Serious injuries among pedestrians in hospital and An Garda Síochána data

Period 2014-2023

Dr Stefanía Castelló, Research Department,
Road Safety Authority, Ireland.
scastello@rsa.ie

Background

- This report provides an overview of serious injuries among pedestrians over 2014-2023.
- The EC has requested all EU Member States to report on serious injuries using hospital data, to complement police data on serious injuries. It is internationally acknowledged that police data alone will understate the number of serious injuries from road traffic collisions; therefore it is important that both sources of data are reported in Ireland to provide a holistic picture of the serious injury problem.
- This report is the third of a series of reports on serious injuries in Ireland from 2014 onwards.
- For the preparation of this report series, two sources of data were used:
  - **Hospital records** from the **Hospital In-Patient Enquiry (HIPE) database**, and
  - **Collision records** from the **Irish Road Traffic Collision database**, transferred from An Garda Síochána (AGS) to the RSA.
- The HIPE database is managed by the HSE and includes demographic and clinical information on casualties admitted to acute hospitals in Ireland.
- AGS information from 2020 onwards is provisional and subject to change. This means that AGS serious injury numbers presented here may change at a later date when new information becomes available.
- Details on the **methodology** that we use to report on serious injuries from hospital data can be found here.

Definitions of injury

Hospital data

- We follow a medical definition of a serious injury, based on an international validated injury severity scoring scale, the **Abbreviated Injury Scale (AIS)***.
- The AIS scale allows to assign an injury severity score between 1 (minor) to 6 (critical) to each hospitalised casualty.
- A casualty may have one or more injuries recorded in their hospital chart. We first assign an AIS score to each injury, and then determine the maximum AIS score assigned to each casualty.
- **Seriously injured casualties are those with at least one injury with a maximum AIS score of 3 or more (MAIS3+).**
- Casualties with a maximum AIS score of 2 or less (**MAIS2-**) are defined as having injuries of minor-to-moderate severity.
- We add the number of casualties having MAIS3+ and MAIS2- scores to obtain the total number of **hospitalised casualties**.
- Please see the methodology report for more details on the definitions of injury.

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

Definitions of injury

An Garda Síochána data

- The definition of a serious injury followed by AGS is as follows:
  - 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.
- All hospitalised casualties fall into the AGS definition of a serious injury, as they are all 'in-patients'.

Report Outline

- **Trends**
- **Characteristics of all hospitalised pedestrians (2014-2023) and comparison with AGS serious injuries**
  - Demographics: age and gender
  - County
  - Collision type
  - Characteristics of injuries sustained, length of stay at hospital and discharge destination (hospital data only)
- **Characteristics of MAIS3+ pedestrians in hospital records (2014-2023)**
  - Demographics: age and gender
  - Month, Day of week and Time of day of admission to hospital
  - County of residence
  - Collision type
  - Characteristics of injuries sustained, length of stay at hospital, and discharge destination

All hospitalised and AGS serious injuries

2014-2023

Summary of results

All hospitalised pedestrians and AGS serious injuries – 2014-2023

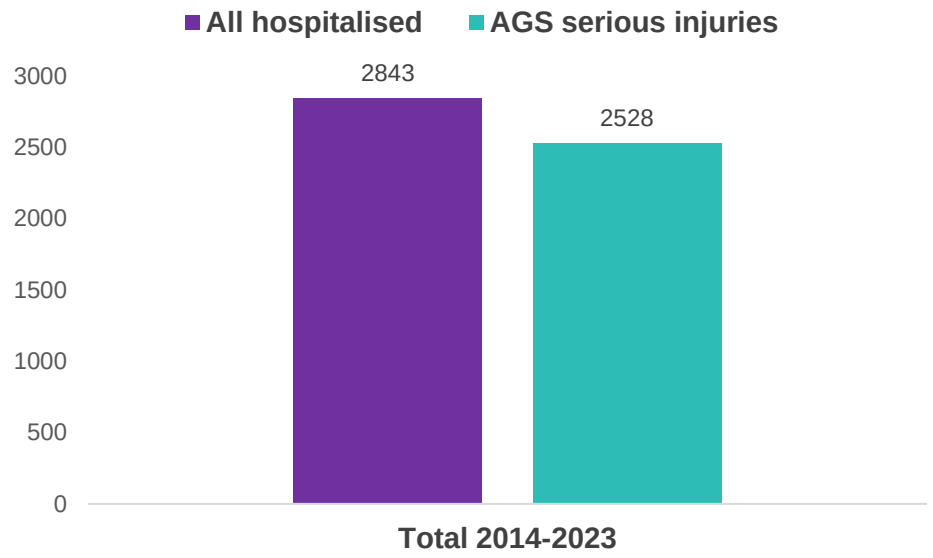
- Over 2014-2023, the total of hospitalised pedestrians was 2,843, and of AGS seriously injured was 2,528.
- The discrepancy in the number of pedestrians recorded in hospital and AGS data was smaller than the observed for cyclists*, and declined over the period under study, which may reflect improvements in serious injury recording by AGS.
- The smaller discrepancy between data sources may suggest that crashes involving a pedestrian were more likely to have been reported to AGS. However, it is not possible to assume that all hospitalised pedestrians were recorded as seriously injured by AGS, as the AGS definition of a serious injury is broad, is not based on a medical assessment, and will include injuries not requiring admission to hospital.
- Hospitalised pedestrians were more frequently aged 65+ or less than 14 years, males, residents in County Dublin, and injured in a collision with a car, truck, or van. AGS seriously injured pedestrians had similar characteristics.
- Hospitalised pedestrians sustained injuries in the lower limbs or head, spent an average of 10 days at hospital, and were more frequently discharged home, although a quarter was sent to another hospital, a rehabilitation facility, or a nursing home.

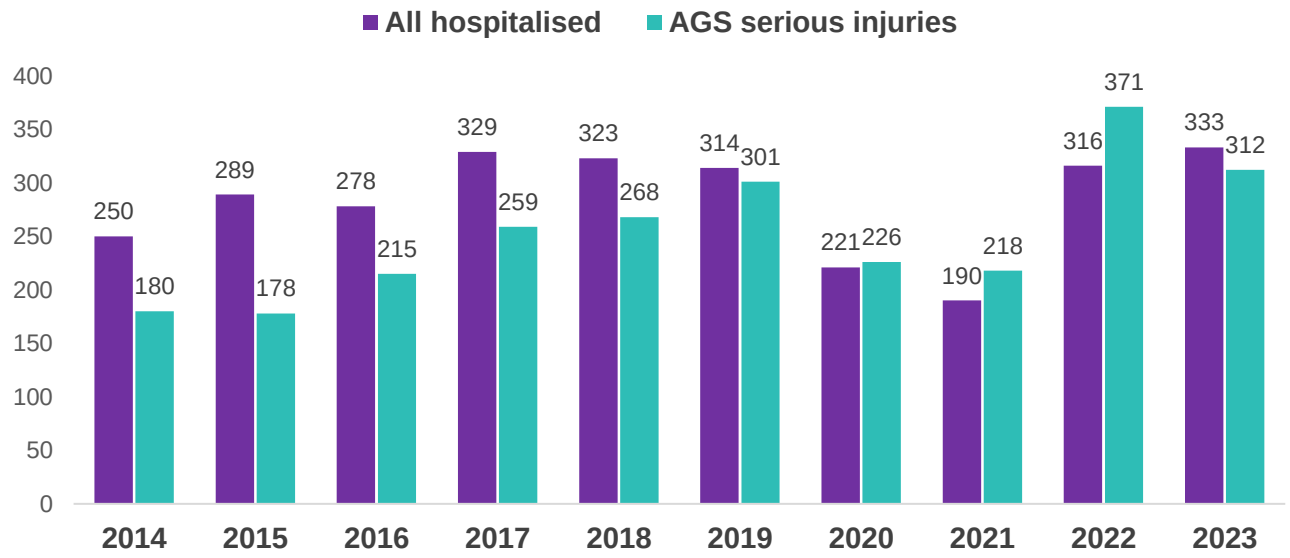
* See the published report on serious injuries among cyclists.

