



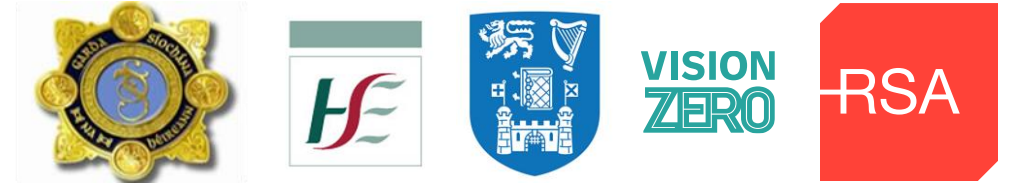
RSA

Serious injuries data in Ireland

Methodology report

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Background



- This report includes a summary of the methodology and definitions used by the RSA to report on serious injuries.
- Serious injury reporting has been historically based on collision records transferred from An Garda Síochána (AGS) to the RSA.
- However, the international evidence highlight limitations of reporting on serious injuries using police data as the unique data source, which may lead to an underestimation of their true prevalence.
- To overcome these limitations, the European Commission (EC) requested Member States to report on serious injuries following a medical definition, the MAIS3+ definition, which require access to hospital data.
- The current Road Safety Strategy 2021-2030 includes specific actions to expand serious road injury reporting with hospital data, to better understand the incidence, cause, management, and outcomes of traumatic road injuries at a national level.
- The RSA developed a project to study serious injuries in hospital data in partnership with the HSE National Health Intelligence Unit and Trinity College Dublin Department of Public Health & Primary Care.
- The primary goal of this project is to report on MAIS3+ serious injuries to the EC, and to have a greater understanding of serious injury trends and characteristics as recorded in hospital discharge records.

Sources of data on serious injuries

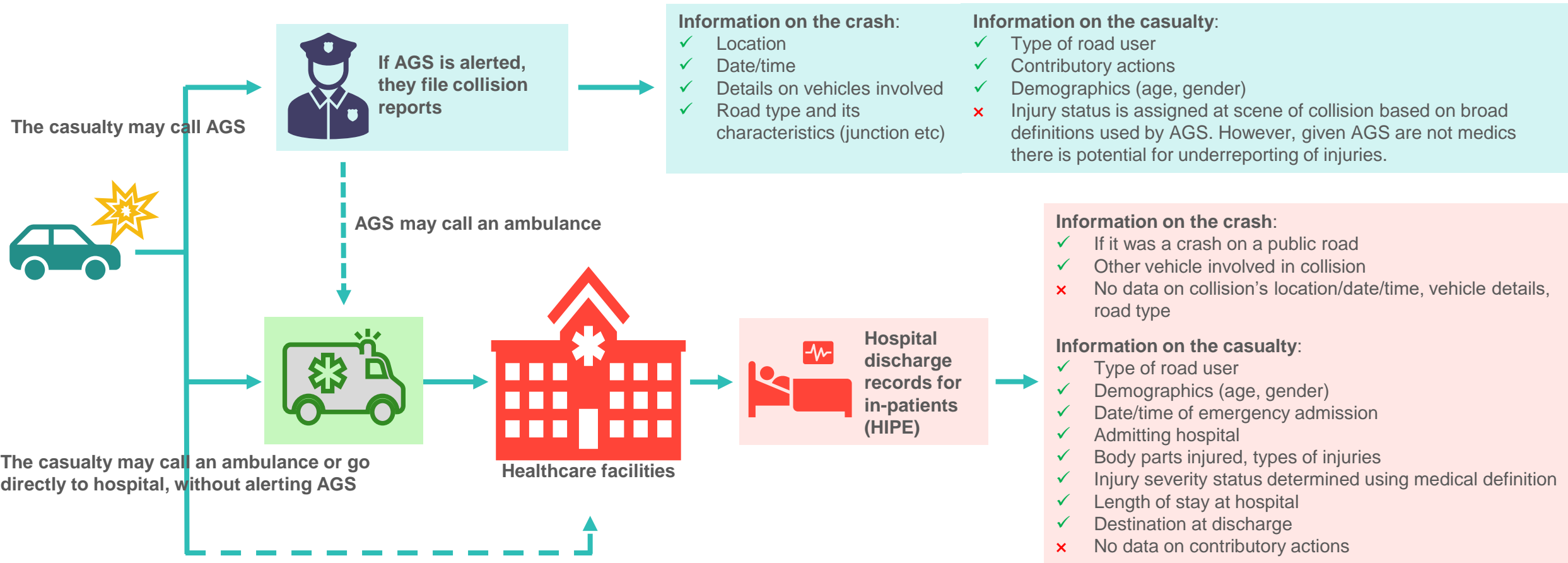
Sources of data on serious injuries



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Information from An Garda Síochána (AGS) and hospital records (HIPE*)



* Hospital In-Patient Enquiry. Please see page 6 for a brief description.

