

The Impact of Small Verdicts and Settlements on the Trucking Industry

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LIST OF ACRONYMS

ABA	American Bar Association
ALAE	Allocated Loss Adjustment Expenses
ANPRM	Advanced Notice of Proposed Rulemaking
ATRF	American Tort Reform Foundation
ATRI	American Transportation Research Institute
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
HOS	Hours-of-Service
OMC	Office of Motor Carriers
RAC	Research Advisory Committee
VIF	Variance Inflation Factors

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INTRODUCTION

The American Transportation Research Institute (ATRI) published *Understanding the Impact of Nuclear Verdicts on the Trucking Industry* in 2020 with the objective of providing comprehensive analysis of the proliferation and impact of litigation verdicts over \$1 million.¹ Concurrent with the “nuclear verdicts” research, it became evident that the proliferation of lawsuits resulting in settlements or verdicts under \$1 million also warranted further investigation. While cases of this size are not individually as devastating to motor carriers and thus do not attract the attention of media outlets, in aggregate they have a significant negative impact on the trucking industry.

Recognizing the cumulative impacts of this litigation category on the trucking industry, ATRI’s Research Advisory Committee (RAC) identified an analysis of lawsuits resulting in payments under \$1 million as a top research priority in 2020.² This report refers to both settlements and verdict awards as “payments;” when the distinction is important, verdicts and settlements are specifically noted.

This research focused on four primary objectives:

1. Identifying the legal conditions that foster the proliferation of “small litigation” in the trucking industry.
2. Assessing the relationship between small verdicts and settlements and increasing commercial motor vehicle insurance rates.
3. Quantifying the impact of crash characteristics and litigation factors on payment sizes.
4. Quantifying the impact of crash characteristics and litigation factors on whether a case is settled in or out of court.

In addressing these objectives, this research provides a concise overview of the legal landscape of small litigation and its impact on trucking companies.

BACKGROUND

Litigation Practices

The proliferation of verdicts and settlements under \$1 million over the last 20 years stems from multiple factors including loose state tort laws, negative public attitudes toward trucking, tighter legal restrictions in other industry sectors, litigation fraud and growing coordination among plaintiff attorneys. These factors are related to changes in the revenue structures of plaintiff firms. Increasingly, attorneys participate in “ambulance chasing” and structure plaintiff firms as “settlement mills.” These trends

¹ Dan Murray, Nathan Williams, and Erin Speltz, *Understanding the Impact of Nuclear Verdicts on the Trucking Industry*, American Transportation Research Institute, June 2020.

² ATRI’s Research Advisory Committee RAC is comprised of industry stakeholders representing motor carriers, trucking industry suppliers, federal government agencies, labor and driver groups, law enforcement, and academia. The RAC is charged with annually recommending a research agenda for the Institute.

have contributed to an increase in plaintiff cases, many of which are small verdict or settlement cases.

An “ambulance chaser” is an attorney who actively and often intrusively solicits clients shortly after a crash. This practice frequently leads to barratry – the pursuit of groundless litigation. Though barratry can be traced back hundreds of years, it was classified as an official breach of professional responsibility in 1908 by the American Bar Association (ABA).³ The ABA maintains that barratry and solicitation of professional services by live person-to-person contact in general violate ethical attorney conduct, and many states have made such practices illegal.⁴

Ambulance chasing is difficult both to prevent and to prosecute, yet some states have taken steps to discourage ambulance chasing. California, for example, employs investigators to prevent in-person solicitation at crash scenes, while the Washington State Patrol redacts personal information from collision reports.⁵ In Georgia, two attorneys were disbarred for the practice in 2011. The Supreme Court of Georgia found evidence that these attorneys paid 54 “runners” to obtain 2,441 cases.⁶

In addition to ambulance chasing, personal injury firms often operate on a volume-based business model. These firms, known as “settlement mills,” may have between 200 and 300 open cases at one time, settling more than 600 annually.⁷ Settlement mills prioritize speed and often avoid the court system altogether, seeking settlement without filing a suit where possible. For comparison, a typical personal injury plaintiff attorney may have between 10 and 70 open cases at one time. Settlement mills and their associated attorneys, who often also engage in ambulance chasing, contribute to a litigious environment that is adverse to transportation industries such as trucking.

A majority of cases processed by settlement mills are minor vehicle crashes. Minor incidents have led to requested payment amounts five times greater than the true medical cost for soft-tissue non-severe injuries regardless of fault.⁸ The inflated figures in these cases result from collaboration between law firms, doctors and other medical professionals. Since insurance companies incur the majority of inflated medical costs, they in turn must pass excess costs onto all other policy holders. Motor carriers have responded to higher policy costs by raising deductibles or retentions, meaning that they

³ Anita Bernstein, “Sanctioning the Ambulance Chaser,” *Loyola of Los Angeles Law Review* Vol. 41 (4), June 2008, available online: <https://digitalcommons.lmu.edu/cgi/viewcontent.cgi?article=2639&context=llr>.

⁴ Center for Professional Responsibility Policy Implementation Committee, “Variations of the ABA Model Rules of Professional Conduct,” American Bar Association, November 9, 2020, available online: https://www.americanbar.org/content/dam/aba/administrative/professional_responsibility/mrpc_8_4.pdf.

⁵ Davis Law Group, P.S., “Ambulance Chasers: The Truth about Unethical Lawyers and Doctors,” June 21, 2020, available online: <https://www.injurytriallawyer.com/blog/ambulance-chasers-the-truth-about-unethical-lawyers-and-doctors.cfm>.

⁶ Supreme Court of Georgia, “IN RE: Thomas C. Sinowski. In the Matter of Steven F. Freedman,” November 30, 2011, available online: <https://caselaw.findlaw.com/ga-supreme-court/1586892.html>.

⁷ Nora Freeman Engstrom, “Run-of-the-Mill Justice,” *The Georgetown Journal of Legal Ethics* Vol. 22 (1485), 2009, available online: <https://law.stanford.edu/index.php?webauth-document=publication/259631/doc/slspublic/Engstrom.pdf>.

⁸ *Ibid.*

must increasingly pay more of these inflated costs. The average deductible or retention for fleets with 100 to 1,000 power units is \$242,857 – more than 50 percent of the average payment found in this study.⁹

The recent rise of litigation financing has further contributed to the number of lawsuits involving commercial vehicles and the size of payments. In litigation financing, a third party supplies capital to finance litigation costs in exchange for a share of any resulting payment. The attraction of high returns has led both the amount of capital and the number of firms involved in this relatively new form of investment to grow by more than 400 percent.¹⁰ Litigation financing also contributes to the ongoing increase in lawsuits that has caused insurers' average adjudication expenses to increase over the past decade.¹¹ Medical receivable funding or factoring, in which a third party purchases a plaintiff's medical bills in anticipation of a court award or settlement, is another related practice on the rise that inflates medical costs and encourages litigation.

Insurance Volatility

The proliferation of litigation against the trucking industry has had wide-reaching impacts on the legal and financial status of commercial motor vehicle insurance.

In 1982, the Office of Motor Carriers (OMC) – now the Federal Motor Carrier Safety Administration (FMCSA) – established a \$750,000 minimum liability insurance coverage threshold for non-hazardous freight.¹² FMCSA implemented required insurance coverage to enhance highway safety and protect the public against dishonest and financially unstable motor carriers. The dollar value of the requirement was determined to be high enough to incentivize insurance companies to investigate prospective motor carriers when determining fair rates of coverage.¹³ FMCSA issued an Advanced Notice of Proposed Rulemaking (ANPRM) on increasing insurance levels in 2014, but ultimately withdrew the proposal due to a lack of data needed to assess the increase.

Several times, Congress has pursued measures to increase insurance minimums for trucking companies. In 2020, the U.S. House of Representatives proposed increasing minimum liability insurance coverage to \$2 million, following FMCSA's withdrawn 2014

⁹ Claire Evans and Alex Leslie, *The Impact of Rising Insurance Costs on the Trucking Industry*, American Transportation Research Institute, expected release February 2022.

¹⁰ Diane Injic, "The growth of litigation funding and its potential effects on commercial auto insurance: Part one," Verisk, June 10, 2019, available online: <https://www.verisk.com/insurance/visualize/the-growth-of-litigation-funding-and-its-potential-effects-on-commercial-auto-insurance-part-one/>; Michael Barry, "Rising Litigation Expenses Are Driving Up Cost of Insurance," Insurance Information Institute, February 11, 2021, available online: <https://www.iii.org/press-release/triple-i-rising-litigation-expenses-are-driving-up-cost-of-insurance-021121>.

¹¹ Philip S. Borba and Derek Jones, "Trends in Attorney Representation: Texas Commercial Automobile Insurance," Milliman, March 19, 2021, available online: <https://www.apci.org/media/news-releases/release/65831/>.

¹² Kent Hymel et al., "Financial Responsibility Requirements for Commercial Motor Vehicles," U.S. DOT Federal Motor Carrier Safety Administration, January 2013, available online: <https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Financial-Responsibility-Study.pdf>.

¹³ Ibid.

proposal.¹⁴ Earlier this year, a bill was reintroduced to increase the federal minimum liability insurance requirement for motor carriers from \$750,000 to nearly \$5 million.¹⁵ For this reason, in practice many motor carriers treat \$1 million as the new de facto minimum liability insurance coverage threshold.¹⁶

In addition to minimum insurance levels, insurance premiums in general have gained attention as crash fraud has become more common. Drivers have cited instances of motorists intentionally braking in front of trucks to provoke an injury-related lawsuit. For example, in 2019, nine people were indicted for staging a truck-trailer crash in Louisiana.¹⁷

Insurance cost increases are clearly corroborated in other ATRI research. ATRI's *An Analysis of the Operational Cost of Trucking: 2020 Update* documents recent fluctuations in trucking insurance premiums. While insurance premiums continue to vary from year to year, two of the last seven years saw cost per mile increases exceeding 11 percent annually; these double digit cost increases are well below insurance premium rate increases – as motor carriers continuously implement cost-reduction strategies.¹⁸ The unpredictability of premiums, like the unpredictability of litigation, poses a challenge to motor carriers' operational planning.

ATRI's forthcoming report on *The Impact of Rising Insurance Costs on the Trucking Industry* shows that insurance premiums rose across all sectors and fleet sizes between 2018 and 2020.¹⁹ Premiums rose despite motor carriers paying less in total annual out-of-pocket incident costs, having fewer incidents, and implementing on average three new safety technologies in these three years alone. In order to mitigate these rising costs, motor carriers decreased total excess coverage, increased deductibles, and made additional internal cuts – all of which could increase the costs of litigation. Policy cost depends on numerous factors including motor carrier safety, operating sector, fleet size and primary region of operation. Industry professionals consulted for both this research and *The Impact of Rising Insurance Costs on the Trucking Industry*, however, reported that external factors such as growing losses and litigation payments played an even greater role in rising insurance rates.

¹⁴ Eric Miller, "House Panel Approves Amendment to Raise Minimum Liability Insurance for Carriers to \$2 Million," *Transport Topics*, June 25, 2020, available online: <https://www.ttnews.com/articles/house-panel-approves-amendment-raise-minimum-liability-insurance-carriers-2-million>

¹⁵ Vesna Brajkovic, "Bill to Increase Carrier Insurance Reintroduced," *Heavy Duty Trucking*, April 16, 2021, available online: <https://www.truckinginfo.com/10141478/bill-to-increase-minimum-insurance-for-carriers-reintroduced>

¹⁶ "Financial Responsibility Requirements for Commercial Motor Vehicles," Federal Motor Carrier Safety Administration, January 2013, available online: <https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Financial-Responsibility-Study.pdf>. A \$1 million minimum coverage already applies to any motor carrier transporting oil or foreign commerce. See FMCSR Part 387.9.

¹⁷ Larry Kahaner, "Truck Crash Fraud: Everyone May be in on it," *FleetOwner*, January 2, 2020, available online: <https://www.fleetowner.com/safety/article/21119301/truck-crash-fraud-everyone-may-be-in-on-it>

¹⁸ Nathan Williams and Dan Murray, *An Analysis of the Operational Costs of Trucking: 2020 Update*, American Transportation Research Institute, November 2020.

¹⁹ Claire Evans and Alex Leslie, *The Impact of Rising Insurance Costs on the Trucking Industry*, American Transportation Research Institute, expected release February 2022.

The proliferation of litigation in the trucking industry wreaks havoc on insurers and motor carriers alike. Insurers are reallocating capacity to other less risky sectors, and declines in capacity in the insurance market place additional upward pressure on rates.²⁰ The proliferation of lawsuits put motor carriers in a pernicious cycle: insurance rates spike as plaintiff payments grow in size or number. Industry news outlets reported that increased insurance premiums led to over half a dozen motor carriers closing their doors in 2019 alone.²¹

DATA AND METHODOLOGY

Despite being labeled as “small,” cases that result in verdicts and settlements under \$1 million are not insignificant to the trucking companies and insurers that pay them. To assess the impact of small verdicts and settlements on the trucking industry, ATRI compiled litigation data for 641 cases and analyzed their key metrics and attributes. The data were collected from multiple external industry sources, including a litigation database resource. Case data spanned 14 years and contained detailed descriptions of each case, which were then mined for keywords frequent across all observations.

