The Case of the Medical Malpractice Crisis: A Classic Who Dunnit

Robert J. Walling III, FCAS, MAAA

CAS Continuing Education Committee
2004 Discussion Paper Program

The Case of the Medical Malpractice Crisis: A Classic Who Dunnit

By: Robert J. Walling III, FCAS, MAAA

We actuaries, detectives of the first order, are presented with a most intriguing case: numerous, grisly bodies of dead insurance companies and physicians' practices in public view, various signs of intrigue and foul play abound, suspects galore, an abundance of alibis, and an endless supply of opinions on how the culprit(s) must repay their debt to society. This case of the medical malpractice crisis is complicated because there is not only no consensus on "who dunnit?" but not even an agreement on "what happened?" This is the situation we are currently faced with in the medical malpractice insurance industry. There is evidence scattered all over the medical malpractice insurance landscape, but there is no agreement at all on the cause, the culprit, the motives or the appropriate sentence.

The Suspects

First, let's identify some of the suspects. Like any good murder mystery, this case presents an abundance of suspects. First, there's the stereotypical bad guy: the trial attorneys. Despised by many members of the (insurance) community (except the claimants) they stand accused of causing run away large losses due to out of control juries encouraged by their wily tactics. Their very livelihood is being threatened by caps on non-economic damages and even worse (gasp!) caps on attorney contingency fees.

The medical malpractice insurance industry's hat is only slightly less black than the attorneys. Their reputation for poor investment strategies, destructive price competition, a preference to pay defense attorneys rather than patients with negative treatment outcomes, grossly inaccurate reserve estimates, and general mismanagement is widely held and is leading to a variety of lawsuits against medical malpractice insurance company directors, officers, and managers, both insolvent and not. Insurance companies are threatened with constraints on their ability to adjust rates as well as increased solvency regulation if convicted of their accused crimes.

The doctors and other healthcare providers are accused of crying wolf over increased costs trends that are actually less than the rate at which health care inflation is increasing their revenues.

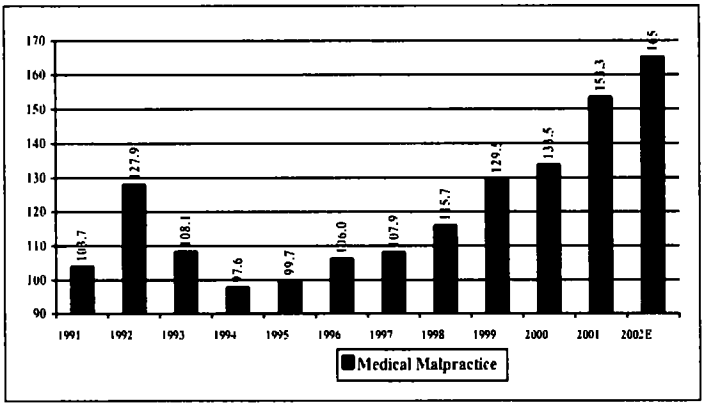
They are also accused of being the victims that are at the root of the crime. They are accused of not doing enough to reduce the negative patient outcomes. Then when the negative outcomes occur, they protect one another through self-governing mechanisms such as medical panels and review boards. Their resistance to reporting malpractice events to public, national, or state databases is also sometimes characterized as "protectionism." The call for damage caps without corresponding loss prevention initiatives is viewed quite negatively by some investigators of the matter. In the eyes of those who accuse the health care providers, the increased premiums they are experiencing are not only appropriate it is the logical result of their behavior.

The list of potential suspects and accessories also includes state insurance regulators, rating agencies, and even the public at large (that's right everybody did it!). State regulators are accused of not monitoring rate adequacy and solvency sufficiently. Rating agencies threatened downgrades to single state medical malpractice insurers that didn't diversify or expand geographically. The logic for accusing all of us is that the current sense of entitlement in American culture is enabling the runaway jury awards.

Signs of Intrigue

The most obvious signs of intrigue and wrongdoing are related to the widespread lack of available or affordable medical malpractice coverage around the country. From an insurance perspective, this problem began with an extreme deterioration of medical malpractice insurance underwriting results. As can be seen in the graph below, the combined operating ratio for the medical malpractice insurance has deteriorated almost 70 points in 8 calendar years.

Table 1. Medical Malpractice Calendar Year Combined Operating Ratios



Companies experiencing underwriting results of this magnitude basically had two responses: exit the line or increase rates. As can be seen in the table below, some insureds have seen significant rate increases in the last five years. General surgeons in Broward County, Florida for this carrier have had their rates triple since 1998.

Table 2. Example Annual Rate Changes – Broward County, FL General Surgeons

Year	Premium	Annual Change
2003	213,763	30.0%
2002	164,437	40.5%
2001	117,049	12.7%
2000	103,859	27.0%
1999	81,765	17.2%
1998	69,786	12.1%
1997	62,259	-7.3%
1996	67,141	+5.7%
Annual Average		16.7%

Source: Medical Liability Monitor

As previously mentioned, another option available to insurers was an exit from the market – either voluntarily or not. Some carriers did not survive the dramatic balance sheet impact of

operating results similar to the results shown in Table 1. A total of almost 8% of the 1998 countrywide direct written premium for medical malpractice coverage has left the marketplace due to insolvencies. The table below highlights several major medical malpractice insurer insolvencies over the last five years. These involuntary departures by themselves would have been more than enough to materially impact the availability of any insurance market; but there were other market dislocations.

