SERIOUS LOWER EXTREMITY INJURIES IN MOTOR VEHICLE CRASHES WISCONSIN, 1991 – 1994

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ABSTRACT

Using linked motor vehicle crash and hospital discharge records from Wisconsin under the auspices of NHTSA's CODES project (Crash Outcome Data Evaluation Systems), the incidence and risk factors for serious lower extremity injuries include fractures, dislocations and crushing injuries of the bones and joints of the lower extremity. Incidence rates of these injuries were 200/ 100,000 crash occupants. Of those who were hospitalized following motor vehicle crash injuries, 16% were diagnosed with a serious lower extremity injury. Using logistic regression models, risk factors for both front seat passengers and drivers include crashes with frontal components, higher posted speed limits, smaller cars and vans. Age, gender and belt-use could only be included in model for drivers, showing increased risk to female drivers, especially those over 60, and a small protective effect from seatbelts. Estimates of risks for specific injuries—including foot and ankle fractures are also included.

INTRODUCTION

Serious lower extremity injuries from motor vehicle crashes can result in expensive care, lengthy rehabilitation and life-long disability.[1] Previous studies indicate that fewer than half of those hospitalized with a serious lower extremity injury had returned to work six months following the crash.[2] Risk factors for serious lower extremity injuries have been identified in cases from trauma centers and include frontal collisions and occupant compartment intrusion.[3,4] Females were shown to be at higher risk, perhaps due to their smaller stature.[5] Literature from one case study also concluded that seatbelts and airbags were not effective in reducing risk, and from another, describes very different outcomes for unrestrained drivers compared to passengers.[4,6]

But trauma center studies do not include the experience of occupants in crashes who were not injured, and so are not as powerful at establishing risk factors. The advent of linked medical outcome and crash data provide a new tool for establishing the magnitude of risk factors for all occupants in crashes by comparing characteristics of crashes and occupants who are injured with those who are not.

We used linked hospital and motor vehicle crash data from Wisconsin over a four-year period to describe the nature and extent of serious lower extremity injuries from passenger vehicle crashes and the magnitude of risk factors for them. These linked data are from the Wisconsin CODES project, funded by the National Highway Traffic Administration.

METHODS

Data Sources

Wisconsin's motor vehicle crash database is housed at the Wisconsin Department of Transportation (WiDOT) During the study period, all crashes that involved either injury or property damage greater than $500 were reported by law enforcement agents. For 1994, WiDOT revised the crash reporting form somewhat, and data from this year have been reformatted to fit previous year's variables.

The Office of Health Care Information has housed the state's hospital discharge database since its inception in 1989. No personal identifiers are collected. Data include all items in the Uniform Hospital Discharge Data Set for inpatient admissions and total hospital charges. E Codes have been mandatory since April 1994.

There are no computerized emergency department or emergency medical services data which cover the state population.

Linkage Techniques

This study was conducted by the Wisconsin CODES project staff. In the CODES project, data are linked using a probabilistic linkage software program, Automatch. The theory and methods underlying the software have been described in the transportation safety literature.[7,8] Linkage variables in Wisconsin from the crash report include date and location of the crash, date of birth of the driver or injured occupant, sex and zip code of residence of the occupant, and whether the occupant was injured or transported by an emergency vehicle.[9-11] From the hospital data, linkage variables include the date of hospital admission (plus seven days to account for delayed admissions) county of hospitalization, date of patient's birth, sex and zip code or residence for the patient.

Study Population

We used public access linked data files for the years 1990 through 1994 for this analysis.
Some variables were not available for the year 1990, and therefore some analyses were confined to the years 1991 – 1994. Wisconsin has a population of about 5 million with one large metropolitan area, and a substantial rural population elsewhere.

We defined passenger vehicles as those recorded either as automobiles, light trucks or sport utility vehicles on the police crash report. Drivers and passengers were defined by their seating location on the crash report.

Definition of Serious Lower Extremity Injury

Serious lower extremity injuries were defined by the hospital discharge diagnoses. There were five diagnoses available in the database, and any serious lower extremity injury in any of these fields were included. Fractures, dislocations, crushing injuries and traumatic amputations of any part of the lower extremity were considered serious. Strains, sprains, contusions, abrasions, burns and fractures of the pelvic girdle and hip were not included in the definition or the analysis.

Crash configuration.

