimated the following "amount" equations:

(1) TTD duration for TTD claims– probability of a TTD

(2) TTD duration for PPD claims – probability of a PPD

(3) Unscheduled PPD degrees – probability of PPD (all PPDs, even those with no reported unscheduled PPD degrees were included – these were treated as zero awards in the equations)

(4) Scheduled PPD degrees – probability of PPD (ditto)

(5) VR amount – probability of VR assistance

Predictions based on these regressions were made for three sets of observations: (1) Non-CDA claims (i.e., the same set of claims that were used to estimate the equations), (2) CDA claims, and (1) and (2) combined. For each set of observations, we estimated the pre-SB 1197 (or SB 369) costs by setting the value of the applicable significant period variable (SB 1197 or 369) to zero and calculated the value of the dependent variable predicted by the regression equation. For the post-period costs, we set the respective significant period to one and did the same.

Claims Rates

A data set with two-digit SIC industry, semi-annual claims rates was constructed. Employment and wage data (by two-digit SIC) were obtained from the Oregon Employment Department for the years 1986 through 1996. Claim frequency by two-digit SIC were obtained using the Oregon WCD's megatape. As was the case for the cost data, claims were restricted to accepted, closed claims that had been closed within three years of the date of injury, and that were not missing data on SIC classification. Semi-annual claims frequency data were calculated (i.e., Jan – June and July – December). However, because the employment and wage data were reported on an annual basis, we used the same values of both variables for both the early and later half-years. Finally, expected

[25] The two-step Heckman procedure controls for sample selection bias by: (1) estimating the probability that observations will be included in the sample (e.g., the probability that a claim will receive PPD benefits), and (2) including an estimate of that probability in the regression equation predicting the dependent variable of interest (e.g., PPD severity).

benefits were calculated using an actuarial technique employed by Thomason & Burton. Wage and benefit data were transformed into 1996 constant dollars using the CPI.

Claim frequencies – total as well as disaggregated by injury, gender, occupation, and industry – were estimated using a negative binomial regression that used employment as an exposure variable. (This was necessitated by the fact that many of the cells had zero values.) The independent variables included the weekly wage rate, expected benefits, the percentage change in industry employment over the previous year, a significant period indicating the aggressive SAIF period, industry dummy variables, and the three legislative significant period variables. In addition, a trend variable was also included in the Model II specification, but was not included in the Model I specification.

Appendix F

REGRESSION EQUATION FOR ANALYSIS IN SECTION 7.4.1

Appendix Table App.C.1
Regression Equations Predicting Claim Rates, All Claims

Variable	Model I	Model II
Benefit Index	-0.00009	-0.00002
	(5.99)	(1.23)
Wage	-0.00004	-0.00008
	(0.20)	(0.40)
Employment growth	-0.00807	-0.00825
	(0.99)	(1.01)
Time	--	-0.02556
		(9.10)
HB2271	-0.04916	0.04983
	(2.61)	(2.36)
SB1197	-0.18727	-0.08285
	(8.40)	(3.44)
SB369	-0.14145	-0.04415
	(7.80)	(2.18)
Aggressive SAIF	.-.0431806	0.07849
	(3.33)	(6.06)
Pseudo R-square	0.2274	0.2324

***** Industry dummies not shown***

Appendix G

REGRESSION EQUATIONS FOR ANALYSIS IN SECTION 7.4.2

Numbers within parenthesis are absolute t-ratios. The probability coefficients are coefficients of the maximum likelihood function; the magnitudes should not be interpreted as representing the change in probability given a unit change in the associated independent variable.

Appendix Table App.D.1
Regression Equations Predicting Duration of TTD for TTD Claims and Probability of TTD

	Model I		Model II	
Variable	**Duration**	**Probability**	**Duration**	**Probability**
Replacement rate	-10.90519	0.51738	-10.93602	0.51470
	(5.63)	(9.84)	(5.64)	(9.78)
Female	5.44287	0.00198	5.44276	0.00203
	(24.82)	(0.29)	(24.82)	(0.30)
Government Employee	-4.79981	0.01147	-4.79948	0.01167
	(12.50)	(1.00)	(12.50)	(1.02)
Age	0.00211	-0.00014	0.00212	-0.00014
	(11.87)	(37.92)	(11.88)	(37.95)
Age-squared*1,000,000	-0.05830	0.00329	-0.05840	0.00329
	(11.55)	(26.09)	(11.56)	(26.09)
Hospitalized	1.24522	-0.06381	1.25106	-0.06341
	(9.46)	(18.82)	(9.49)	(18.70)
SAIF	1.63360	-0.08027	1.63428	-0.08155
	(5.74)	(9.81)	(5.72)	(9.94)
Private Insurer	0.42673	-0.00329	0.42689	-0.00325
	(1.80)	(0.46)	(1.80)	(0.45)
Managerial, Prof., or Tech.	-3.00772	-0.18639	-2.99886	-0.18649
	(7.40)	(18.29)	(7.38)	(18.30)
Clerical, Sales, or Office Support	-1.14626	-0.07083	-1.14329	-0.07082
	(3.23)	(6.65)	(3.22)	(6.65)
Blue-Collar Service	-0.24588	0.07245	-0.24890	0.07261
	(0.81)	(7.74)	(0.82)	(7.76)
Skilled Blue Collar (non-service)	-1.06011	-0.05226	-1.05759	-0.05225
	(3.92)	(6.63)	(3.91)	(6.63)
Agriculture	6.35940	-0.01021	6.36009	-0.01006
	(12.47)	(0.64)	(12.47)	(0.63)
Forestry & Fishing	12.92700	-0.11840	12.93190	-0.11812
	(13.03)	(3.94)	(13.03)	(3.93)
Mining & Construction	4.00273	-0.09364	4.00620	-0.09392

	(10.57)	(8.43)	(10.57)	(8.45)
Logging	3.64852	-0.12437	3.65514	-0.12382
	(6.58)	(7.69)	(6.59)	(7.66)
Ground Transportation	3.77872	0.07874	3.77440	0.07847
	(9.70)	(6.44)	(9.69)	(6.41)
Other Transportation, Comm. &	-3.00934	0.00546	-3.01057	0.00510
Utilities	(5.14)	(0.30)	(5.14)	(0.28)
Finance, Insurance, & Real Estate	0.28425	-0.07588	0.28749	-0.07573
	(0.41)	(3.73)	(0.41)	(3.72)
Other Services	0.76655	-0.02894	0.76742	-0.02908
	(2.65)	(3.18)	(2.65)	(3.20)
Health Services	-1.89453	-0.01571	-1.89321	-0.01558
	(4.77)	(1.28)	(4.77)	(1.26)
Public Administration	-1.78504	-0.04135	-1.78313	-0.04157
	(2.97)	(2.36)	(2.97)	(2.37)
Manufacturing	-0.56267	-0.16824	-0.55442	-0.16798
	(1.77)	(20.52)	(1.74)	(20.49)
Trauma, N.E.C.	-9.13183	0.01435	-9.13213	0.01415
	(14.13)	(0.78)	(14.13)	(0.77)
Dislocations	7.83819	-0.74637	7.88561	-0.74653
	(5.79)	(34.38)	(5.83)	(34.39)
Fractures	5.50134	-0.36530	5.51870	-0.36518
	(7.42)	(20.80)	(7.45)	(20.80)
Sprains & Strains	-6.01650	0.10863	-6.02153	0.10878
	(10.38)	(6.80)	(10.38)	(6.81)
Cuts & Lacerations	-6.01650	0.10863	-6.02153	0.10878
	(10.38)	(6.80)	(10.38)	(6.81)
Bruises	-11.05458	0.14340	-11.06121	0.14355
	(16.36)	(7.66)	(16.37)	(7.67)
Diseases, N.E.C.	-11.36066	0.39992	-11.37659	0.40027
	(15.66)	(21.51)	(15.68)	(21.53)
Carpal Tunnel	9.05889	-0.18917	9.06712	-0.18961
	(13.19)	(10.16)	(13.20)	(10.18)
Hernia	1.35167	1.01164	1.32833	1.01220
	(1.29)	(22.16)	(1.27)	(22.17)
Head	-14.76789	0.40749	-14.78703	0.40778
	(20.20)	(21.85)	(20.22)	(21.86)
Neck	-7.95127	0.12186	-7.95825	0.12159
	(11.44)	(6.16)	(11.45)	(6.15)
Trunk, N.E.C.	-2.84355	0.19615	-2.85382	0.19590
	(3.55)	(8.36)	(3.56)	(8.34)
Shoulder	-5.66826	-0.03631	-5.66616	-0.03641
	(11.11)	(2.60)	(11.10)	(2.61)
Chest	-17.49532	1.24322	-17.54205	1.24343