Table 3. Major Medical Malpractice Insurer Insolvencies

Company	1997 AM Best Rating	1997 Countrywide Market Share
Frontier	A-	2.5%
PHICO	A-	2.5%
Reliance	A-	0.8%
Reciprocal Group	A	0.8%
Fremont General	A-	0.6%
Legion	A-	0.5%

Operating results, adverse reserve development, and the inability to achieve acceptable rate levels caused several companies to voluntarily withdraw either from specific states, specific specialties (e.g. OB/GYNs or emergency room physicians) or from the medical malpractice market entirely. The three most significant of these countrywide departures, St. Paul Companies, Zurich/Farmers and MIIX, accounted for over 15% of the countrywide medical malpractice premium in 1998.

Table 4. Major Medical Malpractice Insurer Exits

Company	1997 AM Best Rating	1997 Countrywide Market Share
St. Paul Companies	A+	6.8%
MMI Companies (merged w/St. Paul)	A	2.8%
MIIX	A	2.8%
Zurich Group	A+	1.8%
Farmers Group	A-	1.1%

As if the insolvencies and voluntary exits did not reduce capacity enough, the medical malpractice industry is highly sensitive to the ratings assigned by industry rating agencies, particularly A.M. Best Company. This is the result of many hospital corporate by-laws requiring both physicians with hospital privileges and the hospital itself to maintain malpractice coverage with an insurer rated A- or better. Therefore, when A.M. Best downgrades a medical malpractice insurer below A-, the downgrade creates an impediment that can severely impair the insurer's ability to provide ongoing malpractice coverage to many insureds. This is not to imply that non A-rated carriers do not write medical malpractice insurance. Rather there is a great deal of time and expense that must be expended to address the concerns of insureds, sometimes including the additional expense of engaging an A-rated fronting carrier, when a company loses its "A" rating. A number of previously "A-rated" malpractice insurers are currently rated below A-. These carriers include: AP Capital, SCPIE, MLMIC Group (including OHIC), Florida Physicians Group, and Connecticut Medical Insurance Company. Together, the downgraded companies account for about 20% of the 1997 market share.

These three groups, the liquidated, the voluntary exits, and the downgraded, combined suggest that over 40% of the 1997 medical malpractice insurance market share has either exited the industry or had their ability to grow and compete for business impaired due to changes in their Best rating. In states where one or more of the exited carriers, such as St. Paul, PHICO, or MIIX, had a commanding market share the market dislocation effect has been even more severe, sometimes up to 70% or 80% of the total market.

Like a cascade of dominos, these significant increases in medical malpractice insurance costs and decreases in coverage availability have caused health care providers to respond in a variety of ways to the increased costs of doing business. The American Medical Association, insurance trade press, and even the national media at times have widely publicized some of these responses which have included significant reduction in coverage limits, the discontinuation of risky procedures, relocations of physician practices to neighboring states with more favorable malpractice laws, early retirements by physicians, and in more extreme cases to hospital closures and marches on state capitals.

Problems with the Available Evidence

Why do we have so much trouble definitively identifying a cause for the current problems of the medical malpractice insurance industry? One of the biggest complications is the lack of a robust, countrywide experience database. Insurance Services Office, Inc., a national statistical agent and rating bureau for medical malpractice, does not have the market share in medical malpractice they have in personal lines and some standard commercial lines. One main cause of this reduced credibility in the ISO data is the flight of medical malpractice from standard insurance carriers to alternative market mechanisms and other non-ISO reporting companies. These programs include captive insurance companies, risk retention groups, and other self-insurance programs. Other malpractice databases such as the National Practitioner Data Bank (different reporting standards by state) and Jury Verdict Research (claims settled by trial only; incomplete geographic coverage) have significant limitations that reduce their effectiveness as diagnostic tools for examining causes of the current market emergency.

Another issue contributing significantly to the complexity of the problem is the significant degree of variability in results and environmental changes by state over time. In some cases, numerous changes were implemented closely enough to one another in time that advocates of each reform claim validation. A classic example is in California where the sweeping medical malpractice reforms of MICRA and the vast insurance rate regulatory changes of Proposition 103 are both credited with the successes in the state by advocates of the competing reforms. In other states, particularly some of the more troubled states, there have been so many insolvencies, government programs, and other changes it's hard to say any of them have truly succeeded. It is equally difficulty to confidently say that a particular measure wouldn't have succeeded under different conditions.

There are a number of factors that can impact the claims characteristics of a state's medical malpractice system including the presence and details of joint underwriting authorities, patient compensation funds, caps on non-economic damages, restrictive rate regulatory approaches, domestic healthcare provider-owned mutual companies, and many others. The presence, specifics, and timing of these factors are different for each state which makes it very difficult to transfer the results from one state to another.

