



Restrained Children's Spinal Injury Causation Scenarios in Motor Vehicle Crashes

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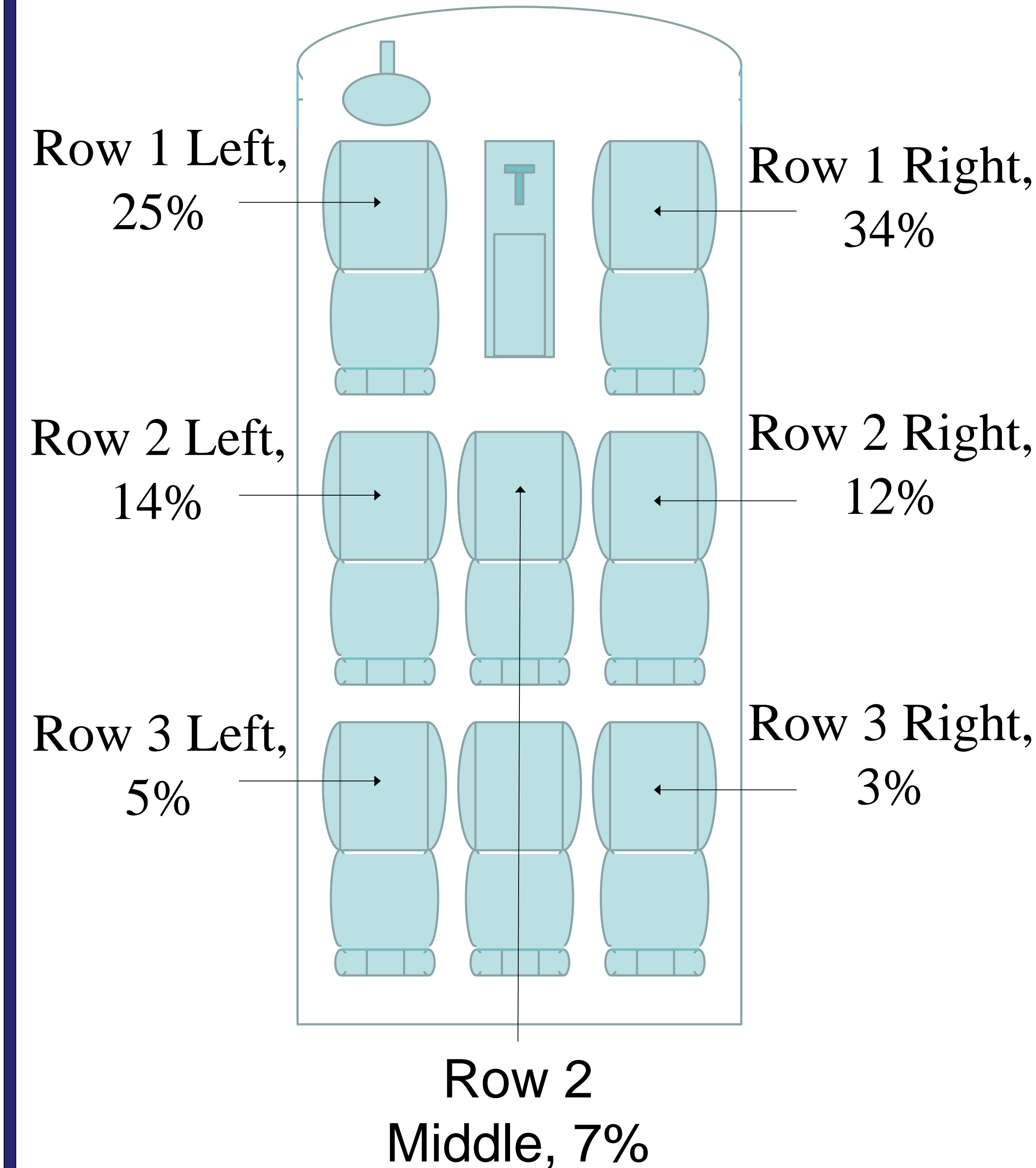
Introduction

- Motor vehicle crashes (MVCs) are the most common mechanism of spinal injury in children
- Spinal cord injuries result in the most residual physical disability in children following discharge from inpatient rehabilitation
- Little is known about patterns of spinal injuries and their associated causation scenarios for restrained child occupants