	(13.99)	(44.22)	(14.03)	(44.23)
Back	-8.10963	0.28164	-8.12294	0.28173
	(17.34)	(27.59)	(17.37)	(27.60)
Abdomen	-7.37077	1.09230	-7.40875	1.09220
	(6.14)	(24.25)	(6.17)	(24.25)
Pelvis	-7.27251	0.73906	-7.30458	0.73886
	(7.65)	(32.37)	(7.68)	(32.36)
Upper Extremities, N.E.C	0.10446	0.01155	0.10466	0.01150
	(0.14)	(0.55)	(0.14)	(0.54)
Arm, N.E.C.	-5.71415	0.17229	-5.72188	0.17234
	(9.00)	(9.65)	(9.01)	(9.65)
Elbow	-4.62614	0.16760	-4.63384	0.16746
	(6.27)	(8.10)	(6.28)	(8.10)
Wrist	-0.07448	0.27695	-0.08669	0.27713
	(0.13)	(19.11)	(0.15)	(19.12)
Hand	-10.82450	0.19346	-10.83251	0.19350
	(18.65)	(11.75)	(18.67)	(11.75)
Fingers	-12.45755	-0.30874	-12.43915	-0.30888
	(18.96)	(22.57)	(18.93)	(22.58)
Lower Extremities, N.E.C.	-6.36636	0.20756	-6.37482	0.20734
	(6.48)	(7.16)	(6.49)	(7.15)
Leg, N.E.C.	-6.80267	0.42291	-6.82209	0.42298
	(9.13)	(21.79)	(9.16)	(21.79)
Knees	-3.35133	-0.39255	-3.32989	-0.39268
	(4.99)	(32.53)	(4.96)	(32.54)
Ankles	-12.71210	0.58164	-12.73658	0.58157
	(16.83)	(35.58)	(16.87)	(35.57)
Feet	-11.09288	0.63977	-11.11916	0.63987
	(13.53)	(34.70)	(13.56)	(34.70)
Toes	-22.49353	0.78681	-22.52599	0.78688
	(19.79)	(27.33)	(19.82)	(27.33)
Body System	-0.77564	0.78710	-0.80921	0.78800
	(0.58)	(20.71)	(0.60)	(20.73)
Date of Injury	--	--	0.00004	0.00002
			(0.16)	(2.37)
Aggressive SAIF period	-1.95075	0.07003	-1.94255	0.07542
	(5.09)	(6.09)	(4.96)	(6.43)
HB2271/HB2900	-0.77312	0.03263	-0.80768	0.01845
	(2.92)	(4.22)	(2.44)	(1.88)
SB1197	-1.03934	0.08340	-1.09045	0.06050
	(4.54)	(12.82)	(2.87)	(5.19)
SB369	-0.96578	0.08293	-1.01101	0.06396
	(3.27)	(9.46)	(2.58)	(5.38)
Constant	25.99935	1.36060	25.67075	1.19903

	(14.91)	(27.22)	(9.00)	(14.16)
Mills lambda	-166.06900	--	-169.32150	--
	(7.27)		(7.41)	
Wald Chi-square	34709.37		34713.03	

Appendix Table App.D.2

Regression Equations Predicting Duration of TTD for PPD Claims and Probability of PPD

	Model I		Model II	
Variable	**Duration**	**Probability**	**Duration**	**Probability**
Replacement rate	83.92044	-0.50923	86.45150	-0.50672
	(6.33)	(9.64)	(6.52)	(9.59)
Female	21.21740	0.00056	21.10389	0.00051
	(14.30)	(0.08)	(14.21)	(0.08)
Government Employee	-28.43679	-0.00993	-28.47738	-0.01011
	(11.45)	(0.86)	(11.46)	(0.88)
Age	-0.01205	0.00014	-0.01202	0.00014
	(4.71)	(38.16)	(4.69)	(38.19)
Age-squared*1,000,000	0.20200	-0.00335	0.20100	-0.00335
	(3.18)	(26.48)	(3.16)	(26.48)
Hospitalized	-5.57808	0.06325	-5.42742	0.06288
	(4.49)	(18.65)	(4.38)	(18.46)
SAIF	-1.50942	0.08613	-0.55920	0.08732
	(0.67)	(10.48)	(0.25)	(10.60)
Private Insurer	7.74586	0.00731	7.71840	0.00727
	(4.94)	(1.01)	(4.92)	(1.01)
Managerial, Prof., or Tech.	-54.69160	0.18269	-54.61787	0.18278
	(15.36)	(17.85)	(15.33)	(17.86)
Clerical, Sales, or Office Support	-31.73503	0.06880	-31.76889	0.06879
	(12.32)	(6.44)	(12.32)	(6.44)
Blue-Collar Service	2.87295	-0.07333	2.81615	-0.07348
	(1.17)	(7.81)	(1.15)	(7.83)
Skilled Blue Collar (non-service)	-12.02160	0.05177	-12.03880	0.05175
	(6.42)	(6.55)	(6.43)	(6.55)
Agriculture	24.56261	0.01140	24.44113	0.01126
	(7.01)	(0.72)	(6.97)	(0.71)
Forestry & Fishing	29.44353	0.11740	28.98493	0.11714
	(4.32)	(3.90)	(4.25)	(3.89)
Mining & Construction	15.29479	0.09449	15.48400	0.09475
	(5.36)	(8.49)	(5.42)	(8.51)
Logging	13.02317	0.12119	12.49285	0.12068
	(3.25)	(7.47)	(3.12)	(7.44)