Exacerbating these problems is the reach and strength of the influence of two of the leading suspects: the health care providers and the trial bar. Health care providers (through associations such as the American Medical Association and the American Hospital Association) have a tremendous stake not just in the determination of the cause, but also the solution. It is an oversimplification of the problem, but if the primary cause of the "crisis" is the trial bar, "runaway" juries, or any other external factors, then the likelihood of reforms, including caps on damages (especially non-economic damages) is increased.

Because of the close relationship between health care providers and their malpractice insurers (partly due to the growing importance and market share of provider-owned insurers), their interests are closely aligned. If damage caps and other cost controlling measures such as medical review boards, arbitration, patient compensation funds, and caps on attorney contingency fees are implemented, insurer rates decrease and more importantly the potential for profitability increases.

On the other hand, if the allegations of the trial bar such as destructive price competition by insurers (with the contribution of poor regulatory oversight), irresponsible investment strategies, poor loss reserving discipline, increasingly risky medical procedures, and a lagging focus on reducing adverse patient outcomes are found to be significant contributors, then reforms that do not impact patient recoveries (and lawyers' fees) will be given more consideration. These reforms might include more reporting requirements of adverse patient outcomes and tighter rate regulatory requirements. Both groups have tremendous income at stake in the "medicine" the industry takes for its problems. They are both exerting tremendous political and media pressure to influence the perception of the cause and the remediation states choose to implement.

The Approach

Because of the concerns stated above regarding countrywide data and the appropriateness of data from one state, the approach taken in this study is to focus on a large database for a single state in an attempt to make some inferences about the medical malpractice insurance market in that state. Another goal of the study is to demonstrate how a Generalized Linear Modeling (GLM) approach can assist in evaluating claims trends for commercial lines of insurance more generally. One state with robust, readily available medical malpractice claims data is the state of Florida. Our approach will be to look at an industry-wide Florida database that contains a variety of

health care provider and claim characteristics. The analysis will use GLM to reflect the impact of each factor when all factors included in the model are reviewed simultaneously and also to identify any interactions between characteristics.

A general discussion of GLM is outside the scope of this paper, and the existence of several excellent writings in this area makes an effort along these lines on my part unnecessary. For the purposes of this paper, it will suffice to say that GLM is a statistical approach to developing a model that explains how a group of explanatory variables can be used to estimate or predict a dependent or response variable. For this analysis a number of claim and health care provider characteristics will be used to predict closed claim severities and a couple of additional response variables. In most ratemaking exercises, GLM takes ratemaking or underwriting characteristics (e.g. territory, class, credit) and uses them to predict claim frequencies, severities and pure premiums. GLM also provides the capabilities to fit polynomial curves, manually override indicated factors, and regroup explanatory variables (e.g. zip codes, credit scores).

The greatest advantage GLM has over traditional one-way loss ratio analyses is the reflection of interactions between explanatory characteristics. As a simple example, consider the following fictional one-way severity results:

Table 5. Example State F Average Severity by Territory

Territory	Average Severity
Metropolitan	$27,600
Urban	$32,400

There would a natural tendency to assume that something was different about the urban territory. Similarly, a one-way severity study was conducted for the two classes insured by a company:

Table 6. Example State F Average Severity by Class

Class	Average Severity
Tree Surgeon	$24,000
Shrub Doctor	$36,000

So, based on this information there is also apparently a severity problem with the shrub class.

These one-way analyses make the assumption that the distribution by class and territory are uniform. Assume the actual results looked as follows:

Table 7. Example State F Average Severity by Territory

	Territory				
	Metro		Urban		
Class	Severity	Weight	Severity	Weight	Total
Tree	24,000	70%	24,000	30%	24,000
Shrub	36,000	30%	36,000	70%	36,000
Total	27,600		32,400		30,000

Because of the distributional bias between territories by class, the identical severities by class, by territory disguised themselves as a territory problem. Imagine if this example had been pure premiums instead of severities. The pricing actuary relying on one-way analyses would have imposed territory and class relativities that in concert would have significantly over-priced urban, shrub doctors. Please don't miss the other problem in this simple example: if the rates in total were adequate, the tree surgeons in the Metro territory would be under-priced by a similar percentage!

It would be natural to ask, "Why hasn't this GLM approach been used more commonly in medical malpractice?" The initial focus of GLM in both Europe and North America has been on personal lines pricing. There are at least three key reasons for this emphasis. Personal lines rating plans are more complex and thus more in need of an understanding of the interactions between variables, particularly factors such as credit that are highly correlated to other factors. Second, personal lines, especially personal automobile, have more premium, more policies, and more claims than commercial lines and thus provide more data. Finally, the impact that GLM can have on personal lines has already been demonstrated by companies that have used this type of analysis to create a sustainable competitive advantage and profitable growth. Now that GLM for personal lines pricing is quickly becoming an industry standard approach, new applications of GLM are constantly emerging for such applications as agency management, claims analysis, utilization review, and commercial lines class plan analysis for such lines as business owners (BOP), workers compensation, commercial automobile, and medical malpractice.

