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2020-2021 Non-Traffic Surveillance System Non-Crash Injuries Database User's Manual

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16. Abstract The Non-Traffic Surveillance system is a virtual data collection system designed to provide counts and details regarding fatalities and injuries that occur in non-traffic crashes and in non-crash incidents. This document describes the creation of the non-crash injury database using a special study conducted by the Consumer Product Safety Commission's National Electronic Injury Surveillance System All Injury Program, NEISS-AIP, for NHTSA. Frequent types of included hazard patterns included injuries while entering or exiting vehicles (boarding or alighting), injuries from closing doors, overexertion while unloading cargo from a vehicle or pushing a disabled vehicle, cuts from parts of the vehicle, striking a vehicle or struck by a part of the vehicle, falls from or against vehicles, injuries involving jacks or hoists, and radiator or antifreeze burns. This document also describes the non-crash injury database, which is available as a Microsoft Excel file.			
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Non-Traffic Surveillance and Non-Crash Injuries

Motor-vehicle-related fatalities and injuries can occur in a variety of situations. The three major categories of motor-vehicle-related fatalities and injuries are traffic crashes, nontraffic crashes, and non-crash incidents. Since 1975, the National Highway Traffic Safety Administration has collected extensive information on fatalities that occur in traffic crashes through the Fatality Analysis Reporting System (FARS). Additionally, NHTSA's National Automotive Sampling System and Crash Report Sampling System has provided national estimates of the number and nature of traffic crash injuries since 1979. Data regarding fatalities and injuries that occur in nontraffic crashes, which can occur on private roads, driveways, and parking lots, and in non-crash incidents, such as fatalities involving children left in hot vehicles or injuries that occur while repairing a vehicle, have not routinely been collected by NHTSA.

The Non-Traffic Surveillance system was developed as a virtual system comprised of four major components. One component is a database of fatalities and injuries in nontraffic crashes based predominantly on police reports. A second component is a database of non-crash fatalities based upon death certificate information, and the third component is a database of non-crash injuries based upon a nationally representative sample of emergency department records. The fourth component is a collection of detailed investigations of particular types of crash and non-crash events such as backovers where a driver reverses into a pedestrian or pedalcyclist, power window strangulation, children left in hot vehicles (heat stroke) and trunk entrapment, which are conducted by NHTSA's Special Crash Investigations (SCI) program.

This document focuses on the non-crash injury component. The non-crash injury database is based upon emergency department records contained in the Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System All Injury Program (NEISS-AIP). This manual begins with an overview of NEISS-AIP and then gives an overview of how the non-crash injury database is created and describes its content. NHTSA has contracted with CPSC to collect information in a special study, the results of which are represented in the current data release.

The database is created through a special study conducted by NEISS-AIP for 2020 to 2021. NHTSA's data use agreement with CPSC prohibits the release of any part of the NEISS-AIP files. Therefore, NHTSA created an aggregate database that provides the number and type of non-crash motor-vehicle-related injuries.

NEISS-AIP Overview

For more than 45 years CPSC has operated a statistically valid injury surveillance and follow-back system known as the National Electronic Injury Surveillance System. The primary purpose of NEISS has been to provide timely data on consumer product-related injuries occurring in the United States. It is made up of approximately 100 hospitals that collect only consumer-product-related injuries. In 2000 CPSC and the Centers for Disease Control and Prevention initiated an expansion of the system to a two-thirds subsample of these hospitals to collect data on all injuries.

With this expansion from the original NEISS to the NEISS All Injury Program, the system became an important public health research tool for injury researchers in the United States and around the world.

Identifying the product or products related to the injury is crucial for NEISS. The NEISS coordinator assigns a product code from an alphabetical listing of hundreds of products and recreational activities, with as much specificity as the data allow. The victim's age, sex, injury diagnosis, body parts affected, and hazard pattern locale are among other data variables coded. A brief narrative description of the hazard pattern is also included. While the NEISS coordinators at the participating hospitals code some of the variables, contractors working for CPSC or CDC code the remaining variables after the data is received at CPSC headquarters.

NEISS-AIP Variables Collected for Every Injury Report

There are five variables entered at the hospital and two variables entered at CPSC that are used to identify and classify passenger vehicle non-crash injuries. The variables coded at the hospital include the motor vehicle product code, the intent variable, the disposition variable, the diagnosis variable, and narrative description. The product variable is entered at the hospital. The motor vehicle product code is used whenever a motor vehicle is involved in an injury scenario. The product code on a record show that the product was mentioned in the description but does not indicate that the product played a direct role in causing the injury. The set of possible non-crash injuries consists of all NEISS-AIP cases with motor vehicle codes.