Ground Transportation	21.06393	-0.07528	21.26755	-0.07503
	(7.05)	(6.14)	(7.12)	(6.12)
Other Transportation, Comm. &	-18.28646	-0.00602	-18.07869	-0.00570
Utilities	(4.60)	(0.33)	(4.54)	(0.31)
Finance, Insurance, & Real Estate	-29.20709	0.07645	-29.46542	0.07631
	(6.41)	(3.74)	(6.46)	(3.74)
Other Services	-4.61076	0.02789	-4.57174	0.02802
	(2.23)	(3.06)	(2.21)	(3.08)
Health Services	-13.32130	0.01712	-13.39194	0.01699
	(4.83)	(1.39)	(4.85)	(1.38)
Public Administration	-10.71132	0.03878	-10.43915	0.03898
	(2.82)	(2.20)	(2.75)	(2.22)
Manufacturing	-31.30877	0.16521	-31.58706	0.16498
	(9.81)	(20.09)	(9.91)	(20.07)
Trauma, N.E.C.	-6.94989	0.00548	-6.54270	0.00564
	(1.75)	(0.30)	(1.65)	(0.31)
Dislocations	-85.87457	0.75560	-85.77610	0.75574
	(7.28)	(34.74)	(7.27)	(34.75)
Fractures	-54.61315	0.37749	-54.71680	0.37737
	(7.80)	(21.43)	(7.81)	(21.43)
Sprains & Strains	-1.80368	-0.10282	-1.92222	-0.10296
	(0.47)	(6.41)	(0.50)	(6.42)
Cuts & Lacerations	-1.80368	-0.10282	-1.92222	-0.10296
	(0.47)	(6.41)	(0.50)	(6.42)
Bruises	-21.09944	-0.12655	-20.83347	-0.12670
	(4.69)	(6.74)	(4.63)	(6.75)
Diseases, N.E.C.	36.03866	-0.38775	35.89291	-0.38808
	(4.66)	(20.79)	(4.63)	(20.81)
Carpal Tunnel	-29.15388	0.15756	-28.58389	0.15799
	(6.06)	(8.40)	(5.93)	(8.43)
Hernia	157.24200	-1.01032	157.33570	-1.01084
	(6.51)	(22.07)	(6.51)	(22.08)
Head	-0.49439	-0.48039	-0.69039	-0.48058
	(0.05)	(24.97)	(0.07)	(24.98)
Neck	-4.72758	-0.11741	-4.55509	-0.11717
	(1.01)	(5.92)	(0.97)	(5.90)
Trunk, N.E.C.	28.67132	-0.19016	28.93898	-0.18993
	(4.69)	(8.08)	(4.73)	(8.07)
Shoulder	-14.50652	0.04381	-14.37197	0.04390

	(4.80)	(3.13)	(4.75)	(3.14)
Chest	151.93520	-1.23386	152.10330	-1.23406
	(6.66)	(43.80)	(6.67)	(43.80)
Back	37.75261	-0.27387	37.78451	-0.27396
	(7.55)	(26.74)	(7.55)	(26.75)
Abdomen	136.02490	-1.07689	136.36020	-1.07680
	(5.77)	(23.85)	(5.78)	(23.85)
Pelvis	104.43480	-0.72359	105.09490	-0.72342
	(7.79)	(31.64)	(7.84)	(31.63)
Upper Extremities, N.E.C	-25.96991	-0.00451	-25.80304	-0.00446
	(5.75)	(0.21)	(5.70)	(0.21)
Arm, N.E.C.	-7.95210	-0.16861	-7.84071	-0.16865
	(1.66)	(9.41)	(1.64)	(9.42)
Elbow	-16.05870	-0.15908	-15.80774	-0.15895
	(3.11)	(7.67)	(3.06)	(7.67)
Wrist	-3.23836	-0.25269	-3.38431	-0.25287
	(0.62)	(17.35)	(0.65)	(17.36)
Hand	-35.68752	-0.19032	-35.38734	-0.19036
	(7.23)	(11.53)	(7.17)	(11.53)
Fingers	-126.62590	0.30713	-126.61200	0.30727
	(23.66)	(22.39)	(23.64)	(22.40)
Lower Extremities, N.E.C.	8.12150	-0.20199	8.89541	-0.20179
	(1.12)	(6.96)	(1.23)	(6.95)
Leg, N.E.C.	59.01803	-0.41867	59.01620	-0.41874
	(7.20)	(21.54)	(7.19)	(21.54)
Knees	-96.52802	0.40188	-96.56412	0.40200
	(14.70)	(33.23)	(14.69)	(33.24)
Ankles	35.32988	-0.57500	35.96612	-0.57494
	(3.42)	(35.09)	(3.48)	(35.09)
Feet	57.74401	-0.63726	58.13694	-0.63735
	(4.99)	(34.47)	(5.03)	(34.48)
Toes	20.37776	-0.78347	21.21459	-0.78353
	(1.38)	(27.18)	(1.43)	(27.18)
Body System	129.30360	-0.76259	128.78090	-0.76341
	(8.19)	(20.01)	(8.15)	(20.03)
Date of Injury	--	--	-0.01339	-0.00002
			(8.50)	(2.19)
Aggressive SAIF period	6.57915	-0.06998	2.14468	-0.07500
	(2.40)	(6.07)	(0.76)	(6.38)

HB2271/HB2900	-25.13856	-0.03186	-14.13856	-0.01863
	(14.48)	(4.11)	(6.65)	(1.90)
SB1197	-8.15945	-0.08268	10.60756	-0.06133
	(4.21)	(12.68)	(3.84)	(5.24)
SB369	-1.96280	-0.08080	13.00995	-0.06311
	(0.83)	(9.20)	(4.63)	(5.29)
Constant	434.96300	-1.39424	565.77250	-1.24356
	(10.12)	(27.78)	(13.07)	(14.63)
Mills lambda	-166.06900	--	-169.32150	--
	(7.27)		(7.41)	
Wald Chi-square	31943.30		31853.61	

Appendix Table App.D.3

Regression Equations Predicting Probability and Cost of a DCS

	Model I		Model II	
Variable	**Cost**	**Probability**	**Cost**	**Probability**
Replacement rate	5245.06	0.91992	5769.51	0.92049
	(1.12)	(9.68)	(1.23)	(9.68)
Female	2103.99	0.09636	2104.13	0.09634
	(4.27)	(9.25)	(4.26)	(9.25)
Government Employee	-3684.16	-0.23789	-3790.09	-0.23795
	(3.31)	(12.42)	(3.39)	(12.42)
Age	1.70971	0.00005	1.74808	0.00005
	(6.07)	(8.58)	(6.19)	(8.58)
Age-squared*1,000,000	-47.40	-0.00148	-48.50	-0.00148
	(5.59)	(7.15)	(5.70)	(7.15)
Hospitalized	636.96	-0.01536	606.81	-0.01543
	(3.91)	(2.78)	(3.71)	(2.79)
SAIF	815.98	-0.00106	1013.18	-0.00081
	(2.18)	(0.08)	(2.69)	(0.06)
Private Insurer	1188.56	0.04352	1163.62	0.04350
	(3.20)	(3.71)	(3.13)	(3.71)
Managerial, Prof., or Tech.	-2570.63	-0.14549	-2603.05	-0.14548
	(3.37)	(8.62)	(3.40)	(8.62)
Clerical, Sales, or Office Support	-1195.05	-0.03082	-1215.45	-0.03082
	(2.55)	(1.90)	(2.59)	(1.90)
Blue-Collar Service	-731.56	0.00800	-771.94	0.00796
	(1.87)	(0.56)	(1.97)	(0.56)
Skilled Blue Collar (non-service)	-1315.67	-0.11078	-1334.73	-0.11078
	(2.19)	(8.25)	(2.22)	(8.25)
Agriculture	2543.59	0.17761	2537.43	0.17756
	(2.48)	(7.04)	(2.46)	(7.03)
Forestry & Fishing	7867.40	0.35457	7887.84	0.35454
	(4.05)	(7.97)	(4.06)	(7.96)
Mining & Construction	2269.79	0.13484	2256.78	0.13487
	(2.98)	(7.42)	(2.96)	(7.42)
Logging	1734.09	-0.07554	1593.92	-0.07565
	(1.89)	(2.47)	(1.73)	(2.48)