Our Evidence

Starting in 1974, the Florida Department of Financial Services Regulation – Office of Insurance Regulation, has maintained a Medical Professional Liability Closed Claim database. This comprehensive database is readily available to regulators, insurers, trial attorneys, health care providers, and other parties interested in the current medical malpractice crisis. In July 1999, the original database was replaced with a new closed claims database with a slightly different format. As a result, some fields contained in one database are not continued in the other, some fields use slightly different entries for the same information, and some fields change definition slightly even though they look the same (e.g. county fields). As a result, there were several fields that required some coordination of similar fields, and others that resulted in an entry of "NO RESPONSE" from one source or the other. A total of almost 65,000 claims were ultimately used in the analysis.

The new version of the Florida database contains the following fields that were identified as potentially useful in the analysis. The table also contains an example from the database and some useful notes on the fields. More information on the database is available from the Florida Office of Insurance Regulation and is also provided when the data is produced for a nominal fee.

Table 8. Florida Database Fields

Fields	Example(s)	Notes
1. Injury Location	Hospital Inpatient Facility	Individual Facility named as well
2. Injury Location Detail	Labor and Delivery Room	More detail for hospitals
3. Occurrence Date	6/5/1981	
4. Report Date	10/24/1984	
5. Patient Date of Birth	6/5/1981	
6. Injured Patient Sex	F	
7. Severity of Injury	Permanent: Major	Emotional Only, Death, and several classes of temporary and permanent
8. Suit Date	10/24/1984	Can be used as an indicator for suits
9. County of Suit	Dade	These two were combined to assess
10. Insured County	Dade	geographic differences using county of suit as primary, if provided.
11. Fin_Meth_Desc	Settled by parties	Also reflects court and arbitration
12. Stage_of_Desc	More than 90 days after suit	
13. Final_Date_Disp	12/21/2001	
14. Court_Desc	No Court Proceedings.	Reflects settlements for plaintiffs and Defendants and directed verdicts.
15. Arbitration indicator	Not subject to Arbitration.	Also shows the results for arbitration eligible claims
16. Insurer Type	Primary	Actual Insurer Named as well

Table 8. Florida Database Fields (cont.)

Fields	Example(s)	Notes
17. Insured Type	Physicians and Surgeons	e.g. Hospital, Dentist, Podiatrist, HMO, Corporation, Ambulatory Surgical Centers
18. Provider Specialty	80267- PEDIATRICS	This is a field that required scrubbing
19. Insured Occ. Limits	$100,000	Aggregate limit available as well
20. Indemnity Paid	$100,000	Additional detail between medical loss, wage loss and other; both paid to date and future is available
21. Loss Adjustment	$184,549	Defense Costs
22. Loss Adjustment Other	$57,001	Other ALAE
23. Non-Economic Loss	$100,000	This field was only partially utilized and required some modification

There is a tremendous amount of specific detail related to the facility and individual health care provider involved in the claim in the database. This data is not relevant to this analysis. Although using the physician detail to assess the impact of "repeat offenders" on overall costs is certainly a conceivable use of the database. There is also more detail related to the patients' conditions and diagnoses that adds to the robustness of the database, but was viewed as too granular to be useful for our purposes.

Several additional values were computed to simplify our analysis. First, a report lag was computed as the number of years from the occurrence of a claim to the first report of the incident. The time from occurrence to the filing of a lawsuit was also computed. Similarly, the settlement lag was calculated as the time from occurrence to settlement of a claim. Two additional response variables were also computed.

This study focused on examining three questions with three response variables:

1) What factors influence overall claim severity? (measured using total loss and ALAE),
2) What factors increase the proportion of non-economic damages in a loss? (measured as the ratio of non-economic damages to total pure losses (excluding ALAE)),
3) What factors increase the proportion of defense costs in a claim? (measured as the ratio of ALAE to total damages)

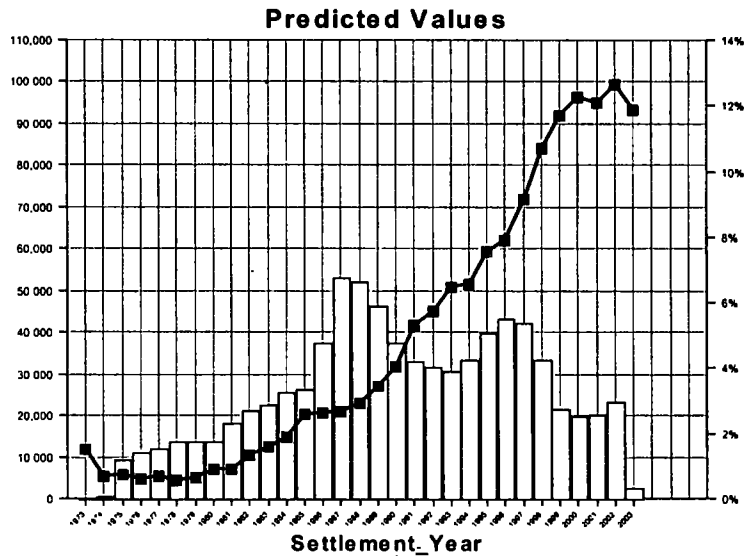
These are by no means the only response variables that could be used for this data. Other severity metrics (total non-economic damage dollars, total ALAE or just defense cost dollars, medical losses only, wage loss, etc.) could certainly be modeled easily using this data. Given the

AMA's fascination with claims over $1,000,000, data looking at the frequency and severity for these claims could also be constructed with meaningful results. Losses above this or any limit (adjusted for inflation or not depending on the analysis goal) could be modeled effectively from this data to examine large loss propensities or to compare them to overall claim characteristics.