Trends

All hospitalised and AGS serious injuries – 2014-2023

- Over 2014-2023, a total of 2,843 pedestrians were admitted to hospital as in-patients with injuries from road traffic collisions. Over the same period, AGS statistics indicated that 2,528 pedestrians were seriously injured.
- The discrepancy in the number of records in hospital and AGS statistics became smaller over the years.
- There was a decline in the number of injured pedestrians in both hospital and AGS records in 2020-2021.



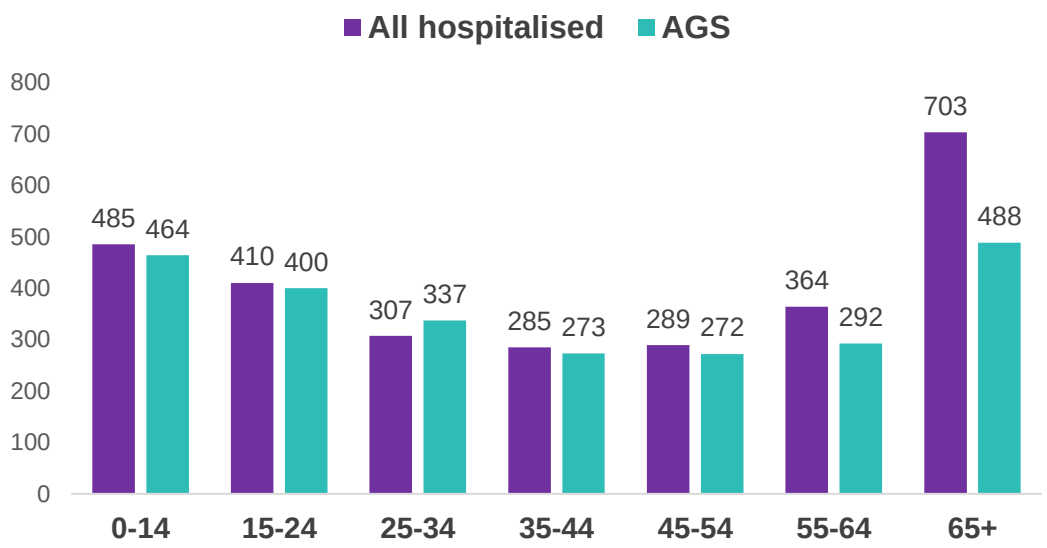


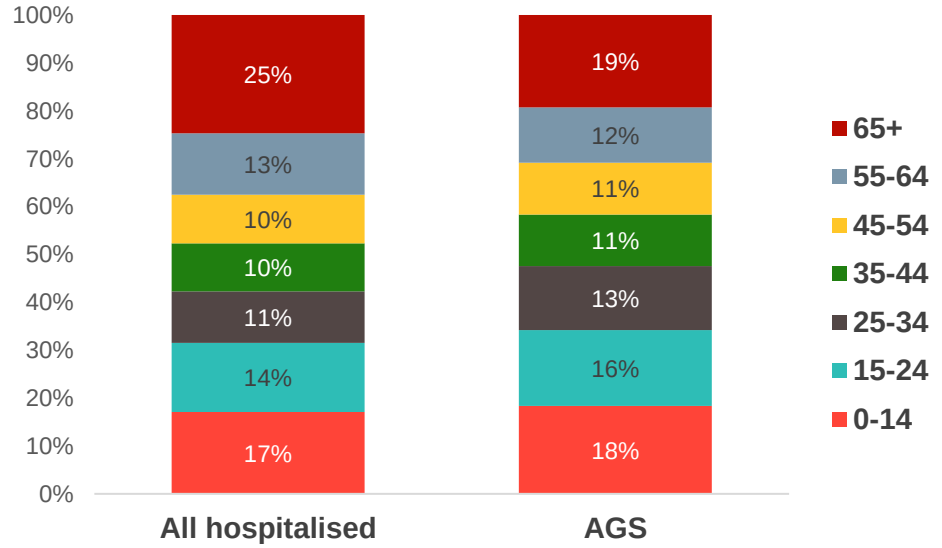
AGS data is current as of 26 August 2024. Data for 2020 onwards is provisional and subject to change.

Age

All hospitalised and AGS serious injuries – 2014-2023

- A quarter of hospitalised pedestrians and almost 1 in 5 AGS serious injuries were aged 65+ years.
- The number and share of pedestrians aged 14 years or less was the second highest in both data sources.



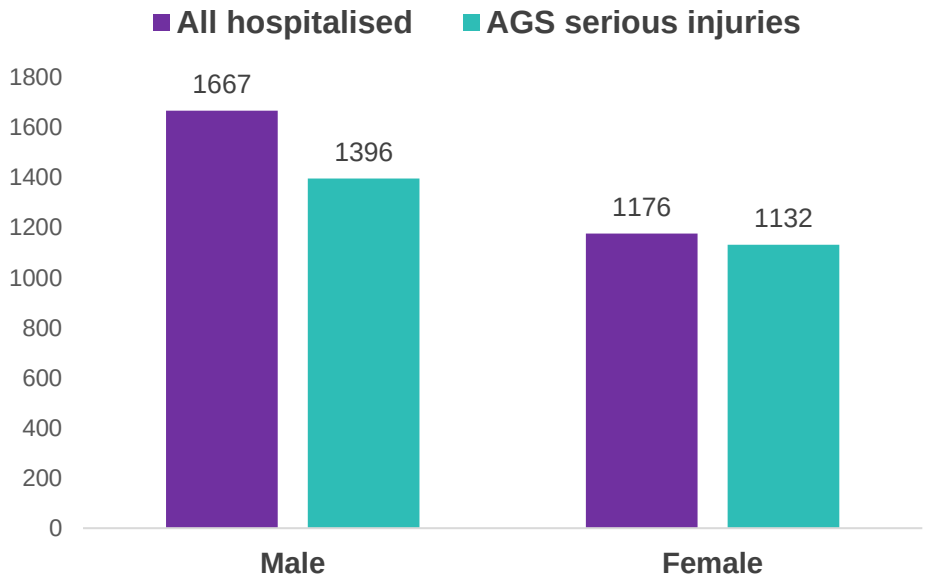


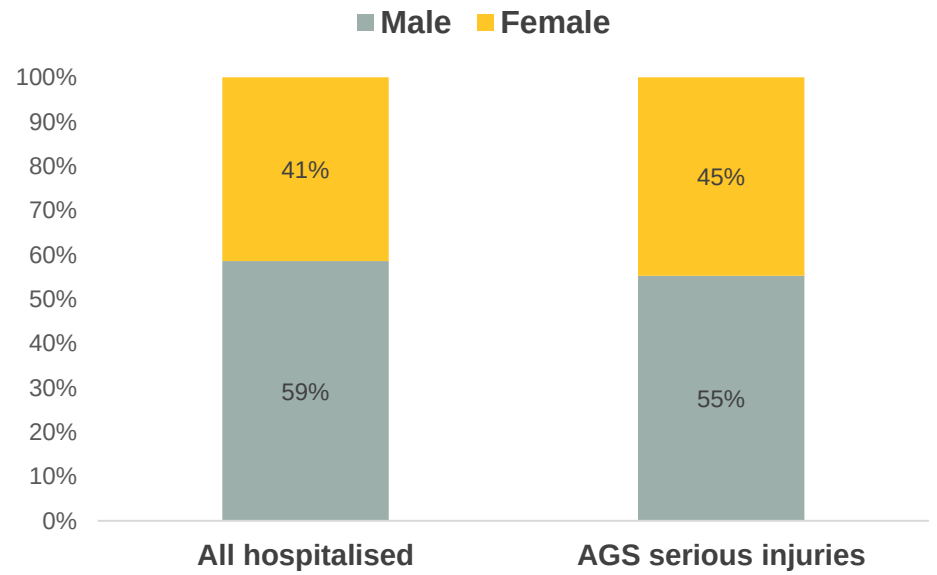
AGS data is current as of 26 August 2024. Data for 2020 onwards is provisional and subject to change.

