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Research Note

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Wheelchair Users Injuries and Deaths Associated with Motor Vehicle Related Incidents

NHTSA's National Center for Statistics and Analysis (NCSA) recently examined data from the Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System (NEISS) on cases of injuries or death to wheelchair users involving motor vehicles that occurred during the period 1991 - 1995. Data on the non-crash related activity associated with the injury or death to wheelchair users, e.g., lift malfunction or improper wheelchair securement within the motor vehicle, were examined to determine the extent to which improper securement and or related actions were involved in the injury or death. NEISS data on persons treated in hospital emergency rooms for these injuries were examined to determine the action or activity involved in producing the injury or death; if injured, the diagnosis of the injury and the severity; the body region with the most severe injury; and the age of the injured person.

CPSC's NEISS collects data on a nationally representative sample of persons treated in hospital emergency rooms each year for injuries related to consumer products. NEISS is a 3-level system consisting of surveillance of persons treated for injuries in hospital emergency rooms, follow-back telephone interviews with injured persons or witnesses, and comprehensive investigations with injured persons and/or witnesses. NEISS obtains data from a sample of 91 of the 6,127 hospitals nationwide with at least six beds that provide emergency care on a continuing 24-hour basis. The data on injuries or death to wheelchair users associated with situations involving motor vehicles were obtained through an agreement between NHTSA

and CPSC to collect data on injuries associated with specific motor vehicle hazards that may not be related to traffic crashes. Such incidents involving wheelchair users, while they may be associated with a motor vehicle, would not be captured in NHTSA's traffic crash data files if the incident did not occur on a trafficway open to the public.

The NEISS data on injuries to wheelchair users were used to develop national estimates of the numbers of injuries and deaths in these incidents. National estimates of the number of wheelchair users injured based upon the NEISS data, however, may be considered conservative for several reasons. First, NEISS does not include medical facilities without emergency care, e.g., walk-in clinics, managed care providers, or physicians in private practice. Secondly, as NEISS is focused upon injuries involving consumer products rather than motor vehicles, cases of injuries associated with motor vehicle incidents may have been inadvertently omitted from the sample. Finally, NEISS data on persons treated for injuries may not include cases for those persons for whom it is unknown at the time of medical treatment if they were a wheelchair user prior to the injury occurrence.

During the five year period, 1991 - 1995, an estimated 299,734 persons in wheelchairs were injured, an average of about 60,000 persons each year. More than 2% (7,121 of 299,734) of these persons were injured or were killed in incidents involving motor vehicles during the five year period, approximately 1,500 persons annually.

Vans were involved in almost half (48%) of the injuries to wheelchair users related to motor vehicles during the five year study period. Passenger cars were involved in another 30%, with the remainder involving buses, ambulances, and trucks. Table 1 presents the distribution of wheelchair users injured or killed by the type of motor vehicle involved in the incident.

Table 1
Estimated Number of Wheelchair Users Injured or Killed by Type of Vehicle Involved, 1991 - 1995

Type of Vehicle Involved	Estimated No. Of Persons	% Total
Van	3,410	48%
Passenger Car	2,153	30%
Bus	856	12%
Ambulance	506	7%
Truck	196	3%
Total	7,121	100%

The activity associated with injuries to wheelchair users could generally be classified into five categories: improper or no securement [in the motor vehicle]; collision between a wheelchair and a motor vehicle; wheelchair lift malfunction [lift fell, did not reach the ground, or person was thrown from the lift]; transferring to or from a motor vehicle; and falling onto or off of a ramp. Improper or no securement was involved in more than one-third (35%) of the incidents during the 5 year period, as shown in Table 2.

Table 2
Estimated Number of Wheelchair Users Injured or Killed by Injury Producing Activity, 1991-1995*

Injury Producing Activity	Estimated No. Of Persons	% Total
Improper or No Securement	2,494	35%
Collision Between Wheelchair and Motor Vehicle	1,819	26%
Lift Malfunction	1,366	19%
Transferring To or From a Motor Vehicle	1,035	15%
Falling On/Off Ramp	407	6%
Total	7,121	100%

* Percentages may not add to 100% due to rounding.

