U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Research Note

NHTSA
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DOT HS 812 120 Summary of Statistical Findings March 2015

Not-in-Traffic Surveillance: Non-Crash Fatalities and Injuries

Summary

This Research Note provides updated information on fatalities and injuries among the overall population as well as among children 14 and younger who were involved in "motor vehicle non-crash incidents" (herein referred to as non-crash incidents). The data on such incidents are obtained by the National Highway Traffic Safety Administration (NHTSA) through its Not-in-Traffic Surveillance system. These updates reflect non-crash fatality data from 2005 to 2007 and injury estimates in 2011 and 2012.

During 2005 through 2007, on average each year 506 persons were killed in non-crash vehicle incidents. The three most frequent reasons for these fatalities were carbon monoxide poisoning from motor vehicle exhaust gas (25%), crushed by a vehicle (25%), and fell from the vehicle (17%). Among children 14 and younger, on average annually, 37 children were killed in non-crash incidents. About 51 percent of them died due to vehicle-related heat stroke or hyperthermia from extreme heat.

During 2011 and 2012, an estimated 647,000 persons were injured annually in non-crash incidents involving motor vehicles. The three most frequent injury mechanisms were from being struck by a vehicle part such as vehicle door, trunk lid, etc., or by striking a vehicle (32%), fall while entering or exiting a vehicle (23%), and overexertion such as while unloading cargo from a trunk or the bed of a pickup truck (11%). These injury mechanisms accounted for about 59 percent of the injuries in non-crash incidents that occurred at home. Overall, about 94 percent of the patients who were injured in non-crash incidents were treated and released. During 2011 and 2012, an estimated 95,000 injuries occurred annually to children 14 and younger. The three most frequent injury mechanisms for children were closing doors (48%), falls while entering or exiting vehicles (11%), and falls from exteriors of vehicles (8%).

Introduction

The Not-in-Traffic Surveillance system is a virtual data collection system designed to provide counts and details of fatalities and injuries that occur in non-traffic crashes and non-crash incidents. The non-traffic crashes refer to crashes that occur off the public trafficways, such as in driveways and parking lots, etc. On the other hand, the non-crash incidents refer to incidents that involve passenger vehicles (cars, pickup trucks, vans, and SUVs), though the injury mechanism is neither due to a traffic crash nor a non-traffic crash. These include incidents such as carbon monoxide poisoning by motor vehicle exhaust gas, crushed by a falling vehicle, or falling from a vehicle, etc. Since 2009, NHTSA has published five reports[1,2,3,4,5] covering both non-traffic crashes and non-crash incidents. This Research Note presents estimated annual averages of non-crash fatalities and injuries in two main sections: Fatalities in Non-Crash Incidents and Injuries in Non-Crash Incidents. Since the estimates are obtained from an external source, the standard errors of the estimates are not presented in this Research Note. The statistics in the two sections pertain to two different periods: 2005 to 2007 for fatalities and 2011 and 2012 for injuries, depending upon the latest available data in each case.

To obtain data on non-crash fatalities, NHTSA uses death certificates from the special mortality files of the National Vital Statistics System (NVSS). The narrative sections of the accidental deaths that did not involve a motor vehicle transport accident were searched for scenarios involving passenger vehicles in non-crash incidents. Fatal incidents that occurred inside the vehicles or where the vehicles were otherwise a factor in these accidental deaths were assigned appropriate incident types.

To collect information on non-crash injuries involving passenger vehicles, NHTSA collaborated with the Consumer Product Safety Commission (CPSC) to conduct a special study of emergency department records contained in the National Electronic Injury Surveillance System—All Injury Program (NEISS-AIP). Since January 1, 2008, all NEISS-AIP motor vehicle-related and car seat-related injuries have been reviewed by trained coders at approximately 60 sampled hospitals to identify the non-crash incidents that involved passenger vehicles. The injuries resulting from crashes or related to car seats outside of motor vehicles were excluded by using a screening question, "Was the victim injured in a collision/rollover or in a car seat (child restraint systems) away from the vehicle?"