Gender

All hospitalised and AGS serious injuries – 2014-2023

- Most hospitalised and AGS seriously injured pedestrians were males.
- There were some differences in the proportion observed for each gender by age: 71% of hospitalised pedestrians aged 25-44 years were males, and 53% of those aged 65+ years were females.





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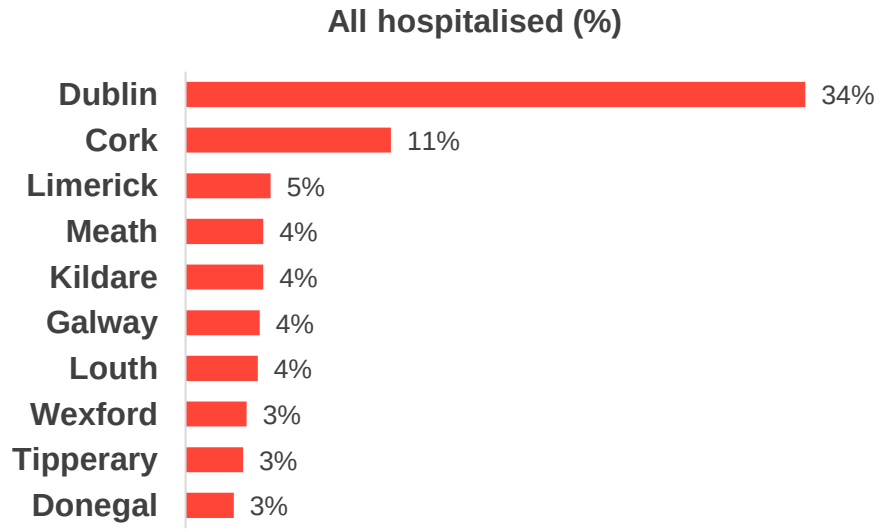
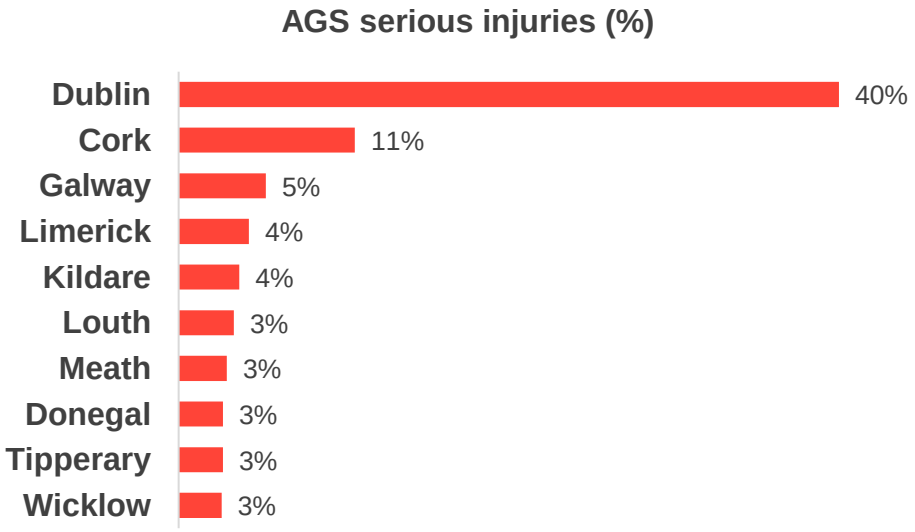
County

All hospitalised and AGS serious injuries – 2014-2023

- Dublin was the county with the highest number of hospitalised pedestrians (951) and serious injuries recorded by AGS (1,015), followed by County Cork.
- In hospital data, the county indicates the residence of the casualty, whereas in AGS records it refers to the location of the collision.





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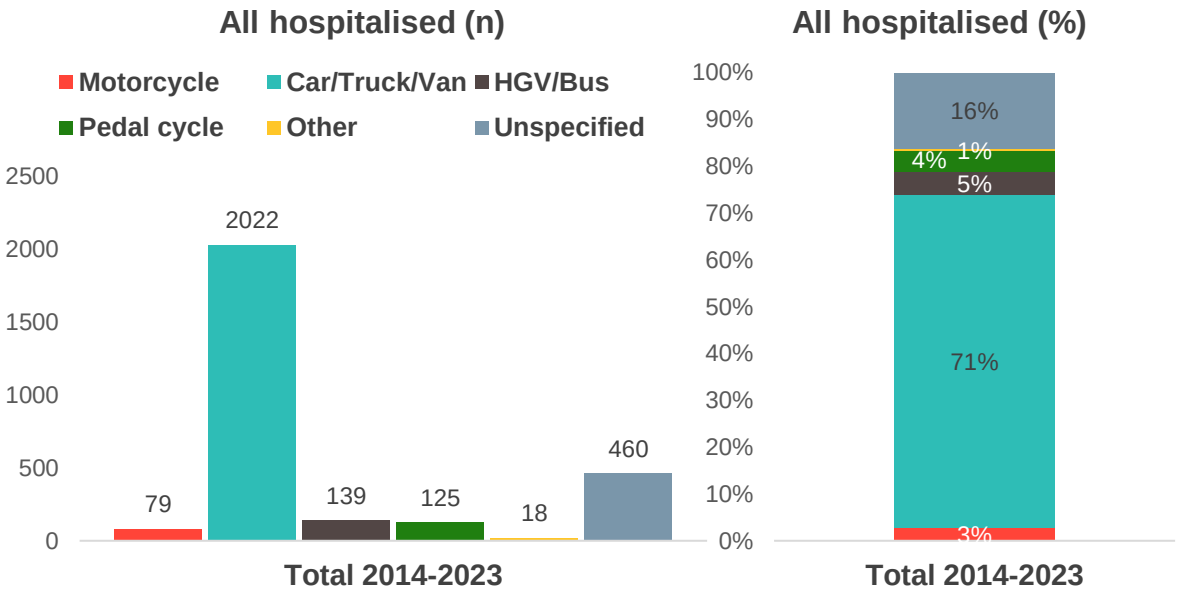
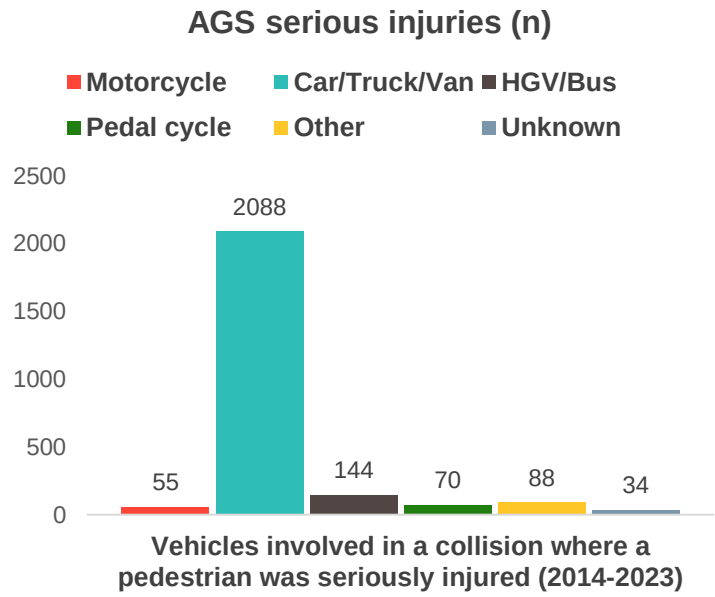
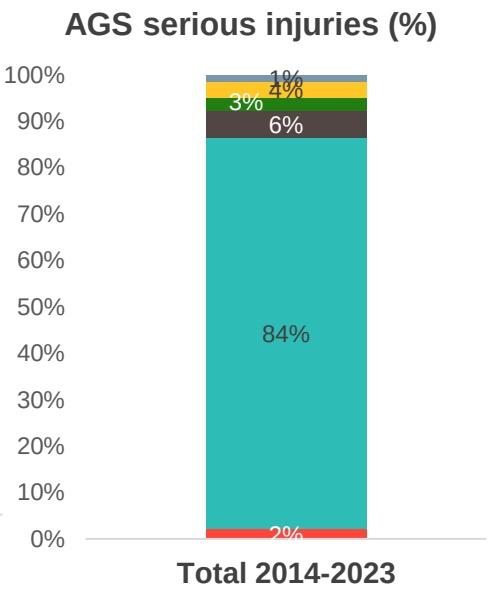
Collision type

All hospitalised and AGS serious injuries – 2014-2023

- 71% (2,022) of hospitalised pedestrians were injured in a collision with a car, truck, or van.
- In AGS records, 84% (2,088) of vehicles involved in a collision where a pedestrian was seriously injured were a car, truck, or van.