The intent variable is coded to show the intent of the victim or perpetrator at the time of the incident. The values include assault, self-inflicted (including suicide or suicide attempt), injury related to legal intervention (law enforcement), and unintentional. NTS follows the convention used by the American National Standards Institute's D16.1 *Manual on Classification of Motor Vehicle Traffic Accidents*,¹ which requires a motor vehicle accident to be unintentional. Therefore, only injuries coded as unintentional in NEISS-AIP are considered possible non-crash injuries.

The disposition variable is coded to show to the patient's final disposition as it recorded in the emergency department record. The seven disposition codes are: treated and released, treated and transferred to another hospital, treated and admitted for hospitalization, held for observation, left without being seen, fatality, and not recorded. Fatalities are excluded from the study.

The diagnosis variable provides a code to identify the nature of the injury that required emergency treatment. If there is more than one injury, the coder is asked to select the code representing the most severe injury. The diagnosis variable is used by NHTSA to classify the non-crash injuries.

The narrative description for each record contains up to 400 characters that summarizes the emergency department record in order to describe how the injury occurred. As described in more detail in the next section, the narrative variable is used extensively to determine which cases among the potential cases qualify as passenger vehicle non-crash injuries.

The variables coded at CPSC include precipitating mechanism and the mechanism of injury.

The precipitating mechanism is the initiating mechanism that started the chain of events leading to the injury. The direct mechanism is the most immediate mechanism that caused the actual physical injury or bodily harm.

The mechanism of injury (hazard pattern) refers to the way in which the injury was sustained, how the person was injured, or the process by which the injury occurred. Injuries are often the result of a sequence of events. Coders can code both the precipitating and the direct mechanisms of injury in the NEISS-AIP. The *precipitating* mechanism is the initiating mechanism that started the chain of events leading to the injury. The *direct* mechanism is the most immediate mechanism that caused the actual physical injury or bodily harm. In most cases there is only a

¹ Association of Transportation Safety Information Professionals. (2017, December 18). *Manual on classification of motor vehicle traffic crashes*, 8th edition (American National Standard ANSI D.16 – 2017). www.nhtsa.gov/sites/nhtsa.gov/files/documents/ansi_d16-2017.pdf

single mechanism and therefore selecting the mechanism is straightforward; in other words, the precipitating and direct mechanisms are the same. Table 1 provides a complete list of mechanism-of-injury categories coded. These categories represent major groupings of external causes used by injury researchers and injury prevention practitioners throughout the world.

Table 1. NEISS-AIP Categories for Classifying Mechanism of Injury

Motor Vehicle Occupant	Drowning/Near-Drowning/Submersion
Motorcyclist	Machinery
Pedal Cyclist	Foreign Body
Pedestrian (struck by or against a vehicle)	Dog Bite
Other Transport	Other Bite/Sting
Fall	Firearm Gunshot
Struck by/Against or Crushed	BB/Pellet Gunshot
Cut/Pierce/Stab	Natural/Environmental
Overexertion (sprains/strains without a fall)	Adverse Effects—Therapeutic Drugs
Fire/Burn (including smoke inhalation)	Adverse Effects—Surgical/Medical Care
Poisoning	Other Specified
Inhalation/Ingestion/Suffocation	Unknown/Unspecified

Injuries that occur because of a motor-vehicle-related transport incident are coded using one of the motor vehicle mechanism codes (first five). For motor-vehicle-related transport cases, coders code the precipitating mechanism only, and the direct mechanism is left blank. Injuries involving motor vehicles that were not in transport could be coded using both a direct and a precipitating code from Table 1. For most of these cases, only the precipitating cause is coded. Therefore, this user manual defines the precipitating cause as the mechanism (or external cause) of injury.

If the mechanism code indicates a motor vehicle occupant, then the coders code Occupant Status as driver, passenger (inside passenger compartment or cab), person boarding or alighting the vehicle, other specified (such as riding in enclosed bed of pickup truck), or unknown. For the purpose of identifying non-crash injuries, only motor vehicle occupants who were boarding or alighting are potential non-crash injuries. All other transport injuries are captured by NHTSA's motor vehicle traffic crash databases.