Fatalities in Non-Crash Incidents

This section presents the annual average of the estimated non-crash fatalities among the overall population as well as among children 14 and younger, based upon the mortality data obtained from the CDC's NVSS database.

Fatalities to People in Non-Crash Incidents

During 2005 to 2007, on average, 506 deaths occurred annually in non-crash incidents that involved passenger vehicles. Table 1 shows the distribution of the incident type involving these fatalities. About 25 percent of the non-crash fatalities occurred due to unintentional carbon monoxide poisoning from motor vehicle exhaust gas. Such incidents occur when a person remains inside an enclosed space such as garage or a vehicle. An equal percentage of non-crash fatalities occurred to persons who were crushed by falling vehicles; a scenario usually occurring while a person was working under a passenger vehicle that subsequently fell from its supports. Fall from a vehicle was the next highest incident type that caused about 17 percent of the non-crash deaths. Vehicle fires caused 8 percent of the fatalities, and 7 percent of the fatalities occurred to people who were struck by an object. Incidents of heat stroke/hyperthermia that usually involve children resulted in 32 fatalities (6%) on average each year. Additionally, 10 fatalities (2%) were attributed to hypothermia, and 14 fatalities (3%) occurred due to drowning/immersion of the vehicles. Vehicle window asphyxia, occurring due to the closing of power windows or from partially opened (stationary) windows, accounted for an annual average of 3 fatalities (about 1% of all non-crash fatalities). An equal number of fatalities were caused by positional asphyxia.

Table 1.
Fatalities to People in Non-Crash Incidents

Incident Type	Estimated Annual Average	
	Frequency†	Percentage
Carbon monoxide poisoning from vehicle exhaust	126	25%
Crushed by vehicle	125	25%
Fell from vehicle	85	17%
Vehicle fire	42	8%
Struck by object	36	7%
Heat stroke/hyperthermia	32	6%
Drowning	14	3%
Hypothermia	10	2%
Poisoning in vehicle from other source	8	2%
Wheelchair fell from vehicle	6	1%
Miscellaneous vehicle incidents	5	1%
Electrocution	4	1%
Closed in trunk	4	1%
Child seat/seat belt strangulation	3	1%
Positional asphyxia	3	1%
Vehicle window asphyxia	3	1%
Burns	1	<< 1%
Tire explosion	1	<< 1%
Total	**506**	**100%**

Source: National Vital Statistics System (NVSS), 2005–2007
†The sum of the averages may not equal the total shown in the table, due to rounding.

Fatalities to Children 14 and Younger in Non-Crash Incidents

Table 2 shows the distribution of the fatalities among children 14 and younger in non-crash incidents such as heat stroke/hyperthermia, carbon monoxide poisoning, etc. About 51 percent of the estimated annual average of 37 non-crash fatalities among children occurred due to heat stroke/hyperthermia. The underlying cause of death on death certificates for cases in which heat stroke is suspected is not always heat-related and the narrative used to capture non-crash fatalities might not reference a motor vehicle. As a result, the number reported here may differ from the total count of such deaths obtained through other sources. In addition to the heat-related deaths, carbon monoxide poisoning from the vehicle exhaust caused about 11 percent of the fatalities. Child seat/seat belt strangulation, drowning, or entrapment in the trunk also resulted in fatalities, each accounting for about 5 percent of the non-crash fatalities to children. Vehicle window asphyxia caused death of 2 children, which is 5 percent of the non-crash fatalities. Children also died while falling from vehicles, struck by objects, or from positional asphyxia; 1 fatality occurred from each of these incidents.

Table 2.
Fatalities to Children 14 and Younger in Non-Crash Incidents

Incident Type	Estimated Annual Average	
	Frequency	Percentage
Heat stroke/hyperthermia	19	51%
Carbon monoxide poisoning from vehicle exhaust	4	11%
Child seat/seat belt strangulation	2	5%
Drowning	2	5%
Closed in trunk	2	5%
Fell from vehicle	1	3%
Struck by object	1	3%
Miscellaneous vehicle incidents	1	3%
Vehicle window asphyxia	2	5%
Positional asphyxia	1	3%
Total	**37**	**100%**

Source: National Vital Statistics System (NVSS) 2005–2007
†The sum of the averages may not equal the total shown in the table, due to rounding.