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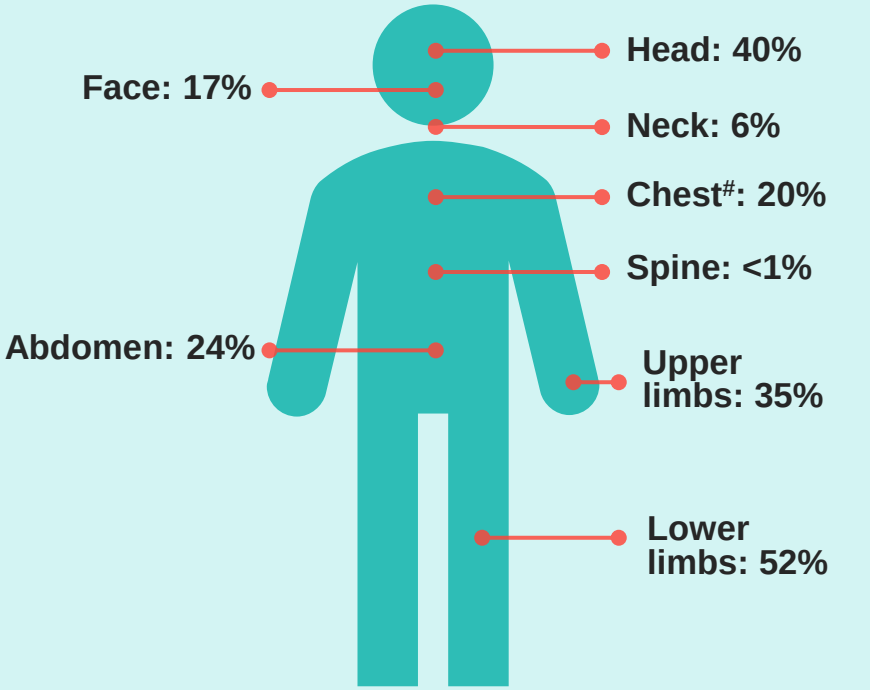
Injuries sustained*

All hospitalised – 2014-2023

Body part where at least one injury was sustained (% Yes)



- Hospitalised pedestrians may have sustained one or more injuries (of any severity).
- 72% sustained 2 or more injuries in the same or in different body parts, with a mean number of injuries of 4, and a maximum of 23 injuries.
- 52% of all hospitalised pedestrians sustained at least one lower limb injury**. Of these, 78% sustained at least one fracture, 22% at least one open wound, and 15% at least one superficial injury.
- 40% of hospitalised pedestrians sustained at least one head injury. Of these, 53% sustained at least one brain injury, 40% at least one open wound, and 24% at least one skull fracture.
- 35% of hospitalised pedestrians sustained at least one upper limb injury**. Of these, 75% sustained at least one fracture, 14% at least one open wound.
- 52% of hospitalised pedestrians sustained at least one abdomen## injury. Of these, 73% sustained at least one fracture, 16% at least one injury in intra-abdominal organs, and 10% at least one injury in pelvic organs.

* Based on information from the ICD-10-AM injury codes recorded for each casualty in HIPE. Percentages represent the proportion of casualties with at least one injury or injury type in each body part.
** The upper limb category include shoulder, upper arm, elbow, forearm, wrist, and hand injuries. The lower limb category includes hip, thigh, lower leg, knee, ankle and foot injuries.
# Examples of chest injuries include thorax, sternum, rib, heart, or lung injuries. ## Examples of abdomen injuries include lower back injuries; abdominal organs such as liver or stomach injuries; and pelvic organs such us kidney or bladder injuries.

Length of stay at hospital

All hospitalised – 2014-2023

- 46% of hospitalised pedestrians stayed 5+ days at hospital as in-patients.
- The average number of days spent at hospital as in-patients was of 10 days.

All hospitalised pedestrians		
Number of days	**All (2843)**	**%**
1 day or less	781	27%
2 days	352	12%
3 to 4 days	391	14%
5 days or more	1319	46%
Mean (SD)	10.28 (22.41)	
Stayed at ICU 1+ days (% yes)	12%	
Mean LOS at ICU (SD)	8.5 (9.75)	

Destination at discharge

All hospitalised – 2014-2023

- At discharge from hospital, 74% of hospitalised pedestrians were sent home and 15% were transferred to another hospital for continued care.

All hospitalised pedestrians		
Destination	**All (2843)**	**%**
Home	2096	74%
Nursing home or other long-term accommodation	215	8%
Transfer to hospital	448	16%
Other	84	3%