The Results of the Investigation

The first widely disputed question is, "How much are severities increasing annually?" The Florida database contains two pertinent dates: occurrence date and settlement date. Both of these dates were converted to calendar years for the purpose of our study. The results by settlement year show a tremendous increase during the 1990s as can be seen in the following table which shows the distribution of claims and predicted severities from the GLM.

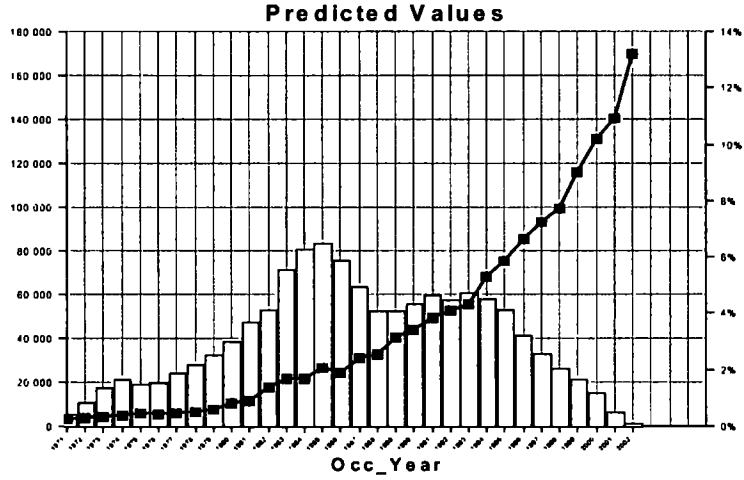
Table 9. Predicted Severities by Settlement Year



The overall severities appear to have leveled off somewhat in the last few years after dramatic growth in the 1990s. Even more alarming are the results by occurrence year. Part of the cause for alarm in the following table is that most of the claims for the more current occurrence years remain open and are not in the database yet. A lower average severity for closed claims to date

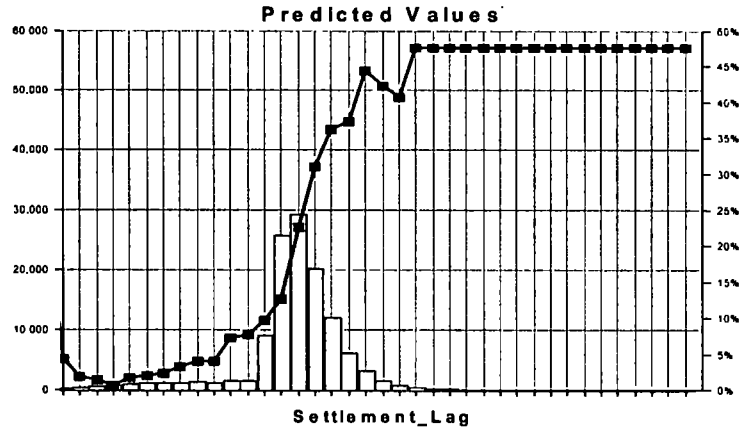
would have been expected for the more recent occurrence years due to the larger average severity for open claims with longer settlement lags.

Table 10. Predicted Severities by Occurrence Year



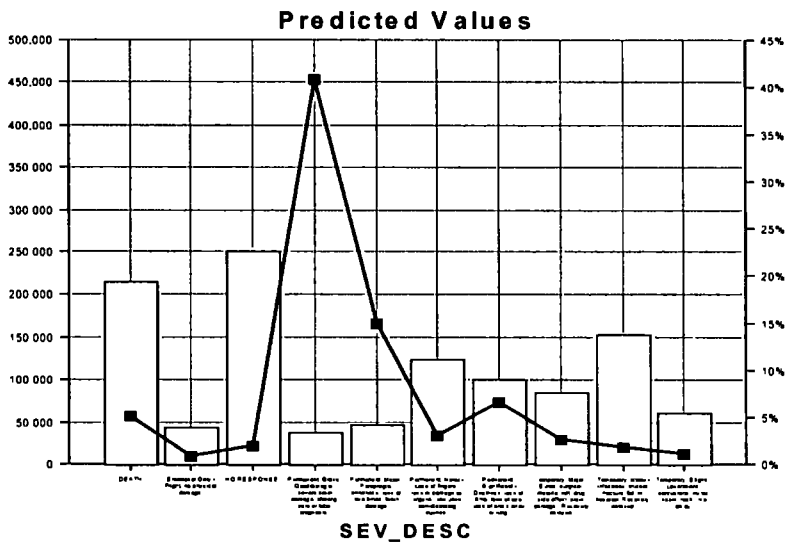
The higher severity by settlement lag described earlier can also be seen in our GLM results. Results of this kind could be effectively utilized in loss reserve analyzes examining the impact of inflation on closed claims over an extended settlement period. You will also notice that all settlement periods over 10 years were grouped together due to the sparsity of the data.

