NEMSIS V3 Case Definition

Motor Vehicle Crash—Motorcycle

Date

August 26, 2021

Definition

The patient was a motorcycle rider injured in a motor vehicle crash.

Criteria Description

Patient care reports where:

- cause of injury is motorcycle rider injured in collision with a motor vehicle

Pseudocode

Patient care reports where:

eInjury.01 Cause of Injury:

Added by NEMSIS (see discussion)	Code	Description
Y	V20	Motorcycle rider injured in collision with pedestrian or animal
	V20.3*	Person boarding or alighting a motorcycle injured in collision with pedestrian or animal
	V20.4*	Motorcycle driver injured in collision with pedestrian or animal in traffic accident
	V20.5*	Motorcycle passenger injured in collision with pedestrian or animal in traffic accident
	V20.9*	Unspecified motorcycle rider injured in collision with pedestrian or animal in traffic accident
Y	V21	Motorcycle rider injured in collision with pedal cycle
	V21.3*	Person boarding or alighting a motorcycle injured in collision with pedal cycle
	V21.4*	Motorcycle driver injured in collision with pedal cycle in traffic accident
	V21.5*	Motorcycle passenger injured in collision with pedal cycle in traffic accident

Added by NEMSIS (see discussion)	Code	Description
	V21.9*	Unspecified motorcycle rider injured in collision with pedal cycle in traffic accident
Y	V22	Motorcycle rider injured in collision with two- or three-wheeled motor vehicle
	V22.3*	Person boarding or alighting a motorcycle injured in collision with two- or three-wheeled motor vehicle
	V22.4*	Motorcycle driver injured in collision with two- or three-wheeled motor vehicle in traffic accident
	V22.5*	Motorcycle passenger injured in collision with two- or three-wheeled motor vehicle in traffic accident
	V22.9*	Unspecified motorcycle rider injured in collision with two- or three-wheeled motor vehicle in traffic accident
Y	V23	Motorcycle rider injured in collision with car, pick-up truck or van
	V23.3*	Person boarding or alighting a motorcycle injured in collision with car, pick-up truck or van
	V23.4*	Motorcycle driver injured in collision with car, pick-up truck or van in traffic accident
	V23.5*	Motorcycle passenger injured in collision with car, pick-up truck or van in traffic accident
	V23.9*	Unspecified motorcycle rider injured in collision with car, pick-up truck or van in traffic accident
Y	V24	Motorcycle rider injured in collision with heavy transport vehicle or bus
	V24.3*	Person boarding or alighting a motorcycle injured in collision with heavy transport vehicle or bus
	V24.4*	Motorcycle driver injured in collision with heavy transport vehicle or bus in traffic accident
	V24.5*	Motorcycle passenger injured in collision with heavy transport vehicle or bus in traffic accident
	V24.9*	Unspecified motorcycle rider injured in collision with heavy transport vehicle or bus in traffic accident
Y	V25	Motorcycle rider injured in collision with railway train or railway vehicle
	V25.3*	Person boarding or alighting a motorcycle injured in collision with railway train or railway vehicle
	V25.4*	Motorcycle driver injured in collision with railway train or railway vehicle in traffic accident
	V25.5*	Motorcycle passenger injured in collision with railway train or railway vehicle in traffic accident
	V25.9*	Unspecified motorcycle rider injured in collision with railway train or railway vehicle in traffic accident
Y	V26	Motorcycle rider injured in collision with other nonmotor vehicle
	V26.3*	Person boarding or alighting a motorcycle injured in collision with other nonmotor vehicle

Added by NEMSIS (see discussion)	Code	Description
	V26.4*	Motorcycle driver injured in collision with other nonmotor vehicle in traffic accident
	V26.5*	Motorcycle passenger injured in collision with other nonmotor vehicle in traffic accident
	V26.9*	Unspecified motorcycle rider injured in collision with other nonmotor vehicle in traffic accident
Y	V27	Motorcycle rider injured in collision with fixed or stationary object
	V27.3*	Person boarding or alighting a motorcycle injured in collision with fixed or stationary object
	V27.4*	Motorcycle driver injured in collision with fixed or stationary object in traffic accident
	V27.5*	Motorcycle passenger injured in collision with fixed or stationary object in traffic accident
	V27.9*	Unspecified motorcycle rider injured in collision with fixed or stationary object in traffic accident
Y	V28	Motorcycle rider injured in noncollision transport accident
	V28.3*	Person boarding or alighting a motorcycle injured in noncollision transport accident
	V28.4*	Motorcycle driver injured in noncollision transport accident in traffic accident
	V28.5*	Motorcycle passenger injured in noncollision transport accident in traffic accident
	V28.9*	Unspecified motorcycle rider injured in noncollision transport accident in traffic accident
Y	V29	Motorcycle rider injured in other and unspecified transport accidents
Y	V29.4	Motorcycle driver injured in collision with other and unspecified motor vehicles in traffic accident
	V29.40*	Motorcycle driver injured in collision with unspecified motor vehicles in traffic accident
	V29.49*	Motorcycle driver injured in collision with other motor vehicles in traffic accident
Y	V29.5	Motorcycle passenger injured in collision with other and unspecified motor vehicles in traffic accident
	V29.50*	Motorcycle passenger injured in collision with unspecified motor vehicles in traffic accident
	V29.59*	Motorcycle passenger injured in collision with other motor vehicles in traffic accident
Y	V29.6	Unspecified motorcycle rider injured in collision with other and unspecified motor vehicles in traffic accident
	V29.60*	Unspecified motorcycle rider injured in collision with unspecified motor vehicles in traffic accident
	V29.69*	Unspecified motorcycle rider injured in collision with other motor vehicles in traffic accident