It is important to note that all cases in the dataset involved some form of litigation and concluded with either a settlement or a finding in favor of the plaintiff. The data did not include cases resolved in favor of the defendant, small claims or the “settlements” obtained prior to the filing of any case that settlement mills often pursue. While verdicts and settlements under \$1 million are much more common than nuclear verdicts, they are much less common than incidents that merely conclude with insurance claims: subject matter experts in the insurance industry reported that less than 2 percent of reported claims generate any litigation action. As this report shows, smaller verdicts and settlements differ from both ordinary claims and nuclear verdicts in many key respects.

The case data was subdivided into two categories: crash characteristics and litigation factors. Crash characteristics included the number of vehicles involved in the crash, alleged faults on the part of either the driver or the motor carrier, and injuries sustained by the plaintiff. Litigation factors included the presence of expert witnesses, location of the crash and court where a case was tried (e.g. state vs. federal).

This report utilizes statistical analysis in conjunction with summary statistics because the data does contain some inevitable limitations. It is important to clearly qualify the limits of any dataset as part of interpretation in order to make the analysis optimally useful. The first qualification is related to scope. Due to the secrecy surrounding much litigation, ATRI’s data – which constitutes a fraction of the total number of verdicts and settlements during this period – does not necessarily capture all possible scenarios. The second qualification arises from the nature of litigation itself. Every case is unique,

²⁰ Rodrigo Amaral, “There’s the Hard Market – Then There’s the Trucking Industry,” *Risk & Insurance*, April 29, 2020, available online: <https://riskandinsurance.com/the-trucking-industry-insurance-crisis/>.

²¹ Brian Straight, “Spike in Insurance Rates Lead to Shutdown of Carney Trucking,” *FrewightWaves*, August 5, 2019, available online: <https://www.freightwaves.com/news/spike-in-insurance-rates-lead-to-shutdown-of-carney-trucking>.

and even alleged faults or injuries of the same category can vary in specifics from one incident to the next. Furthermore, the circumstances surrounding litigation involve a number of idiosyncrasies that are difficult to quantify, such as attorney rhetoric, behind-the-scenes dealing, or jury irrationality. Nonetheless, these potential idiosyncrasies can be approximated to some degree through other variables in combination and mitigated through common statistical techniques.

Whereas summary statistics describe collected data and thus may reflect certain limitations in the sample, they provide the opportunity to pose hypotheses that can be tested through statistical analysis to make claims about the wider population. In following these standard procedures, this report offers methodological transparency while identifying trends that can be observed with standard confidence levels in the broader field of litigation resulting in payments under \$1 million.

Subject Matter Expert Review

To gain insight in to the sample data and statistical findings, a summary of the analysis along with open-ended questions was submitted to both defense attorneys and insurance professionals. Subject matter expert feedback assisted the research team in adjusting assumptions about the data to produce more comprehensive interpretations of the findings.

Litigation-Related Payments

The mean payment size in the dataset from 2007 through 2019 was \$427,336, with a median value of \$400,000. Payment size distributions were generally normal, with a maximum of \$999,000 and a minimum of \$4,199. Defendants facing litigation in small verdicts and settlements cases can, in general, expect to pay between \$406,386 and \$449,792 in plaintiff payments, at a 95 percent confidence level (Table 1).

Table 1: Summary Statistics of Payment Size

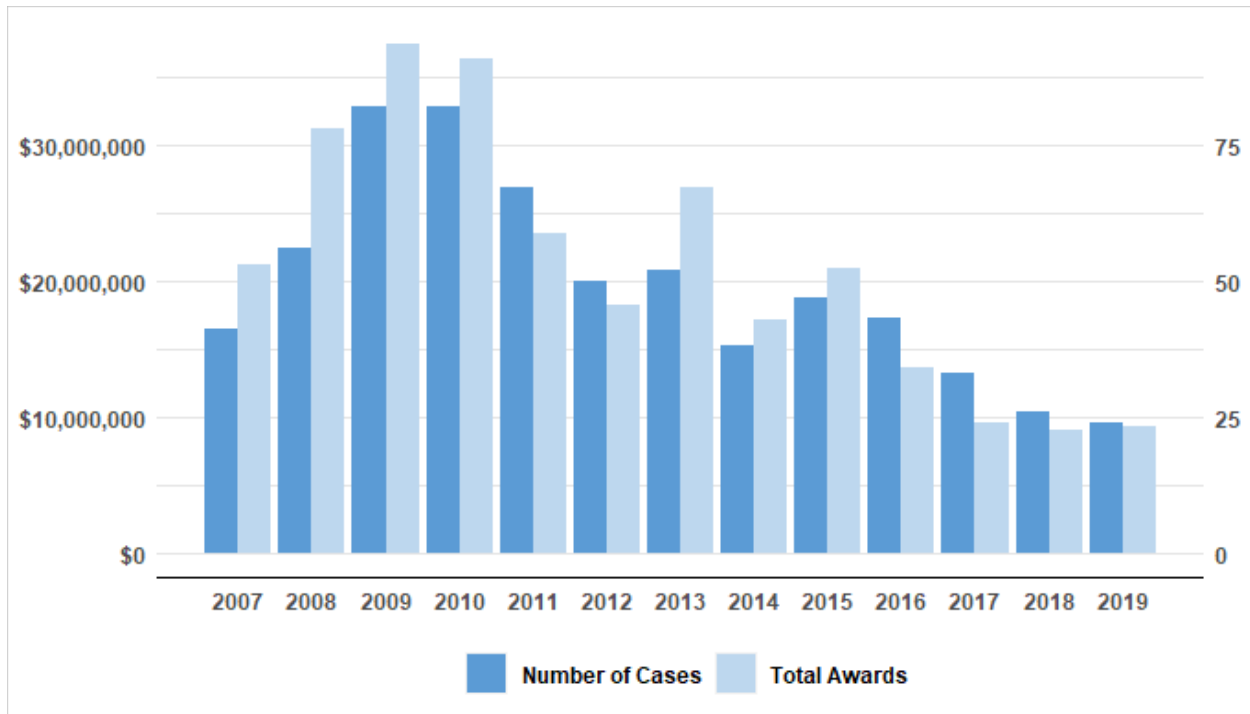
Mean	\$427,336
Standard Deviation	\$279,608
Minimum	\$4,199
Maximum	\$999,000
Confidence Interval 95.0 %	+/- \$21,703

The average annual payment size in the data peaked in 2008 at \$557,271, which is approximately 94 percent higher than the smallest average annual payment size (\$287,347) in 2017. Nonetheless, there is considerable year-to-year variability in average payments, and as Figure 1 shows, the years with the highest average payments also tended to include the largest number of payments. One possible explanation for the downward trend in annual average payment sizes is that a requisite number of cases crossed the \$1 million threshold. ATRI's data for nuclear verdicts suggests such an increase, but there is no statistical way to map a linear relationship for

cases that move from small (<\$1M) to large (\$1M+). It is also not possible to conclude that this change is persistent based on the payment data's volatility.

The highest number of cases in ATRI's data were in 2009 and 2010, each with 82 total cases. Again, the decline in the number of cases in the sample may be attributed to shifts over \$1M or to data availability and data collection methods rather than a true decline. One insurance industry professional, however, noted a recent decline in the incident per truck rate (crashes per 100 trucks).

Figure 1: Total Litigation-Related Payments and Number of Cases



FINDINGS

State Impacts on Litigation-Related Payment Size

Average payment size varied considerably by the state in which the case was venued. Of the 38 states represented in the small verdicts and settlements dataset, California, New Jersey and Missouri had the highest average payment sizes (Table 2). The American Tort Reform Foundation (ATRF) considers these states among the top “judicial hellholes” – states with litigation environments that are unfavorable to defendants.²² ATRF’s “judicial hellholes” is a determination of the venues least amenable to defendants due to jury verdicts, court decisions, judicial rules and legislative actions.

Table 2: Top 10 States by Average Litigation-Related Payment Size

Rank	State	Number of Cases	Sum of Payments	Average Payment Size
1	California	27	\$15,882,234	\$588,231
2	New Jersey	50	\$28,451,099	\$569,022
3	Missouri	47	\$23,185,398	\$493,306
4	New York	30	\$14,471,500	\$482,383
5	Virginia	38	\$17,953,804	\$472,469
6	Illinois	58	\$25,868,713	\$446,012
7	Washington	27	\$11,451,471	\$424,129
8	Texas	90	\$35,249,410	\$391,660
9	Florida	24	\$8,921,254	\$371,719
10	Louisiana	35	\$10,084,659	\$288,133

ATRI’s small verdicts and settlements data included both the state where the incident occurred and the state where the case was venued. All cases in the data were venued in the state in which the incident occurred. Nine states were not represented in the dataset: Delaware, Iowa, Maine, Montana, New Hampshire, New Mexico, North Dakota, Rhode Island and Vermont. Since most states were represented in the data, the average payment size used for comparison in the analysis is assumed to approximate the national average.

²² “Judicial Hellholes 2020/2021,” American Tort Reform Foundation, 2021, available online: http://www.judicialhellholes.org/wp-content/uploads/2020/12/ATRA_JH20_layout_08.pdf.

A multiple linear regression model was developed to test the hypothesis that particular states truly favor plaintiffs with higher payments.

Three states were found to be highly significant in predicting above-average payments to plaintiffs. Among these was California, which is considered one of the worst states for trucking companies involved in litigation. North Carolina and New Jersey were also among the most significant in predicting larger payments. Each of these states have been cited in recent years in ATRF’s annual “Judicial Hellholes” report. The feedback from the industry subject matter experts indicated that in addition to the findings presented in this report, Illinois and Florida are also known for large payments to plaintiffs. Additionally, experts noted that the biggest disparities in payment size exist at the state-level between counties.

Table 3 lists the statistically significant ($p < 0.05$) results of the analysis for state impact on payment size, including estimated average payments and the percent difference from the approximate national average. The methodology and results of the full model are described in Appendix A.

Table 3: Predicting Litigation-Related Payments by State

State	Estimated Average Payment Size	Percent Difference from National Average
National Average	\$376,757	
New Jersey	\$569,022	51.0 %
North Carolina	\$640,529	70.0 %
California	\$588,231	56.1 %
Michigan	\$621,517	65.0 %
Missouri	\$493,306	30.9 %
Tennessee	\$228,090	-39.5 %
West Virginia	\$985,000	161.4 %
New York	\$482,383	28.0 %
Virginia	\$472,468	25.4 %

Tennessee was the only significant state to predict lower than average payments. Between 2011 and 2013, Tennessee enacted limits on noneconomic and punitive damages awarded to plaintiffs as well as restricted trial lawyer advertising.²³ Tort reform initiatives such as those pursued by ATRF may play a role in award size differences between states.

²³ “Tort Reform Record,” American Tort Reform Association, December 2020, available online: <https://www.atra.org/wp-content/uploads/2021/03/Record-12-31-2012.pdf>; “Tennessee Issues,” American Tort Reform Association, September 14, 2021, available online: <https://www.atra.org/state/tennessee/>.

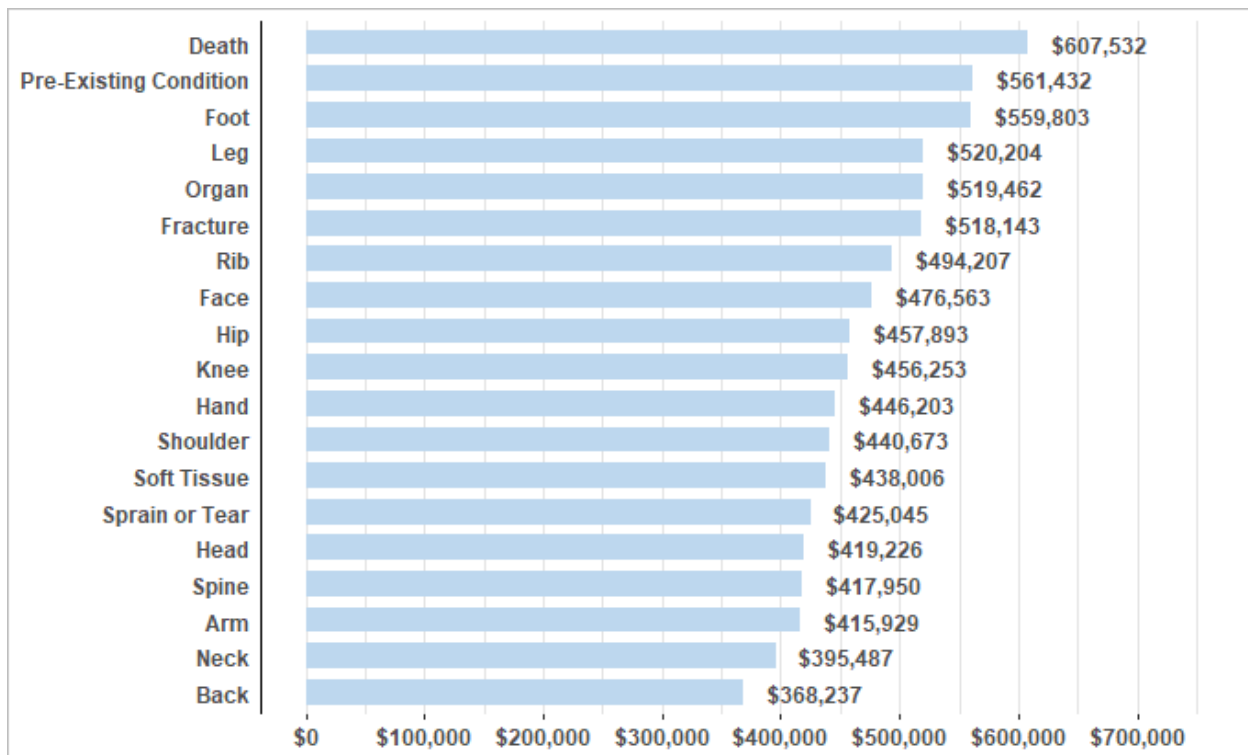
Impacts of Crash Characteristics and Litigation Factors

Injury Data Summary

The type and severity of injuries sustained in an incident are crucial factors in payment size outcomes because medical cost, personal disability and lost wages claims contribute significantly to overall damages. ATRI’s litigation data included detailed case descriptions of the type of injury or injuries documented by the plaintiffs, which were binned by keyword. For classification purposes, this report refers to fatality as an injury type. It is also important to note that the summary statistics for injury types do not reflect each injury in isolation because many crashes involve multiple injuries.