The NHTSA Motor Vehicle Special Study and the Creation of the Non-Crash Injury Database

The non-crash injury database was created using the variables described in the previous section and new variables that were added. In particular, the possible non-crash cases for NTS were identified as unintentional injuries that either occurred in a non-transport accident that involved a motor vehicle or a boarding or alighting injury. It should be noted, however, that NEISS-AIP coding rules do not require that the motor vehicle directly cause the injury; it only requires that the motor vehicle be mentioned in the injury scenario. Therefore, the potential non-crash injuries identified using the product code for a motor vehicle could either indicate the motor vehicle was the source of the injury (patient cut by vehicle door), the injury occurred in a motor vehicle (patient left unattended in hot car), or sometimes even that the injury occurred near a motor vehicle (patient slipped on ice while pushing vehicle from snowbank).

Hospital coders and NHTSA contractors classify each case in one and only one hazard pattern using a limited set of 17 major hazard patterns. Many cases could have been classified in more than one pattern, but for the sake of consistency only one pattern is applied. If there is a choice between more than one appropriate hazard pattern, coders are instructed to choose the more specific code starting with hazards associated with a part of the car, continuing with the fall codes, then the more general injury codes with the “Not Specified” code as the last resort.

NHTSA analysts use the coding from the hospitals and the narratives in the hospital report to assign each case to a more specific hazard pattern code from the following list:

- **Incidents Related to Falls**
 - Fall While Entering or Exiting Vehicle
 - Injuries associated with patients who fell while entering or exiting the vehicle. This includes patients who fell while intentionally exiting open beds of pickup trucks.
 - Fall From Vehicle (from exterior or interior)
 - Used for injuries associated with jumps/falls from the interior or exterior of the vehicle that do not involve boarding or alighting. An example is when an unrestrained child falls from the back seat when a door is opened suddenly. This category also includes patients who unintentionally fall from the bed of an open pickup truck.
 - Fall Against Exterior of Vehicle
 - Injuries associated with falls against the exterior of a vehicle. Scenarios include when a victim falls, trips, slips, stumbles, or loses his/her balance and lands on an exterior surface of a vehicle.
 - Fall Inside of Vehicle
 - Injuries associated with a fall/loss of balance inside a vehicle. Acceptable scenarios include when a victim falls, trips, slips, stumbles, or loses his/her balance and lands on an interior surface of a vehicle.

- **Incidents Related to Vehicle Parts**

- Injured by Closing Door
 - These cases involved doors closing or otherwise striking the patients.
- Struck Vehicle or Struck by Vehicle Part.
 - These hazard patterns frequently involved people who hit, struck, or punched vehicles as well as people who struck or were struck by parts of vehicles while repairing them. This is also used when a patient rides a motorcycle, bicycle or ATV into a stationary motor vehicle. (Patients struck by doors, trunk lids, and hoods and patients who fell against a vehicle exterior are covered by other categories).
- Cut by Other Vehicle Part (excludes door, trunk, hood, tire, jack incidents and falls against vehicles)
 - Injuries due to being cut by a part of the vehicle other than a door, trunk, hood, tire, or jack. Examples include striking and breaking vehicle windows or mirrors, or people cut by bumpers or license plates.
- Other Door Injury While Entering or Exiting Vehicle
 - Injuries that involve patients who struck the doors or door frames while entering or exiting the vehicles.
- Struck by Trunk Lid
 - These hazard patterns frequently involve injuries from getting caught in closing trunks or patients striking their heads on the trunk lids while unloading or loading cargo.
- Struck by Hood
 - These cases involve patients where the open hoods fell on them while looking under the hoods.
- Tire Incident While Changing or Inflating
 - These incidents involved either overexertion or a laceration while changing a tire.
- Other Hoist or Jack Incident
 - These incidents involved an injury that occurred while using a hoist or jack other than when changing a tire.
- Hoist or Jack Incident While Changing Tire
 - These incidents usually involve an injury that occurred while changing a tire using a hoist or a jack.
- Injured by Closing Window
 - Injury from a body part that was closed, caught, or rolled up in a vehicle window.

- **Burns**

- Radiator/Antifreeze Burn
 - These hazard patterns occurred while removing a hot radiator cap or while repairing a vehicle.
- Vehicle Fire Incident
 - These hazard patterns usually involved a person injured inside a vehicle that caught fire or injured when trying to enter a burning vehicle.