Ground Transportation	-1351.09	-0.14765	-1424.06	-0.14761
	(1.55)	(7.03)	(1.63)	(7.03)
Other Transportation, Comm. &	-2396.13	-0.19292	-2532.02	-0.19288
Utilities	(1.94)	(5.81)	(2.05)	(5.81)
Finance, Insurance, & Real Estate	2551.58	0.17526	2537.76	0.17523
	(2.48)	(6.18)	(2.45)	(6.18)
Other Services	2088.89	0.14090	2115.11	0.14092
	(2.98)	(10.27)	(3.01)	(10.28)
Health Services	263.92	-0.01840	201.10	-0.01845
	(0.51)	(0.98)	(0.39)	(0.98)
Public Administration	-143.06	0.01721	-106.38	0.01727
	(0.18)	(0.60)	(0.14)	(0.60)
Manufacturing	18.25	0.02674	-32.72	0.02667
	(0.05)	(1.99)	(0.08)	(1.99)
Trauma, N.E.C.	-5624.62	-0.53528	-5639.51	-0.53523
	(2.36)	(18.75)	(2.36)	(18.74)
Dislocations	443.78	-0.10036	545.28	-0.10030
	(0.47)	(3.18)	(0.57)	(3.18)
Fractures	-3329.16	-0.58329	-3451.36	-0.58331
	(1.24)	(19.25)	(1.28)	(19.25)
Sprains & Strains	-3042.95	-0.30770	-3093.61	-0.30772
	(2.07)	(13.01)	(2.10)	(13.01)
Cuts & Lacerations	-3042.95	-0.30770	-3093.61	-0.30772
	(2.07)	(13.01)	(2.10)	(13.01)
Bruises	-9065.45	-0.75906	-9165.70	-0.75906
	(2.56)	(20.23)	(2.59)	(20.23)
Diseases, N.E.C.	-6403.69	-0.55868	-6501.42	-0.55872
	(2.49)	(18.73)	(2.52)	(18.73)
Carpal Tunnel	3797.53	0.16679	3933.35	0.16692
	(3.93)	(6.32)	(4.06)	(6.32)
Hernia	-7584.71	-0.42104	-7570.20	-0.42108
	(3.36)	(8.85)	(3.35)	(8.86)
Head	-5737.47	-0.16224	-5851.81	-0.16233
	(5.35)	(5.44)	(5.44)	(5.44)
Neck	-2025.14	-0.07815	-2049.99	-0.07811
	(2.46)	(2.78)	(2.48)	(2.78)
Trunk, N.E.C.	-2308.25	-0.05959	-2314.87	-0.05955
	(2.45)	(1.77)	(2.46)	(1.77)

Shoulder	-6952.74	-0.32672	-6956.33	-0.32669
	(4.53)	(14.46)	(4.52)	(14.46)
Chest	-4460.85500	-0.04690	-4409.51000	-0.04690
	(5.16)	(1.51)	(5.09)	(1.51)
Back	-3398.44	-0.11649	-3421.78	-0.11651
	(5.39)	(7.91)	(5.41)	(7.91)
Abdomen	-4727.43	-0.12796	-4861.74	-0.12799
	(3.67)	(2.98)	(3.77)	(2.98)
Pelvis	-8554.34	-0.36859	-8601.55	-0.36855
	(4.71)	(11.32)	(4.72)	(11.32)
Upper Extremities, N.E.C	-4754.29	-0.27402	-4779.02	-0.27401
	(3.22)	(8.15)	(3.23)	(8.15)
Arm, N.E.C.	-6749.92	-0.36594	-6822.40	-0.36597
	(3.77)	(11.72)	(3.80)	(11.72)
Elbow	-7449.57	-0.49987	-7441.00	-0.49981
	(3.10)	(13.04)	(3.08)	(13.03)
Wrist	-10203.54	-0.52733	-10325.63	-0.52739
	(4.43)	(23.38)	(4.47)	(23.38)
Hand	-9941.27	-0.49603	-10000.94	-0.49607
	(4.27)	(14.93)	(4.28)	(14.93)
Fingers	-17311.29	-0.78295	-17402.23	-0.78292
	(4.82)	(22.42)	(4.83)	(22.42)
Lower Extremities, N.E.C.	-6351.84	-0.25122	-6482.31	-0.25122
	(3.62)	(5.04)	(3.69)	(5.04)
Leg, N.E.C.	-8658.51	-0.37064	-8833.33	-0.37068
	(4.58)	(10.35)	(4.66)	(10.35)
Knees	-7854.11	-0.36445	-7847.95	-0.36441
	(4.70)	(17.88)	(4.69)	(17.88)
Ankles	-15422.16	-0.70378	-15646.66	-0.70380
	(4.76)	(21.33)	(4.83)	(21.33)
Feet	-9880.02	-0.48419	-10010.92	-0.48425
	(4.26)	(13.97)	(4.30)	(13.97)
Toes	-20668.30	-0.71261	-20723.21	-0.71263
	(5.35)	(9.40)	(5.37)	(9.40)
Body System	16899.61	1.29843	17074.41	1.29832
	(3.59)	(46.22)	(3.61)	(46.22)
Date of Injury	--	--	-2.23488	0.00000
			(7.33)	(0.30)
Aggressive SAIF period	3709.06	0.31897	3171.42	0.31797

	(2.63)	(19.49)	(2.24)	(19.05)
HB2271/HB2900	-349.22	0.28439	1544.93	0.28728
	(0.27)	(21.13)	(1.17)	(17.44)
SB1197	-3824.85	-0.06446	-974.96	-0.06001
	(9.91)	(6.47)	(1.80)	(3.39)
SB369	-2743.01	-0.06916	-89.63	-0.06527
	(5.54)	(4.83)	(0.15)	(3.40)
Constant	-50924.68	-2.41712	-29781.64	-2.38467
	(3.66)	(28.38)	(2.11)	(17.44)
Mills lambda	20839.14	--	21037.11	--
	(4.30)		(4.33)	
Wald Chi-square	13538.34		13481.80	

Appendix Table App.D.4

Regression Equations Predicting Medical Benefit Costs

Variable	Model I	Model II
Replacement rate	-6344.40	-8777.02
	(15.05)	(18.03)
Female	-8.35	-43.49
	(0.16)	(0.71)
Government Employee	-738.51	-813.54
	(8.11)	(7.74)
Age	0.44022	1.02431
	(15.29)	(30.85)
Age-squared*1,000,000	-13.70	-26.50
	(14.03)	(23.51)
Hospitalized	18.25	281.51
	(0.68)	(9.08)
SAIF	-48.33	392.79
	(0.75)	(5.25)
Private Insurer	48.59860	53.39
	(0.86)	(0.82)
Managerial, Prof., or Tech.	-647.41	266.05
	(7.93)	(2.82)
Clerical, Sales, or Office Support	-628.23	-304.54
	(7.51)	(3.15)
Blue-Collar Service	-402.04	-727.98
	(5.60)	(8.77)
Skilled Blue Collar (non-service)	-36.06	209.50
	(0.58)	(2.91)
Agriculture	476.87	488.05
	(3.86)	(3.42)
Forestry & Fishing	1948.19	2423.82
	(8.25)	(8.89)
Mining & Construction	1566.62	1990.66
	(17.94)	(19.74)
Logging	2397.86	2906.86
	(18.77)	(19.70)
Ground Transportation	950.74	609.41

	(10.15)	(5.63)
Other Transportation, Comm. &	118.92	115.48
Utilities	(0.84)	(0.71)
Finance, Insurance, & Real Estate	-400.83	-73.97
	(2.46)	(0.39)
Other Services	-92.65	41.34
	(1.32)	(0.51)
Health Services	-130.51	-96.97
	(1.35)	(0.87)
Public Administration	177.93	389.02
	(1.27)	(2.40)
Manufacturing	122.02	874.04
	(1.90)	(11.82)
Trauma, N.E.C.	828.90	786.37
	(5.52)	(4.54)
Dislocations	2000.91	6092.73
	(11.07)	(29.25)
Fractures	1397.50	3083.63
	(9.65)	(18.45)
Sprains & Strains	-471.99	-964.76
	(3.59)	(6.35)
Cuts & Lacerations	-471.99	-964.76
	(3.59)	(6.35)
Bruises	-240.89	-1033.41
	(1.58)	(5.86)
Diseases, N.E.C.	-281.78530	-1950.52
	(1.91)	(11.46)
Carpal Tunnel	445.02	1353.09
	(2.92)	(7.68)
Hernia	-51.42	-2196.14
	(0.22)	(8.24)
Head	-3151.88	-5000.87
	(21.73)	(29.88)
Neck	-1015.31	-1601.46
	(6.35)	(8.67)
Trunk, N.E.C.	-573.03	-1547.99
	(3.07)	(7.17)
Shoulder	-1417.39	-1191.75