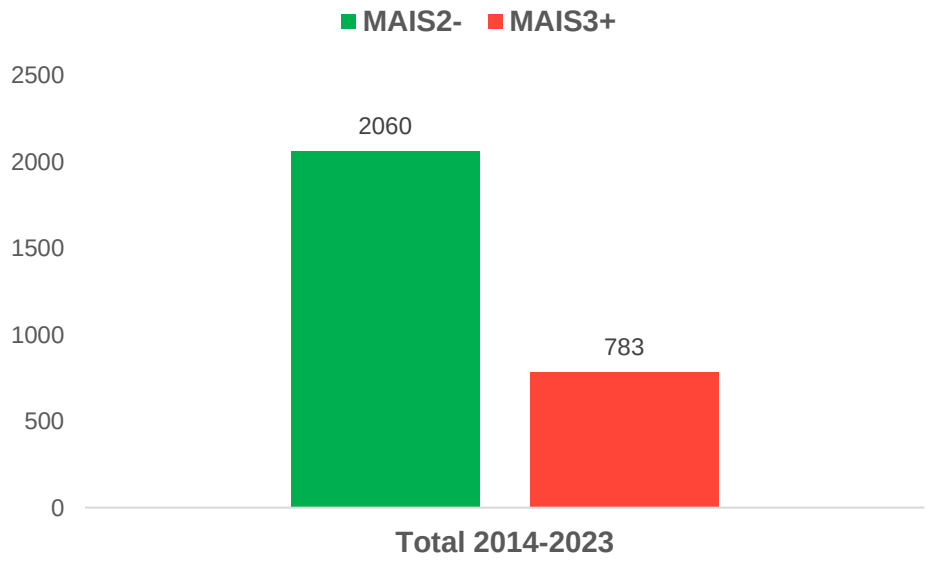
Injury severity

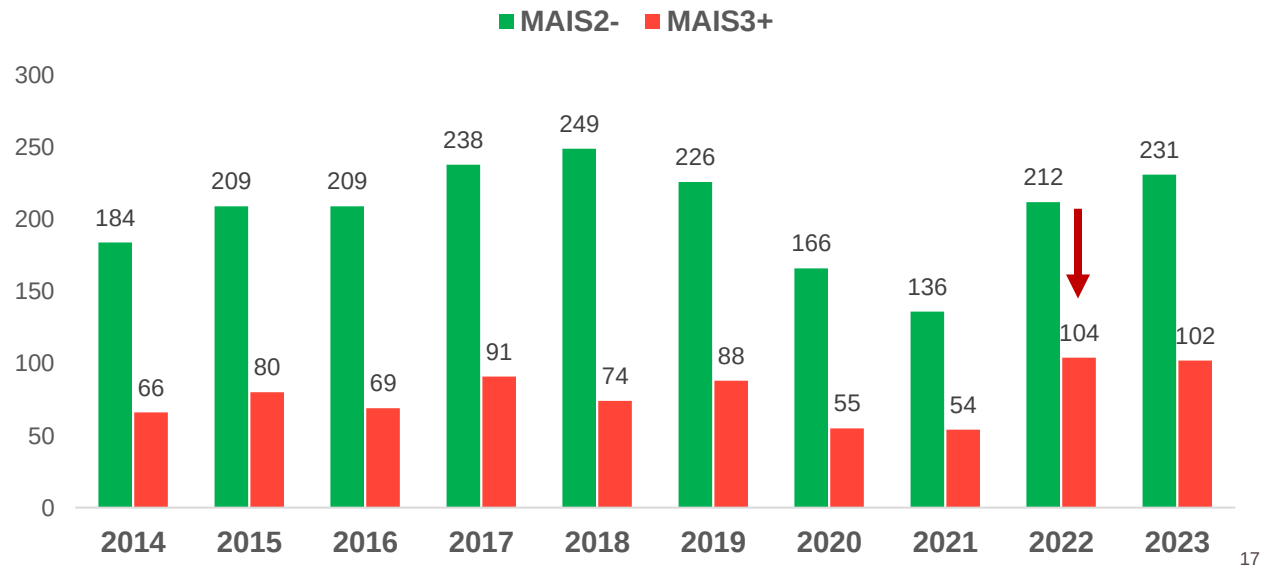
2014-2023 – Hospital data

Total and trend

MAIS2- and MAIS3+ pedestrians – 2014-2023

- We assigned an injury severity score to all hospitalised pedestrians (2,843) using the AIS scale and determined the maximum score, to know the number of casualties who sustained clinically serious injuries (see link for more details).
- 72% of all hospitalised pedestrians (2,060) sustained injuries of minor to moderate severity (MAIS2- injuries), and 28% (783) sustained clinically serious injuries (MAIS3+ injuries).
- The number of MAIS2- and MAIS3+ pedestrians declined over 2020 and 2021. The annual totals of MAIS3+ pedestrians recorded in 2022 and 2023 (104 and 102) were the highest since 2017.





Characteristics of MAIS3+ pedestrians

2014-2023

Summary of results

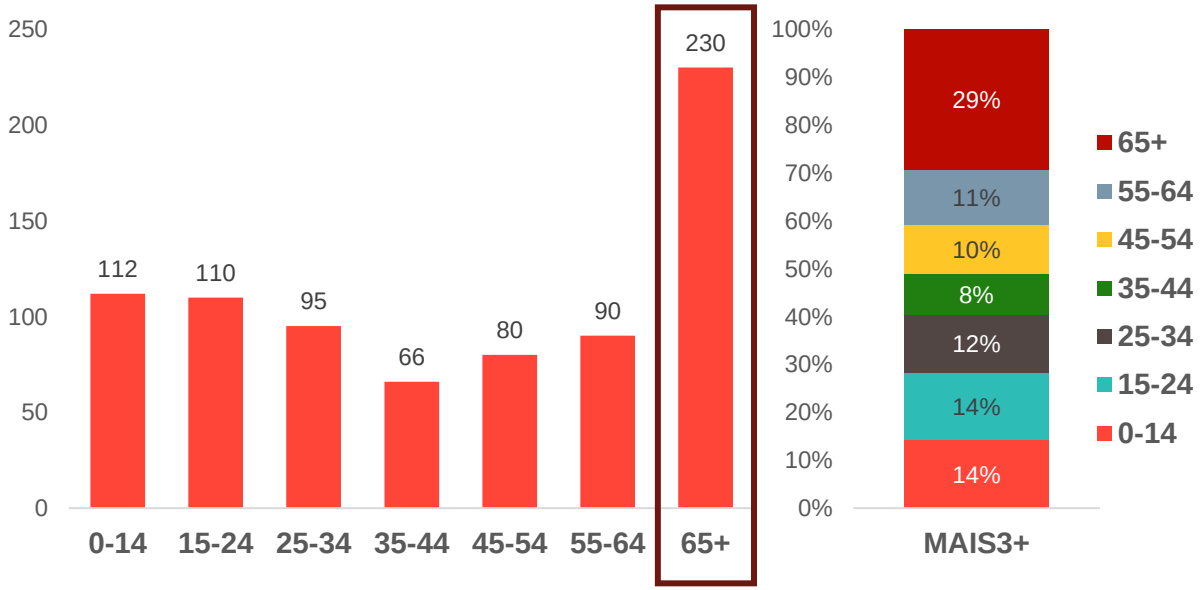
MAIS3+ pedestrians – 2014-2023

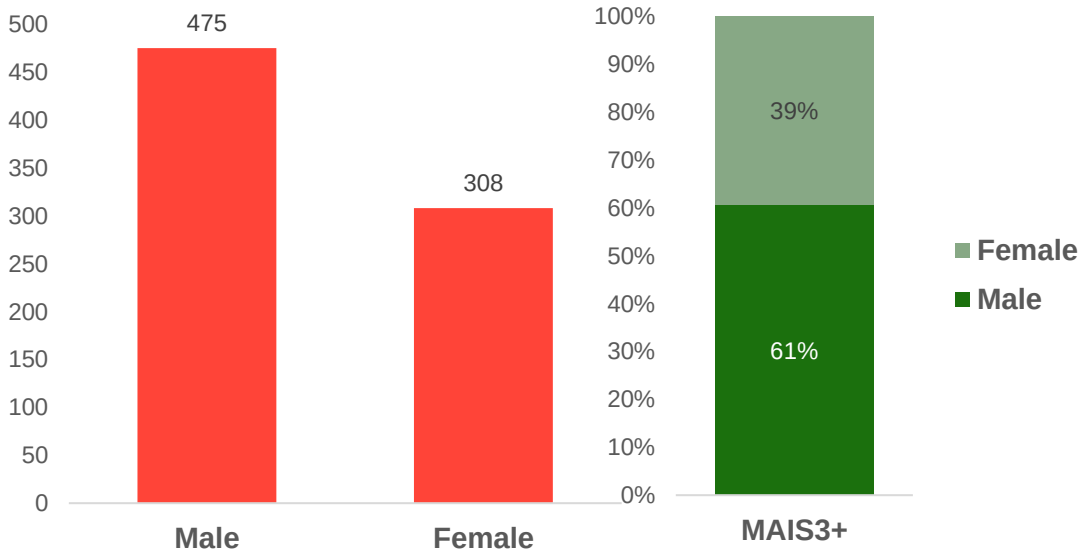
- 28% of all hospitalised pedestrians sustained MAIS3+ injuries, these being the most clinically serious injuries with a higher probability of having long term consequences on the casualty's life.
- The number of MAIS3+ pedestrians recorded in 2022 (104) was the highest of the period under study, represented an 18% increase with respect to 2019, and almost doubled the number recorded in 2021. In 2023, the annual total of MAIS3+ pedestrians remained similar (102).
- MAIS3+ pedestrians were more frequently males, aged 65+ years, residents in County Dublin, admitted to hospital over October and December, with an average length of stay of 19 days.
- They were more frequently injured in collisions with a car, truck or van, and sustained multiple serious injuries in the same or different body parts.
- MAIS3+ pedestrians aged 65+ years stayed more frequently at hospital for 5+ days, were less frequently sent home and more frequently sent to a nursing home or other long-term accommodation facility at discharge than younger pedestrians.