None of the wheelchair users injured in incidents associated with improper or no securement were associated with passenger cars, as might be expected. Of the 2,494 wheelchair users whose injuries were related to improper securement, 65% (1,616/2,494) involved vans, while 18% (455/2,494) involved ambulances, and 17% (422/2,494) involved buses. Meanwhile, the majority (83% or 1,511/1,819) of the wheelchair users whose injuries were related to collision with a motor vehicle involved passenger cars. Trucks were involved in 8% (152/1,819), while vans were involved in 7% (122/1,819) and buses in 2% (34/1,819).

Table 3 presents information on the severity of the injury by the medical disposition for the estimated number of wheelchair users injured between 1991 - 1995. Fatalities represented 0.6% (43/7,121) of the wheelchair users. All of the estimated 43 fatalities were associated with collisions with a motor vehicle. For the remaining 7,078 injured wheelchair users, injury severity by medical disposition is presented in Table 3. Approximately 90% of injured wheelchair users were treated and released.

Table 3
Estimated Number of Wheelchair Users
Injured by Injury Severity
and Medical Disposition, 1991-1995*

Injury Severity	Medical Disposition		
	Treated & Released	Hospitalized	%Total
Minor	1,826	34	26%
Serious	225	290	7%
%Total	90%	10%	100%

* Percentages may not add to 100% due to rounding.

The proportion of serious injuries differed considerably for each of the five types of injury producing activity, i.e., while more than 14% of wheelchair users in incidents involving a collision were considered seriously injured, this proportion dropped to 7% for those injured in incidents involving improper or no securement, to roughly 3% for those in incidents involving lift malfunctions and in incidents involving transferring to or from a motor vehicle. None of the injuries to wheelchair users involving falling onto or off of a ramp were considered as serious. The majority (5,233 or 73%) of the wheelchair users injured or killed in motor vehicle incidents were at least 60 years old, as shown in Table 4. Eighteen percent (18%) were between the ages of 30 - 59, with the remainder of those injured or killed 29 years of age or less.

Table 4
Estimated Number of Wheelchair Users Injured
or Killed in Motor Vehicle Incidents by Age
1991-1995*

Age of Person	Estimated No. Of Persons	% Total
0 - 14 Years	242	3%
15 - 29 Years	378	5%
30 - 44 Years	659	9%
45 - 59 Years	609	9%
60 Years and Over	5,233	73%
Total	7,121	100%

* Percentages may not add to 100% due to rounding.

In addition to the NEISS data on wheelchair users injured or killed involving motor vehicles, additional data on fatalities to wheelchair users were obtained from CPSC's death certificate and reported incidents files. These data indicated that twelve (12) deaths occurred during the period 1991-1995. As the data on the twelve deaths of wheelchair users are anecdotal, it is not possible to extrapolate these data to national estimates. The twelve deaths, however, do provide some insight as to whether the patterns of injury producing action (Table 2) are similar for injuries and fatalities. Table 5 presents a breakdown of the twelve fatality cases by injury producing activity. As shown in Table 5, none of the twelve fatalities reportedly involved lift malfunction or falling on to or off of a ramp. Nine of the twelve cases, i.e., 75%, involved a collision between the wheelchair and a motor vehicle. This appears to differ from the distribution of injury producing activity for injured wheelchair users shown in Table 2, i.e., 26% involved a collision between a wheelchair and a motor vehicle, while 35% involved improper or no securement. This appears to indicate that when a collision between a wheelchair user and a motor vehicle is involved, there is a greater potential for serious injury, including death, than in other situations which may cause injury, e.g., lift malfunction.

Table 5
Wheelchair Users Killed
by Injury Producing Activity, 1991-1995*

Injury Producing Activity	No. Of Persons Killed
Improper or No Securement	2
Collision Between Wheelchair and Motor Vehicle	9
Lift Malfunction	None
Transferring To or From a Motor Vehicle	1
Falling On/Off Ramp	None
Total	12

* Data may not be representative and/or extrapolated to national estimates..

For additional copies of this research note, please call (202) 366-4198 or toll free, 1-800-934-8517. Questions regarding this research note may be directed to Delmas Johnson at (202) 366-5382 or Gayle Dalrymple at (202) 366-5559. This research

note and other traffic safety information is available to Internet users at <http://www.nhtsa.dot.gov/people/nca> and <http://www.nhtsa.dot.gov/cars/rules/adaptive>.