	(12.27)	(8.93)
Chest	-2789.40	-7405.58600
	(16.40)	(37.83)
Back	-841.27	-2218.04
	(10.14)	(23.19)
Abdomen	-586.29	-4315.95
	(2.60)	(16.60)
Pelvis	-276.15	-3435.87
	(1.76)	(19.00)
Upper Extremities, N.E.C	-2011.58	-2025.82
	(11.52)	(10.04)
Arm, N.E.C.	-2278.60	-3066.99
	(15.83)	(18.45)
Elbow	-2769.09	-3522.25
	(16.48)	(18.15)
Wrist	-1996.92	-3281.07
	(17.11)	(24.35)
Hand	-3688.82	-4601.16
	(28.09)	(30.35)
Fingers	-7086.53	-5345.26
	(62.55)	(40.90)
Lower Extremities, N.E.C.	-1929.38	-2912.50
	(8.36)	(10.92)
Leg, N.E.C.	-728.08	-2624.49
	(4.89)	(15.26)
Knees	-3138.46	-1030.29
	(31.13)	(8.87)
Ankles	-3006.70	-5509.11
	(24.62)	(39.14)
Feet	-3105.91	-5826.26
	(22.92)	(37.31)
Toes	-5288.35	-8741.33
	(25.12)	(35.99)
Body System	-467.84	-4030.03
	(1.69)	(12.61)
Date of Injury		-1.08782
		(17.13)
Aggressive SAIF period	-117.60	-797.89
	(1.30)	(7.50)

HB2271/HB2900	-2044.76	-1267.27
	(33.28)	(14.17)
SB1197	-1098.76	44.34
	(21.50)	(0.42)
SB369	-842.94	27.45
	(12.39)	(0.26)
Constant	7143.5	339.92
	(18.18)	(0.79)
Adjusted R-square	0.0638	0.0648

Appendix Table App.D.5

Regression Equations Predicting Probability and Cost of Vocational Rehabilitation

	Model I		Model II	
Variable	**Cost**	**Probability**	**Cost**	**Probability**
Replacement rate	-32728.67	0.00331	-31395.12	0.02986
	(4.50)	(0.04)	(4.48)	(0.32)
Female	1801.90	0.10937	1384.67	0.11020
	(0.95)	(8.80)	(0.74)	(8.85)
Government Employee	-4484.82	-0.11967	-4144.15	-0.12262
	(1.81)	(5.53)	(1.69)	(5.65)
Age	11.15396	0.00013	10.66907	0.00013
	(5.45)	(17.52)	(5.25)	(17.66)
Age-squared*1,000,000	-336.80	-0.00384	-322.20	-0.00388
	(5.49)	(15.35)	(5.30)	(15.48)
Hospitalized	7937.52	0.19663	6702.61	0.18846
	(2.67)	(36.33)	(2.39)	(34.52)
SAIF	5171.61	0.14922	4980.81	0.15782
	(2.06)	(9.88)	(1.93)	(10.40)
Private Insurer	2063.08	0.03382	1912.58	0.03352
	(1.71)	(2.42)	(1.64)	(2.40)
Managerial, Prof., or Tech.	-9134.74	-0.21544	-8220.12	-0.21561
	(2.50)	(10.52)	(2.30)	(10.51)
Clerical, Sales, or Office Support	-10947.40	-0.19730	-10191.98	-0.19854
	(3.23)	(9.38)	(3.05)	(9.42)
Blue-Collar Service	-9231.97	-0.08926	-8975.46	-0.09157
	(4.77)	(5.06)	(4.69)	(5.19)
Skilled Blue Collar (non-service)	421.16	-0.00912	362.00	-0.01014
	(0.37)	(0.63)	(0.33)	(0.70)
Agriculture	2234.12	0.04267	1936.08	0.04065
	(0.95)	(1.46)	(0.86)	(1.39)
Forestry & Fishing	21064.56	0.35465	19481.42	0.35457
	(3.30)	(7.55)	(3.13)	(7.53)
Mining & Construction	18239.03	0.24722	17428.76	0.25157
	(4.52)	(12.65)	(4.33)	(12.85)
Logging	24354.30	0.27175	22820.75	0.26568
	(5.37)	(10.40)	(5.22)	(10.15)

Ground Transportation	3021.85	-0.00882	3183.74	-0.00642
	(1.74)	(0.39)	(1.90)	(0.29)
Other Transportation, Comm. & Utilities	-7403.38	-0.13840	-6676.04	-0.13587
	(1.95)	(3.53)	(1.81)	(3.46)
Finance, Insurance, & Real Estate	-3741.15	-0.02388	-3682.54	-0.02515
	(1.19)	(0.59)	(1.21)	(0.63)
Other Services	-3157.70	-0.02503	-2994.97	-0.02435
	(2.25)	(1.44)	(2.22)	(1.40)
Health Services	1230.75	0.08381	762.12	0.08226
	(0.57)	(3.81)	(0.37)	(3.74)
Public Administration	-1643.69	-0.06392	-1217.31	-0.06184
	(0.54)	(1.74)	(0.41)	(1.68)
Manufacturing	4509.56	0.02776	4167.46	0.02416
	(3.60)	(1.83)	(3.50)	(1.59)
Trauma, N.E.C.	2008.61	-0.20365	2922.93	-0.20433
	(0.49)	(6.05)	(0.73)	(6.06)
Dislocations	15467.05	0.22339	14758.43	0.22735
	(3.58)	(6.22)	(3.46)	(6.32)
Fractures	14887.31	0.08102	14418.02	0.07882
	(5.45)	(2.58)	(5.47)	(2.51)
Sprains & Strains	-7450.76	-0.17351	-6919.06	-0.17683
	(2.18)	(6.23)	(2.05)	(6.34)
Cuts & Lacerations	-7450.76	-0.17351	-6919.06	-0.17683
	(2.18)	(6.23)	(2.05)	(6.34)
Bruises	-21863.31	-0.53073	-19602.04	-0.53419
	(2.48)	(13.37)	(2.24)	(13.44)
Diseases, N.E.C.	-16145.57	-0.34964	-14996.61	-0.35586
	(2.73)	(10.45)	(2.55)	(10.61)
Carpal Tunnel	4105.39	0.05232	4200.57	0.05754
	(1.50)	(1.56)	(1.58)	(1.71)
Hernia	-56246.06	-0.82334	-52804.05	-0.83046
	(3.90)	(10.72)	(3.69)	(10.80)
Head	-38507.92	-0.68718	-35736.05	-0.69188
	(3.47)	(16.04)	(3.25)	(16.11)
Neck	-8151.41	-0.23874	-7020.04	-0.23709
	(1.82)	(6.76)	(1.61)	(6.70)
Trunk, N.E.C.	-5017.36	-0.05427	-4622.88	-0.05183
	(1.66)	(1.42)	(1.60)	(1.35)