Data on the crash report that indicated the point of impact and the nature of the collision were used to categorize crashes by the amount of energy likely to be concentrated at the front of the vehicle. Categories include: multiple vehicle head on collisions, single vehicle fixed object collision, single vehicle crashes off road, and side collisions, with frontal damage. For the multiple logistic regression analysis, the comparison group was all other collisions which included multiple vehicle collisions when point of impact was the rear or side of the vehicle, single vehicle overturns, and single vehicle collisions into a movable object.

VIN

The Vehicle Identification Number is included in the Wisconsin crash reports, and was decoded using software from the Insurance Institute for Highway Safety modified for a VAX computing environment. These data were the source of information on vehicle size.

Estimated Seatbelt Use.

Information on seatbelt use is recorded by law enforcement agents at the crash site based either on information provided by the occupant or from the agents' observations. In all, 85% of occupants in Wisconsin crashes are reported as wearing belts, while WiDOT seatbelt observation data suggest that the rate of belt use was closer to 55% during the time period of the study. To correct for overreporting of belt use, our research team developed a method to estimate a probability of belt use for each crash occupant based on factors from the state observational studies. Variables used to estimate the probability of belt use included sex, age, make and model of vehicle, location in the state, and type of roadway. Because these data were not always available for uninjured passengers in the crash reports, estimates of probability are only reported for drivers. This procedure is explained in a previous NHTSA report [9]

Analytic methods

In addition to describing the nature and incidence of serious lower extremity injuries, risk factors were estimated from logistic regression models with various outcomes as dependent variables. This method controls simultaneously for multiple factors, and offers a direct estimate of the odds ratios for the association of the independent variables and the outcome of interest. Outcomes used as dependent variables in our models included the presence of any serious lower extremity injury, multiple serious lower extremity injuries, and specific injury diagnoses.

FINDINGS

Incidence of Serious Lower Extremity Injuries

During the five-year period, 1990 to 1994, there were more than 1.6 million occupants in passenger vehicle crashes reported to the Wisconsin Department of Transportation. Of these, 19,514 were hospitalized, and 3,138 (16%) were diagnosed with a serious lower extremity injury. Over the five-year period, the rate per 100,000 crash occupants ranged from 173 to 205 per 100,000 with no discernable temporal trend.

During 1994 and 1995 when external cause of event was reported in Wisconsin's hospital discharge data, 16% of all cases admitted with serious lower extremity injuries were from motor vehicle crashes. This was second to the large number of injuries from falls. During these years, hospital charges average $18,000 per patient with a primary diagnosis of a serious lower extremity injury. These charges do not include either the physician's fee or any follow-up care.

Table 1.
Incidence of serious lower extremity injuries in motor vehicle crashes,Wisconsin, 1990 – 1994

Year	Number of Cases	Rate /100,000 passenger vehicle crash occupants
1990	693	205
1991	566	173
1992	663	201
1993	618	180
1994	598	175

Specific Injury Diagnoses

The annual number of cases with specific diagnoses is reported as five-year averages (1990 – 1995). These diagnoses are not necessarily mutually exclusive:

Ankle fractures	183
Femur fractures	176
Tibia/fibula fractures	173
Fractures of the bones of the foot	112
Patellar fractures	69

Multiple serious lower extremity injuries were common – about 22% of cases sustained more than one serious lower extremity injury.

Seatbelt Use

For drivers, we estimated the probability that seat belts were being used based on a logistic regression model of seatbelt use independently observed by the Wisconsin Department of Transportation. Because seatbelt use as reported on crash forms is higher than rates observed of drivers, we assume that the reported use overestimates the actual. This overestimate has the effect of inflating the actual protective effect of seatbelts because uninjured occupants who are not wearing belts are reported to be wearing them. Our estimates of the effectiveness of seatbelts in providing protection against lower extremity injuries are lower than the estimates using reported belt use but may be a better estimate of their effectiveness. The measures of risk based on observed data suggest that belt use more effectively protects injuries proximal to the torso, with less protection for the foot. In general, the measures of risk based on reported use are substantially higher but are likely to be inflated.