Figure 2 details the average payment size by common injury types cited in case data. Payments in cases with multiple injuries count toward the averages for each injury. For more detailed summary, see Appendix B.

Figure 2: Average Litigation-Related Payment Size by Injury



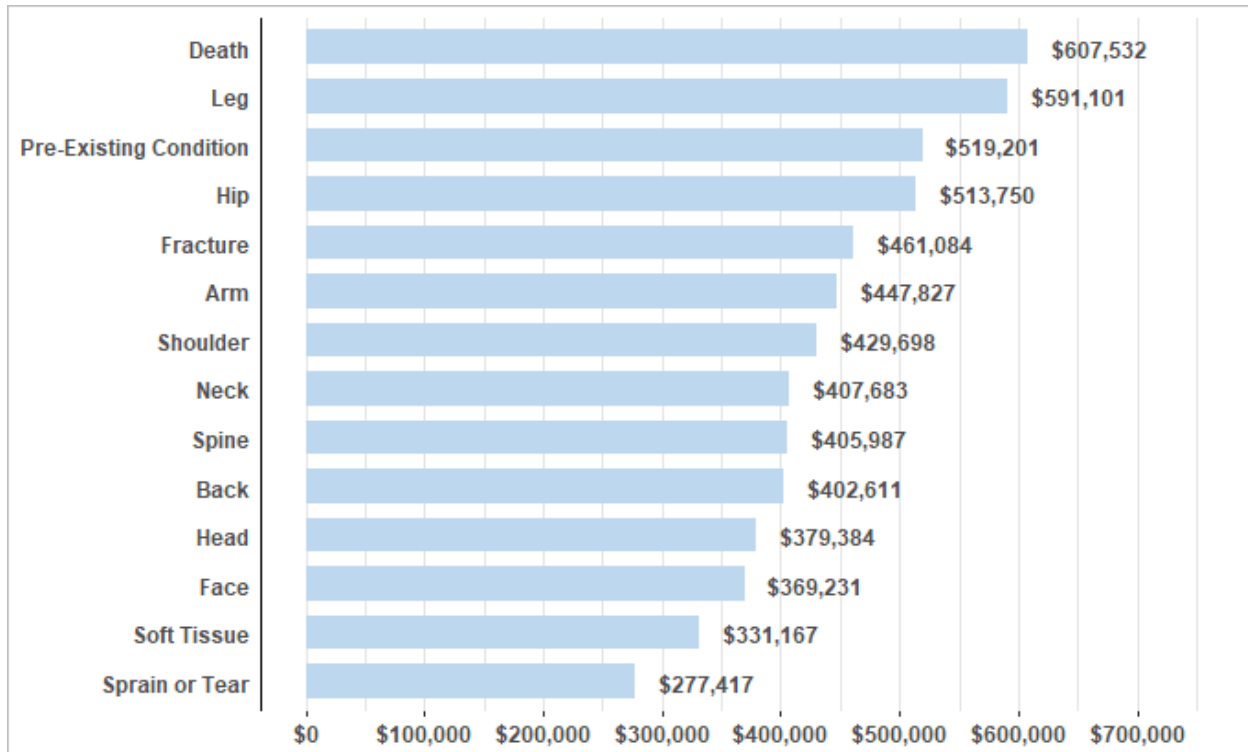
Not surprisingly, the average payment size for cases with a fatality topped the list at \$607,532. Cases that did not have a fatality had an average payment amount of approximately \$428,000. Crashes that resulted in one or more fatalities yielded an average payment that was 41.9 percent higher than crashes that did not result in a fatality.

Cases in which a defendant had a pre-existing condition resulted in some of the largest payments, with an average of over \$561,432. Larger payments in cases where plaintiffs had pre-existing conditions could be the result of higher medical cost claims. Herniated discs, cervical neck injuries and arthritis were among the most common pre-existing conditions cited by plaintiffs. These plaintiffs frequently claimed that their conditions were exacerbated by the incident and could request more in damages due to long-term losses. Injuries resulting from a pre-existing condition or injury can also make an incident appear more severe to a jury, leading to larger payments.

Cases involving back and neck injuries resulted in the smallest average payment amounts. Spinal cord injuries command some of the highest average awards in nuclear verdict cases, but back and neck injuries in this report are not necessarily spinal injuries. Plaintiff attorneys may be incentivized to exaggerate back and neck injuries in a trial because they know spine injuries generate large awards in high profile cases. Consequently, cases involving minor back and neck injuries are often overclaimed. Juries typically see through this strategy, however, and as a result these minor cases result in smaller average payments for back and neck injuries.

To compensate for the effect of multiple injuries on average payment size, Figure 3 depicts average payment size by injury in cases where there are only one or two injuries. The rank order is generally consistent between the two figures, but the interquartile ranges in Appendix B are better indicators of the impact of individual injuries.

Figure 3: Average Litigation-Related Payment Size by Injury in Cases with Only 1-2 Injuries



Some injuries tend to occur more frequently with other injuries. These injury correlations can impact payment size even if the injuries are not severe by themselves, as co-occurring injuries often lead to larger payments. The strongest same-crash injury correlations occur between adjacent body parts, such as knee and leg, back and neck, and organ and rib ($p < 0.05$). Though these injuries can often seem minor individually, their tendency to appear together can lead to litigation and larger payments.

Correlation analysis also indicates the existence of two injury categories in litigation. Of the 641 cases in the ATRI dataset, only death, spine, head, or neck injuries resulted in payments on their own, without any additional injury. These are the injury types that are severe enough to regularly warrant payments on their own. By contrast, sprains, fractures, and leg injuries had moderate correlations ($r = 0.5$) with multi-injury crashes. These injury types are less severe in isolation and so did not yield payments by themselves, but they contributed to payments in cases where there were additional injuries. This was especially the case for highly correlated injury types. Payments for leg injuries are among the highest in part because they so consistently appear with multiple other injury types. In practice, then, injuries fall into two semi-distinct categories in litigation: primary or standalone injuries and secondary or contributing injuries. Identifying highly correlated secondary injuries can be just as important for understanding the outcome of litigation as identifying severe primary injuries.

Alleged Infractions Data Summary

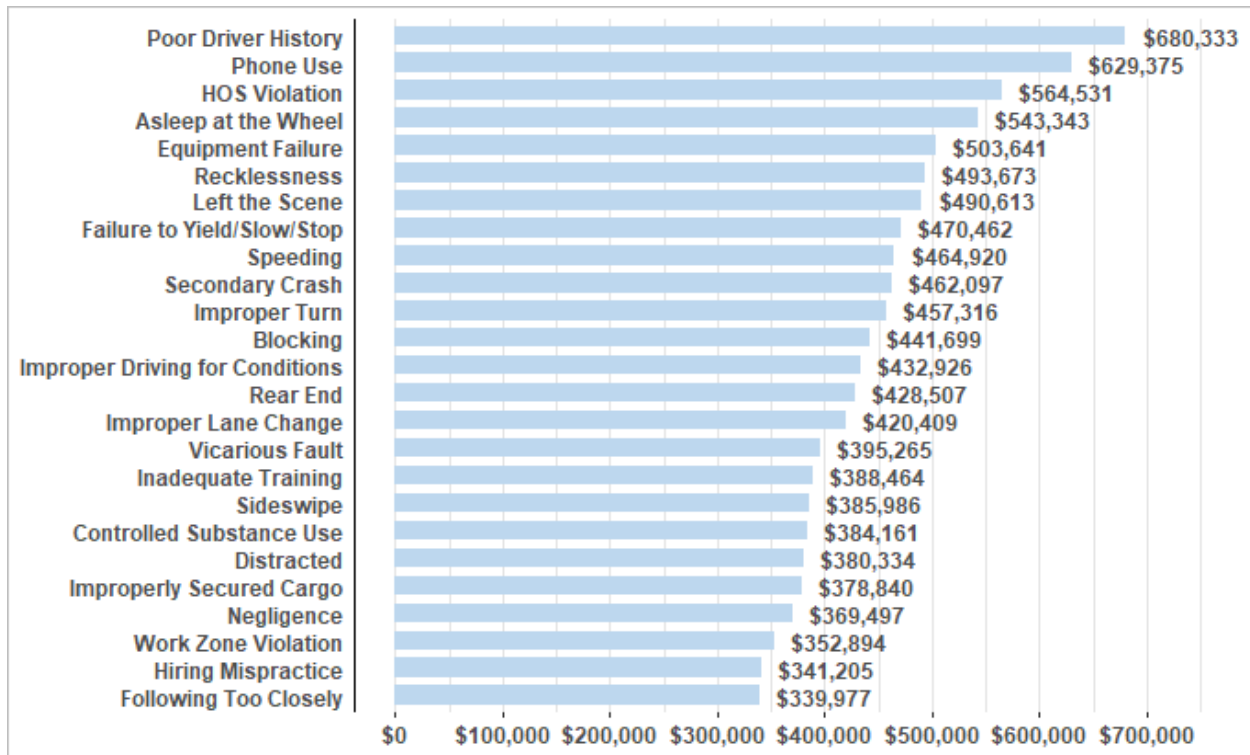
Case descriptions also cited a variety of alleged infractions by the defendants. Each accusation was brought against a defendant by a plaintiff and resulted in some type of payment. This does not, however, mean that the alleged infraction necessarily took place or indicate a relative degree of guilt. As with injury types, cases often included multiple accusations.

Some alleged infractions, such as driving over the posted speed limit apply to drivers, while others, such as inadequate training practices, apply to motor carriers. Some alleged infractions, such as improper lane changes, occur during crashes while others, such as poor driver history or leaving the scene, occur outside of the crash itself and are cited in order to strengthen cases against a defendant. Not all alleged infractions involve violating a law. Several alleged infractions can overlap. For example, falling asleep at the wheel can coincide with Hours-of-Service (HOS) violations, though not necessarily. Finally, some alleged infraction variables are in fact legal bases of liability rather than specific infractions themselves, such as negligence and recklessness, which are discussed in greater detail below. A summary of each alleged infraction and payment size was conducted to investigate if certain infractions could be associated with higher payments in the sample.

Figure 4 details the average payment size by alleged infraction in each case. For a more detailed summary, see Appendix B. Cases citing poor driver history resulted in the largest average payment size of \$680,333. This is consistent with the findings in ATRI's *Understanding the Impact of Nuclear Verdicts on the Trucking Industry* report, in which poor driver history yielded a high percentage of plaintiff victories.²⁴ Poor driver history and other alleged carrier infractions can prove especially costly because they spark additional jury sympathy on the basis of corporate ethics and culture.

²⁴ Dan Murray, Nathan Williams, and Erin Speltz, *Understanding the Impact of Nuclear Verdicts on the Trucking Industry*, American Transportation Research Institute, June 2020.

Figure 4: Litigation-Related Payment Size by Alleged Infractions



After poor driver history, phone use, HOS violations, falling asleep at the wheel and equipment failure had the highest average payments. Carriers should make the elimination of these issues a top priority in order to lower litigation payments.

There was no correlation between most alleged infractions. There were, however, noteworthy exceptions. See Appendix B for the full correlation plot. Poor hiring practices, inadequate training, and vicarious liability (i.e., a carrier was held vicariously at fault for mistakes committed by the driver or another party) are all correlated with each other in the dataset. They are also correlated with poor driver history ($p < 0.05$). These correlations suggest that lack of oversight on the part of motor carriers is connected with inattention on the part of drivers, and they reaffirm that comprehensive driver onboarding and training programs are among the most important ways to improve the likelihood of lower payments overall. To this end, subject matter experts stress the need for carriers to cultivate defensible drivers through uniform and consistent driver hiring and onboarding protocols in accordance with Federal Motor Carrier Safety Regulations (FMCSR) Parts 383 and 391.

Predicting Large Litigation-Related Payments

To estimate which crash characteristics and litigation factors predict payments larger than \$600,000 – approximately the upper 25 percent of all payments – a logistic regression model was developed and implemented. A logistic regression model estimates the change in probability of an event occurring. Table 4 gives the statistically significant ($p < 0.1$) percent changes in likelihood of cases involving each variable having payments larger than \$600,000. For full model details, see Appendix C.