- Other Heat Related Burn From Vehicle
 - These cases involved burns that were not captured by the above categories.
- Other Chemical Burn
 - These hazard patterns involved a mix of chemical burns that occurred while repairing, cleaning, painting, or washing a vehicle as well as cases of chemical burns that occurred while pumping or siphoning gasoline. Also includes chemical burns from a product inside the vehicle (such as pepper spray) or leaking cargo.
- Muffler/Exhaust Pipe Burn
 - Burns that involve contact with a muffler or exhaust pipe.
- Battery Acid Burn
 - Burns due to battery acid.
- **Other Injuries/Incidents**
 - Overexertion
 - Injuries due to the patient suffering a sprain, strain, joint dislocation, back or abdominal pain or whiplash from overexertion (without a fall) or from the application of continuous excessive force by a person or object (e.g., seatbelt). These incidents also include heat exhaustion due to motor vehicle-related activity in hot weather.
 - Other Injury While Entering or Exiting Vehicle
 - These cases were the remaining boarding and alighting cases not captured by the categories above.
 - Struck by Other Object (Usually Cargo)
 - Injuries from being struck by vehicle cargo (usually during loading or unloading) or by tools or other objects used for vehicle repair.
 - Foreign Body While Working on Vehicle
 - Injuries caused by a foreign body while working a vehicle.
 - Foreign Body While Driving
 - Injury involving foreign bodies that strike the patient 's eye while driving or riding in vehicles.
 - Other Foreign Body
 - These cases involve a foreign body that enters the patient's body through a natural body orifice (eye, ear, mouth/throat) other than while driving or working on vehicle.
 - Carbon Monoxide From Vehicle Exhaust
 - Injuries that involve a person inside a vehicle where exhaust entered the vehicle. A few involved a person outside of a vehicle in an enclosed space.

- Other Poisoning Incident
 - These cases involve poisoning other than carbon monoxide. They include a variety of situations such as accidental poisoning while repairing a vehicle, exposure to fumes such as from gasoline or cargo while in the vehicle, or children who consumed products found inside the vehicle.
- Wheelchair Incident
 - These hazard patterns usually involved falls from wheelchairs while entering or exiting vehicles (boarding or alighting) or injury involving wheelchairs inside vehicles.
- Heat Exhaustion
 - A few hazard patterns involved people who suffered heat-related illness inside vehicles after strenuous outdoor activity or when vehicles became disabled.
- **Other or Not Specified**
 - This category includes incidents where there is not enough information to classify the hazard in one of the above categories. It also includes falls where the patient did not fall from, against, or inside a vehicle. For example, a patient falls to the ground while standing next to a vehicle while washing it. Another type of fall included here is when a pedestrian or cyclist falls while trying to avoid an oncoming vehicle.

The following table contains the annual estimated number of injuries/diagnoses, and the actual cases counts. The annual estimates have been rounded to the nearest thousand.

Table 2. Non-Crash Injury Diagnoses for 2020 - 2021

Hazard Pattern	Sample Size	Annual Estimate **	% Annual Estimate **
Incidents Related to Falls			
Fall while Entering or Exiting Vehicle	2,914	90,000	18%
Fall from Vehicle (from exterior or interior)	979	28,000	6%
Fall Against Exterior of Vehicle	586	17,000	3%
Fall Inside of Vehicle	55	1,000	0%
Incidents Related to Vehicle Parts			
Injured by Closing Door	2,344	61,000	12%
Struck Vehicle or Struck by Vehicle Part	1,547	46,000	9%
Cut by other vehicle part (excludes door, trunk, hood, tire, jack incidents)	1,728	55,000	11%
Other Door Injury while Entering or Exiting Vehicle	411	11,000	2%
Struck by Trunk Lid	403	11,000	2%
Struck by Hood	103	3,000	1%
Tire Incident While Changing or Inflating	197	6,000	1%
Other Hoist or Jack Incident	306	9,000	2%
Hoist or Jack Incident While Changing Tire	74	2,000	0%
Injured by Closing Window	37	1,000	0%

Hazard Pattern	Sample Size	Annual Estimate **	% Annual Estimate **
Burns			
Radiator/Antifreeze Burn	156	5,000	1%
Vehicle Fire Incident	120	3,000	1%
Other Heat Related Burn from Vehicle	45	1,000	0%
Other Chemical Burn	50	2,000	0%
Muffler / Exhaust Pipe Burn	18	*	*
Battery Acid Burn	14	*	*
Other Injuries / Incidents			
Overexertion	1,850	59,000	12%
Other Injury while Entering or Exiting Vehicle	1,059	33,000	7%
Struck by Other Object (Usually Cargo)	278	9,000	2%
Foreign Body while Working on Vehicle	282	10,000	2%
Foreign Body while Driving	20	1,000	0%
Other Foreign Body	120	4,000	1%
Carbon Monoxide from Vehicle Exhaust	61	2,000	0%
Other Poisoning Incident	98	3,000	1%
Wheelchair Incident	94	3,000	1%
Heat Exhaustion	71	2,000	1%
Other or Not Specified (see note below)	834	25,000	5%
Total	16,854	503,000	100%