Added by NEMSIS (see discussion)	Code	Description
Y	V29.8	Motorcycle rider (driver) (passenger) injured in other specified transport accidents
	V29.81*	Motorcycle rider (driver) (passenger) injured in transport accident with military vehicle
	V29.88*	Motorcycle rider (driver) (passenger) injured in other specified transport accidents
	V29.9*	Motorcycle rider (driver) (passenger) injured in unspecified traffic accident

XPath Code

```
/EMSDataSet/Header/PatientCareReport
  [
    eInjury/eInjury.01[matches(., '^(V20)|(V20\.3.*)|(V20\.4.*)|(V20\.5.*)|
      (V20\.9.*)|(V21)|(V21\.3.*)|(V21\.4.*)|(V21\.5.*)|(V21\.9.*)|(V22)|(V22\.3.*)|
      (V22\.4.*)|(V22\.5.*)|(V22\.9.*)|(V23)|(V23\.3.*)|(V23\.4.*)|(V23\.5.*)|
      (V23\.9.*)|(V24)|(V24\.3.*)|(V24\.4.*)|(V24\.5.*)|(V24\.9.*)|(V25)|(V25\.3.*)|
      (V25\.4.*)|(V25\.5.*)|(V25\.9.*)|(V26)|(V26\.3.*)|(V26\.4.*)|(V26\.5.*)|
      (V26\.9.*)|(V27)|(V27\.3.*)|(V27\.4.*)|(V27\.5.*)|(V27\.9.*)|(V28)|(V28\.3.*)|
      (V28\.4.*)|(V28\.5.*)|(V28\.9.*)|(V29)|(V29\.4)|(V29\.40.*)|(V29\.49.*)|
      (V29\.5)|(V29\.50.*)|(V29\.59.*)|(V29\.6)|(V29\.60.*)|(V29\.69.*)|(V29\.8)|
      (V29\.81.*)|(V29\.88.*)|(V29\.9.*)$')]
  ]
```

SAS Code

```
proc sql;
  create table MotorVehicleCrashMotorcycleKey as
  select distinct pcrKey from
    (
      select pcrKey from memsis.factPcrCauseOfInjury where prxmatch('^(V20)|
        (V20\.3.*)|(V20\.4.*)|(V20\.5.*)|(V20\.9.*)|(V21)|(V21\.3.*)|(V21\.4.*)|
        (V21\.5.*)|(V21\.9.*)|(V22)|(V22\.3.*)|(V22\.4.*)|(V22\.5.*)|(V22\.9.*)|
        (V23)|(V23\.3.*)|(V23\.4.*)|(V23\.5.*)|(V23\.9.*)|(V24)|(V24\.3.*)|
        (V24\.4.*)|(V24\.5.*)|(V24\.9.*)|(V25)|(V25\.3.*)|(V25\.4.*)|(V25\.5.*)|
        (V25\.9.*)|(V26)|(V26\.3.*)|(V26\.4.*)|(V26\.5.*)|(V26\.9.*)|(V27)|
        (V27\.3.*)|(V27\.4.*)|(V27\.5.*)|(V27\.9.*)|(V28)|(V28\.3.*)|(V28\.4.*)|
        (V28\.5.*)|(V28\.9.*)|(V29)|(V29\.4)|(V29\.40.*)|(V29\.49.*)|(V29\.5)|
        (V29\.50.*)|(V29\.59.*)|(V29\.6)|(V29\.60.*)|(V29\.69.*)|(V29\.8)|
        (V29\.81.*)|(V29\.88.*)|(V29\.9.*)$/', eInjury_01)
    )
```

```
   ;
quit;
```

Discussion

For all "crash" case definitions, the following apply:

The *ANSI D.16-2017 Manual on Classification of Motor Vehicle Traffic Crashes* glossary, "Characteristics of Motor Vehicle Traffic Crashes," was consulted in the development of the motor vehicle crash case definitions, with differences noted below. (Text in *italics* is quoted from ANSI D.16-2017.)

