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2016-2017 Non-Traffic Surveillance (NTS) System Noncrash Injuries Database User's Manual

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16. Abstract

The Non-Traffic Surveillance (NTS) 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 noncrash incidents.

This document describes the creation of the noncrash 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 noncrash injury database, which is available as a Microsoft Excel file.

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Non-Traffic Surveillance and Noncrash 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 noncrash 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 Record Reporting 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 noncrash 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 NTS 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 noncrash fatalities based upon death certificate information, and the third component is a database of noncrash 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 noncrash 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 noncrash injury component. The noncrash 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 noncrash 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 2016 to 2017. 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 noncrash motor-vehicle-related injuries.

NEISS-AIP Overview

For over 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 throughout 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, gender, 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 four variables entered at the hospital and two variables entered at CPSC that are used to identify and classify passenger vehicle noncrash injuries. The variables coded at the hospital include the product code, the intent variable, the diagnosis variable, and narrative description. The variables coded at CPSC include precipitating mechanism and the occupant variable. 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 shows 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 noncrash 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*, which requires a motor vehicle accident to be unintentional. Therefore, only injuries coded as unintentional in NEISS-AIP are considered possible noncrash injuries.

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 noncrash injuries.

The narrative description for each record contains up to two lines (142 characters) of information taken verbatim from the emergency department record to describe how the injury occurred. As is 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 noncrash injuries.

The mechanism of injury 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. In the NEISS, coders can code both the precipitating and the direct mechanisms 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. In most cases there is only a 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 (strains/sprains 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 as a result 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 noncrash injuries, only motor vehicle occupants who were boarding or alighting are potential noncrash injuries. All other transport injuries are captured by NHTSA's crash databases.

The NHTSA Motor Vehicle Special Study and the Creation of the Noncrash Injury Database

The noncrash injury database was created using the variables described in the previous section and new variables that were added. In particular, the possible noncrash cases for NTS were identified as unintentional injuries that either occurred in a nontransport 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 noncrash 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 snow bank).

Hospital coders and NHTSA contractors classify each case in one and only one hazard pattern using a limited set of 16 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:

Fall while Entering or Exiting Vehicle
Some of the cases involved people entering or exiting vehicles or people exiting the beds of pickup trucks.

Other Injury while Entering or Exiting Vehicle
These cases were the remaining boarding and alighting cases not captured by the categories above. Most involved overexertion such as strains or sprains while entering or exiting vehicles.

Fall from Exterior of Vehicle
These hazard patterns involved people falling from the hoods, trunks, roofs, or tailgates of vehicles. They also included falls from the backs of trucks where there was no indication that the patients were attempting to enter or exit the vehicles.

Fall Against Exterior of Vehicle
These cases generally involved people who slipped or fell outside of the vehicles and struck the vehicles. In many cases, the people fell in snow or ice.

Fall Inside of Vehicle
These incidents frequently occurred in the backs of pickups and vans. Occasionally these incidents also involved children playing inside vehicles.

Injured by Closing Door
These cases involved doors closing or otherwise string the patients.

Other Door Injury while Entering or Exiting Vehicle
These hazard patterns tended to involve patients who struck the doors or door frames while entering or exiting the vehicles.

Injured by Closing Window
A body part, usually an extremity, was closed, caught, or rolled up in a vehicle window. While in most cases it could not be determined whether the window was electric, it is assumed that most of this involves power rather than manual windows because of the unlikely event of a person manually closing a window on themselves or others.

Struck by Trunk Lid
These hazard patterns frequently involved extremities 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 or repairing the vehicles.

Cut by Part of Vehicle
These hazard patterns frequently involved people working on vehicles, striking and breaking vehicle windows or mirrors, or people cut by bumpers or license plates.

Struck Vehicle or Struck by Vehicle Part
These hazard patterns frequently involved people who hit, struck, or punched vehicles, often in anger. They also involved people who "ran into" or "bumped" vehicles as well as people who struck or were struck by parts of vehicles while repairing them. (Patients struck by doors, trunk lids, and hoods were covered by other categories.)

Tire Incident (While Changing or Inflating)
These incidents involved either overexertion or a laceration while changing a tire.

Hoist or Jack Incident While Changing Tire
These hazard patterns usually involved an injury that occurred while changing a tire, such as a jack slipping or failing.

Other Hoist or Jack Incident
These hazard patterns usually involved an injury that occurred while the person was working on or repairing a vehicle.

Struck by Other Object (Usually Cargo)
Most of these hazard patterns involved people struck by cargo while loading or unloading vehicles, although a few cases also involved people repairing vehicles.

Foreign Body while Working on Vehicle
In many a case, the person was working under a vehicle or was sanding or grinding the vehicle when the injury occurred.

Foreign Body while Driving
These cases involved objects that came through open windows and struck the patients, usually in the eye, while the people were driving or riding in vehicles.