Structure of the Non-Crash Injury Database

This section describes the structure and the variables included in the Non-crash injury database. Because the data use agreement between CPSC and NHTSA prohibited release of any information about individual injuries, the Non-crash injury database contains aggregate information designed to provide information about the number, types and causes of passenger vehicle non-crash injuries. The database is provided as a Microsoft Excel workbook. The variables included in the database indicate the type of hazard pattern, the mechanism of injury, the age of the victim, and the location of the hazard pattern.

The workbook contains 15 worksheets:

- Non-Crash Injury Hazard Pattern
 - Annual average injuries by the type of hazard pattern
- Non-Crash Injuries by Age
 - Annual average injuries by age group of injured person
- Non-Crash Injuries by Sex
 - Annual average injuries by sex of injured person
- Non-Crash Injuries by Locale
 - Annual average injuries by location
- Non-Crash Injuries by Disposition
 - Annual average injuries by disposition of injured person
- Non-Crash Injuries by Vehicle Type
 - Type-annual average injuries by type of involved vehicle
- Non-Crash Injuries by Vehicle Motion
 - Type-annual average injuries by weather a vehicle was moving
- Non-Crash Injuries by Person Location
 - Annual average injuries by position of injured person relative to vehicle
- Non-Crash Injury Diagnoses
 - Annual average injuries by diagnosis
- Non-Crash Injury Alcohol
 - Annual average injuries by alcohol presence
- Non-Crash Injuries; Hazard Pattern by Locale
 - Annual average injuries; hazard pattern by locale
- Non-Crash Injuries; Hazard Pattern by Age Group
 - Annual average injuries; hazard pattern by age group
- Non-Crash Injuries; Disposition by Age
 - Annual average injuries; disposition by age
- Non-Crash Injuries; Locale by Age Group
 - Annual average injuries; locale by age group
- Non-Crash Injuries; Hazard Pattern by Person Location
 - Annual average injuries; hazard pattern by position of injured person relative to vehicle

All worksheets also contain the sample count from which the estimates were derived.

The types of hazard patterns are listed in Table 2 and described in the previous section. The mechanisms of injury are listed in Table 1.

The age of the patient was categorized into one of the following age groups.

- 3 years old or younger
- 4 to 7 years old
- 8 to 14 years old
- 15 to 24 years old
- 25 to 44 years old
- 45 to 64 years old
- 65 to 74 years old
- 75 to 84 years old
- 85 years old and older

The sex of the patient was categorized into one of the following groups.

- Male
- Female

The location of the hazard pattern is coded as one of the following.

- Home
- Other public property
- Street
- Farm/ranch
- Industrial
- School
- Sports
- Unknown

The disposition of the injured person is coded as one of the following.

- Transported and released
- Hospitalized
- Left prior to admission
- Transferred to another facility
- Held for observation

The type of vehicle is coded as one of the following.

- Car
- Truck, unknown if pickup
- Pickup truck
- Van
- SUV
- Not specified

The motion of the vehicle is coded as one of the following.

- Not in motion
- In motion
- Unknown if vehicle in motion

The location of the injured person relative to the vehicle is coded as one of the following.

- Person not in/on vehicle
- Person in/on vehicle
- Unknown whether in/on vehicle

The diagnosis of the injured person is coded as one of the following:

- Laceration
- Contusions, abrasions
- Fracture
- Strain, Sprain
- Internal injury
- Crushing
- Hematoma
- Foreign body
- Concussion
- Dislocation
- Avulsion
- Nerve damage
- Poisoning
- Burn, scald
- Burns, thermal
- Anoxia
- Amputation
- Puncture
- Burn, chemical
- Dermatitis/conjunctivitis
- Hemorrhage
- Dental injury
- Aspiration
- Burn, not specified
- Ingestion
- Radiation
- Electric shock
- Submersion
- Burn electrical
- Other

The presence of alcohol is coded as one of the following.

- Yes
- No

More information may be found in the *NEISS Coding Manual* at [NEISS \(cpsc.gov\)](https://www.cpsc.gov/NEISS)

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