Table 4: Predicting Litigation-Related Payments over \$600,000

Variable	Change in Likelihood
Death	965.9 %
Pre-Existing Condition	208.1 %
Reckless Driving	207.7 %
Severe Injury	198.7 %
Leg Injury	116.0 %
Settle	79.8 %
Negligence	- 51.6 %

Cases involving death and cases where the plaintiff cites a pre-existing condition were among the case types most likely to have a litigation payment over \$600,000. Cases alleging “generic negligence” were more likely to be associated with payments under \$600,000. In these plaintiff victories, “generic negligence” was alleged where no violation of law was committed, as discussed in greater detail below.

Predicting Litigation-Related Payment Size

A multiple linear regression analysis was conducted for all payment sizes to provide a more granular account of the relationship between overall payment size and case variables. This analysis allows the research to extrapolate from the ATRI dataset to the larger population of small verdict and settlement cases.

When the statistical test was applied, the mean payment size estimated by the model (absent all variables) was \$208,793. The estimated average payment size for each significant variable ($p < 0.1$) and percent change from the average are given in Table 5. The estimated average payment sizes should be interpreted as the expected average payment in the presence of each crash characteristic or litigation factor absent all others. The model is practical for use in understanding which variables impact payment amounts and the associated payment amounts one might expect in cases involving any of the variables. For full model details, see Appendix D.

Table 5. Litigation-Related Payment Size Linear Regression

Variable	Estimated Payment	Percent Change From Average
Fatality	\$541,851	159.5 %
Driver History	\$403,169	93.1 %
Pre-Existing Condition	\$353,866	69.5 %
Reckless Driving	\$347,146	66.3 %
Severe Injury	\$340,886	63.3 %
Leg Injury	\$325,342	55.8 %
Settle	\$301,443	44.4 %
Fracture	\$276,917	32.6 %
Defense Expert	\$265,718	27.3 %
Negligence	\$123,972	- 40.6 %

Fatality, pre-existing conditions, severe injury and reckless driving not only predicted the highest average payment sizes; they were also some of the more reliable predictors of payment size overall. Although less statistically significant, poor driver history predicted the second highest average payment in the model. Conversely, “generic negligence” had one of the lowest average payment sizes while once again being one of the most reliable predictors of lower payment size overall.

Recklessness and negligence are two broad bases for litigation, which a plaintiff attorney attempts to justify with more specific accusations. FMCSA defines “reckless driving” as “including, but not limited to, offenses of driving a motor vehicle in willful or wanton disregard for the safety of persons or property.”²⁵ This definition is consistent with legal definitions of recklessness, which vary according to additional state or local laws or regulations. As a result, allegations of reckless driving can generate considerable debate over interpretation. Nonetheless, “reckless driving” typically includes behaviors such as texting while driving, driving while intoxicated, failing to stop for a school bus, or knowingly failing to yield right-of-way to pedestrians. While some of these behaviors were not common enough to be coded separately in ATRI’s dataset, many are cited in cases with the highest average payment sizes. Cases involving recklessness are subject to additional punitive damages, which can result in even greater expenses to motor carriers due to the fact that they are not typically covered by insurance.

Allegations of negligence can be more ambiguous. In legal contexts “negligence” refers to a failure to act with the care that a reasonable person should under the particular circumstances. Negligence is the most common legal basis for litigation. While it often

²⁵ Code of Federal Regulations, Title 49, Subtitle B, Chapter III, Subchapter B, 383.51, available online: https://www.ecfr.gov/cgi-bin/text-idx?SID=8d0ba1a6c2f07bd60f7728debbd1c5ed&mc=true&node=se49.5.383_151&rqn=div8

includes a legal violation or infraction on the part of the defendant, an individual can be guilty of negligence without breaking a law. In this respect, negligence differs from negligence per se, which entails the breaking of a law, and gross negligence, which is equivalent to recklessness in severity. Depending on the interpretation of an incident, the criterion of “reasonable care” may be used to hold drivers and motor carriers to a higher safety standard than the FMCSA’s baseline definition of a “preventable accident,” namely, an accident that “could have been averted but for an act, or failure to act, by the motor carrier or the driver.”²⁶ As such, negligence can also be alleged about incidents with lesser severity or fault. In ATRI’s data set and throughout this research, “generic negligence” denotes only cases of this kind in which no violation of law was reported.

Accusations of “recklessness” and “negligence” are common in the litigation process, and can carry rhetorical power among juries or the general public, partly because these words inherently attribute blame and partly because they are defined broadly enough to be used liberally. Similar connotations between technical terms like these, however, can be used to obscure key differences in the incidents they are used to describe. Recklessness is associated with high payment sizes in the data because it is defined, albeit broadly, to apply only to severe faults. Generic negligence is associated with lower payment sizes, within the ATRI dataset, because it is associated with incidents where drivers or motor carriers did not commit more specific or serious legal infractions, even though it can rhetorically suggest the opposite impression.

State versus Federal Court

According to subject matter experts, state courts are notorious for unpredictable outcomes in court trials. Liberal state jurisdictions in particular are thought to be more sympathetic to plaintiffs in truck-related incidents. More diverse jury pools and the use of appointed rather than elected judges fuel the perception that federal court is more disinterested in truck crash cases. For this reason, defendants often find federal court a preferable venue.

Additional prerequisites must be met in order to try a case in federal court. Cases are eligible for federal court when each party is from a different state and the damages in question are greater than \$75,000.²⁷ These additional conditions may prevent defendants from utilizing federal courts and may encourage them to pursue settlement out of court instead.

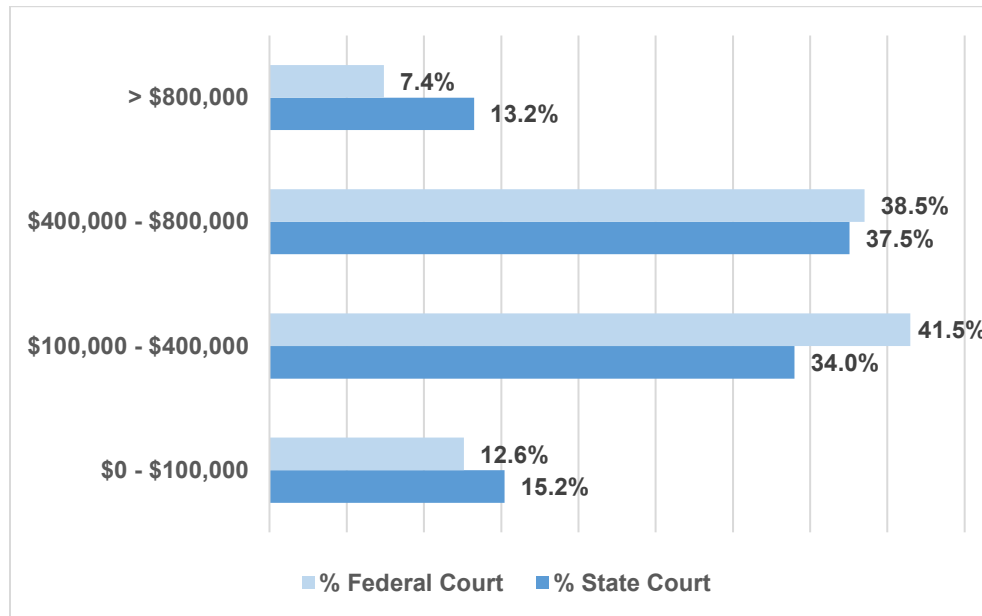
The ATRI dataset had a total of 506 cases venued in state court and 135 cases venued in federal court. Litigation payment size differences for cases venued in federal versus state court are shown in Figure 5. The proportion of state court cases with payments greater than \$800,000 was nearly twice that of federal court cases, but state court cases also represented a greater percentage in cases below \$100,000. The jurisdiction

²⁶ Code of Federal Regulations, Title 49, Subtitle B, Chapter III, Subchapter B, 385.3, available online: https://www.ecfr.gov/cgi-bin/text-idx?SID=bd4b04930911ed4329abdabd482fcc7d&mc=true&node=se49.5.385_13&rgn=div8

²⁷ 28 U.S. Code § 1332(a).

in which a case was venued, however, was not found to have a statistically significant impact on payment size.

Figure 5: Litigation-Related Payment Size by State vs Federal Court



Expert accounts of the current legal landscape suggest that trends in the ATRI data are indicative of volatility in established amounts for damages in state courts. While the differences between state and federal court payment sizes were not large or consistent enough to constitute statistical significance, ATRI's data does correspond to the expectations of industry professionals.

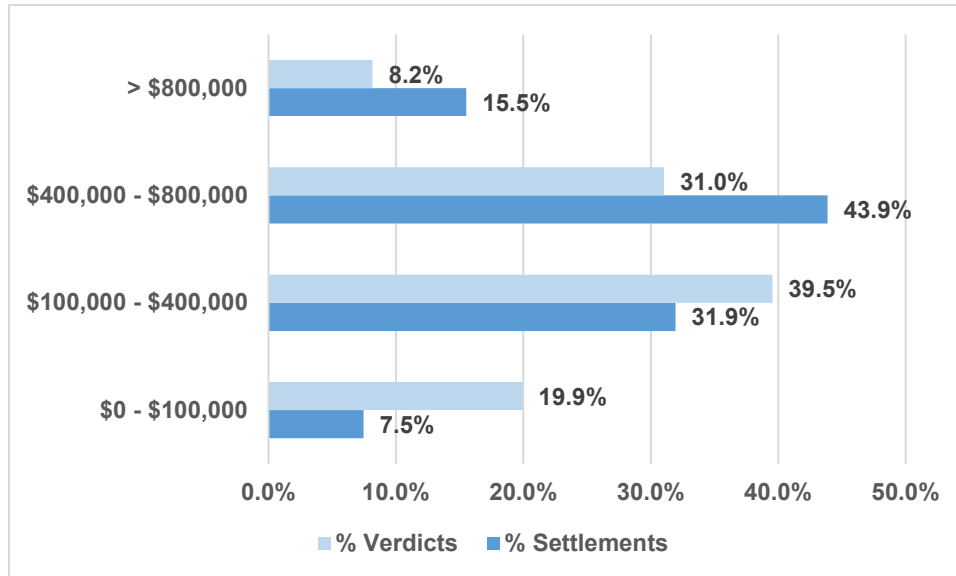
Settlements versus Verdicts

Cases ending in verdicts versus those ending in settlements appeared to differ considerably in payment amounts and case details. To identify potential influences on these disparities, it was necessary to subdivide the data by case outcome. Involved parties can agree to settle at any point after a suit is filed: prior to trial, during trial or jury deliberation, or even after a verdict has been reached (they can also settle before a suit is filed, but observations of this type are not included in ATRI's data). As a result, settled cases differ from verdict cases both in length of time to resolution and in accumulated legal costs.

Approximately 50.3 percent of all settlement cases in ATRI's data had payments exceeding \$500,000, while only 31.5 percent of all verdict cases resulted in payment of this size. Payments between \$100,000 and \$500,000 represented about the same percentage of both verdicts and settlements. Conversely, the majority of cases with payments under \$100,000 concluded with a verdict. Figure 6 illustrates the disparity

between settlement and verdict award sizes exceeding \$500,000 and below \$100,000. Defendants appeared to pay more when the case concluded with a settlement.

Figure 6: Litigation-Related Payments by Settlements and Verdicts



Distinguishing Settlement and Verdict Payments

A two-sample t-test was conducted to determine whether a true, consistent difference in payments exists between settlements and verdicts. Settlements were found to be approximately \$135,805 larger than verdicts on average, with a high level of statistical certainty.²⁸ This finding suggests that verdicts and settlements constitute two separate markets for determining payment levels.

A number of crash characteristics also had significantly larger settlement payments individually. As Table 6 shows, cases involving death as well as head, spine and severe injury have higher payment amounts in settled cases at a high level of statistical certainty as well.

²⁸ ± \$35,366 with a 90 percent level of confidence

Table 6: Impact of Injury Type on Verdict and Settlement Size

Injury Type	Mean Verdict Payment	Mean Settlement Payment	Difference in Means
Head	\$352,404	\$460,117	30.6% ²⁹
Spine	\$355,199	\$479,060	34.9% ³⁰
Severe	\$393,833	\$490,291	24.5% ³¹

Cases involving back, neck, organ and surface injuries do not result in larger payment sizes for settlements. Cases involving leg injuries and where the plaintiff has a pre-existing condition do not result in size differences between settlement and verdict payments, despite having some of the largest average payment sizes.

Cases alleging generic negligence and rear-end collisions also had significant differences in payment size for settlements and verdicts (Table 7).

Table 7: Impact of Alleged Infractions on Verdict and Settlement Size

Alleged Infraction	Mean Verdict Payment	Mean Settlement Payment	Difference in Means
Negligence	\$327,610	\$416,113	27.0% ³²
Rear-end Collision	\$359,075	\$501,796	39.7% ³³

Plaintiff attorneys often try to leverage a settlement and justify settlement payments higher than what juries might find appropriate by arguing that the legal costs of trial would make a verdict more costly overall. Carriers may also pressure insurers to settle for higher amounts in order to avoid paying court-awarded punitive damages not covered by insurance policies.

Verdict awards to plaintiffs are substantially reduced by both attorney fees and legal expenses. Industry experts reported that litigation costs in commercial motor vehicle lawsuits that end in a verdict can amount to between 20 and 50 percent of the award amount for both plaintiffs and defendants. Litigation costs for settlements are lower, but still often amount to between 15 and 20 percent of the settlement amount.