Non-Crash Incidents – Injuries

NEISS-AIP collects data on non-crash injuries from records of emergency department visits. The relevant data are collected from a probability sample of hospitals across the United States. Since these data are based exclusively on emergency department records, they lack information on the outcomes after the patients leave the emergency departments. The national estimates of injuries in non-crash incidents are obtained by using the sampling weights provided by NEISS-AIP. These estimates pertain only to those persons whose injuries were serious enough to warrant trips to emergency departments. Since the data does not capture injuries treated in doctors' offices or the ones that did not require urgent medical care, these estimates do not reflect the complete counts of injuries. Fatalities where the persons were either dead on arrival or died in the emergency departments were excluded from the count of injuries.

Injuries in Non-Crash Incidents

Table 3 lists all the specific injury mechanisms with at least an estimated 1,000 emergency department visits per year. All other injuries are captured in the category labeled "Other or unknown." The specific injury mechanisms account for 97 percent of all non-crash injuries, while the remaining 3 percent occurred in other or unspecified situations. Striking a vehicle or struck by a vehicle part accounted for an estimated one-third (32%) of the estimated 647,000 non-crash injuries seen in emergency departments. Injuries while striking a vehicle occur when people strike or hit the vehicles with their hands or fists, kick the vehicles, or impact stationary vehicles while running, skating or sledding, etc. On the other hand, injuries when struck by a vehicle occurs when a person is struck by a vehicle part such as a closing or an opening door, a hood, a trunk lid, a tailgate or a closing window, or a vehicle part while repairing the vehicle. The most common non-crash injury type under these scenarios was an injury from a closing vehicle door. An estimated 132,000 people on average annually were injured by a closing door, accounting for 20 percent of all non-crash injuries. Furthermore, these injuries comprised 65 percent of all the injuries resulting from "struck by vehicle part or struck a vehicle" (Table 3). Injuries to persons entering or exiting vehicles accounted for 23 percent of all non-crash incidents. This injury mechanism occurred in one of the three ways: a fall (51%), striking a door or door frame (18%), and other situations such as a sprain or strain while exiting a vehicle (31%). Among all non-crash injuries, fall from a vehicle, striking a door or door frame, and other situations such as a sprain or strain while exiting a vehicle accounted for 12 percent, 4 percent, and 7 percent of the non-crash incidents, respectively. Overexertion was the third most common reason for injury, accounting for an estimated average of 68,000 injuries (11% of all non-crash injuries) per year. Such injuries often occur while unloading cargo from the beds of pickups or trucks or while pushing disabled vehicles. Falls that occurred other than while entering or exiting vehicles accounted for an estimated 10 percent of all non-crash injuries. These included falls from the exteriors of vehicles such as from tailgates or trunk lids (58%) and falls against the exteriors of vehicles such as when slipping on ice or while washing vehicles (37%). Among all non-crash injuries, falls from the exteriors of vehicles and falls against the exteriors of vehicles accounted for 6 percent and 4 percent of all non-crash injuries, respectively. About 60,000 people had cuts from a vehicle part, accounting for 9 percent of all non-crash injuries. About 3 percent of all people injured in non-crash incidents were hit by foreign bodies, mostly while working on vehicles.

Fire and burns were the cause of injury in an average of 13,000 incidents per year. Of these, radiator and antifreeze burns alone accounted for 46 percent injuries. Such injuries often occur while removing hot radiator caps or while repairing vehicles. An addi-