Age and gender

MAIS3+ pedestrians – 2014-2023

- 29% of MAIS3+ pedestrians in hospital records were aged 65 years or more.
- The highest frequency of MAIS3+ pedestrians aged 65+ years was recorded in 2023 (38).
- 61% of all MAIS3+ pedestrians in hospital records were males.
- MAIS3+ pedestrians aged 65+ years were equally distributed between genders.

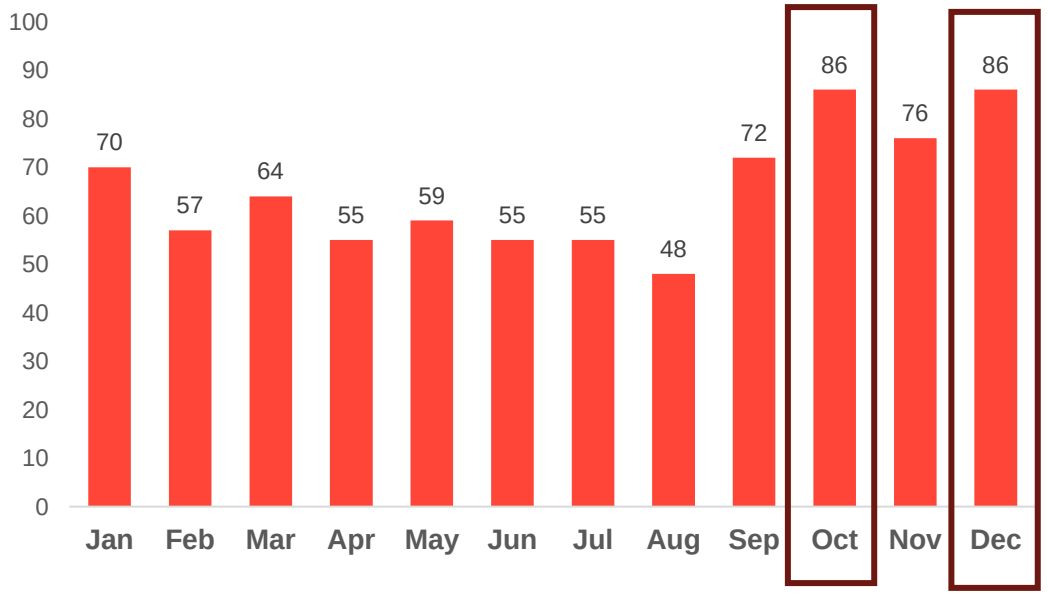


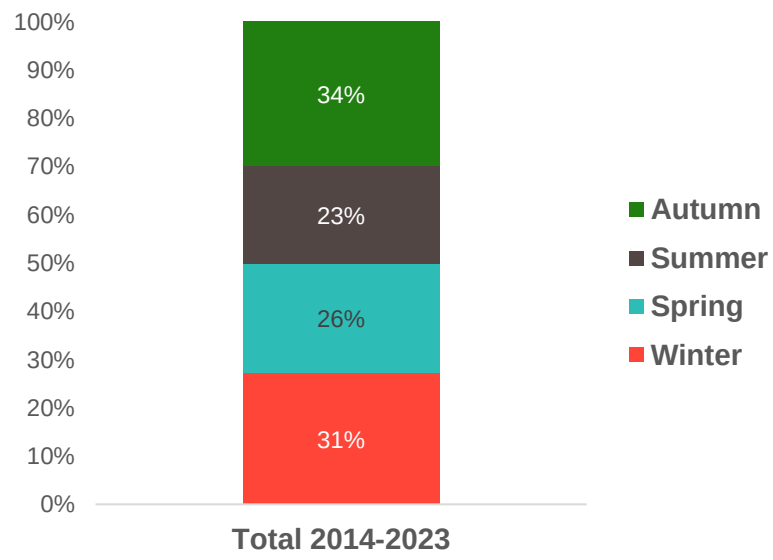


Month of hospital admission

MAIS3+ pedestrians – 2014-2023

- The number of MAIS3+ pedestrians admitted to hospital was the highest in October and December.
- Autumn was the season with the highest share of admissions to hospital.

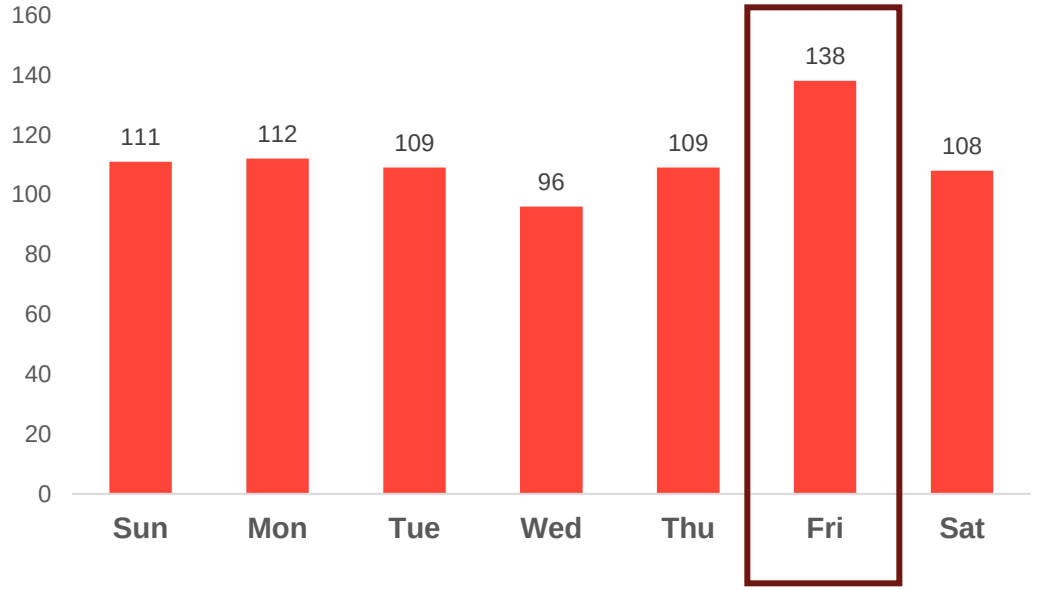


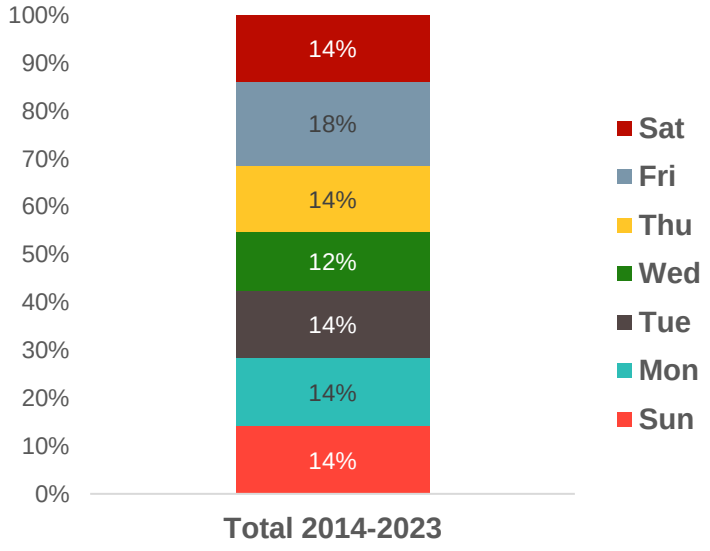


Day of hospital admission

MAIS3+ pedestrians – 2014-2023

- Fridays had the highest number and share of MAIS3+ admissions to hospital.