Table 2.
Estimates of risk vary according to the method used to determine seatbelt use

Injury Diagnosis	Estimate of Risk for unbelted drivers when belt use is determined by police reports	Estimates of Risk for unbelted drivers when belt use probability is estimated from observational data
Any serious lower extremity injury	6.3	1.8
Fracture of the foot	4.6	1.3
Tibia/fibula fracture	10.0	1.9
Femur fracture	6.6	3.1

Risk Factors for Serious Lower Extremity Injuries

Drivers

From logistic regression models we find that the risks of sustaining serious lower extremity injuries were very high for crashes with a frontal component compared to other risk factors.(Table 3, attached) This association was more pronounced than for brain injuries or hospitalization with any injury, with odds ratios of 28 compared to 7.2 for brain injury and 9.7 for any hospitalization. The odds ratio for serious lower extremity injury increase with posted speed limit of the crash site, as is the case for brain injury and any hospitalization. Unlike brain injury, however, odds ratio for serious lower extremity injury are higher for women than men, and especially high for women over 60. Vehicle size also affects the odds ratio of serious lower extremity injury, as it does with brain injury and hospitalization, with the odds ratio decreasing as car and van sizes increases.

These odds ratios vary somewhat with the nature of the lower extremity injury (Table 4 attached). The odds ratio of sustaining a fracture of the foot in a head on collision were 53 times greater than a crash that did not involve impact with the front of the vehicle. Serious lower extremity injuries of each diagnosis had elevated odds ratios for crashes with a frontal component, and with higher posted speed limits, although the magnitude of the odds ratios varied by diagnosis. Odds ratios were high for crashes with a higher likelihood of increased impact forces. Therefore, in each case, head on collisions resulted in higher odds ratio estimates than did single vehicle fixed object collisions, with the comparison being crashes without a frontal component.

Our models also suggest older females were at higher risk for ankle and foot fractures but the odds ratio for fractured tibia or fibula were not significantly higher for women of any age.

Passengers

Logistic regression models that include passengers do not include information on age and gender because these data are not available for uninjured passengers. This also limits our ability to estimate seat belt use based on observed data. Both drivers and front seat passengers have higher odds ratios of any serious lower extremity injury, and of multiple serious lower extremity injuries than do back seat passengers (Table 5 attached). Odds ratio estimates were especially high for fractures of the foot (21 for drivers, and 13 for front seat passengers) compared to back seat passengers. Odds ratios were lower for fractures of the femur for drivers in this model, and were not significant for front seat passengers.

DISCUSSION

Limitations

These data provide a conservative estimate of the extent of problem of serious lower extremity injuries. Some people who are injured in Wisconsin crashes are hospitalized in Minnesota, and are not included in the Wisconsin hospital data system nor in the linked data set. Some cases may be included in the Wisconsin hospital data system, but are not linked to crashes because of errors in data recording in either the crash data system or by the hospitals themselves. Others may be missed because the crash was never reported to the police. In previous reports, we estimated that these situations result in an underestimate of about 20% of all motor vehicle related hospitalizations.[11] We can think of no reason that this would be different for serious lower extremity injuries.

While the study underestimates the extent of the problem, it is unlikely that the situations described above bias the risks estimated from the logistic regression analysis. For the results to be due to bias, a substantial number of cases with serious lower extremity injury in non-frontal crashes, for example, would have to be systematically referred to out-of-state hospitals. Given trauma referral patterns in Wisconsin, this is not probable.

Linked data p invaluable information on the medical outcomes of non-fatal crashes, but data from the hospital discharge system are limited. Because the data are limited to the initial hospitalization, we do not have actual information on the long-term outcomes of injuries. In addition, bilateral injuries cannot be discerned from hospital discharge data despite their enormous impact on the time it takes to become ambulatory after injury.

Because Wisconsin crash data do not include information on the age or gender of uninjured passengers, models of the effect of age and gender on injury are limited to drivers. In addition, belt use is estimated from observational data based in part on age and gender of passengers, so models on passengers have limited information on the role of seat belts as protective devices.

Despite these limitations, linked data make an important contribution to our knowledge of injury risk in crashes. Unlike trauma center studies and other case series, linked data include information on the characteristics of occupants and crashes in which injuries did not occur. Comparing the crashes that lead to injury with those that do not is a powerful method to measure risk.

CONCLUSIONS

Serious lower extremity injuries in crashes are common and costly. Our study shows that one of six people who are hospitalized following a motor vehicle crash has a serious lower extremity injury. One in every 500 passenger vehicle crashes reported to police involves an occupant who is hospitalized with a serious lower extremity injury.