Shoulder	-12364.33	-0.18912	-11560.27	-0.18935
	(3.63)	(7.70)	(3.45)	(7.69)
Chest	-48537	-0.70146	-45559	-0.70470
	(4.27)	(15.05)	(4.06)	(15.10)
Back	-6072.40	-0.11498	-5598.38	-0.11591
	(2.85)	(6.80)	(2.68)	(6.84)
Abdomen	-28248.52	-0.55800	-26069.76	-0.55954
	(2.72)	(7.70)	(2.54)	(7.69)
Pelvis	-17464.35	-0.39006	-15621.87	-0.38864
	(2.61)	(9.75)	(2.39)	(9.69)
Upper Extremities, N.E.C	-15222.85	-0.14534	-14453.30	-0.14414
	(4.17)	(3.84)	(4.10)	(3.80)
Arm, N.E.C.	-22047.40	-0.29117	-20803.96	-0.29215
	(4.34)	(8.98)	(4.17)	(8.99)
Elbow	-19595.93	-0.21558	-18554.55	-0.21355
	(4.59)	(5.93)	(4.47)	(5.86)
Wrist	-29109.65	-0.37505	-27621.88	-0.37778
	(4.81)	(14.20)	(4.61)	(14.27)
Hand	-32517.83	-0.48336	-30322.64	-0.48427
	(4.15)	(14.21)	(3.93)	(14.23)
Fingers	-54337.95	-0.76198	-50868.54	-0.76113
	(4.51)	(22.97)	(4.30)	(22.91)
Lower Extremities, N.E.C.	-19531.39	-0.34614	-18048.05	-0.34638
	(2.85)	(6.13)	(2.70)	(6.11)
Leg, N.E.C.	-11649.87	-0.26762	-10555.08	-0.26938
	(2.40)	(7.81)	(2.21)	(7.85)
Knees	-18017.19	-0.27408	-16731.61	-0.27265
	(4.05)	(12.32)	(3.84)	(12.23)
Ankles	-47549.10	-0.68541	-44569.38	-0.68683
	(4.41)	(20.09)	(4.19)	(20.09)
Feet	-40768.05	-0.57087	-38177.25	-0.57144
	(4.46)	(16.10)	(4.24)	(16.10)
Toes	-71351.77	-1.15220	-66524.09	-1.15834
	(3.73)	(13.88)	(3.51)	(13.91)
Body System	-15285.96	-0.17043	-15234.59	-0.18194
	(3.11)	(3.11)	(3.14)	(3.31)
Date of Injury	--	--	-14.12355	-0.00023
			(3.73)	(15.38)
Aggressive SAIF period	-491.50	-0.06016	-3357.45	-0.11296

	(0.23)	(2.49)	(1.32)	(4.61)
HB2271/HB2900	-39705.31	-0.93348	-23919.91	-0.73896
	(2.78)	(73.59)	(2.14)	(41.60)
SB1197	-16422.10	-0.23017	3920.07	0.08665
	(4.27)	(16.40)	(1.67)	(3.53)
SB369	-26776.30	-0.36023	-8501.63	-0.08519
	(4.29)	(13.66)	(2.81)	(2.64)
Constant	-117467.90	-1.93947	32600.74	0.33722
	(2.75)	(21.20)	(2.17)	(1.94)
Mills lambda	-5157.27	--	-372.18	--
	(1.64)		(0.13)	
Wald Chi-square	16553.63		15883.41	

Appendix Table App.D.6

Regression Equations Predicting Probability and Severity of Unscheduled PPD

	Model I		Model II	
Variable	**Degrees**	**Probability**	**Degrees**	**Probability**
Replacement rate	23.1003	-0.51738	23.4434	-0.51470
	(8.49)	(9.84)	(8.62)	(9.78)
Female	1.3046	-0.00198	1.2897	-0.00203
	(4.27)	(0.29)	(4.21)	(0.30)
Government Employee	-2.1205	-0.01147	-2.1237	-0.01167
	(4.13)	(1.00)	(4.13)	(1.02)
Age	-0.00358	0.00014	-0.00358	0.00014
	(7.10)	(37.92)	(7.09)	(37.95)
Age-squared*1,000,000	0.1020	-0.00329	0.1020	-0.00329
	(8.17)	(26.09)	(8.17)	(26.09)
Hospitalized	-1.4574	0.06381	-1.4341	0.06341
	(5.81)	(18.82)	(5.73)	(18.70)
SAIF	0.2957	0.08027	0.4108	0.08155
	(0.66)	(9.81)	(0.92)	(9.94)
Private Insurer	1.2814	0.00329	1.2782	0.00325
	(3.97)	(0.46)	(3.95)	(0.45)
Managerial, Prof., or Tech.	-9.4015	0.18639	-9.4028	0.18649
	(12.98)	(18.29)	(12.96)	(18.30)
Clerical, Sales, or Office Support	-4.8959	0.07083	-4.9034	0.07082
	(9.24)	(6.65)	(9.24)	(6.65)
Blue-Collar Service	3.4213	-0.07245	3.4186	-0.07261
	(6.88)	(7.74)	(6.86)	(7.76)
Skilled Blue Collar (non-service)	-2.5517	0.05226	-2.5554	0.05225
	(6.63)	(6.63)	(6.63)	(6.63)
Agriculture	4.6694	0.01021	4.6538	0.01006
	(6.46)	(0.64)	(6.43)	(0.63)
Forestry & Fishing	5.3925	0.11840	5.3245	0.11812
	(3.84)	(3.94)	(3.78)	(3.93)
Mining & Construction	-1.2372	0.09364	-1.2194	0.09392
	(2.13)	(8.43)	(2.09)	(8.45)
Logging	-1.6508	0.12437	-1.7262	0.12382
	(2.01)	(7.69)	(2.10)	(7.66)

Ground Transportation	2.1027	-0.07874	2.1312	-0.07847
	(3.42)	(6.44)	(3.46)	(6.41)
Other Transportation, Comm. &	-2.0122	-0.00546	-1.9821	-0.00510
Utilities	(2.46)	(0.30)	(2.42)	(0.28)
Finance, Insurance, & Real Estate	-4.2081	0.07588	-4.2478	0.07573
	(4.48)	(3.73)	(4.51)	(3.72)
Other Services	-0.4764	0.02894	-0.4739	0.02908
	(1.12)	(3.18)	(1.11)	(3.20)
Health Services	-0.3368	0.01571	-0.3443	0.01558
	(0.59)	(1.28)	(0.61)	(1.26)
Public Administration	-2.2133	0.04135	-2.1779	0.04157
	(2.82)	(2.36)	(2.77)	(2.37)
Manufacturing	-4.9480	0.16824	-4.9941	0.16798
	(7.65)	(20.52)	(7.72)	(20.49)
Trauma, N.E.C.	1.6899	-0.01435	1.7531	-0.01415
	(2.06)	(0.78)	(2.13)	(0.77)
Dislocations	-11.3740	0.74637	-11.3929	0.74653
	(4.90)	(34.38)	(4.90)	(34.39)
Fractures	-10.0750	0.36530	-10.1014	0.36518
	(7.35)	(20.80)	(7.36)	(20.80)
Sprains & Strains	6.1793	-0.10863	6.1718	-0.10878
	(7.77)	(6.80)	(7.75)	(6.81)
Cuts & Lacerations	6.1793	-0.10863	6.1718	-0.10878
	(7.77)	(6.80)	(7.75)	(6.81)
Bruises	3.0741	-0.14340	3.1255	-0.14355
	(3.26)	(7.66)	(3.31)	(7.67)
Diseases, N.E.C.	13.5949	-0.39992	13.6022	-0.40027
	(8.62)	(21.51)	(8.61)	(21.53)
Carpal Tunnel	-6.3749	0.18917	-6.3152	0.18961
	(6.16)	(10.16)	(6.09)	(10.18)
Hernia	43.4401	-1.01164	43.5254	-1.01220
	(9.24)	(22.16)	(9.26)	(22.17)
Head	-11.5584	-0.40749	-11.6008	-0.40778
	(7.20)	(21.85)	(7.21)	(21.86)
Neck	7.9409	-0.12186	7.9698	-0.12159
	(8.22)	(6.16)	(8.24)	(6.15)
Trunk, N.E.C.	15.7170	-0.19615	15.7636	-0.19590
	(12.55)	(8.36)	(12.57)	(8.34)