Motor vehicle traffic crashes have a number of characteristics that are used to distinguish between motor vehicle traffic crashes and other events such as noncrashes, aircraft or railway accidents and other motor vehicles, cataclysms, and nontraffic crashes. The questions below address all the distinguishing characteristics of motor vehicle traffic crashes. If the answer to each of the questions below is "yes," then the incident is a motor vehicle traffic crash.

1. *Did the incident include one or more occurrences of injury (2.3.1) or damage (2.3.7)?*
   - It is assumed that injury occurred, since we are looking at eInjury.01 Cause of Injury. Damage-only crashes are out of scope from a NEMSIS perspective.
2. *Was there at least one occurrence of injury or damage which was not a direct result of a cataclysm (2.4.5 Cataclysm and 2.4.9 Transport crash)?*
   - This information is unlikely to be reliably available in NEMSIS data.
3. *Did the incident involve one or more motor vehicles (2.2.7)?*
   - Cases that are specifically reported as not including a motor vehicle are excluded. However, sometimes EMS uses more generic ICD-10-CM codes that do not indicate whether a motor vehicle was involved. The case definitions for pedestrian crash and bicycle crash may include cases that did not specify whether a motor vehicle was involved.
4. *Of the motor vehicles involved, was at least one in-transport (2.2.34)?*
   - This information is unavailable in the NEMSIS data.
5. *Was the incident an unstabilized situation (2.4.4)?*
   - This information is unavailable in the NEMSIS data.
6. *Did the unstabilized situation originate on a trafficway (2.2.1) or did injury or damage occur on a trafficway?*
   - Cases that are specifically reported as "non-traffic" are excluded. However, sometimes EMS uses more generic ICD-10-CM codes that do not indicate whether a crash was "traffic" or "non-traffic." The case definitions may include cases that did not specify whether a crash was "traffic" or "non-traffic."
   - The terms "traffic" and "non-traffic" are not further defined in ICD-10-CM. EMS may not interpret the terms in the same way as ANSI D.16-2017.
7. *If the incident involved a railway train (2.2.5) in-transport, did a motor vehicle in-transport become involved prior to any injury or damage involving the train?*
   - The case definitions may include cases where a train was involved in the primary crash event.

8. *Is it true that neither an aircraft (2.1.5) in-transport nor a watercraft (2.1.6) in-transport was involved in the incident?*
   - The case definitions may include cases where an aircraft or watercraft was involved, but not cases where the patient was an aircraft or watercraft occupant.

The intent of the "crash" case definitions is to cast a wide net. Users of the case definitions may choose to narrow the criteria for their specific purposes. For example,

- To identify fatal crashes in a manner similar to the Fatality Analysis Reporting System, the case definition could be narrowed to only include patients who died during the EMS call. However, this would exclude patients who survived to the hospital and died later because of the crash.
- To identify traffic crashes more strictly, the case definition could be narrowed to only include ICD-10 codes labeled as "traffic". However, this would exclude records where the report did not specify whether the crash was traffic or non-traffic. Also, it is unlikely that EMS providers are highly trained on the differences between "traffic" and "non-traffic".
- To identify only those crashes involving motor vehicles more strictly, the case definitions for pedestrian and bicycle crashes could be narrowed to only include records where the ICD-10 code indicates that a motor vehicle was involved. However, this would exclude records where the report did not specify whether a motor vehicle was involved.

The ICD-10-CM codes selected for the case definitions for crashes are based on the lists provided in the *CDC NCHS 2020 ICD-10-CM External Cause of Injury Matrix for Causes other than Poisoning*. The NEMSIS case definitions for crashes implement the criteria in the CDC ICD-10 matrix, with the following exceptions and refinements:

- The NEMSIS case definitions do not distinguish between accidental, self-harm, assault, undetermined intent, and legal intervention/war operations. Applicable codes from all intent categories are included in the NEMSIS case definitions.
- NEMSIS data sometimes includes non-billable ICD-10-CM codes. The NEMSIS case definitions account for the non-billable codes and include the ones that would be consistent with the intent of the CDC criteria.

The CDC Injury Matrix label for this case definition is "MVT-Motorcyclist".

References

ANSI D.16-2017 Manual on Classification of Motor Vehicle Traffic Crashes. transportation.gov/sites/dot.gov/files/docs/resources/government/traffic-records/304331/ansid16-2017.pdf.

ICD Injury Matrices. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). cdc.gov/nchs/injury/injury_matrices.htm.