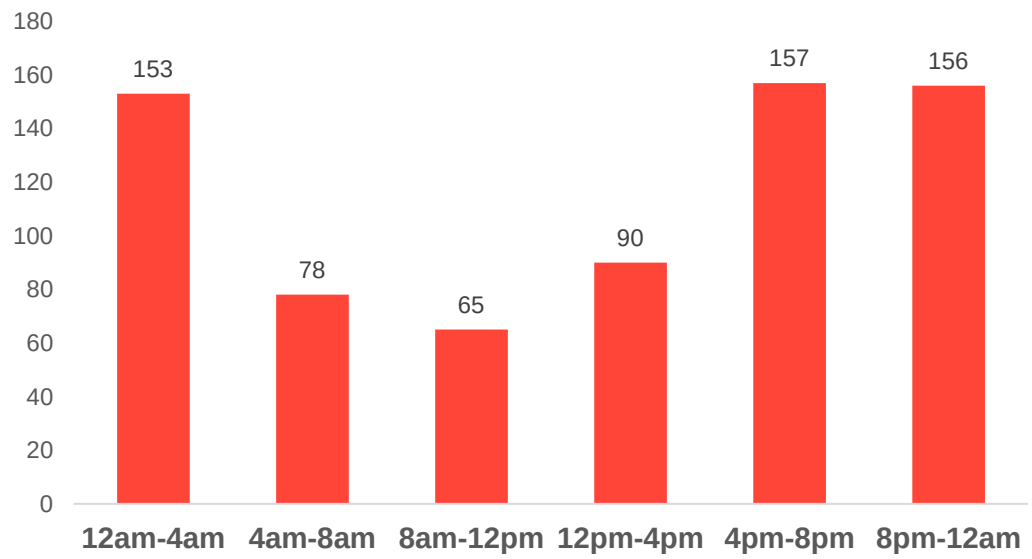


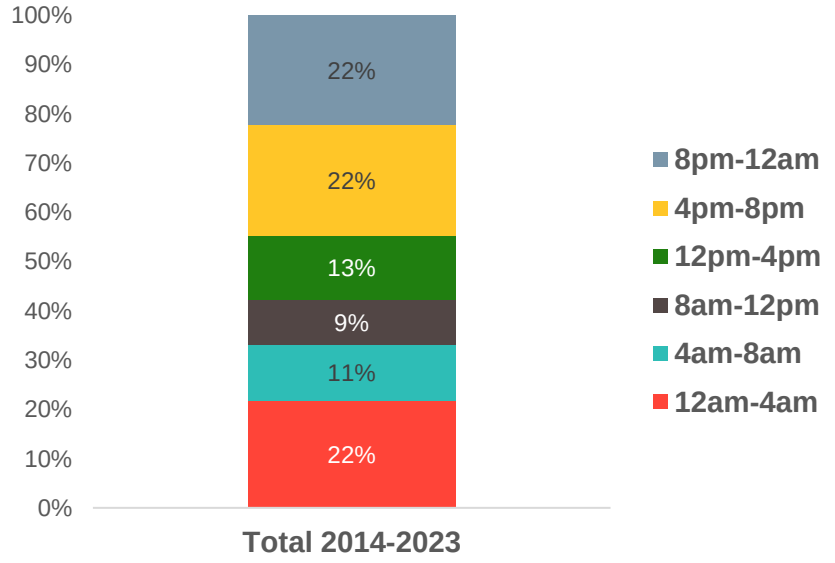


Time of hospital admission

MAIS3+ pedestrians – 2014-2023

- Overall, hospital admission of MAIS3+ pedestrians was more frequent between 4pm-4am.

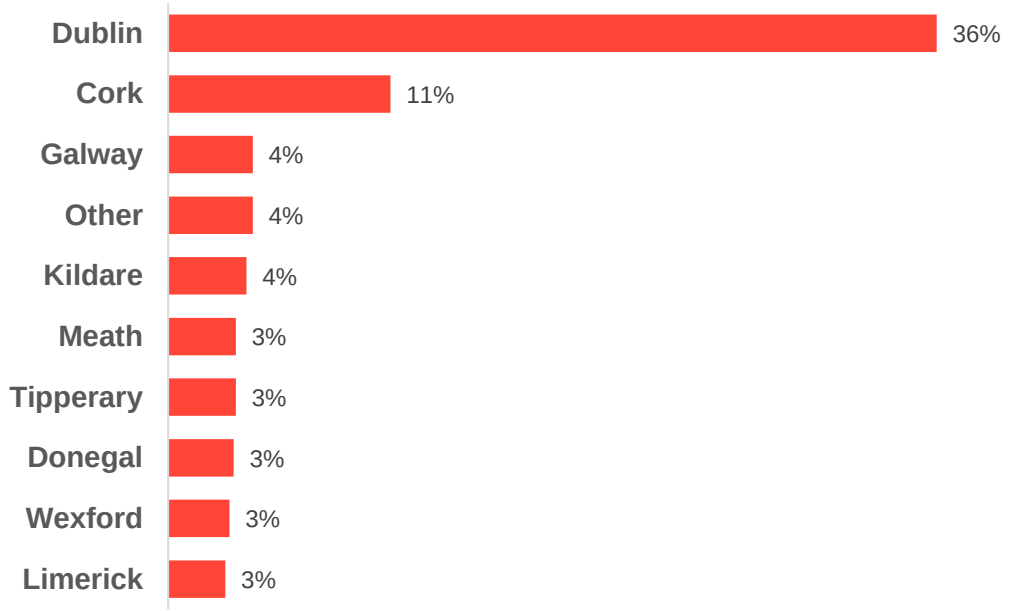




County of residence

MAIS3+ pedestrians – 2014-2023

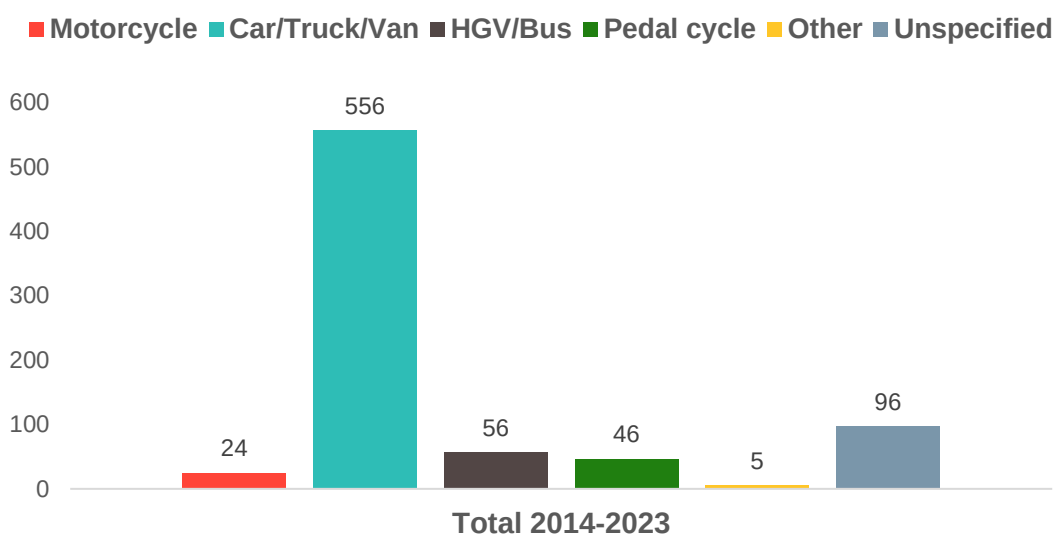
- 36% of MAIS3+ pedestrians (284) were County Dublin residents.