Shoulder	3.6630	0.03631	3.6797	0.03641
	(5.91)	(2.60)	(5.92)	(2.61)
Chest	43.04915	-1.24322	43.14354	-1.24343
	(9.51)	(44.22)	(9.53)	(44.23)
Back	17.5561	-0.28164	17.5761	-0.28173
	(17.23)	(27.59)	(17.23)	(27.60)
Abdomen	36.0151	-1.09230	36.1211	-1.09220
	(7.74)	(24.25)	(7.76)	(24.25)
Pelvis	23.6632	-0.73906	23.7909	-0.73886
	(8.74)	(32.37)	(8.79)	(32.36)
Upper Extremities, N.E.C	-32.7926	-0.01155	-32.7692	-0.01150
	(35.01)	(0.55)	(34.93)	(0.54)
Arm, N.E.C.	-21.1556	-0.17229	-21.1287	-0.17234
	(21.60)	(9.65)	(21.54)	(9.65)
Elbow	-30.7500	-0.16760	-30.7062	-0.16746
	(28.76)	(8.10)	(28.68)	(8.10)
Wrist	-28.0399	-0.27695	-28.0396	-0.27713
	(25.31)	(19.11)	(25.26)	(19.12)
Hand	-30.8563	-0.19346	-30.8031	-0.19350
	(30.77)	(11.75)	(30.67)	(11.75)
Fingers	-45.1347	0.30874	-45.1505	0.30888
	(41.91)	(22.57)	(41.86)	(22.58)
Lower Extremities, N.E.C.	-30.0479	-0.20756	-29.9299	-0.20734
	(20.19)	(7.16)	(20.09)	(7.15)
Leg, N.E.C.	-17.5555	-0.42291	-17.5342	-0.42298
	(10.64)	(21.79)	(10.62)	(21.79)
Knees	-50.0931	0.39255	-50.1166	0.39268
	(39.13)	(32.53)	(39.09)	(32.54)
Ankles	-20.4920	-0.58164	-20.3737	-0.58157
	(9.91)	(35.58)	(9.85)	(35.57)
Feet	-18.4936	-0.63977	-18.4043	-0.63987
	(8.04)	(34.70)	(8.00)	(34.70)
Toes	-13.7259	-0.78681	-13.5653	-0.78688
	(4.65)	(27.33)	(4.59)	(27.33)
Body System	33.5788	-0.78710	33.5521	-0.78800
	(10.49)	(20.71)	(10.47)	(20.73)
Date of Injury	--	--	-0.0017	-0.00002
			(5.17)	(2.37)
Aggressive SAIF period	0.0231	-0.07003	-0.5343	-0.07542

	(0.04)	(6.09)	(0.92)	(6.43)
HB2271/HB2900	-4.1006	-0.03263	-2.7241	-0.01845
	(11.44)	(4.22)	(6.20)	(1.88)
SB1197	0.7229	-0.08340	3.0890	-0.06050
	(1.83)	(12.82)	(5.46)	(5.19)
SB369	0.3389	-0.08293	2.2203	-0.06396
	(0.70)	(9.46)	(3.85)	(5.38)
Constant	97.8969	-1.36060	114.4686	-1.19903
	(11.64)	(27.22)	(13.47)	(14.16)
Mills lambda	-40.0778	--	-40.5454	--
	(8.93)		(8.99)	
Wald Chi-square	63229.57		63302.79	

Appendix Table App.D.7

Regression Equations Predicting Probability and Severity of Scheduled PPD

	Model I		Model II	
Variable	**Degrees**	**Probability**	**Degrees**	**Probability**
Replacement rate	2.6687	-0.51738	2.8438	-0.51470
	(1.64)	(9.84)	(1.75)	(9.78)
Female	-0.8309	-0.00198	-0.8426	-0.00203
	(4.59)	(0.29)	(4.66)	(0.30)
Government Employee	-0.7468	-0.01147	-0.7538	-0.01167
	(2.48)	(1.00)	(2.51)	(1.02)
Age	-0.00105	0.00014	-0.00102	0.00014
	(3.17)	(37.92)	(3.08)	(37.95)
Age-squared*1,000,000	0.0319	-0.00329	0.0311	-0.00329
	(3.94)	(26.09)	(3.85)	(26.09)
Hospitalized	-1.7523	0.06381	-1.7280	0.06341
	(11.03)	(18.82)	(10.94)	(18.70)
SAIF	0.7199	0.08027	0.8351	0.08155
	(2.65)	(9.81)	(3.06)	(9.94)
Private Insurer	1.0483	0.00329	1.0464	0.00325
	(5.54)	(0.46)	(5.53)	(0.45)
Managerial, Prof., or Tech.	-1.8998	0.18639	-1.8608	0.18649
	(4.17)	(18.29)	(4.08)	(18.30)
Clerical, Sales, or Office Support	-1.0722	0.07083	-1.0623	0.07082
	(3.36)	(6.65)	(3.33)	(6.65)
Blue-Collar Service	-0.5346	-0.07245	-0.5553	-0.07261
	(1.74)	(7.74)	(1.81)	(7.76)
Skilled Blue Collar (non-service)	-0.6919	0.05226	-0.6838	0.05225
	(3.02)	(6.63)	(2.98)	(6.63)
Agriculture	0.7556	0.01021	0.7451	0.01006
	(1.77)	(0.64)	(1.74)	(0.63)
Forestry & Fishing	-0.0657	0.11840	-0.0907	0.11812
	(0.08)	(3.94)	(0.11)	(3.93)
Mining & Construction	0.9713	0.09364	1.0081	0.09392
	(2.75)	(8.43)	(2.86)	(8.45)
Logging	1.4717	0.12437	1.4384	0.12382
	(2.97)	(7.69)	(2.91)	(7.66)

Ground Transportation	0.1914	-0.07874	0.1979	-0.07847
	(0.51)	(6.44)	(0.53)	(6.41)
Other Transportation, Comm. &	0.7407	-0.00546	0.7658	-0.00510
Utilities	(1.53)	(0.30)	(1.59)	(0.28)
Finance, Insurance, & Real Estate	-0.3974	0.07588	-0.4107	0.07573
	(0.72)	(3.73)	(0.74)	(3.72)
Other Services	0.2313	0.02894	0.2413	0.02908
	(0.91)	(3.18)	(0.95)	(3.20)
Health Services	-0.0763	0.01571	-0.0796	0.01558
	(0.23)	(1.28)	(0.24)	(1.26)
Public Administration	0.1651	0.04135	0.2017	0.04157
	(0.36)	(2.36)	(0.44)	(2.37)
Manufacturing	-0.0307	0.16824	-0.0303	0.16798
	(0.07)	(20.52)	(0.07)	(20.49)
Trauma, N.E.C.	7.5840	-0.01435	7.6284	-0.01415
	(15.81)	(0.78)	(15.92)	(0.77)
Dislocations	-3.8638	0.74637	-3.7297	0.74653
	(2.57)	(34.38)	(2.48)	(34.39)
Fractures	1.6426	0.36530	1.6991	0.36518
	(1.89)	(20.80)	(1.95)	(20.80)
Sprains & Strains	-0.9886	-0.10863	-1.0198	-0.10878
	(2.07)	(6.80)	(2.14)	(6.81)
Cuts & Lacerations	-0.9886	-0.10863	-1.0198	-0.10878
	(2.07)	(6.80)	(2.14)	(6.81)
Bruises	1.2815	-0.14340	1.2867	-0.14355
	(2.26)	(7.66)	(2.27)	(7.67)
Diseases, N.E.C.	2.9117	-0.39992	2.8226	-0.40027
	(2.87)	(21.51)	(2.78)	(21.53)
Carpal Tunnel	0.3969	0.18917	0.4873	0.18961
	(0.62)	(10.16)	(0.77)	(10.18)
Hernia	2.8123	-1.01164	2.6017	-1.01220
	(0.86)	(22.16)	(0.79)	(22.17)
Head	14.9346	-0.40749	14.8099	-0.40778
	(14.40)	(21.85)	(14.29)	(21.86)
Neck	-2.1748	-0.12186	-2.1770	-0.12159
	(3.77)	(6.16)	(3.78)	(6.15)
Trunk, N.E.C.	-4.4244	-0.19615	-4.4316	-0.19590
	(5.72)	(8.36)	(5.74)	(8.34)