In terms of defense losses, the jury awards do not include defense litigation and related costs, often described as Allocated Loss Adjustment Expenses (ALAE). ALAE expenses are defined as any cost attributed to defending a claim including attorney

²⁹ \$107,713 ± \$84,642 with a 90 percent level of confidence.

³⁰ \$123,861 ± \$50,879 with a 90 percent level of confidence.

³¹ \$96,458 ± \$41,897 with a 90 percent level of confidence.

³² \$88,502 ± \$80,692 with a 90 percent level of confidence.

³³ \$142,721 ± \$81,073 with a 90 percent level of confidence.

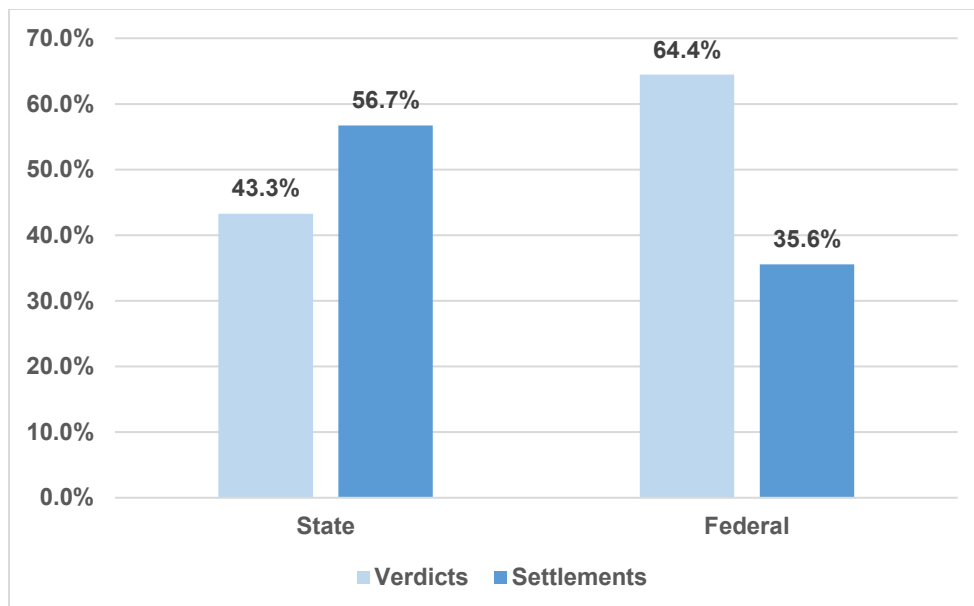
fees, expert witnesses and investigators.³⁴ To understand the total cost impact to the defense, the ALAE accrued in a case should be added to any award or settlement amounts.

It is important to consider these additional litigation costs along with the average difference between settlement and verdict payments to better understand total expenses. Plaintiffs should be aware that their final compensation can be significantly diminished by legal expenses and attorney fees, especially if they elect to take their case to court. For defendants, settling may still be the more financially efficacious option in many cases in light of litigation costs and variability of verdict award outcomes. For cases involving the crash characteristics in Tables 6 and 7, however, defendants may be more likely to encounter disproportionately higher settlement proposals and may receive more favorable payment amounts by proceeding to court.

Predicting Settlements

A case variable that does not result in significantly higher settlement payments on its own may nonetheless impact the likelihood of settling. Figure 7 shows the proportion of settlements in state vs federal court observed in the sample. Cases venued in federal court were more likely to end with a verdict. As stated above, industry professionals consider state courts less amenable to defendants. A larger proportion of cases venued in state court settle, which suggests that defendants unable to meet federal court requirements prefer settlement rather than risking trial in state court.

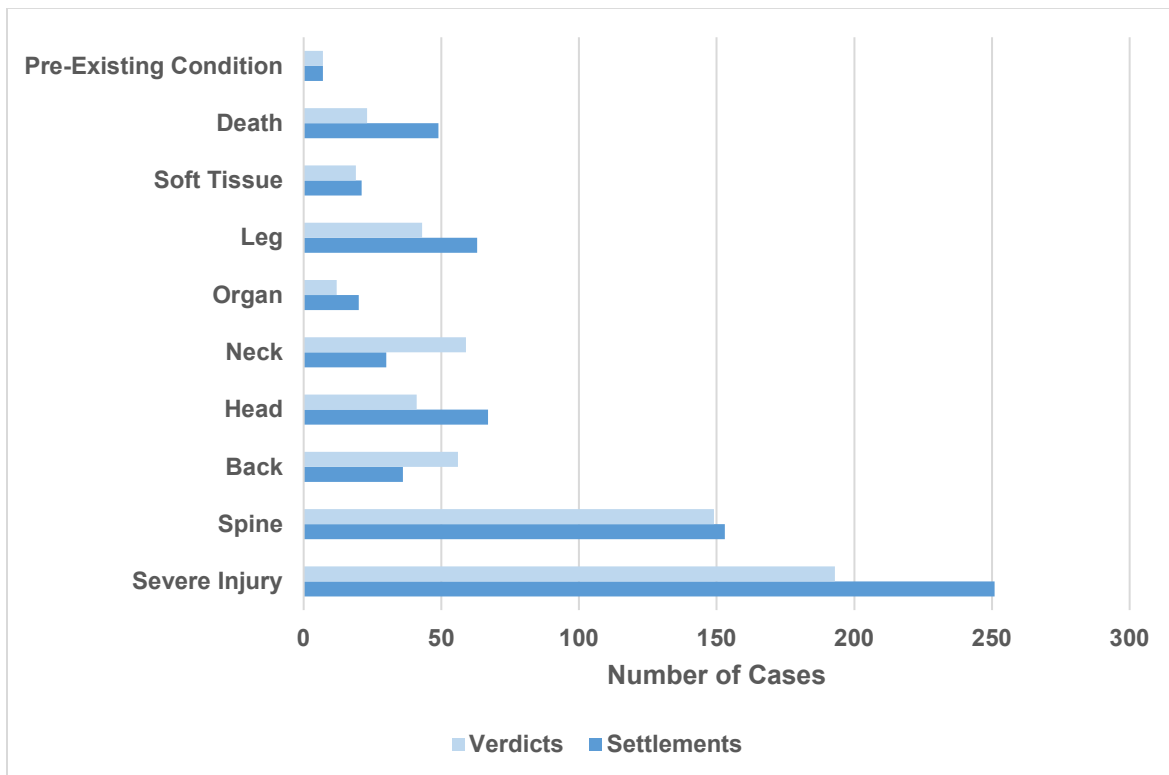
Figure 7: Settlements vs Verdicts by State vs Federal Court



³⁴ “Glossary,” Society of Actuaries, accessed November 1, 2021, available online: <https://actuarialtoolkit.soa.org/tool/glossary/allocated-loss-adjustment-expenses-alae>

Figure 8 shows the frequencies of settled cases versus verdict cases by injury type cited in the case. The injury type “Severe” was a keyword mined from case descriptions where a sustained injury incurred high levels of medical care. Head injuries, neck injuries and death had the largest disparities between the number of verdicts and settlements in the sample data. Sixty-six percent of cases citing a neck injury (an injury type with one of the lowest average payments) ended in a verdict while 62 percent of cases citing a head injury and 68.1 percent of cases citing a death (the injury type with the highest average payments) ended in a settlement.

Figure 8: Settlements vs Verdicts by Injury Type



To better understand which variables contribute to settlement outcomes, a second logistic regression model was developed to test the hypothesis that crash characteristics and litigation factors influenced settlement outcomes. Each variable used in the model was selected because of its significance in the preliminary analysis and its potential usefulness to trucking industry attorneys. Table 8 lists the variables found to be statistically significant in predicting settlements ($p < 0.1$). As before, each variable is associated with a percent change in likelihood of a settlement outcome. For full model details, see Appendix E.

Table 8. Settlements Logistic Model

	Percent Increase in Likelihood of Settling
Fatality	393.8 %
Pelvis Injury	259.5 %
Severe Injury	217.4 %
Speeding	82.5 %
Head Injury	72.1 %
	Percent Decrease in Likelihood of Settling
Neck Injury	-58.8 %
Federal Court	-64.5 %
Defense Expert	-71.4 %
Reckless Driving	-74.4 %

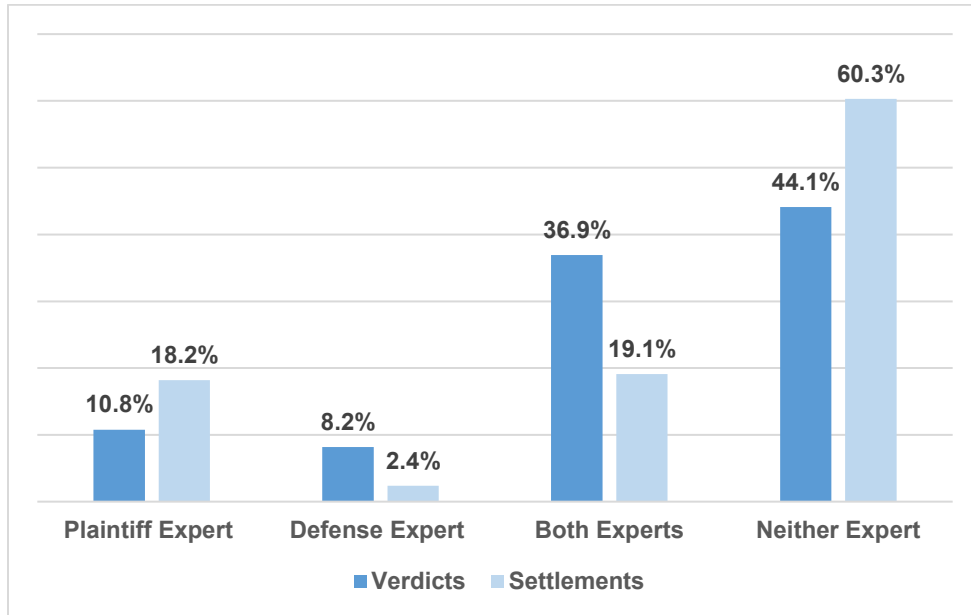
Cases venued in federal court and cases with a defense expert were less likely to end in settlements, suggesting that defendants under these circumstances are more inclined to try their case.

Severe injury and death were associated with an increase in likelihood of cases settling, at a high level of significance. This suggests that defendants perceive cases with these injuries as less amenable to favorable verdict outcomes (note: the ATRI data does not include verdicts favoring the defense).

Expert Involvement and Impact on Litigation-Related Payment Size

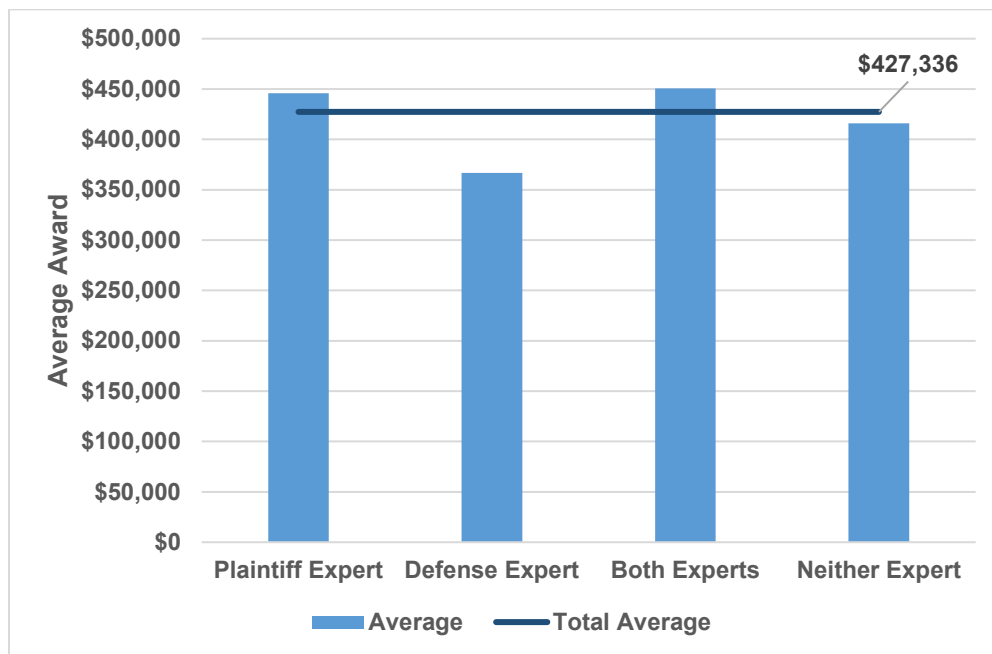
As the significance of defense experts in predicting verdicts suggests, the presence of an expert witness is another litigation factor that could impact payment size. ATRI data cited expert involvement only in cases with testifying experts; it did not include consulting experts. Though plaintiffs often utilize treating doctors who give opinion evidence, these are not included as testifying experts in this report. Figure 9 depicts the frequency of expert witness participation in cases that settled versus cases that ended in verdicts. The majority of both settlements and verdicts had no expert witness. Cases with a defense expert more often concluded in verdicts (note these are plaintiff awards), however, while cases with plaintiff experts more often concluded in settlements. Defense experts are likely called if a defendant is confident in the strength of their case and thus willing to contest it in court.

Figure 9: Settlements and Verdicts by Presence of an Expert Witness



Moderate differences in average payment size were noted in the sample data. Cases with both plaintiff and defense expert witnesses and cases with only a plaintiff expert had moderately higher than average payments (Figure 10).