Hospital data

Description

Hospital data

Discharge information in the HIPE system



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- We are interested in the total number and characteristics of road users who were admitted to hospital with injuries from a collision on a public road in Ireland.
- We work in partnership with the Health Service Executive (HSE) National Health Intelligence Unit, and with the Department of Public Health & Primary Care in Trinity College Dublin, to explore hospital data.
- We analyse hospital discharge information collated in the **Hospital In-patient Enquiry (HIPE) system**, managed by the HSE.
- The HIPE system is the main source of national data on hospital discharge records from acute hospitals in Ireland. It includes in-patient's de-identified demographic and clinical information from each admission to hospital, and it is accessible with permission only. Injury information in each discharge record is translated by trained personnel into specified codes, using the International Classification of Diseases, version 10, Australian Modification (ICD-10-AM).*
- To obtain our sample of interest, we detect in HIPE all in-patient discharge records with ICD-10-AM codes indicating injuries from road crashes. Then, we undertake an extensive data cleaning and de-duplication process following specified inclusion and exclusion criteria, focused on obtaining one record per in-patient.

*Source: Healthcare Pricing Office (HPO). Hospital In-Patient Enquiry (HIPE) Data Dictionary 2022, Version 14.0. HPO, Health Service Executive, Dublin, Ireland.



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Hospital data

Inclusion and exclusion criteria



In-patient records included in our sample must indicate:

- Admission to hospital within the target dates (01-January-2014 to 31-December-2022)
- Having ICD-10-AM codes indicating injuries from a road traffic collision (occurring on a public road)
- Admission to hospital as an emergency only. Transfers from another hospital are included only when the records are not duplicated.



In-patient records excluded from our sample were those indicating:

- Elective admissions or readmissions
- Emergency readmissions
- Duplicated records
- The road collision did not occur on a public road
- The in-patient was a rail or train user
- The in-patient died within 30 days since hospital admission.



Hospital data



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How do we assess injury severity

- We assess the severity of each injury sustained by an in-patient using an internationally validated severity scoring scale, the **Abbreviated Injury Scale (AIS)**, developed by the Association for the Advancement of Automotive Medicine (AAAM).
- Using the AIS scale we can accurately determine the number of in-patients who were seriously injured from a clinical point of view, with a higher potential of having life-changing consequences, and separate these from casualties with less severe injuries.
- As injury information in Ireland is coded using ICD-10-AM, we convert these ICD codes into AIS using a translation table developed by AAAM*.
- Each in-patient record may have 1 or more injuries from the same episode of care at hospital. Each injury is assigned an AIS score: injuries with an AIS score of 1 or 2 are of minor-to-moderate severity. Injuries with an AIS score of 3 to 6 are serious injuries.
- We classify in-patients as moderately or seriously injured considering the **maximum AIS score** their injuries were assigned:
 - Casualties with at least one injury scored with an AIS of 3 or more are *seriously injured*, and are named '**MAIS3+**'
 - Casualties with injuries scored with a maximum AIS of 2 or less sustain injuries of *minor-to-moderate severity*, and are named '**MAIS2-**'.



MAIS3+ definition used internationally

- The European Commission requested Member States to report on serious injuries following the MAIS3+ definition.
- This will help to **overcome the current limitations of police-based serious injury statistics**, documented internationally. These limitations are *underreporting* (as not all serious injury collisions are reported to the police), *misreporting* (as police members' assessment of injury severity may not be accurate, given they are not medics), and *the lack of a common definition between member states* (each country may have their own definition of a serious injury, which make international comparisons difficult).

*Association for the Advancement of Automotive Medicine (2016). Abbreviated Injury Scale (c) 2005 Update 2008. (T. Gennarelli, & e. Woodzin, Eds.) Chicago, Illinois

Key definitions to understand hospital data

Definitions



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Hospital discharge records*

- **Acute Hospitals** in Ireland are those that provide a wide range of emergency, diagnosis, treatment and rehabilitation services. They can be owned and funded by the HSE, or by voluntary organisations receiving State funds. All acute hospitals send data on discharges to be collated in HIPE.
- An **in-patient** is admitted to hospital for treatment or investigation. We focus only on those admitted in an emergency basis, which means the admission is unforeseen and requires urgent care. They can be admitted and discharged on the same day or stay at least one night in hospital.
- An **emergency admission** is an unforeseen admission, when the in-patient requires immediate care and treatment as a result of severe, life threatening or potentially disabling condition.
- An **emergency readmission** is an unscheduled readmission following a previous spell of treatment in the same hospital and relating to treatment or case previously given.
- **Elective admissions** are scheduled; may be delayed without substantial risk to the health of the individual. **Elective readmissions** are those by which the patient is admitted electively to continue ongoing treatment or care.
- Each in-patient record may have between 1 and 30 diagnoses which are coded using ICD-10-AM:
 - **Principal diagnosis** (number 1): the diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the healthcare establishment, as represented by a code.
 - **Additional or secondary diagnosis** (number 2-30): a condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted patient care, as represented by a code.

