Motor vehicle crash characteristics and fatal child occupant injuries: An analysis of linked national databases

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Background

- Motor vehicle crashes are the leading cause of death and disability in the pediatric and young adult populations
- Correlating anatomic injuries with the causative motor vehicle crash characteristics is of paramount importance as a basis for safety design initiatives and injury prevention strategies
- Data is particularly limited in the area of child occupant injury.

Background

- The Centers for Disease Control maintain a database of all deaths that occur in the United States, the Multiple Cause-of-Death Public-Use file (MCOD)
- Up to 20 anatomic diagnosis codes per decedent
- For the period 1987 to 2002 there were 2,380,566 injury-related decedents including 150,980 fatally injured youth (age < 16 years). For the period 1999-2002, there were 28,837 fatally injured youth.
- For those fatally injured occupants, detailed injury information but no crash details available

Background

- In 1975 the Fatality Analysis and Reporting System (FARS) launched by NHTSA
- For the period 1987-2002, there were 173,681 passenger fatalities entered into database including 31,231 fatally injured youth. For the 1999-2002 era, there were 8,044 child occupant decedents.
- For those fatally injured occupants, detailed crash information but no anatomic injury details available.

Methods

- NHTSA created a linked dataset between FARS and MCOD currently available for the period 1987-2002.
- Linkage created based on the unique death certificate number present in both FARS and MCOD.
- Merged datasets contain all of the data elements currently available from the individual FARS and MCOD decedent files

Methods

- Initial support and approval of the project obtained from NCHS and National Association of Public Health Statistics and Information Systems for their approval.
- Individual data use agreements sought and obtained from 47 of 50 state jurisdictions
- Data analysis performed through the Research Data Center (RDC) of the NCHS.

Methods

- Crash-related fatality within 30 days of event
- Occupant age less than 16 at time of death
- Decedents from 1999 to 2002
- MCOD data elements to include anatomic injury diagnoses based on ICD-10 codes

Results

For the 4 years of review:

- 6,065 child occupant decedents
- 59.1% male
- Mean age 8.6 years

Results

Injury Location	N	%
Overall	6,065	100.0%
Head	3,389	55.9%
Spinal Cord	64	1.1%
Vertebral Column	117	1.9%
Thorax	620	10.2%
Abdomen/pelvis	427	7.0%
Upper/lower Extremity	88	1.5%
Multiple Body Regions	1,520	25.1%

*not mutually exclusive

Results

Direction of Initial Impact	N	%
Front	2,494	41.1%
Side	2,005	33.1%
Rear	520	8.6%
Other / Unknown	288	4.7%
No Collision	758	12.5%

Results

Vehicle Type	N	%
Passenger Car	3,772	62.2%
Cargo Van	113	1.9%
Pickup Truck	709	11.7%
SUV	829	13.7%
Minivan	630	10.4%
Non-Classifiable but Eligible	12	0.2%

Results

Crash Characteristic	N	%
Restrained	2,615	43.1%
Front Row Seated	2,375	39.2%
Exposed to Airbag	368	6.1%
Intrusion (Severe)	5,586	92.1%
Non-Drivable	5,967	98.4%

Limitations

- Only as good as data that is entered
- Not known how diagnoses obtained
- May under detect injuries

Conclusions

- Potentially robust data tool
- Head injuries predominate in child occupant fatalities
- Decedents most commonly rear seated, unrestrained passengers in frontal crashes

Future Directions

- Focus on specific anatomic injuries (e.g. closed head injury, spinal cord injury)
- Focus on specific crash characteristics (e.g. airbag exposure, side impact)
- Broaden data use agreement

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