Table 3.
Injuries to People in Non-Crash Incidents

Incident Type	Estimated Annual Average		
	Frequency	Percentage	
		Category Based	Overall
Struck by Vehicle Part or Struck a Vehicle (32% of all non-crash incidents)			
Injured by Closing Door	132,000	65%	20%
Struck by Trunk Lid	10,000	5%	2%
Struck by Hood	5,000	2%	1%
Injured by Closing Window	2,000	1%	<1%
Struck by Other Vehicle Part or Struck a Vehicle (i.e., hitting or kicking vehicle)	55,000	27%	9%
Subtotal (Struck by Vehicle Part or Struck a Vehicle)	204,000	100%	32%
Entering or Exiting Vehicle (23% of all non-crash incidents)			
Fall	75,000	51%	12%
Door Injury	27,000	18%	4%
Other Injury (i.e., sprain or strain)	45,000	31%	7%
Subtotal (Entering or Exiting Vehicle)	147,000	100%	23%
Overexertion (11% of all non-crash incidents)			
Overexertion	68,000	100%	11%
Fall Other Than Entering or Exiting (10% of all non-crash incidents)			
Fall From Exterior of Vehicle	38,000	58%	6%
Fall Against Exterior of Vehicle	24,000	37%	4%
Fall Inside Vehicle	3,000	5%	<1%
Subtotal (Fall Other Than Entering or Exiting)	65,000	100%	10%
Cut by Part of Vehicle (9% of all non-crash incidents)			
Cut by Part of Vehicle	60,000	100%	9%
Foreign Body (3% of all non-crash incidents)			
While Working on Vehicle (i.e., sanding vehicle or working under vehicle)	16,000	73%	2%
While Driving Vehicle (i.e., object coming through open window)	2,000	9%	<1%
Other Injury	4,000	18%	1%
Subtotal (Foreign Body)	22,000	100%	3%
Fire or Burn (2% of all non-crash incidents)			
Radiator/Antifreeze Burn	6,000	46%	1%
Vehicle Fire Incident	2,000	15%	<1%
Muffler/Exhaust Pipe Burn	1,000	8%	<1%
Other Heat-Related Burn	3,000	23%	0%
Other Chemical Burn	1,000	8%	0%
Subtotal (Fire or Burn)	13,000	100%	2%
Hoist/Jack Incident (2% of all non-crash incidents)			
While Changing Tire	3,000	23%	<1%
Other Injury	10,000	77%	2%
Subtotal (Hoist/Jack incident)	13,000	100%	2%
Tire Incident (lacerations while changing/ inflating tires) (1% of all non-crash incidents)			
Tire Incident	9,000	100%	1%
Struck by Other Object (usually cargo) (2% of all non-crash incidents)			
Struck by Other Object	16,000	100%	2%
Wheelchair Incident (i.e., fall from wheelchair) (<1% of all non-crash incidents)			
Wheelchair Incident	3,000	100%	<1%
Poisoning (1% of all non-crash incidents)			
Carbon Monoxide From Vehicle Exhaust	2,000	40%	<1%
Other Injury	3,000	60%	<1%
Subtotal (Poisoning)	5,000	100%	1%
Heat Exhaustion (<1% of all non-crash incidents)			
Heat Exhaustion	2,000	100%	<1%
Other or Unknown (i.e., unspecified injury) (3% of all non-crash incidents)			
Other or Unknown	19,000	100%	3%
Total†	**647,000**	**100%**	**100%**

Source: National Electronic Injury Surveillance System – All Injury Program, 2011–2012
†Total, computed from unrounded entries, may not equal the actual sum of entries shown in the table.

tional 15 percent of the fire-related injuries were from vehicle fire incidents. About 13,000 people (2% of all people injured in non-crash injuries) were injured from hoist/jacking incidents that occurred while changing tires. An estimated 2,000 injuries per year were from heat exhaustion. This included both people inside hot vehicles and heat-related injuries while repairing vehicles. Other less commonly occurring injuries to people included those occurring while struck by other objects such as cargo (2% of all injuries), tire incidents, and carbon monoxide poisoning (each accounting for about 1% of all non-crash injuries).

Injury severity in NEISS-AIP is measured by the disposition of the non-crash incident. For an estimated 94 percent of the non-crash injuries, the patients were treated and released from the emergency departments. In the case of an estimated 5 percent of the incidents, the patients were admitted to hospitals or transferred to other hospitals. The remaining 1 percent left the emergency room without being treated or transferred to another facility. A general incident location is known in about 50 percent of the cases. Among such cases, an estimated 53 percent occurred at home (house, townhouse, apartment, etc.). A majority (59%) of the injuries at home could be attributed to three injury mechanisms, namely struck by a vehicle part or by striking a vehicle, falls while entering or exiting vehicles, and overexertion due to unloading cargo from trunks or the beds of pickup trucks. Two other common locations of non-crash incidents were streets and highways (22%) and other public property such as parking lots and business centers (20%).