To decrease the incidence of serious lower extremity injury to occupants in crashes, data from this study suggest that we need to improve passenger vehicle crashworthiness. We base this conclusion on the following evidence:

- Risks for all serious lower extremity injuries are highest in crashes with energy concentration in the forward part of the occupant compartment, and risks increase with crash configurations that are associated with large impact forces. The odds ratio for drivers' serious lower extremity injury in head-on collisions is 28 compared to 5.7 for single vehicle fixed object crashes. Both of these are odds of sustaining serious lower extremity injury when compared to crashes without a frontal component. We need to consider how to design cars that can manage the impact forces of frontal collisions in such a way as to protect the lower extremities. Lower extremities are closer to the point of impact in frontal collisions.

- The risks of serious lower extremity injuries are increased with smaller car sizes, suggesting that impact forces can be managed more appropriately. The protective effect of large cars and vans shows that it is possible to provide some occupant protection through changes in vehicle design.

- Risks for sustaining fractures of the foot are higher than for other injury diagnoses for all crash configurations with a frontal component – they are extraordinarily high for head on collisions – with odds ratios for drivers of 53 compared to crashes with no frontal component. The foot in a crash is likely to be closer to the impact than other parts of the leg, and is protected by less crush space. Front seat passengers also have high odds ratios for foot fracture when drivers and front seat passengers are compared to other passengers. The higher odds for driver foot fracture (21 compared to 13) suggests that driver side foot well or driver controls could be associated with increased risk.

- To the extent that we can determine, seatbelts do provide some protective effect for serious lower extremity injury to drivers. Seatbelts, are however, primarily designed to protect against head injury, and injury to

- the internal organs of the chest. The protective effect of seatbelts increases to the lower extremity injuries that are proximal (closer to the trunk) such as femur injuries. They had less protective effect for distal injuries, such as foot and ankle fracture. This suggests that occupants may be more appropriately protected through improved crashworthiness of the vehicle, rather than through occupant protection devices such as seatbelts. Airbags were not common enough during the years of our study to include in our analysis.

Finally, when occupant protection through vehicle design is being discussed, it is important to remember than for serious lower extremity injuries, women over the age of 60 have increased risks. This has been attributed to their smaller stature, and lower injury threshold. These populations deserve consideration in the design and standards for vehicle crashworthiness.

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Table 3. Odds Ratios and 95% Confidence Intervals for Three Injury Outcomes
Wisconsin 1991-1994
Passenger Vehicles, Drivers Only

Passenger Vehicles Only
Drivers Only
1991-1994 Data

Independent Variables	Any Lower Extremity Injuries		Brain Injury		Any Hospitalization	
Estimated Seat Belt Probability (10% change in probability)	0.76 ***	(.75, .78)	0.68 ***	(.67, .70)	0.75	*** (.74, .75)
Air Bag	1.17	(.80, 1.72)	1.06	(.70, 1.61)	0.90	(.73, 1.10)
2 Vehicle, Head On	28.00 ***	(23.9,32.81)	7.22 ***	(5.94, 8.77)	9.68	*** (8.94,10.49)
1 Vehicle, Fixed Object	5.66 ***	(4.85, 6.60)	3.60 ***	(3.13, 4.15)	3.93	*** (3.70, 4.16)
1 Vehicle, Off Road	3.28 ***	(2.39, 4.49)	2.15 ***	(1.59, 2.90)	3.12	*** (2.78, 3.50)
Side, Front End Damage	3.15 ***	(2.68, 3.70)	1.66 ***	(1.40, 1.96)	1.88	*** (1.76, 2.00)
Speed Limit 35-50	2.63 ***	(2.25, 3.07)	1.93 ***	(1.63, 2.29)	1.99	*** (1.87, 2.12)
Speed Limit 55+	3.88 ***	(3.36, 4.48)	3.49 ***	(3.02, 4.03)	3.10	*** (2.93, 3.29)
Age 16-29	0.60 ***	(.51, .71)	0.82 *	(.70, .96)	0.59	*** (.55, .63)
Age 60+	1.22	(.95, 1.57)	1.85 ***	(1.48, 2.32)	2.09	*** (1.91, 2.27)
Female	1.51 ***	(1.28, 1.79)	1.13	(.93, 1.38)	1.30	*** (1.21, 1.40)
Age 16-29, Female	0.96	(.76, 1.22)	0.89	(.69, 1.15)	0.95	(.86, 1.05)
Age 60+, Female	2.86 ***	(2.08, 3.94)	1.34	(.94, 1.92)	1.57	*** (1.38, 1.78)
Car, Compact	1.02	(.81, 1.28)	0.86	(.67, 1.09)	0.95	(.86, 1.05)
Car, Small	0.788 *	(.63, .98)	0.69 **	(.55, .87)	0.79 ***	(.72, .87)
Car, Medium	0.679 ***	(.54, .85)	0.76 *	(.60, .96)	0.75 ***	(.67, .84)
Car, Large	0.465 ***	(.35, .62)	0.46 ***	(.34, .62)	0.50 ***	(.44, .57)
Car, Luxury	0.396 ***	(.29, .52)	0.48 ***	(.36, .64)	0.47 ***	(.38, .59)
Van/Truck, Small	0.825	(.50, 1.37)	0.9	(.55, 1.48)	0.79 *	(.71, .87)
Van/Truck, Medium	0.509 ***	(.40, .64)	0.49 ***	(.39, .63)	0.49 ***	(.43, .56)
Van/Truck, Large	0.343 ***	(.64, 1.27)	0.52 ***	(.39, .71)	0.43 ***	(.31, .57)
Number of Injury Cases	1364		1242		7940	
Total Cases in Model	656895		(Models only include cases for which all variables have no missing data)			