Figure 10: Average Litigation-Related Payment by Expert Witness



A correlation analysis was conducted to assess the relationships between payment size and expert witness involvement. The presence of an expert witness in a case was examined at four levels: cases with only one expert present (plaintiff or defendant), cases with both experts present and cases with neither expert present.

Plaintiff expert and defense expert were moderately correlated at a high level of statistical significance ($p = 0$). This indicates that plaintiffs and defendants may hire an expert to counter the other doing so. Alternatively, plaintiffs and defendants may both call expert witnesses independently in severe consequence or controversial cases.

Plaintiff experts and the absence of experts were each found to have modest significant relationships with settlements. In other words, cases with no expert or only a plaintiff expert more often end in a settlement. The presence of expert witnesses on both sides and defense experts were found to have a moderate significant relationship with verdicts. In other words, cases with only a defense expert or experts on both sides more often end in a verdict.

The presence of expert witnesses on both sides was moderately correlated with verdict cases, at a high level of significance. This result indicates that the co-appearance of both plaintiff and defense experts is moderately common in verdict cases. A similar conclusion should be derived for the presence of a defense expert in verdict cases. Furthermore, the involvement of experts on both sides or even for the defense alone in the early stages of litigation indicates that a case is more likely to conclude with a verdict rather than reach a settlement first.

No significant relationship was found between expert witnesses and payment size universally across all cases, both verdicts and settlements. The lack of a significant relationship at this level suggests that the utility of calling experts is highly situational. As a result, the analysis was refined to examine correlations for each expert variable and settlement size or verdict size separately.

Plaintiffs seeking large payments may employ an expert witness proactively to coerce a fleet into settling. Conversely, defendants trying a case in court might employ a defense expert to increase chances of a favorable outcome. This broad interpretation is mitigated, however, by the low positive correlations found in the analysis.

The analysis showed that a true difference in expert involvement between case types exists. For this reason, a simple linear regression analysis was conducted for each expert to test for its impact on settlement payment size and verdict award size separately. Summaries of expert witness impact on payment size are given in Tables 9 and 10 ($p < 0.1$). For full model details, see Appendix F.

Plaintiff experts, though correlated with settlements, were not significant in impacting settlement amounts. Defense experts, however, were correlated with above average settlement payment amounts – despite not being correlated with the outcome of

settlement. One interpretation might be that defendants facing serious cases (and consequently larger payments) choose to hire defense experts to avoid overpaying.

Table 9: Settlement Size by Presence of Expert Witness

	Percent Difference from Average Settlement Size
Defense Expert	36.0 %

Table 10: Verdict Size by Presence of Expert Witness

	Percent Difference from Average Verdict Size
Defense Expert	-25.5 %
No Expert	-21.0 %
Defense and Plaintiff Experts	35.5 %

Defense experts were significant in predicting lower verdict awards. This confirms that defense experts do in fact help defense attorneys that choose to hire them. This finding is corroborated in ATRI’s *Understanding the Impact of Nuclear Verdicts on the Trucking Industry* report, where the presence of a defendant expert was found to be significant in lower than average awards. When expert witnesses are not used by either party, verdict sizes tend to be smaller. Some cases without expert testimony have smaller payments because they were not severe enough to warrant hiring experts and as such already likely to result in smaller payments. Alternatively, the absence of expert testimony might diminish a courtroom’s impression of the severity of a case thus leading to smaller payments. Following that logic, the presence of both defense and plaintiff expert witnesses may either indicate a highly contentious case, thereby already likely to result in high payment sizes, or heighten the gravity of a case, leading to larger payments. This is borne out in the statistics, where cases with both expert witnesses are present are highly significant in predicting larger payments.

CONCLUSION

The need for investigation into small verdicts and settlements became evident after the publication of *Understanding the Impact of Nuclear Verdicts on the Trucking Industry* in 2020. Although payments under \$1 million are referred to as “small” in this report, they are anything but to the motor carriers and their insurers faced with paying them.

There is a general consensus within the trucking industry that small verdicts and settlements are increasing in both frequency and severity. The rise of these cases can be attributed to a multitude of factors including loose state tort laws, negative public attitudes towards trucking, harsher legal restrictions in other industry sectors, litigation fraud and growing coordination among plaintiff attorneys. In this report ATRI examined and expanded on these factors to update industry professionals on the current state of the litigation landscape while offering the industry actionable information for responding to these trends. Table 11 summarizes key findings.

Table 11: Key Findings

	Conclusion
Settlements Larger than Verdicts	<ul style="list-style-type: none"> Settlements were approximately 37.7 percent larger than verdicts on average and more likely to take place when a case is venued in state court.
States Impact Litigation Payment Sizes and Case Outcomes	<ul style="list-style-type: none"> Cases venued in California, Michigan, New Jersey and North Carolina had average litigation payments over 50 percent larger than the approximate national average.
Fatality and Injury Impact Litigation-Related Payment Sizes and Case Outcomes	<ul style="list-style-type: none"> Fatalities and severe injury were 965.9 and 198.7 percent more likely to result in payments over \$600,000, respectively. In addition to being the best predictors of higher payments, cases with a fatality were 393 percent more likely to settle and cases with a severe injury were 217 percent more likely to settle.
Carrier Practices and Driver Behavior Impact Litigation-Related Payment Sizes	<ul style="list-style-type: none"> Cases in which carriers were accused of poor hiring or training practices had a correlation with cases in which drivers had previous driving or hours-of-service violations.

	Conclusion
	<ul style="list-style-type: none"> Allegations of generic negligence, as opposed to those of negligence per se or recklessness, were 50 percent less likely to result in a payment over \$600,000.
Expert Witness Impact Litigation-Related Payment Sizes	<ul style="list-style-type: none"> The use of defense experts resulted in a 25.5 percent reduction in average verdict award size.

These findings were presented to and corroborated by insurance and legal professionals. Carriers should actively prioritize the prevention of the most costly infractions and anticipate the costs and benefits of the legal strategies outlined in this report. Though every case is unique and warrants individualized consultation, the results of this research provide an expansive account of the state of “small case” trucking litigation and serve as a reference for all members of the trucking industry.

As previously noted, several subject-matter experts proposed that carriers internally conceptualize and formalize “Defensible Driver” programs. While these programs will differ by fleet size and sector, they should all share documentation of: entry-level, maintenance, and remedial driver training; corporate safety culture processes; detailed safety technology investment plans; and clear, consistent hiring and onboarding procedures. Recognizing that this information is discoverable, it is critical that all aspects of the Defensible Driver program are implemented, monitored and continuously evaluated.

APPENDIX A: Multiple Linear Regression for Litigation-Related Payment by State

Linear regression is a standard statistical method used in predicting outcomes. The parameter estimates of the model are interpreted as an estimated change in payment size for each state and the associated p value is the level of certainty that each estimate is representative of the population.

The general form of a multiple linear regression model is:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n$$

Where y is the average payment, $\beta_0, \beta_1, \dots, \beta_n$ are the parameters of the equation to be estimated and x_1, x_2, \dots, x_n are the predictor variables.

Table A.1: Predicting Litigation-Related Payment Size by State

State	Parameter Estimate	Standard Error	t-statistic	p-value	Percent Difference
Intercept	\$376,757	15,923	23.66	0 ***	
NJ	\$192,265	40,597	4.74	0 ***	51.0 %
NC	\$263,772	65,993	4.00	0 ***	70.0 %
CA	\$211,474	53,254	3.97	0 ***	56.1 %
MI	\$244,760	85,007	2.88	0.004 **	65.0 %
MO	\$116,549	41,678	2.80	0.005 **	30.9 %
TN	-\$148,667	72,347	-2.06	0.04 *	-39.5 %
WV	\$608,243	264,537	2.30	0.022 *	161.4 %
NY	\$105,626	50,772	2.08	0.038 *	28.0 %
VA	\$95,711	45,700	2.09	0.037 *	25.4 %
IL	\$69,255	38,154	1.82	0.070	18.4 %
KY	-\$88,624	47,389	-1.87	0.062	-23.5 %
MA	\$191,322	108,971	2.76	0.080	50.8 %
OK	\$423,243	264,537	1.60	0.11	112.3 %
IN	-\$96,583	62,637	-1.54	0.124	-25.6 %

APPENDIX B: Injury Types and Alleged Infractions

Boxplots provide a clearer sense of the range of payments. Boxes represent the middle 50 percent of payments, solid vertical lines represent median payment sizes and dotted vertical lines represent mean payment sizes. Boxplots are utilized for visualizing disparities in the mean and median values revealing potential outliers

The proximity of means and medians for most injury types indicates approximately even distribution of payments. Variability between mean and median values indicate outliers skewing data in the direction of the mean. For injury types where mean and median differ, such as death and organ injuries, median is the more representative metric.

Seventy-five percent of cases involving death, organ, or rib injuries – the injuries with the highest average payments – resulted in payments greater than \$418,750, \$331,250, and \$325,000, respectively.

Figure B.1: Average Litigation-Related Payment by Injury

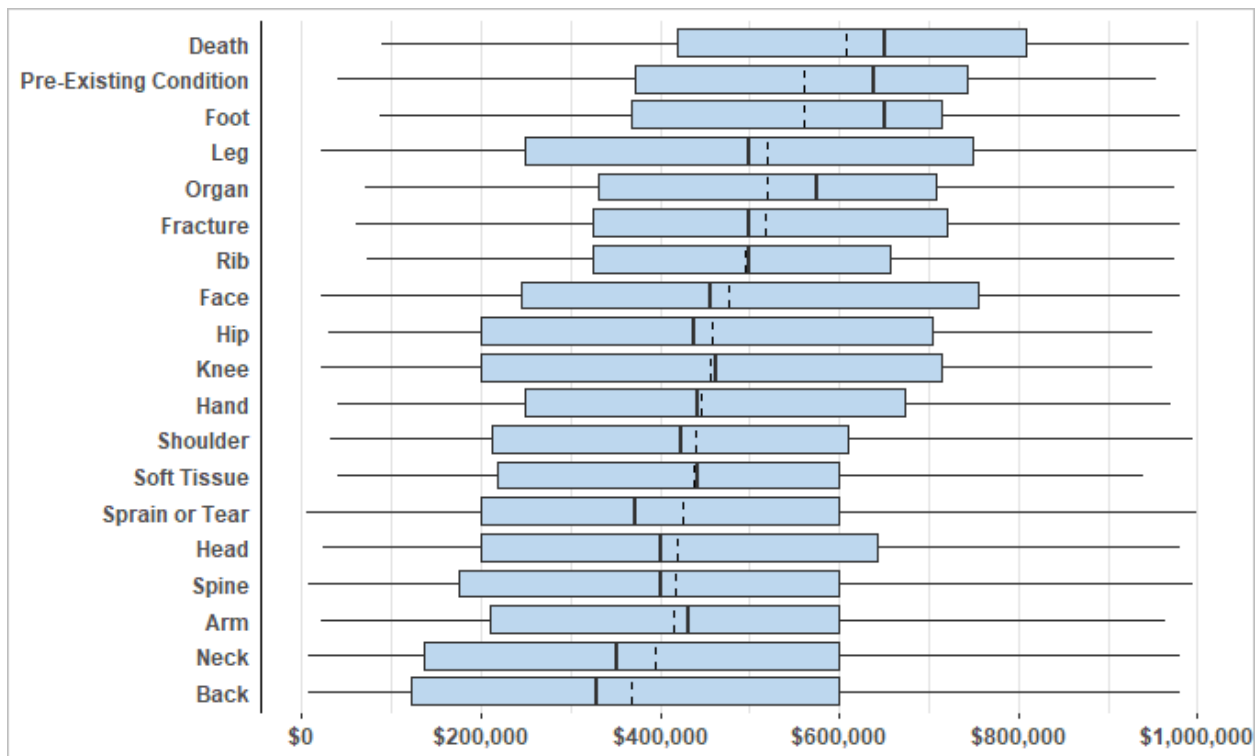


Figure B.2: Average Litigation-Related Payment by Injury in Cases with Only 1-2 Injuries

