

Serious Lower Extremity Injuries in Motor Vehicle Crashes

Wisconsin, 1990-1994

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Serious Lower Extremity Injuries

- May not be life threatening, but are costly and effect quality of life
- Lifelong pain and disability are common
 - ❖ one study indicated fewer than half had returned to work six months post crash

We define serious lower extremity injuries as:

- Traumatic amputations
- Crushing injuries
- Dislocations
- Fractures

(Not included: strains, sprains, contusions and abrasions, fractures of the pelvic girdle and hip)

Wisconsin's Linked Data

- Motor vehicle crash reports w/ VINS
- Hospital discharge data
- No EMS or ED data available
- Available from 1989-1994
- 1995 to be linked in fall

Wisconsin Linkage Methodology

- Based on
 - ❖ Zipcode of residence
 - ❖ Date of crash/hospital admission
 - ❖ Birthdate
 - ❖ Sex
- 1989-1990 Exact match algorithm developed at CHSRA
- 1991-1994 Probabilistic linkage with AutoMatch

Serious Lower Extremity Injuries in Wisconsin

Passenger Vehicles

1990 - 1994

Occupants in reported crashes	1,679,391
Hospitalizations	19,514
Cases with serious lower extremity injuries	3138 (16.1%)

E-Coded Wisconsin Hospital Discharge Data *1994 - 1995*

- 16 % of all serious lower extremity injury hospitalizations are the result of motor vehicle traffic crashes
- Hospital charges (without physician fees or rehabilitation care) average \$18,000 per patient with a primary diagnosis of serious lower extremity injury

Wisconsin Annual Incidence Rate of Serious Lower Extremity Injuries

Passenger Vehicles

Rate/100,000 Crash Occupants

	#	Rate
1990	693	205
1991	566	173
1992	663	201
1993	618	180
1994	598	175

Serious Lower Extremity Injuries

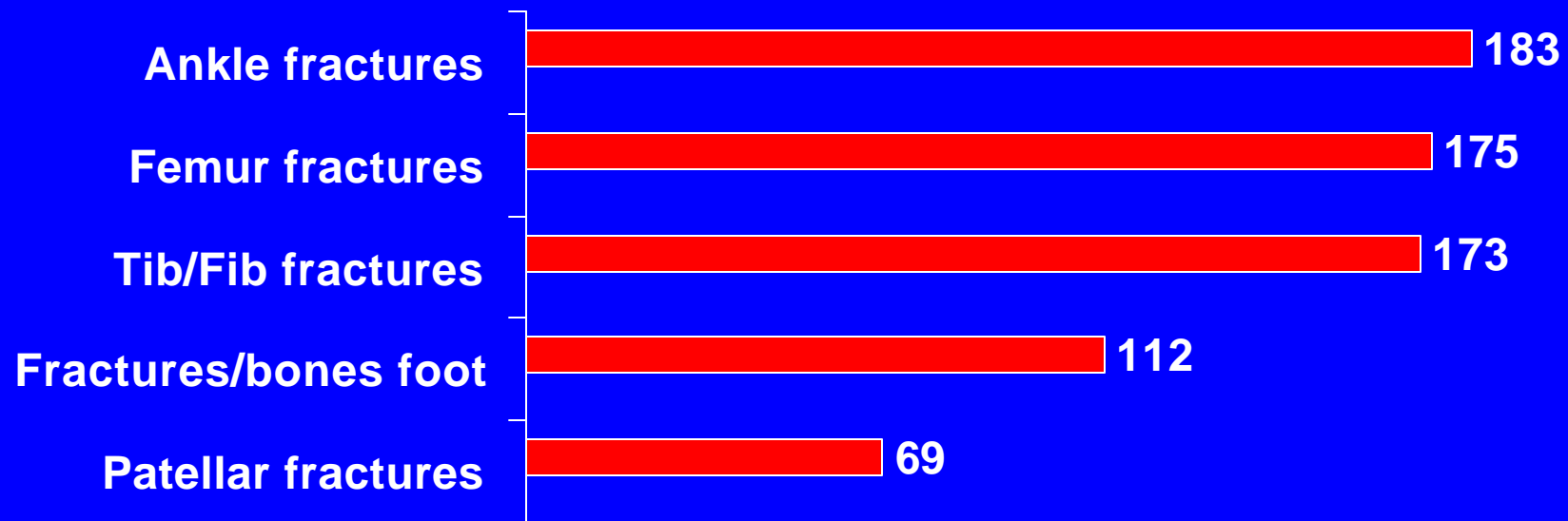
Passenger Vehicles

Specific Injuries - 5 Year Average

Cases w/ Lower Extremity Injuries **628**

Cases w/ more than one Injury **137 (21.8%)**

Cases w/ Specific Injuries (not mutually exclusive)



Measuring Seatbelt Use

Problem

Reported use in crash data	85%
WiDOT Observation studies	54%

Our Solution

- For each driver in crash, probability of seat belt use was estimated based on logistic regression model of observation data provided by WiDOT

Comparing risks with reported vs. estimated seat belt use.

Over reporting of seat belt use by uninjured occupants results in overestimates of effectiveness. Our method may provide a better estimate of true effectiveness.

	Reported Use	Estimated Use
Any Severe Lower Extremity Injury	6.3	1.8
Foot Fracture	4.8	1.3
Tib/Fib Fracture	10	1.9

Selected Logistic Regression Results

Serious Lower Extremity Injuries

Drivers of Passenger Vehicles

1991-1994

Odds Ratios

RISK CATEGORY	COMPARISON GROUP	ANY SLE INJURY	FOOT FRACTURE
10% Increase in Estimated Seatbelt Use	N.A.	.76	.83
Multiple Vehicle Head On	Crash w/out frontal component	28.0	53.0
Posted Speed >55	Speed < 35	3.9	4.9
Female	Male	1.5	1.8
Female Age 60+	Female Age 30-60	2.9	4.5
Luxury Car	Subcompact car	0.4	0.4
Large Van	Subcompact car	0.3	0.3

Limitations

- Cannot easily estimate long term rehabilitation outcome for lower extremity injuries based solely on hospital discharge diagnosis
- Bilateral injuries have an enormous impact, but cannot be discerned from hospital data
- Seatbelt information is based on estimated probability

Methodologic Implications

- Linked data contribute to knowledge because uninjured occupants are included in analysis - unlike trauma center studies
- Estimated belt use probability can help account for over reporting of seatbelt use in crash reports
- Including VINS allow us to study role of vehicle characteristics.

Conclusions

- Seatbelts may provide some protection from serious lower extremity injuries, but need further study
- Elevated odds ratios for frontal crashes, small cars, and high speeds suggest we improve vehicle crashworthiness especially for footwell intrusion and other occupant compartment integrity.