* indicates sig. at .05 level ** indicates sig. at .01 level *** indicates sig. at .001 level

Table 4. Odds Ratios for Selected Lower Extremity Injury Outcomes Wisconsin 1991-1994
Passenger Vehicles, Drivers Only

Passenger Vehicles Only Drivers Only 1991-1994 Data *Independent Variables*	Fractured Ankle	Fractured Foot	Fractured Tibia/ Fibula	Fractured Femur	Other Lower Extremity Injury	Multiple Fractures	Any Lower Extremity Injury	
MODEL 2								
Estimated Seat Belt Probability (10% change in probability)	0.794 ***	0.83 ***	0.71 ***	0.76 ***	0.76 ***	0.78 ***	0.76 ***	(.75, .78)
Air Bag	1.513	0.99	1.46	0.54	2.03	1.42	1.17	(.80, 1.72)
2 Vehicle, Head On	27.965 ***	52.99 ***	27.19 ***	23.91 ***	18.98 ***	45.88 ***	28.00 ***	(23.9,32.81)
1 Vehicle, Fixed Object	6.32 ***	7.19 ***	6.35 ***	4.76 ***	2.90 ***	5.44 ***	5.66 ***	(.485, 6.60)
1 Vehicle, Off Road	2.345 *	4.03 ***	3.88 ***	2.32 *	4.22 ***	3.16 **	3.28 ***	(2.39, 4.49)
Side, Front End Damage	3.033 ***	3.19 ***	2.08 ***	3.27 ***	3.79 ***	2.28 ***	3.15 ***	(2.68, 3.70)
Speed Limit 35-50	2.244 ***	2.97 ***	2.95 ***	2.45 ***	2.67 ***	2.41 ***	2.63 ***	(2.25, 3.07)
Speed Limit 55+	2.994 ***	4.86 ***	4.24 ***	4.48 ***	3.68 ***	4.38 ***	3.88 ***	(3.36, 4.48)
Age 16-29	0.509 ***	0.39 ***	1.15	0.45 ***	0.63 *	0.50 ***	0.60 ***	(.51, .71)
Age 60+	1.012	0.44 *	1.86 *	2.14 ***	0.52	1.40	1.22	(.95, 1.57)
Female	1.96 ***	1.76 ***	1.43	1.12	0.94	1.49	1.51 ***	(1.28, 1.79)
Age 16-29, Female	0.96	1.31	0.62	1.46	1.02	1.00	0.96	(.76, 1.22)
Age 60+, Female	3.749 ***	4.54 ***	1.33	1.76 *	9.74 ***	1.88	2.86 ***	(2.08, 3.94)
Car, Compact	0.884	1.141	1.005	1.958 *	0.755	1.657	1.02	(.81, 1.28)
Car, Small	0.932	0.954	0.751	1.141	0.454 **	1.161	0.788 *	(.63, .98)
Car, Medium	0.615 *	0.845	0.663	1.051	0.581	0.92	0.679 ***	(.54, .85)
Car, Large	0.396 ***	0.416 **	0.253 ***	0.796	0.567	0.302 *	0.465 ***	(.35, .62)
Car, Luxury	0.314 ***	0.367 **	0.432 **	0.614	0.289 **	0.236 **	0.396 ***	(.29, .52)
Van/Truck, Small	1.074	0.429	1.13	1.417	0.559	1.506	0.825	(.50, 1.37)
Van/Truck, Medium	0.504 **	0.518 *	0.493 **	0.813	0.354 ***	0.641	0.509 ***	(.40, .64)
Van/Truck, Large	0.356 **	0.262 **	0.308 ***	0.602	0.328 **	0.468	0.343 ***	(.64, 1.27)
Number of Injury Cases	432	293	336	350	179	204	1364	
Total Cases in Model	656,895		(Models only include cases for which all variables have no missing data)					