Definitions



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ICD-10-AM codes*

- **ICD-10-AM injury codes** are those included in the Chapter *Injury, poisoning, and certain other consequences of external causes*. Codes rank from S00 to T98, and indicate the body part(s) injured, the type of injury sustained, or if this information is unspecified.
 - The S-section is used for coding different types of injuries related to single body regions.
 - The T-section cover injuries to multiple or unspecified body regions as well as poisoning and certain other consequences of external causes.
- A **transport accident** is any accident involving a device designed primarily for, or being used at the time primarily for, conveying persons or goods from one place to another.
- **ICD-10-AM codes indicating a transport accident** as the cause of injury are included in the chapter *External causes of morbidity and mortality*. These codes rank between V01-V89, and may have between 4 and 5 characters. These characters indicate:
 - The victim's mode of transport, i.e. the road user type which was injured, or if this information was unspecified;
 - The victim's counterpart, i.e. the other vehicle involved in the collision, or if this information was unspecified;
 - The type of event, i.e. if the injury took place in a traffic collision, non-traffic collision, or if this was unspecified;
 - The position of the victim in the vehicle, i.e. if they were drivers, passengers, or pedestrians.

*Source: International Statistical Classification of Diseases and Related Health Problems 10th Revision. [Available at <https://icd.who.int/browse10/2019/en#/>].

Definitions



Type of event and position in the vehicle

- The following definitions applied to hospital data have been taken from the ICD-10 coding instructions*, and matched with the definitions used in police data, when necessary, to facilitate comparisons between datasets.
- A **traffic accident** is any vehicle accident occurring on the public highway [i.e. originating on, terminating on, or involving a vehicle partially on the highway].
- A **nontraffic accident** is any vehicle accident that occurs entirely in any place other than a public highway.
- A **public highway** [trafficway] or street is the entire width between property lines (or other boundary lines) of land open to the public as a matter of right or custom for purposes of moving persons or property from one place to another. A roadway is that part of the public highway designed, improved and customarily used for vehicular traffic.
- A **pedestrian** is any person involved in an accident who was not at the time of the accident riding in or on a motor vehicle, railway train, streetcar or animal-drawn or other vehicle, or on a pedal cycle or animal. It may include a person outside the vehicle; making an adjustment to a motor vehicle; changing tyre of vehicle; on foot; or users of pedestrian conveyances such as baby carriage, ice-skates, perambulator, push-cart, roller-skates, scooter, skateboard, skis, sled, powered wheelchair.
 - Currently in hospital data, **e-scooter users** do not have a separate category to be included in, and are coded as 'pedestrians' using this type of conveyance.
- A **driver** is an occupant of a transport vehicle who is operating or intending to operate it.
- A **passenger** is any occupant of a transport vehicle other than the driver. It may include a person boarding or alighting from a vehicle.

*Source: International Statistical Classification of Diseases and Related Health Problems 10th Revision. [Available at <https://icd.who.int/browse10/2019/en#/>].

Definitions



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Road users and vehicles in hospital data

- A **pedal cyclist** is any person riding on a pedal cycle or in a sidecar or trailer attached to such a vehicle. The vehicle may be a bicycle or tricycle.
- A **motorcycle rider** is any person riding on a motorcycle or in a sidecar or trailer attached to such a vehicle.
- A **motorcycle** is a two-wheeled motor vehicle with one or two riding saddles and sometimes with a third wheel for the support of a sidecar. The sidecar is considered part of the motorcycle. Includes moped, motor scooter.
- A **car** is a four-wheeled motor vehicle designed primarily for carrying up to 10 persons. A trailer or caravan being towed by a car is considered a part of the car. It may include a minibus.
- A **pick-up truck or van** is a four- or six-wheeled motor vehicle designed primarily for carrying property, weighing less than the local limit for classification as a heavy goods vehicle, and not requiring a special driver's licence.
- A **heavy goods vehicle** is a motor vehicle designed primarily for carrying property, meeting local criteria for classification as a heavy goods vehicle in terms of kerbside weight (usually above 3500 kg), and requiring a special driver's licence.
- A **bus** is a motor vehicle designed or adapted primarily for carrying more than 10 persons, and requiring a special driver's licence. Includes coach.
- Special categories of vehicles are: **agricultural vehicles** (motor vehicles designed specifically for use in farming and agriculture/horticulture); **industrial vehicles** (motor vehicles designed primarily for use within the buildings and premises of industrial or commercial establishments); **construction vehicles** (motor vehicles designed specifically for use in the construction [and demolition] of roads, buildings and other structures).
- Special **all-terrain vehicles** are motor vehicle of special design to enable it to negotiate rough or soft terrain or snow.
- There is also a category for **ridden animals**, which includes an animal rider or occupant of animal-drawn vehicle.

Key definitions to understand AGS data



Definitions

AGS collision reports

- A **fatal casualty** is one killed as a result of the collision within 30 days since the collision date.
- A **serious injury** is an injury for which the person is detained in hospital as an 'in-patient', or has any of the following injuries whether or not detained in hospital: fractures, concussions, internal injuries, crushing, severe cuts and lacerations, or severe general shock requiring medical treatment.
- A **minor injury** is an injury of a minor character such as a sprain or bruise.
- Vehicle and road user definitions applied to collision data are similar to those applied to hospital data.





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