Table 11. Predicted Severities by Settlement Lag



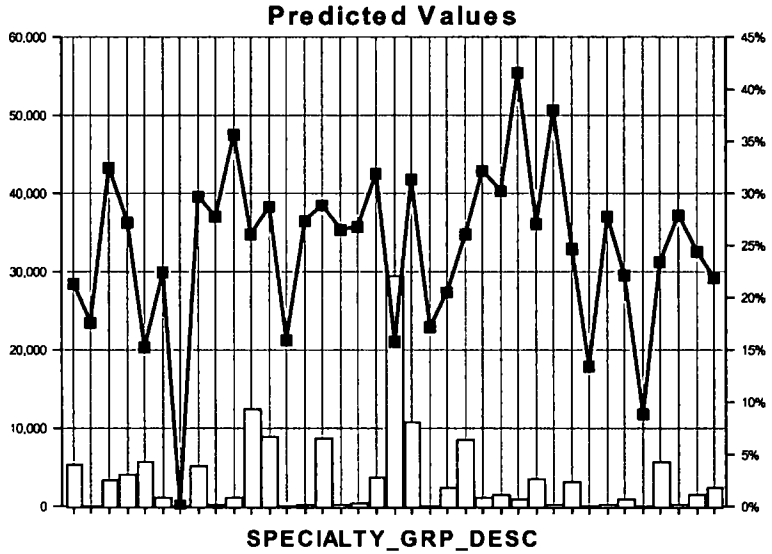
Next, the consistency of this behavior across different types of injury was investigated. As you can see, the permanent claim classes; grave, major and significant; all predict substantially higher claim severities than the other injury types. These results by severity of injury were found to be consistent by type of health care provider and location of injury.

Table 12. Predicted Severities by Claim Type



How about different categories of health care provider? The next table shows a significant amount of variation in average severity by physician type. In particular, classes such as cardiovascular disease, neoplastic diseases, emergency room physician, gastroenterology, neurology, obstetrics/gynecology, pediatrics and pathology all produced higher predicted severities while dentistry, allergy, diabetes treatment and podiatry all predicted much lower severities than average.

Table 13. Predicted Severities by Specialty



A number of critical concerns related to claim settlement environment can be addressed by the results of a GLM analysis of the Florida data including:

- the potential impact different courts geographically (by county),
- the impact on severities caused by a claim going to suit, and
- the impact on severities caused by the use of arbitration.

The issue of geographic differences presented some fascinating results, while the results by type of claim resolution and arbitration impact (shown in tables 14 and 15) were reasonably intuitive with severities of claims resulting from judgments for plaintiffs three to four times those with judgments for defendants. Also, court disposals had lower severities than arbitration cases which were in turn lower than settlements agreed to by the parties. This behavior is also extremely stable by settlement year.