* indicates sig. at .05 level ** indicates sig. at .01 level *** indicates sig. at .001 level

Table 5. Odds Ratios for Select Lower Extremity Injury Outcomes, Wisconsin, 1991 – 1994.
Passenger Vehicles, Drivers and Passengers

Passenger Vehicles Only
Passengers & Drivers
1991-1994 Data

Independent Variables	Fractured Ankle	Fractured Foot	Fractured Femur	Fractured Tib/Fib	Other Injuries	Multiple Injuries	Any Lower Extremity Injuries	95% C.I.
Reported Seat Belt Use	0.25 ***	0.31 ***	0.13 ***	0.18 ***	0.22 ***	0.22 ***	0.20 ***	(.18, .22)
Air Bag	1.68	1.28	1.42	0.61	2.27	1.55	1.30	(.89, 1.90)
Driver	5.77 ***	20.99 ***	1.43 *	2.56 ***	8.45 ***	5.85 ***	2.97	(2.44, 3.61)
Front Seat Passenger	3.79 ***	13.32 ***	1.29	1.74 **	3.51 **	3.69 ***	2.03 ***	(1.64, 2.52)
2 Vehicle, Head On	24.21 ***	46.02 ***	24.57 ***	19.48 ***	17.15 ***	42.11 ***	23.87 ***	(20.82, 27.37)
1 Vehicle, Fixed Object	5.39 ***	5.91 ***	5.72 ***	3.94 ***	2.99 ***	5.02 ***	4.90 ***	(4.30, 5.58)
1 Vehicle, Off Road	2.88 ***	3.28 ***	3.39 ***	2.31 ***	4.19 ***	3.28 ***	3.09 ***	(2.38, 4.00)
Side, Front End Damage	3.01 ***	3.18 ***	2.12 ***	3.19 ***	4.02 ***	2.55 ***	3.07 ***	(2.68, 3.53)
Speed Limit 35-50	2.04 ***	2.84 ***	2.38 ***	2.34 ***	2.36 ***	2.15 ***	2.37 ***	(2.07, 2.72)
Speed Limit 55+	3.00 ***	4.84 ***	4.22 ***	4.61 ***	3.56 ***	4.40 ***	3.91 ***	(3.46, 4.41)
			0.757					
Car, Compact	0.88	1.32	1.02	1.75 *	0.80	1.75	1.03	(.84, 1.26)
Car, Small	1.02	1.13	0.76 *	1.29	0.65	1.27	0.90 *	(.74, 1.10)
Car, Medium	0.81	1.11	0.68 *	1.39	0.80	1.17	0.86 *	(.70, 1.04)
Car, Large	0.80	0.71	0.56 *	1.30	0.92	0.60	0.82 *	(.65, 1.04)
Car, Luxury	0.57 *	0.67	0.71 *	1.01	0.43 *	0.60	0.68 ***	(.53, .86)
Van/Truck, Small	0.95	0.83	1.24 *	1.06	0.85	1.31	0.95	(.62, 1.45)
Van/Truck, Medium	0.60 **	0.74	0.66 ***	1.08	0.58	0.98	0.67 ***	(.55, .82)
Van/Truck, Large	0.46 **	0.52	0.50 **	0.83	0.44 *	0.64	0.52 ***	(.39, .69)
Number of Injury Cases	567	366	518	477	212	262	1838	
Total Cases in Model	1,001,801			(Models only include cases with no missing data)				

* indicates sig. at .05 level ** indicates sig. at .01 level *** indicates sig. at .001 level