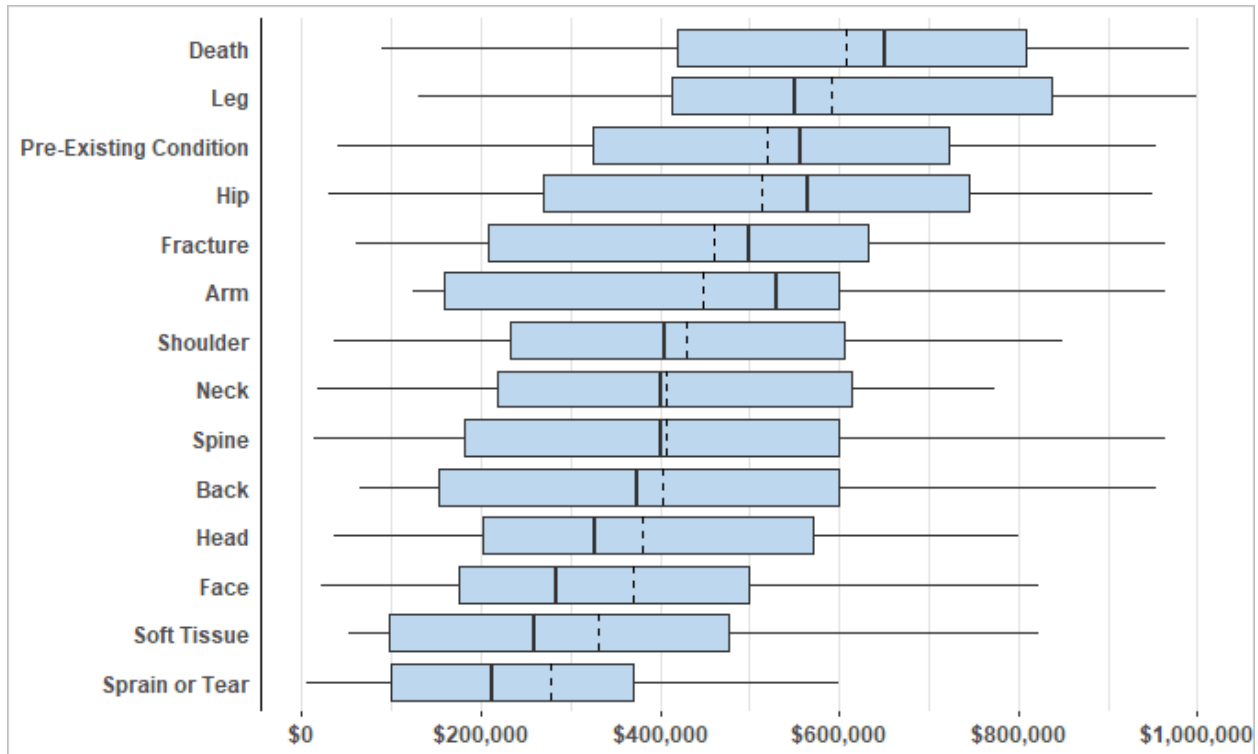


Figure B.3 shows the correlations between injury types that occurred within the same incident, where only significant correlations are visualized ($p < 0.05$). The size and shade of each square represents the strength of correlation between the two injuries named directly to its left and directly above it, with r values listed in the legend below. Litigation payment size and whether a crash had only one injury are included as additional variables.

Figure B.3: Correlations Between Injuries

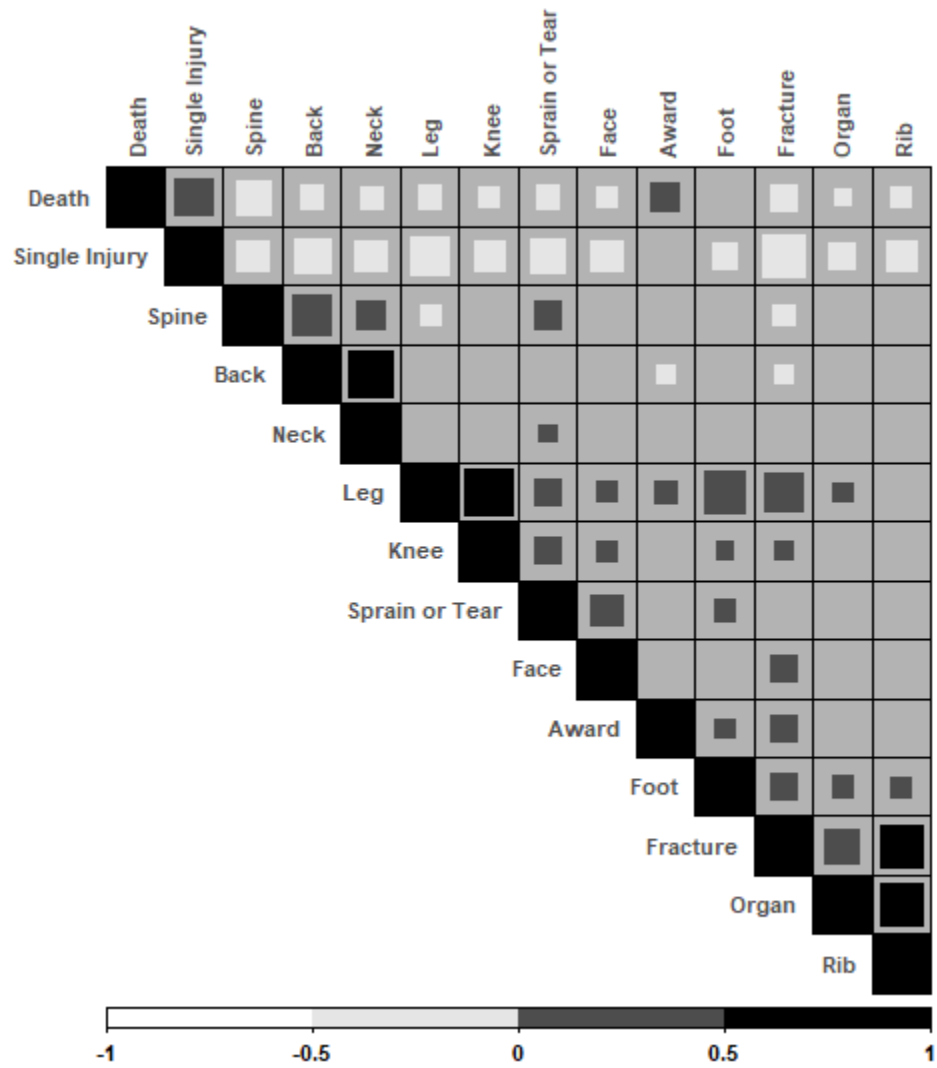


Figure B.4: Litigation-Related Payment by Alleged Infractions

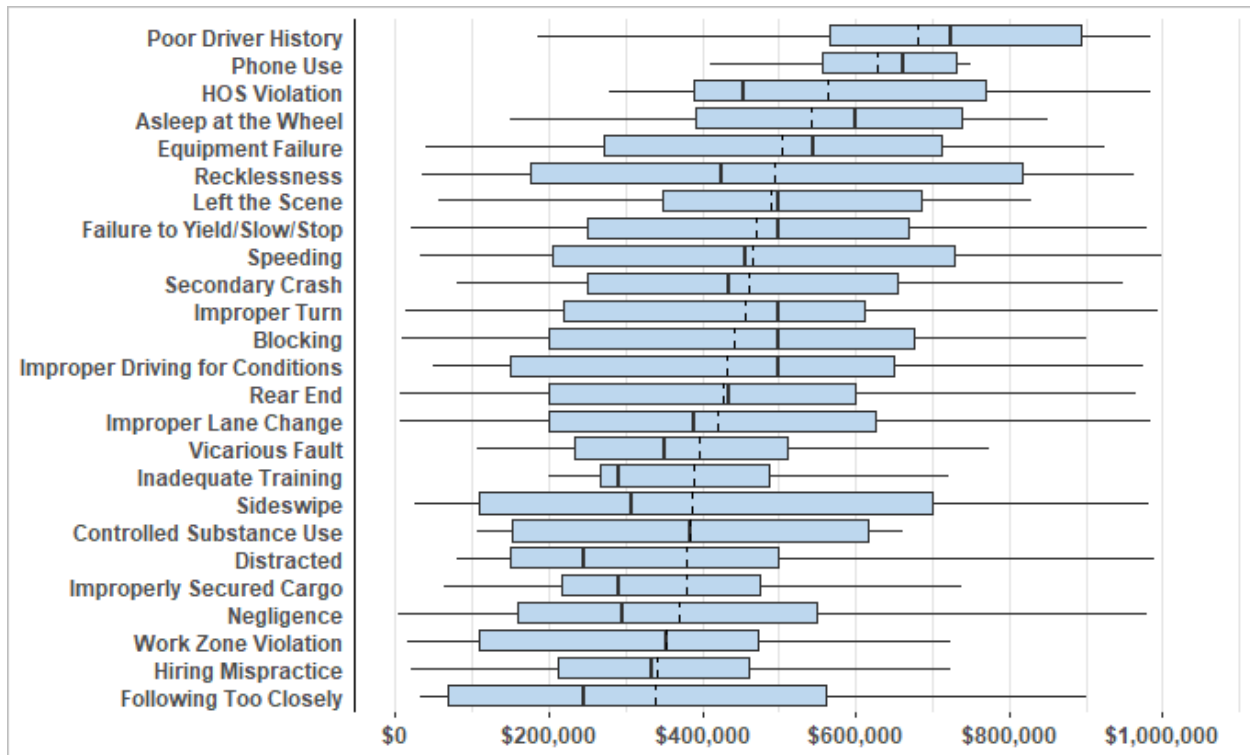
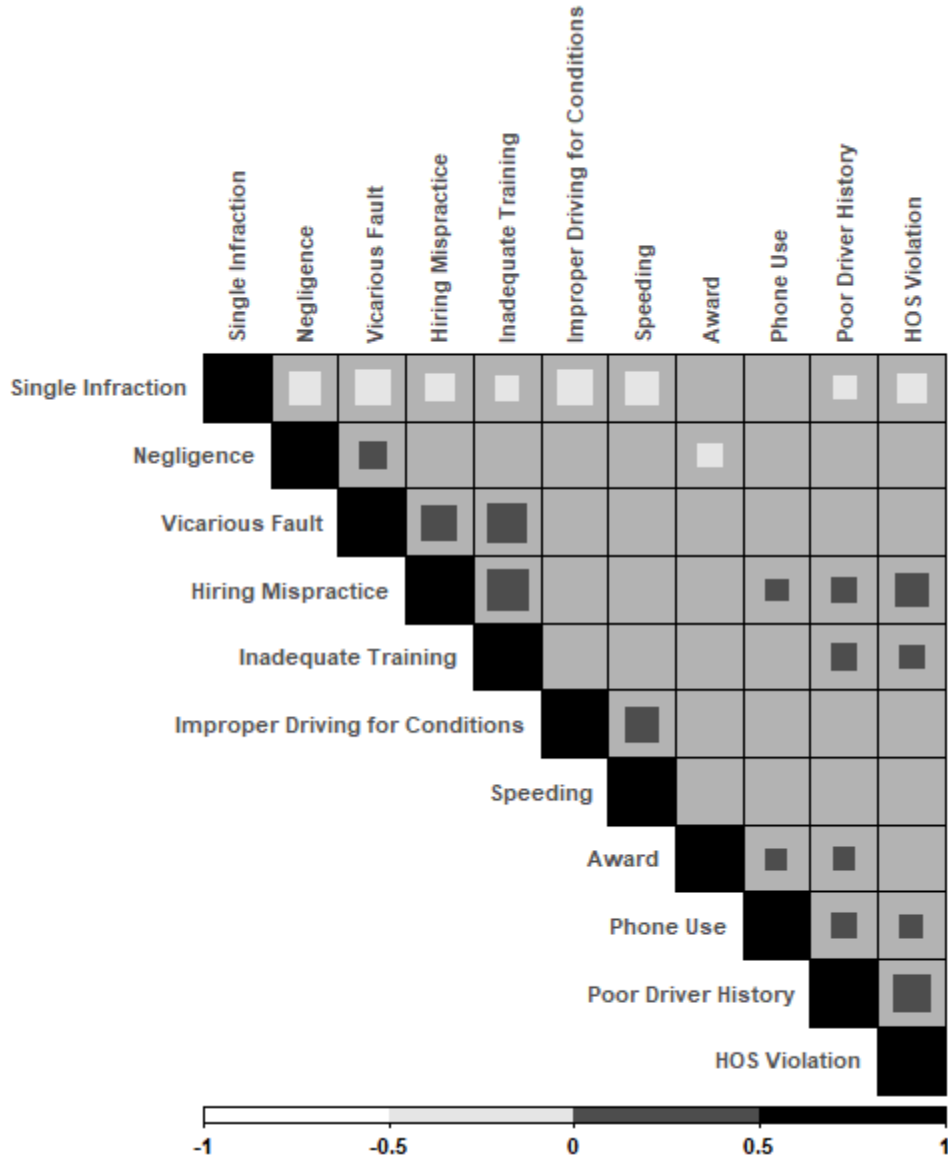


Figure B.5: Correlations between Alleged Infractions



One might intuitively expect to see correlations between certain injury types and alleged infractions. No significant relationships were found however, possibly due to the qualitative nature of litigation data.