Table 14. Predicted Severities by Claim Resolution

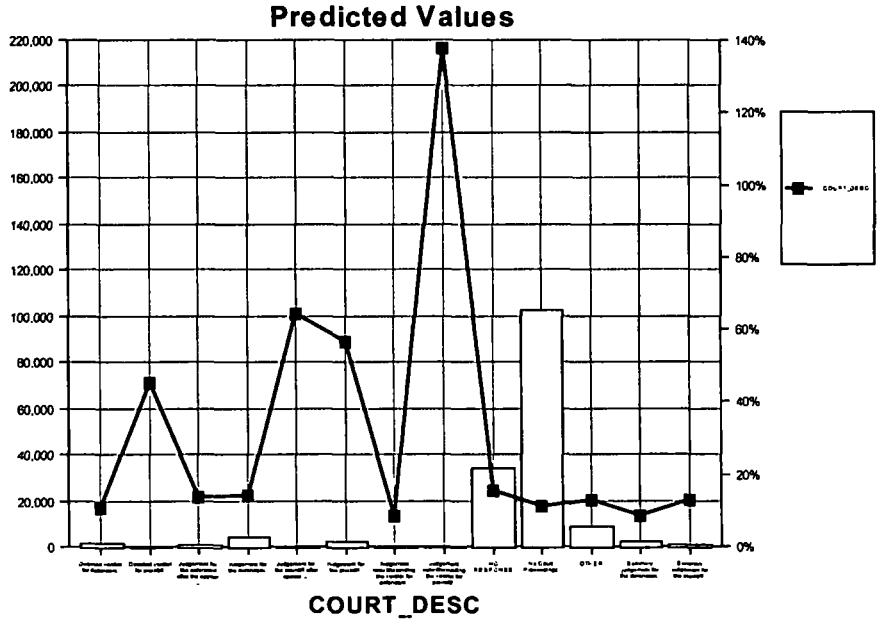
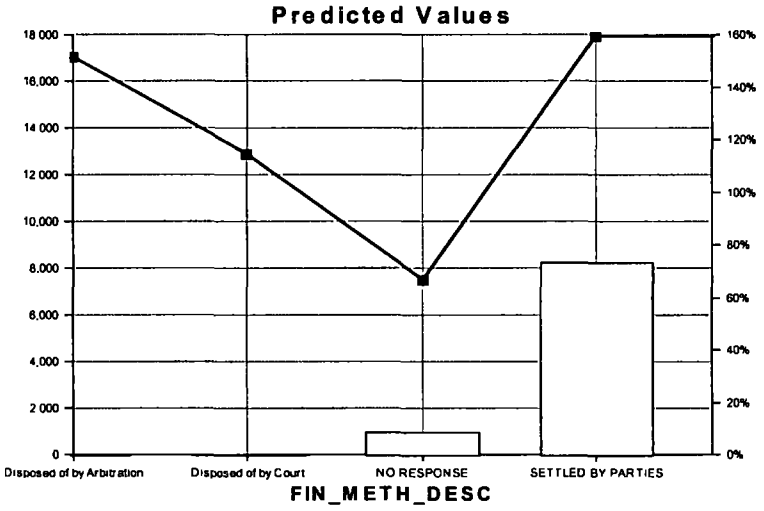
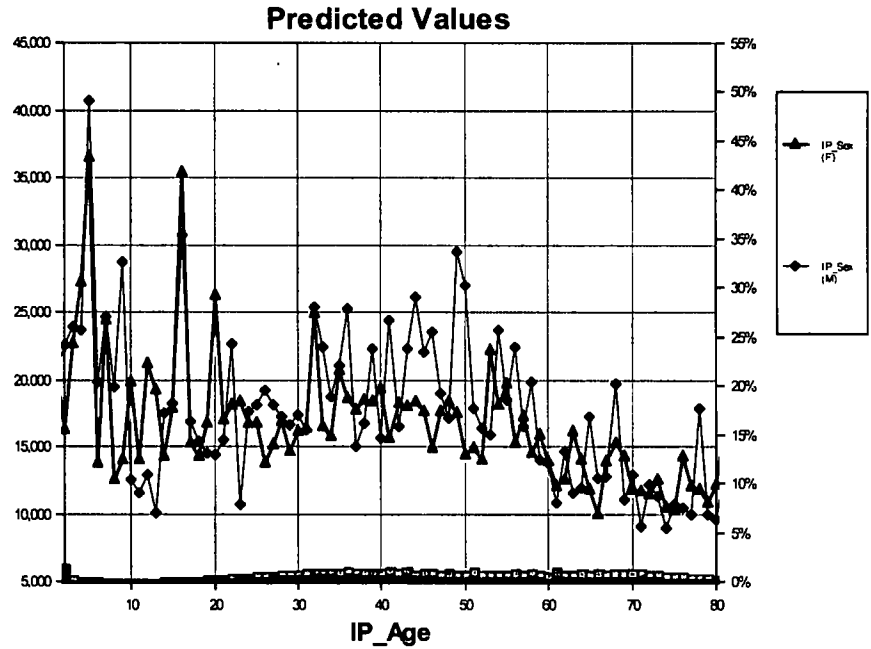


Table 15. Predicted Severities by Arbitration Impact



While not a key discussion point at this stage in the debate, variances by sex and age, along with their interactions were investigated to identify any differences in severities. Particularly, note the slightly higher average severities for male patients between the ages of 30 and 60. The theory that this could be the result of higher wage loss payments for men versus women in this age segment is currently being investigated.

Table 16. Predicted Severities by Age and Sex



Two of the interesting results from, the ALAE to loss + ALAE ratio analysis relate to the dramatic differences by severity of claim and by settlement lag. The results are summarized in Tables 17 and 18. Table 17 shows that emotional and temporary claims result in a much higher ratio of ALAE to Loss and ALAE. Table 18 shows that the ratio of ALAE to Loss and ALAE increases as the settlement lag increases and exceeds 80% by the time the claim has been open 10 years.