Other Foreign Body
Many of these cases involved eating in vehicles, children placing objects found in vehicles in their ears, noses or mouths, or vague narratives such as "complaint of foreign body in eye."

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, usually to retrieve property.

Radiator/Antifreeze Burn
These hazard patterns occurred while removing a hot radiator cap or while repairing a vehicle.

Muffler/Exhaust Pipe Burn
These cases are similar to the previous category but involve contact with a muffler or exhaust pipe.

Other Heat Related Burn
These cases involved burns that were not captured by the above categories. These hazard patterns usually involved a patient who was burned by a hot part of the vehicle. Cases involving a blowtorch or fireworks and cases involving hot food or beverages being consumed in the vehicles were excluded.

Battery Acid Burn
Most of these hazard patterns involved a person working on or repairing a vehicle although a handful involved people attempting to "jump start a dead battery."

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. A small number of cases involved a chemical burn from a product inside the vehicle (such as pepper spray) or leaking cargo.

Carbon Monoxide from Vehicle Exhaust

Many hazard patterns involved 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

The remaining poisoning cases involving motor vehicles involved 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, typically in vans.

Heat Exhaustion

A few hazard patterns involved people who suffered heat-related illness inside vehicles after strenuous outdoor activity or when vehicles became disabled. (A search for cases of hypothermia inside vehicles only produced a handful of cases, which were not enough to produce meaningful estimates.)

Overexertion

These hazard patterns frequently involved overexertion by loading or unloading cargo from vehicles or overexertion by pushing disabled vehicles. Less frequently they involved patient repairing vehicles or overexertion that occurred during long drives.

Other or Unknown

These hazard patterns frequently did not contain enough information to be classified in another category such as “injured hand while working on 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: Noncrash Injury Diagnoses for 2016-2017

HAZARD PATTERN	SAMPLE SIZE	ANNUAL ESTIMATE **	%Annual Estimate
Injured by Closing Door	3,789	110,000	16%
Fall while Entering or Exiting Vehicle	2,660	96,000	14%
Overexertion	2,135	86,000	12%
Struck Vehicle or Struck by Vehicle Part	2,014	69,000	10%
Cut by Part of Vehicle	1,533	54,000	8%
Other Injury while Entering or Exiting Vehicle	1,333	49,000	7%
Fall from Exterior of Vehicle	1,243	41,000	6%
Fall Against Exterior of Vehicle	620	22,000	3%
Other Door Injury while Entering or Exiting Vehicle	615	21,000	3%
Struck by Other Object (Usually Cargo)	397	15,000	2%
Foreign Body while Working on Vehicle	384	15,000	2%
Tire Incident (While Changing or Inflating)	287	10,000	1%
Struck by Trunk Lid	265	9,000	1%
Other Hoist or Jack Incident	234	9,000	1%
Radiator/Antifreeze Burn	259	8,000	1%
Struck by Hood	157	5,000	1%
Other Poisoning Incident	129	4,000	1%
Vehicle Fire Incident	116	4,000	1%
Wheelchair Incident	104	4,000	1%
Other Foreign Body	103	4,000	1%
Heat Exhaustion	81	3,000	0%
Other Heat Related Burn	81	3,000	0%
Hoist or Jack Incident While Changing Tire	76	3,000	0%
Fall Inside of Vehicle	94	2,000	0%
Carbon Monoxide from Vehicle Exhaust	66	2,000	0%
Injured by Closing Window	55	2,000	0%
Foreign Body while Driving	37	1,000	0%
Other Chemical Burn	35	1,000	0%
Muffler/Exhaust Pipe Burn	27	1,000	0%
Battery Acid Burn	10	*	*
Other or Unknown	1,061	39,000	6%
Total	***20,000***	***690,000***	

* sample size is too small to make estimate

** sum of the annual estimates may vary due to rounding

Structure of the Noncrash Injury Database

This section describes the structure and the variables included in the noncrash injury database. Because the data use agreement between CPSC and NHTSA prohibited release of any information about individual injuries, the noncrash injury database contains aggregate information designed to provide information about the number, types and causes of passenger vehicle noncrash 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 eleven worksheets:

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

All worksheets also contain the sample count from which the estimates were derived. Finally, no estimates are produced for categories with fewer than 20 sampled cases.

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 location of the hazard pattern is coded as one of the following:

- Home
- Farm/ranch
- Street/highway
- Other public property
- Manufactured (mobile) home
- Industrial place
- School
- Place of recreation or sports
- Not recorded

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
- Unknown

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

- Car
- Pickup Truck
- Van
- SUV
- Truck, unknown if pickup

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

- Not In Motion
- Unknown
- In Motion

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

- In or on the Vehicle
- Not In or on the Vehicle
- Unknown

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

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

More information may be found in the *NEISS Coding Manual*, which is available at www.cpsc.gov/s3fs-public/2017NEISSCodingManualCPSConlyNontrauma.pdf

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