Table B.1: Average Litigation-Related Payment by Evidence Brought Against the Defense

	Average	Total	Min	Max
Poor Driver History	\$680,333	\$4,082,000	\$185,000	\$985,000
Phone Use	\$629,375	\$5,035,000	\$410,000	\$750,000
Asleep at the Wheel	\$543,343	\$4,346,743	\$150,000	\$850,000
Uncategorized	\$517,438	\$4,656,946	\$207,500	\$750,000
Equipment Failure	\$503,641	\$12,087,386	\$40,000	\$926,053
Recklessness	\$493,673	\$5,924,071	\$35,000	\$963,541
Left the Scene	\$490,613	\$5,396,746	\$57,600	\$830,000
Failure to Yield / Slow/ Stop	\$470,462	\$36,225,594	\$20,000	\$980,000
Speeding	\$464,920	\$20,921,383	\$32,379	\$999,000
Secondary Crash	\$462,097	\$11,552,416	\$80,000	\$950,000
Improper Turn	\$457,316	\$25,152,355	\$13,200	\$995,173
Blocking	\$441,699	\$4,858,688	\$9,004	\$900,000
Improper Driving for Conditions	\$432,926	\$10,823,157	\$50,000	\$975,000
Rear End	\$428,507	\$47,564,279	\$6,781	\$965,000
Improper Lane Change	\$420,409	\$45,824,631	\$6,463	\$985,000
Vicarious Fault	\$395,265	\$8,300,575	\$107,500	\$775,390
Inadequate Training	\$388,464	\$2,719,246	\$200,000	\$720,975
Sideswipe	\$385,986	\$6,561,758	\$25,000	\$981,328
Controlled Substance Use	\$384,161	\$1,536,644	\$107,500	\$662,109
Distracted	\$380,334	\$4,944,345	\$80,000	\$990,000
Improperly Secured Cargo	\$378,840	\$4,167,235	\$65,000	\$900,000
Work Zone Violation	\$352,894	\$3,176,050	\$16,500	\$725,000
Backing	\$352,684	\$4,232,205	\$10,700	\$900,000
Following too Closely	\$339,977	\$4,759,677	\$32,379	\$900,000

APPENDIX C: Logistic Regression for Litigation-Related Payment Size

To estimate which crash characteristics and litigation factors predict payments larger than \$600,000 a logistic regression model was developed. Logistic regression analysis is typically used when the response variable y is binary, i.e., the variable is either true or false. Forty-nine variables were screened using forward stepwise regression. Of these variables seven were determined to be statistically significant for estimating the change in odds that a case would result in a payment larger than \$600,000. The general form of the transformed logistic regression model used is

$$\pi^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_n x_n$$

where

$$\pi^* = \ln\left(\frac{\pi}{1 - \pi}\right)$$

is the expected value i.e. the probability that a case will result in a payment larger than \$600,000.

For practical purposes, the beta parameters (log-odds) of the model can be interpreted as the increase or decrease in the likelihood of a case resulting in a payment larger than \$600,000. Payments over \$600,000 are more likely to occur when the parameter is positive and less likely when the parameter is negative. Alternatively, the odds ratio can be interpreted in a similar way, where an odds ratio greater than one is associated with an increase in probability of a case resulting in a payment larger than \$600,000.

Table C.1: Predicting Litigation-Related Payments Over \$600,000 Overall Model

Variable	Parameter Estimate	Standard Error	Wald Z	p-value	Odds Ratio
Intercept	-2.50	0.332	-7.53		
Death	2.37	0.410	5.77	0.0 ***	10.7
Severe Injury	1.09	0.345	3.17	0.002 **	2.97
Negligence	-0.73	0.261	-2.78	0.005 **	-0.581
Leg Injury	0.77	0.241	3.20	0.001 **	2.16
Settle	0.59	0.198	2.97	0.003 **	1.80
Pre-Existing	1.13	0.573	1.97	0.049 *	3.10
Recklessness	1.12	0.661	1.70	0.089 .	3.06

APPENDIX D: Multiple Linear Regression for Litigation-Related Payment Size

Fifty-two variables were screened for significance using a forward stepwise regression variable selection method. Appropriate tests were conducted to confirm the validity and predictive strength of the linear model. Regression diagnostic plots were examined for heteroscedasticity. Variance inflation factors (VIF) and correlation coefficients were examined to check for collinearity among all variables in the data. Only two variables, “death” and “number of deaths” predictably had a VIF value greater than 4 since the “number of deaths” is dependent on whether “death” was present in the observation. The main effect term “number of deaths” and the interaction term for “death” and “number of deaths” were rejected for insignificance. The binary main effects term “death” was chosen for its significance. A correlation matrix showed six of the 50 total variables had correlation coefficients ($|r| > 0.8$). Binary variables “plaintiff expert” and “defense expert” were highly correlated but when added as main effects and interaction terms were not significant to the model. The same was true for binary variables “back” and “neck” as well as binary variable “Death” and integer variable “Number of Deaths.” Statistical interactions were not, therefore modeled, and main effects terms were used for Model 1.

11 variables proved statistically significant in predicting payment size. The parameters of the model were used to estimate payments in the presence of these selected variables, as defined in Appendix G.

The parameter estimates of the model indicate how much a payment might change in the presence of each crash characteristic or litigation factor, i.e., the variable is equal to 1. A positive parameter indicates an increase in average payment size while a negative parameter results in a lower average payment size.

Table D.1: Litigation-Related Payment Size Linear Regression Overall Model

Variable	Parameter Estimate	Standard Error	t-statistic	p-value
Intercept	208,793	25,509	8.19	0 ***
Settle	92,650	21,176	4.38	0 ***
Fatality	333,058	38,125	8.74	0 ***
Severe	132,093	27,296	4.84	0 ***
Negligence	-84,821	24,715	-3.43	0.0006 ***
Defense Expert	56,925	21,900	2.60	0.0097 **
Leg Injury	116,549	38,812	3.003	0.0028 **
Pre-Existing Condition	145,073	67,752	2.141	0.0326 *
Fracture	68,124	27,268	2.50	0.0127 *
Driver History	194,376	103,047	1.89	0.0597 .
Recklessness	138,353	73,387	1.89	0.0599 .
Knee Injury	-82,605	50,430	-1.64	0.1019
Equipment Failure	79468	52176	1.52	0.1282

APPENDIX E: Logistic Regression for Settlements

Forty-two variables including payment size were screened using forward and backward stepwise regression. Of these variables, four were determined to be statistically significant for use in estimating the change in odds of a case settling.

The dataset was split into a training dataset and a testing dataset. The training dataset was used to generate the parameters of the model, and the testing dataset was used to test the accuracy of the model. The dataset was randomly split utilizing 60 percent of the sample for the model (388 observations) and 40 percent of the sample data for testing (253 observations).

Table E.1: Settlements Overall Logistic Model

Variable	Parameter Estimate	Standard Error	Wald Z Statistic	p-value	Odds Ratio
(Intercept)	-0.3082	0.2193	-1.406	0.1598	
Federal Court	-1.0350	0.2226	-4.650	0 ***	0.3552
Defense Expert	-1.2526	0.1926	-6.505	0 ***	0.2858
Severe Injury	1.1549	0.2423	4.767	0 ***	3.174
Fatality	1.5969	0.3401	4.696	0 ***	4.938
Neck Injury	-0.8874	0.2747	-3.231	0.001 **	0.4117
Pelvis Injury	1.2795	0.5305	2.412	0.0159 *	3.595
Head Injury	0.5430	0.2498	2.174	0.0297 *	1.721
Recklessness	-1.3612	0.6735	-2.021	0.0433 *	0.2564
Speeding	0.6014	0.3620	1.661	0.0967	1.825

Table E.2: Logistic Model Predictive Capability

	Verdict	Settlement
Predicted Verdict	0.34	0.20
Predicted Settlement	0.14	0.32

APPENDIX F: Expert Analysis

Pearson’s correlation analyses were conducted to determine whether a significant relationship exists between payment size and expert witness involvement. Pearson’s coefficient of correlation offers only information on the existence and strength of a linear relationship between two variables. The population coefficient ρ is the strength of a linear relationship between variables in the population at a level of confidence (p value).

Four additional binary variables representing these were coded for analysis. Plaintiff expert and defense expert showed a moderately strong positive correlation ($\rho = 0.59$) at a high level of significance ($p = 0$).

Table F.1: Expert Variable Definitions

Variable	Definition
x_P	Cases where ONLY a plaintiff expert was present
x_D	Cases where ONLY a defense expert was present
x_B	Cases where BOTH a plaintiff and defense expert were present
x_N	Cases where NEITHER plaintiff or defense expert was present

Plaintiff expert and defense expert showed a moderately strong positive correlation at a high level of statistical significance ($p = 0$). This indicates that plaintiffs and defendants may hire an expert in response to the other doing so. Alternatively, plaintiffs and defendants may both call expert witnesses independently in severe consequence or controversial cases.

Plaintiff experts and the absence of experts were each found to have modest significant relationships with settlements (Table F.2). The presence of both expert witnesses and defense experts were found to have a moderate significant relationship with verdicts (Table F.3).

Table F.2: Pearson Correlation for Expert Witness and Settlements

Variable	Correlation Coefficient ρ	p-value
Plaintiff Expert (x_P)	0.1	0.008
No Expert (x_N)	0.16	0

Table F.3: Pearson Correlation for Expert Witness and Verdicts

Variable	Correlation Coefficient ρ	p-value
Defense Expert (x_D)	0.13	0.0009
Defense and Plaintiff Experts (x_B)	0.2	0

Table F.4: Settlement Size Regression Analysis by Presence of Expert Witness

Variable	Intercept	Parameter Estimate	Standard Error	t-statistic	p-value
Defense Expert	486,841	175,022	97,604	1.793	0.07

Table F.5: Verdict Size Regression Analysis by Presence of Expert Witness

Variable	Intercept	Parameter Estimate	Standard Error	t-statistic	p-value
Defense and Plaintiff Experts	316,126	112,365	31,338	3.586	0.0004 ***
No Expert	393,912	-82,267	30,737	-2.676	0.008 **
Defense Expert	365,215	-92,994	56,119	-1.657	0.1

APPENDIX G: Crash Characteristic and Litigation Factor Definitions

Variable	Definition
Arm Injury	1 if the plaintiff alleged an arm injury 0 if not
Asleep at the Wheel	1 if the plaintiff alleged that the truck driver fell asleep while driving 0 if not
Litigation-Related Payment Size	Dollar amount awarded to the plaintiff (both settlement and verdict cases)
Back Injury	1 if the plaintiff alleged a back injury 0 if not
Blocking	1 if the plaintiff alleged blocking on the part of the truck driver 0 if not
Controlled Substance Use	1 if the plaintiff alleged that the truck driver used a controlled substance 0 if not
Death	1 if the plaintiff alleged a death 0 if not
Defense Expert	1 if defense expert was used 0 if not
Distracted	1 if the plaintiff alleged distracted driving on the part of the driver was documented 0 if not
Equipment Failure	1 if the plaintiff alleged truck equipment issues 0 if not
Face Injury	1 if the plaintiff alleged a face injury 0 if not
Failure to Yield/Slow/Stop	1 if the plaintiff alleged that the truck driver failed to yield, slow or stop 0 if not
Federal Court	1 if case went to federal court 0 if the case went to state court
Following Too Closely	1 if the plaintiff alleged that the truck driver was following too close 0 if not
Foot Injury	1 if the plaintiff alleged a foot injury 0 if not
Fracture	1 if the plaintiff alleged a fracture 0 if not
Hand Injury	1 if the plaintiff alleged a hand injury 0 if not
Head Injury	1 if the plaintiff alleged a head injury

Variable	Definition
	0 if not
Hiring Mispractice	1 if the plaintiff alleged that the carrier had committed hiring mispractice(s) 0 if not
Hours of Service Violation	1 if the plaintiff alleged that the truck driver had a HOS violation on record 0 if not
Improper Driving for Conditions	1 if the plaintiff alleged that the truck driver was driving in a manner improper for weather conditions at the time of the incident 0 if not
Improper Lane Change	1 if the plaintiff alleged that the driver made an improper lane change 0 if not
Improper Turn	1 if the plaintiff alleged that the truck driver made an illegal turn 0 if not
Improperly Secured Cargo	1 if the plaintiff alleged that cargo had been improperly secured 0 if not
Inadequate Training	1 if the plaintiff attorney alleged that the carrier failed to provide sufficient driver training 0 if not
Injury Count	Integer value of number of injuries alleged by the plaintiff
Knee Injury	1 if the plaintiff alleged a knee injury 0 if not
Left the Scene	1 if the driver left the scene of the incident 0 if not
Leg Injury	1 if the plaintiff alleged a leg injury 0 if not
Neck Injury	1 if the plaintiff alleged a neck injury 0 if not
Negligence	1 if the plaintiff attorney alleged generic negligence on the part of the truck driver 0 if not
Organ Injury	1 if the plaintiff alleged a organ injury 0 if not
Pelvis Injury	1 if the plaintiff alleged a pelvis injury 0 if not
Phone Use	1 if the plaintiff alleged that the truck driver was using a cell phone 0 if not
Plaintiff Expert	1 if a plaintiff expert was used 0 if not

Variable	Definition
Poor Driver History	1 if the plaintiff alleged that the truck driver had a poor driver history record 0 if not
Pre-Existing Condition	1 if the plaintiff alleged a pre-existing condition exacerbated by the incident 0 if not
Rear End	1 if the truck rear-ended the plaintiff's vehicle 0 if not
Recklessness	1 if the plaintiff attorney alleged recklessness on the part of the truck driver 0 if not
Rib Injury	1 if the plaintiff alleged a rib injury 0 if not
Secondary Crash	1 if a secondary crash occurred 0 if not
Settle	1 if the case settled 0 if the case concluded with a verdict
Severe Injury	1 if the plaintiff alleged a severe injury 0 if not
Shoulder Injury	1 if the plaintiff alleged a shoulder injury 0 if not
Sideswipe	1 if the plaintiff alleged that the truck driver side-swiped them 0 if not
Soft Tissue	1 if the plaintiff alleged a soft tissue injury 0 if not
Speeding	1 if the plaintiff alleged that the truck driver was speeding 0 if not
Spine Injury	1 if the plaintiff alleged a spine injury 0 if not
Sprain	1 if the plaintiff alleged a sprain 0 if not
Vicarious Fault	1 if the plaintiff alleged vicarious liability on the part of the carrier 0 if not
Work Zone Violation	1 if the plaintiff alleged that the truck driver committed a work zone violation at the time of the incident 0 if not



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