Shoulder	-4.9465	0.03631	-4.9257	0.03641
	(13.73)	(2.60)	(13.69)	(2.61)
Chest	1.87006	-1.24322	1.64412	-1.24343
	(0.62)	(44.22)	(0.55)	(44.23)
Back	-3.4353	-0.28164	-3.4836	-0.28173
	(5.21)	(27.59)	(5.29)	(27.60)
Abdomen	0.7972	-1.09230	0.6125	-1.09220
	(0.25)	(24.25)	(0.19)	(24.25)
Pelvis	4.9992	-0.73906	4.9243	-0.73886
	(2.81)	(32.37)	(2.77)	(32.36)
Upper Extremities, N.E.C	16.3135	-0.01155	16.3273	-0.01150
	(29.90)	(0.55)	(29.97)	(0.54)
Arm, N.E.C.	14.3602	-0.17229	14.3406	-0.17234
	(23.93)	(9.65)	(23.92)	(9.65)
Elbow	15.9225	-0.16760	15.9190	-0.16746
	(24.61)	(8.10)	(24.64)	(8.10)
Wrist	16.4482	-0.27695	16.3847	-0.27713
	(23.32)	(19.11)	(23.23)	(19.12)
Hand	13.7619	-0.19346	13.7536	-0.19350
	(21.85)	(11.75)	(21.85)	(11.75)
Fingers	1.4601	0.30874	1.5120	0.30888
	(2.14)	(22.57)	(2.21)	(22.58)
Lower Extremities, N.E.C.	13.5187	-0.20756	13.5580	-0.20734
	(14.88)	(7.16)	(14.94)	(7.15)
Leg, N.E.C.	14.4248	-0.42291	14.3462	-0.42298
	(13.57)	(21.79)	(13.50)	(21.79)
Knees	10.5642	0.39255	10.6291	0.39268
	(12.74)	(32.53)	(12.82)	(32.54)
Ankles	11.6659	-0.58164	11.6199	-0.58157
	(8.61)	(35.58)	(8.58)	(35.57)
Feet	14.7035	-0.63977	14.6209	-0.63987
	(9.75)	(34.70)	(9.70)	(34.70)
Toes	4.5146	-0.78681	4.4487	-0.78688
	(2.34)	(27.33)	(2.30)	(27.33)
Body System	-0.9982	-0.78710	-1.2064	-0.78800
	(0.48)	(20.71)	(0.58)	(20.73)
Date of Injury	--	--	-0.0014	-0.00002
			(7.29)	(2.37)
Aggressive SAIF period	-0.2494	-0.07003	-0.7271	-0.07542

	(0.74)	(6.09)	(2.09)	(6.43)
HB2271/HB2900	-3.9197	-0.03263	-2.7729	-0.01845
	(18.52)	(4.22)	(10.81)	(1.88)
SB1197	-2.2170	-0.08340	-0.2715	-0.06050
	(9.07)	(12.82)	(0.80)	(5.19)
SB369	-1.4888	-0.08293	0.0626	-0.06396
	(5.02)	(9.46)	(0.18)	(5.38)
Constant	28.6342	-1.36060	41.8437	-1.19903
	(5.17)	(27.22)	(7.59)	(14.16)
Mills lambda	-9.2653	--	-8.9097	--
	(3.08)		(2.97)	
Wald Chi-square	44127.93		44019.74	

Appendix H

Tort Cost Analysis

In order to arrive at a figure representing potential tort damages as a percentage of the benefit payments made on disabling claims, we made a number of assumptions and approximations. Given the very approximate nature of the key proportions and ratios that go into estimating the potential tort costs, these additional approximations are of second order importance.

First, we assume that denied nondisabling claims would not lead to civil suits.

Second, based on table 3.7, we assume that in the post SB 1197 period, approximately 85% of disabling claims are accepted or settled, and the other 15% denied and not settled. Most denied claims are whole claim denials; we will treat the partially denied and wholly denied claims identically. So, the number of claimants with claims that end up denied and not settled is assumed to be .15/.85 = .176 times the number of claimants whose claims are ultimately accepted or settled.

We assume that the pool of potential civil litigants consists of those whose claims were denied for MCC and not settled. According to the file review data, about 35% of the claims that were filed after 1993 and that were ultimately denied and not settled involved MCC denials. So,

Potential Litigants = (.176) X (.35) X (Number of Accepted and Settled Claims)

In the report, we argue that the proportion of potential litigants that would actually sue is between .05 and .4. Call this proportion S, so that

Number of Civil Suits = S X (potential litigants) = S X (.176) X (.35) X (Number of Accepted and Settled Claims)

Next, let R stand for the ratio of what a worker pursuing a civil lawsuit would receive relative to what that worker would receive in workers' compensation benefits if his or her claim were accepted. In the text of the report it is argued that R would probably range between 1.5 and 4. Then,

Damages in Average Civil Suit = B*(Cost of average litigant's potential WC benefits),

where the potential WC benefits are the workers' compensation benefits the litigant would have received had their claim not been denied.

According to the model described in section 7 of the report and used to predict the cost of workers' compensation claims, the cost in terms of benefit payments of the average accepted workers' compensation disabling claim during the 1990's was about $17,000. (This is in 1996 dollars, and from the model that allows for a trend). Using the claim and claimant characteristics of the file review cases that were denied for MCC, and the model predicts that the average claimant denied for MCC in the 1990's would have received $15,500 had their claim been accepted. If we make the assumption that the average litigant's potential WC benefits were the same as the potential benefits of the average claimant denied for MCC, we could say that the cost of average litigant's potential WC benefits equaled 15,500/17,000 or .91 times the cost of the average disabling claim.

However, it is probably the case that the typical litigant would have more potential workers' compensation benefits than the average claimant denied for MCC, because the more the damages (lost earnings and medical expenses) associated with the injury the more likely the denied claimant would be to sue. So, we will round .91 up to 1, and say that:

(Cost of average litigant's potential WC benefits) = (cost of average WC disabling claim)

The total damages should denied claimants be allowed to sue can be written as:

(Number of Civil Suits) X (Cost of average Civil Suit)

Making substitutions from the equations above, this can be rewritten as

[S X (.176) X (.35) X (Number of Accepted and Settled Claims)] X

B X (cost of average WC disabling claim)

Next, note that:

(Total cost to employers for benefits paid on disabling claims) =

(Number of Accepted and Settled Claims) X (cost of average WC disabling claim).

That allows us to write that:

Total damages in Civil Suits =

S X (.176) X (.35) X B X (total cost to employers for benefits paid on disabling claims),

which expresses potential damages from tort costs as a fraction of total benefit paid on disabling claims.

Using the lower bounds of our estimated ranges of values for S and B thus leads to the conclusion that the cost in damages of allowing denied claimants to sue would be

.05 X .176 X .35 X 1.5 = .0046

or about half a percent of the total cost of benefits paid on disabling claims. Using the upper bound values for S and B raises that percentage to

$$.4 \text{ X } .176 \text{ X } .35 \text{ X } 4 = .098$$

or about 10% of the total cost of benefits paid on disabling claims.