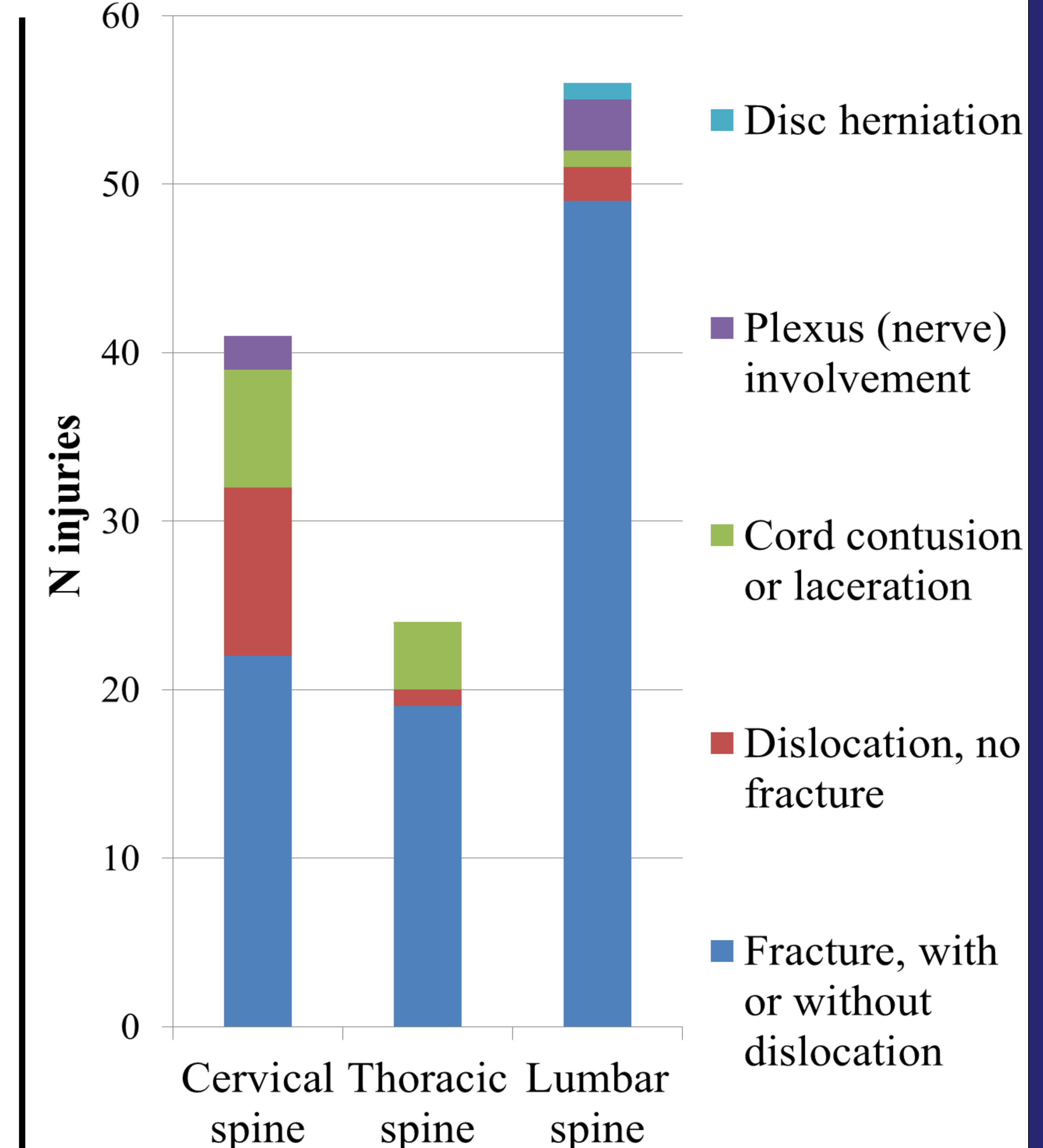
Methods

- Queried CIREN for occupants ≤ 17 years old in a model year 1990+ vehicle with an AIS 2+ spinal injury
- Excluded cases of rollover, limited injury information, gross restraint misuse, or pre-existing comorbidity predisposing injury
- Reviewed each case with a multidisciplinary team of physicians and engineers to determine injury causation scenarios (ICS)