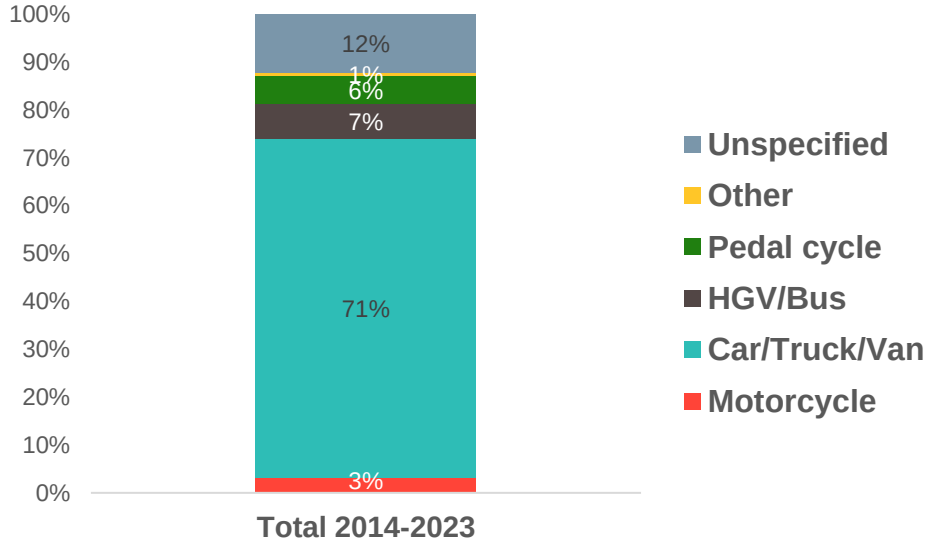


Collision type

MAIS3+ pedestrians – 2014-2023

- There were 556 MAIS3+ pedestrians injured in collisions with a car, truck or van.
- Of MAIS3+ pedestrians injured in a collision with a pedal cycle, 59% (27) were aged 65+ years.

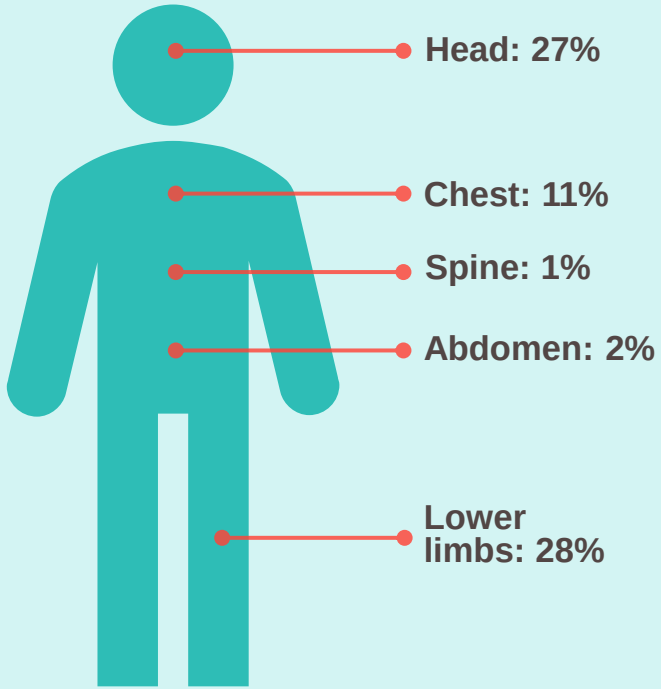




Injuries sustained*

MAIS3+ pedestrians – 2014-2023

Share per body part for pedestrians with a single serious injury:



- Casualties may have sustained a single serious injury, or multiple serious injuries in the same or different body parts.
- 69% of MAIS3+ pedestrians sustained a **single serious injury** (percentages of single serious injuries per body part are displayed in the graph in the left).
  - 27% of MAIS3+ pedestrians sustained a single serious head injury. 59% of these were serious brain injuries, and 41% were skull fractures.
  - 11% of MAIS3+ pedestrians sustained a single serious chest# injury. 82% of these were serious injuries in internal chest organs.
  - 2% of MAIS3+ pedestrians sustained a single serious abdomen## injury. 53% of these were serious injuries in pelvic organs.
  - 28% of MAIS3+ pedestrians sustained a single serious lower limb** injury. 97% of these were serious fractures.
- 31% sustained **multiple serious injuries** in the same or in different body parts.
  - The mean number of injuries among pedestrians with multiple injuries was 2.43, with a maximum of 6 serious injuries.

* Based on information from the ICD-10-AM injury codes recorded for each casualty in HIPE.
** The lower limb category includes hip, thigh, lower leg, knee, ankle and foot injuries.
# Examples of chest injuries include thorax, sternum, rib, heart, or lung injuries. ## Examples of abdomen injuries include lower back injuries; abdominal organs such as liver or stomach injuries; and pelvic organs such us kidney or bladder injuries.

Injuries sustained*

MAIS3+ pedestrians – 2014-2023

MAIS3+ pedestrians				Age (n)				
	Body part	All (783)	%	0-14 (112)	15-24 (110)	25-44 (161)	45-64 (170)	65+ (230)
Single serious injury	Head	211	27%	30%	35%	30%	24%	21%
	Chest#	87	11%	13%	17%	12%	9%	8%
	Lower limbs**	216	28%	18%	~	17%	27%	47%
	Other	26	3%	4%	*	4%	4%	~
Multiple serious injuries		243	31%	34%	30%	37%	36%	22%

* Denotes a cell with less than 5 cases. ~ indicates that further suppression was needed to avoid disclosure of a cell with less than 5 cases.

- Serious head injuries were more frequent among younger pedestrians, and serious lower limb injuries were more frequent among pedestrians aged 65+.

* Based on information from the ICD-10-AM injury codes recorded for each casualty in HIPE.
** The lower limb category includes hip, thigh, lower leg, knee, ankle and foot injuries.
# Examples of chest injuries include thorax, sternum, rib, heart, or lung injuries.

Length of stay at hospital

MAIS3+ pedestrians – 2014-2023

MAIS3+ pedestrians (n)			Age (n)				
Number of days	**All (783)**	**%**	**0-14 (112)**	**15-24 (110)**	**25-44 (161)**	**45-64 (170)**	**65+ (230)**
1 day or less	86	11%	13%	16%	17%	8%	5%
2 days	60	8%	18%	13%	6%	4%	4%
3 to 4 days	91	12%	21%	16%	14%	9%	5%
5 days or more	546	70%	48%	55%	63%	79%	86%
Mean (SD)	19.38 (34.15)		10.86 (18.70)	12.01 (18.14)	20.74 (44.30)	21.01 (30.12)	24.89 (39.00)
Stayed at ICU 1+ days (% yes)	242	31%	33%	31%	41%	35%	20%
Mean LOS at ICU (SD)	9.67 (10.09)		4.95 (5.57)	8.65 (6.95)	10.77 (11.15)	11.00 (9.70)	10.96 (12.69)

- 70% of MAIS3+ pedestrians stayed 5 days or more at hospital as in-patients.
  - The share of pedestrians staying 5+ days increased with age.

Destination at discharge

MAIS3+ pedestrians – 2014-2023

MAIS3+ pedestrians (n)			Age (n)				
Destination	**All (783)**	**%**	**0-14 (112)**	**15-24 (110)**	**25-44 (161)**	**45-64 (170)**	**65+ (230)**
Home	462	59%	84%	76%	60%	56%	40%
Nursing home or other long-term accommodation	75	10%	-	*	*	8%	26%
Transfer to hospital	222	28%	~	21%	32%	35%	31%
Other	24	3%	*	*	~	*	3%

* Denotes a cell with less than 5 cases. – Indicates absence of cases in a cell. ~ Indicates that further suppression was needed to avoid disclosure of a cell with less than 5 cases.

- At discharge from hospital, 28% of MAIS3+ pedestrians were sent to another hospital for continued care.
- Over a quarter of MAIS3+ pedestrians aged 65+ years were sent to a nursing home or other long term accommodation facility at discharge from hospital.

Serious injuries among pedestrians in hospital and AGS records

2014-2023

The findings presented in this report will inform evidence-based interventions to promote pedestrians' safety and prevent serious injuries.

Acknowledgements

- Members of the MAIS3+ project Board:
  - Dr Howard Johnson, National Health Intelligence Unit, Health Service Executive (HSE).
  - Dr Fionnuala Donohue, National Health Intelligence Unit, HSE.
  - Prof Noel McCarthy, Department of Public Health & Primary Care, Trinity College Dublin.
  - Ms Velma Burns, Research Manager, RSA.
  - Ms Sharon Heffernan, Statistician, RSA.
- RSA Research Department.

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