Table 17. Predicted ALAE to Loss and ALAE Ratios by Claim Type

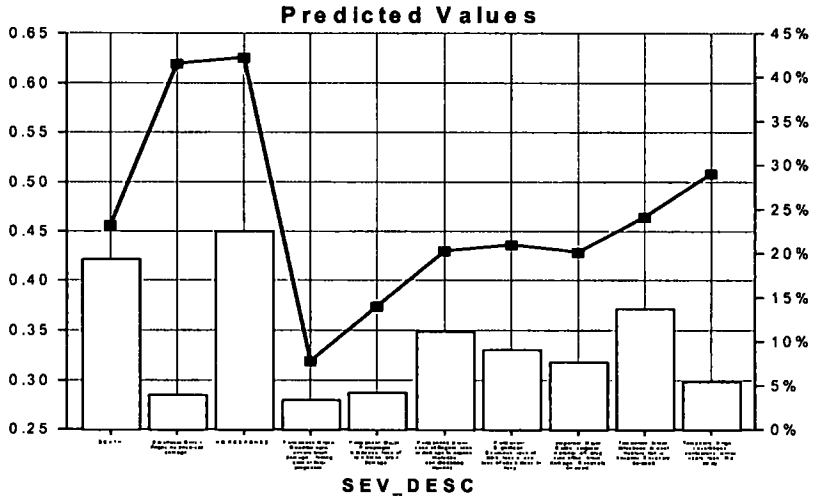
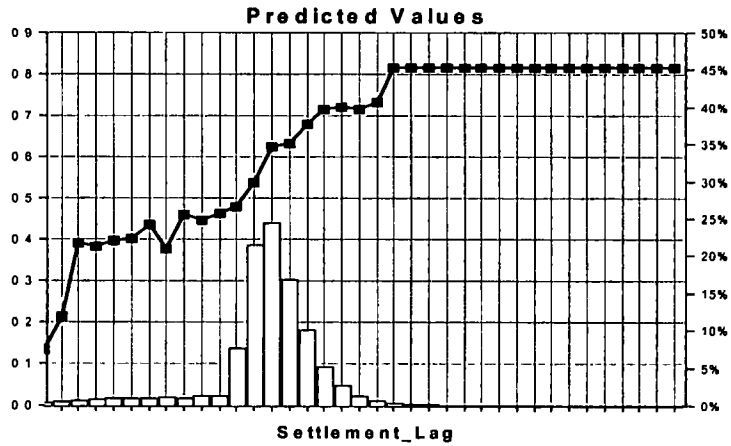
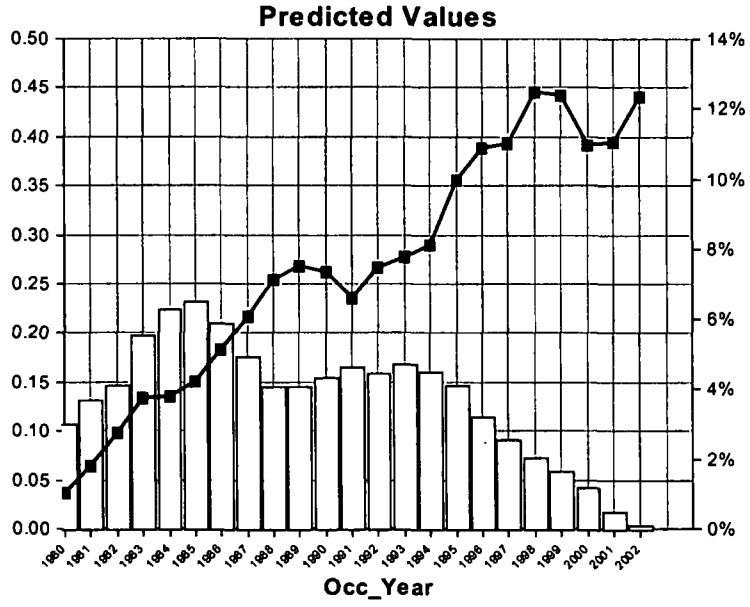


Table 18. Predicted ALAE to Loss and ALAE Ratios by Settlement Lag



Easily the most disconcerting element of the non-economic damages study was the skyrocketing of non-economic damages to total loss by occurrence year as is seen in table 19.

Table 19. Predicted Non-economic damages to total loss by Occurrence Year



Many additional insights can be gleaned from GLM model and analysis, but hopefully these exhibits have shown the highlights and demonstrated the usefulness of GLM for this type of analysis.

Enhancements

Licensed physician counts by year, county, and specialty are available for a nominal fee from the American Medical Association. The Florida Closed Claim database could easily be augmented with this exposure data to create an ideal data set for modeling frequency characteristics in a manner very similar to the approach shown in this paper.

Applications

A GLM severity analysis of the type shown in this paper could have multitude of potential applications. It could be used to assess the value added to the claims process by different claims offices, "managed care" operations offering provider networks for such services as auto glass

repair, defense attorney services, and health services generally or just for prescription drugs or medical appliances. These types of "utilization review" GLM applications have some fascinating results when applied to workers compensation and commercial automobile programs. A more detailed understanding of changing severity trends is an obvious use of a GLM severity analysis. These analyses also have applications in pricing and reinsurance program design. Medical malpractice insurers can apply this type of analysis to the development of enhanced classification and territory relativities or underwriting guidelines. Claims departments can apply the results of this type of analysis to change their approach to different types of claims and reserving actuaries can use some elements of this type of study in some loss reserving methods, such as the Berquist-Sherman method.

Conclusion

In retrospect, the original goal of the paper, to identify "Who Dunnit?" was patently unachievable. No single analysis of a single database, no matter how rigorous, could hope to resolve this issue. Hopefully this paper has done something even more dangerous. It is my hope that this paper has demonstrated just one of the many applications of GLM. I have taken some liberties with all of the parties involved in this crisis. Please recognize this as an attempt to bring a little humor to a somewhat dark and emotionally-charged situation. As an actuary, I can think of no more noble a professional goal than to introduce an actuarial technique that can help prevent the pain, suffering, and misery that so many will have to endure in the next crisis. Hopefully, GLM will be one of the tools our professional can take into the future to accomplish just this end.