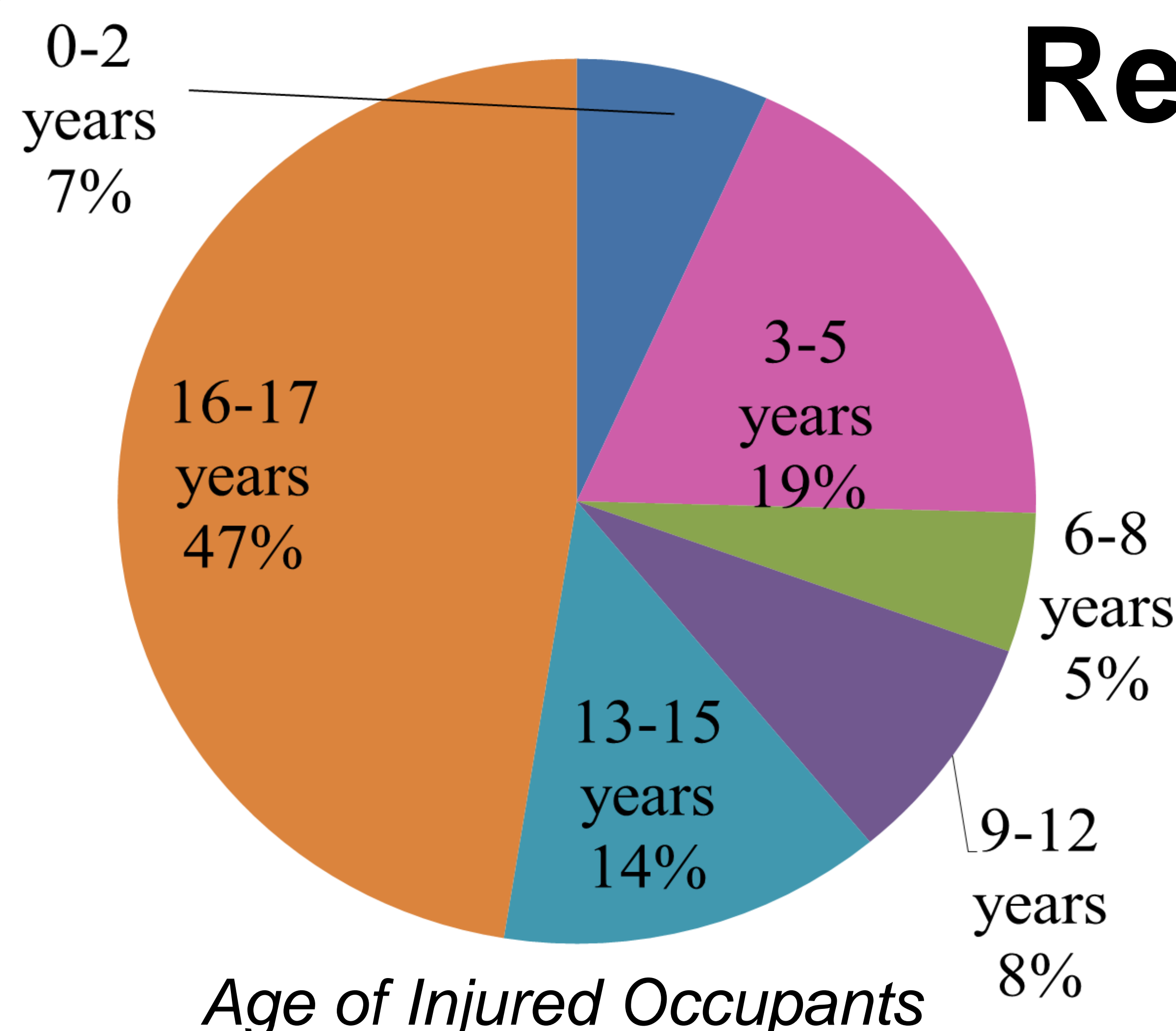
Results



Seating Position of Injured Occupants

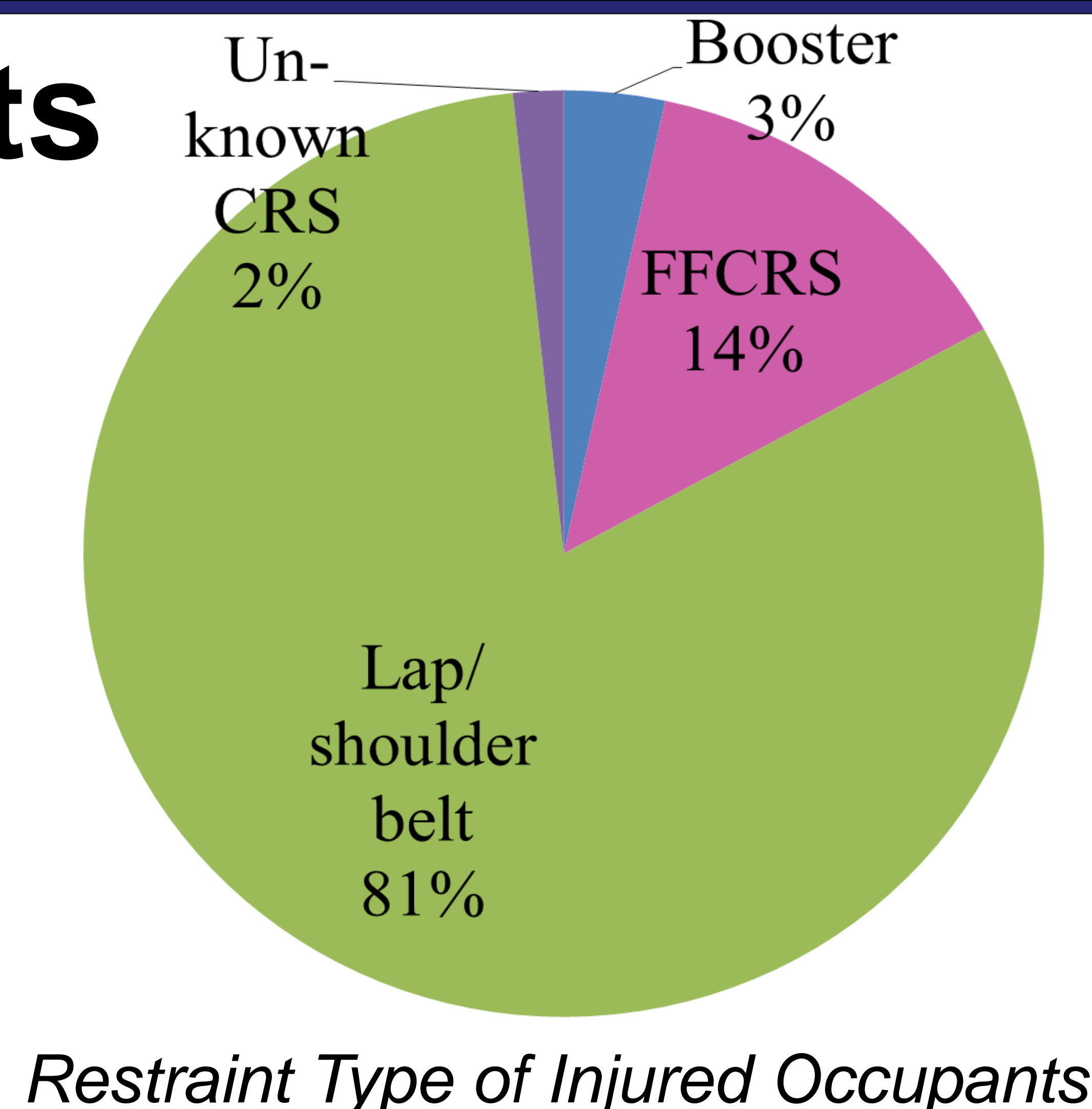


Injury Details of Occupants



Age of Injured Occupants

Results



Restraint Type of Injured Occupants

Findings and Conclusions

- Nearly half of occupants were 16-17 years old (47%)
- Occupants were most frequently in passenger cars (64%)
- Crash direction was most often frontal (62%)
- Fracture was most common injury (80%)
- Spinal injury causation typically due to:
 1. Flexion or lateral bending over the lap and/or shoulder belt or child restraint harness
 2. Compression by occupant's own seat back
 3. Axial loading through the seat pan