Injuries to Children in Non-Crash Incidents

The special study identified 3,581 non-crash incidents involving children 14 and younger. Based on this statistical sample, an estimated annual average of 95,000 injuries occurred to children during 2011 and 2012. Table 4 presents estimates for some of the more commonly occurring injury mechanisms. An estimated 52,000 children were injured annually by striking vehicles or vehicle parts as well as by striking a vehicle, which accounts for 55 percent of all non-crash injuries to children. In a majority of these cases, the injuries resulted from being jammed by closing doors (88%). Among all

Table 4.
Injuries to Children 14 and Younger in Non-Crash Incidents

Incident Type	Estimated Annual Average		
	Frequency	Percentage	
		Category Based	Overall
Struck by Vehicle Part or Struck a Vehicle (55% of all non-crash injuries to children)			
Injured by Closing Door	46,000	88%	48%
Struck by Other Vehicle Part or Struck a Vehicle (i.e., hitting or kicking vehicle)	4,000	8%	4%
Struck by Trunk Lid	1,000	2%	1%
Injured by Closing Window	1,000	2%	1%
Subtotal (Struck by Vehicle Part or Struck a Vehicle)	52,000	100%	55%
Entering or Exiting Vehicle (18% of all non-crash injuries to children)			
Fall	10,000	59%	11%
Door Injury	6,000	35%	6%
Other Injury (i.e., sprain or strain)	1,000	6%	1%
Subtotal (Entering or exiting vehicle)	17,000	100%	18%
Overexertion (1% of all non-crash injuries to children)			
Subtotal (Overexertion)	1,000	100%	1%
Fall Other Than Entering or Exiting (14% of all non-crash injuries to children)			
Fall From Exterior of Vehicle	8,000	62%	8%
Fall Against Exterior of Vehicle	4,000	31%	4%
Fall Inside Vehicle	1,000	8%	1%
Subtotal (Fall other than entering or exiting)	13,000	100%	14%
Cut by a Part of the Vehicle (8% of all non-crash injuries to children)			
Subtotal (Cut by part of vehicle)	7,000	100%	7%
Other or Unknown (i.e., unspecified injury while repairing vehicle) (1% of all non-crash injuries to children)			
Subtotal (Other or unknown)	1,000	100%	1%
Total†	**95,000**	**100%**	**100%**

Source: National Electronic Injury Surveillance System – All Injury Program, 2011–2012
†Total, computed from unrounded entries, may not equal the actual sum of entries shown in the table.

non-crash incidents involving children, closing doors accounted for 48 percent of the injuries.

An estimated average of 17,000 injuries (18% of all non-crash injuries to children) occurred to children annually while entering or exiting vehicles. A fall while entering or exiting a vehicle was the most common injury scenario in this category; an estimated 10,000 children were injured each year, accounting for 11 percent of all injuries to children. The third most common injury scenario involving children was a fall from the exterior of a vehicle usually while playing on the outside of a vehicle or a fall from a tailgate or the bed of a pickup truck. This accounted for an estimated 8,000 injuries per year (8% of all non-crash injuries to children.) Other common injury scenarios involving children included a cut from a part of a vehicle that resulted in 7,000 injuries to children annually. Such injuries are normally caused by a bumper or license plate, and striking a vehicle (such as kicking a tire or striking a stationary vehicle while playing) or being struck by a vehicle part such as a tailgate or door.

The location of the non-crash incidents that caused injury to children is known for about 45 percent of the cases. An estimated 63 percent of the incidents occurred at home (house, townhouse, apartment, etc.). Streets and highways accounted for about 21 percent of the incidents, while 9 percent of the incidents occurred at other public property such as parking lots and business centers. Regarding disposition of the injured children, all were taken care of. Of an estimated average of 95,000 children injured in non-crash incidents, 1 percent left prior to hospital admission; 96 percent were transported to hospitals but were released; while 1 percent was transferred to other facilities.

References

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For More Information

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