Using hospital data to understand serious injuries on Irish roads

Capacity Building on MAIS3+

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VISION ZERO

Content

Serious injuries on Irish roads

- Serious injuries in police records
- Hospital data and translation to AIS
- Comparison hospital vs police data
- MAIS3+ casualties
- Summary and future work

Serious injuries in Ireland

Police-based statistics

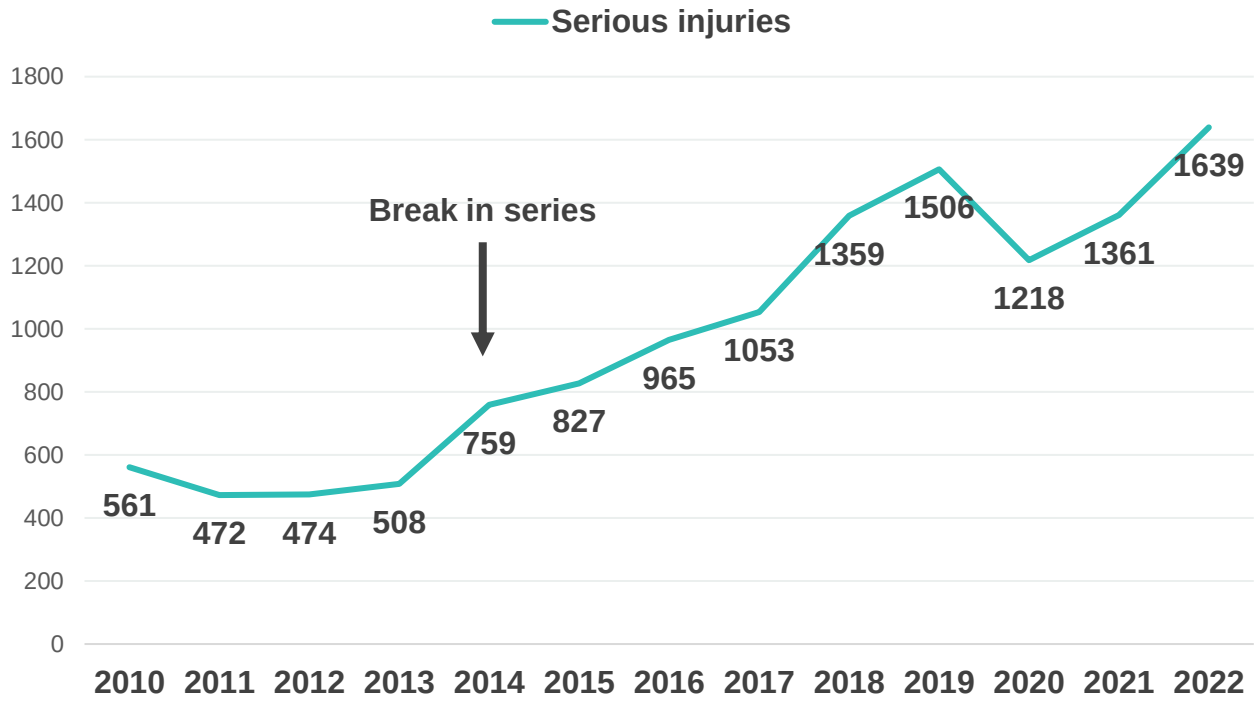
Serious injuries in police data

Definition and trend

Definition of a serious injury:

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.

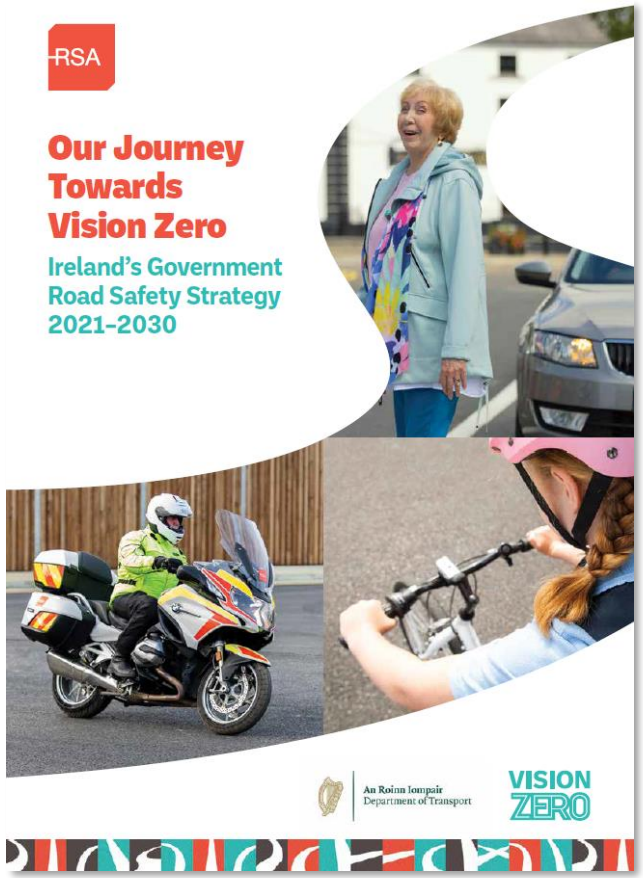
- **Updated procedure** for recording serious injuries in Ireland by the police since 2014 allowed to have more accurate figures.
- However, underreporting may still be significant.



Police data is current as of 7 April 2024. Data for 2020 onwards is provisional and subject to change.

The MAIS3+ serious injuries project

Overview



- 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 MAIS3+ serious injuries project (since March 2022)

- **Primary goal** of reporting on MAIS3+ serious injuries to the EC
- **Greater understanding** of serious injury trends and characteristics in hospital discharge records
- **Partnership** with the HSE National Health Intelligence Unit and Trinity College Dublin Department of Public Health & Primary Care
- **Comparison** of injury trends and characteristics in hospital data with police records, where possible.
- **Exploration** of other sources of data on serious injuries

Hospital data

Data preparation and translation results

Period 2014-2022

Working with hospital data

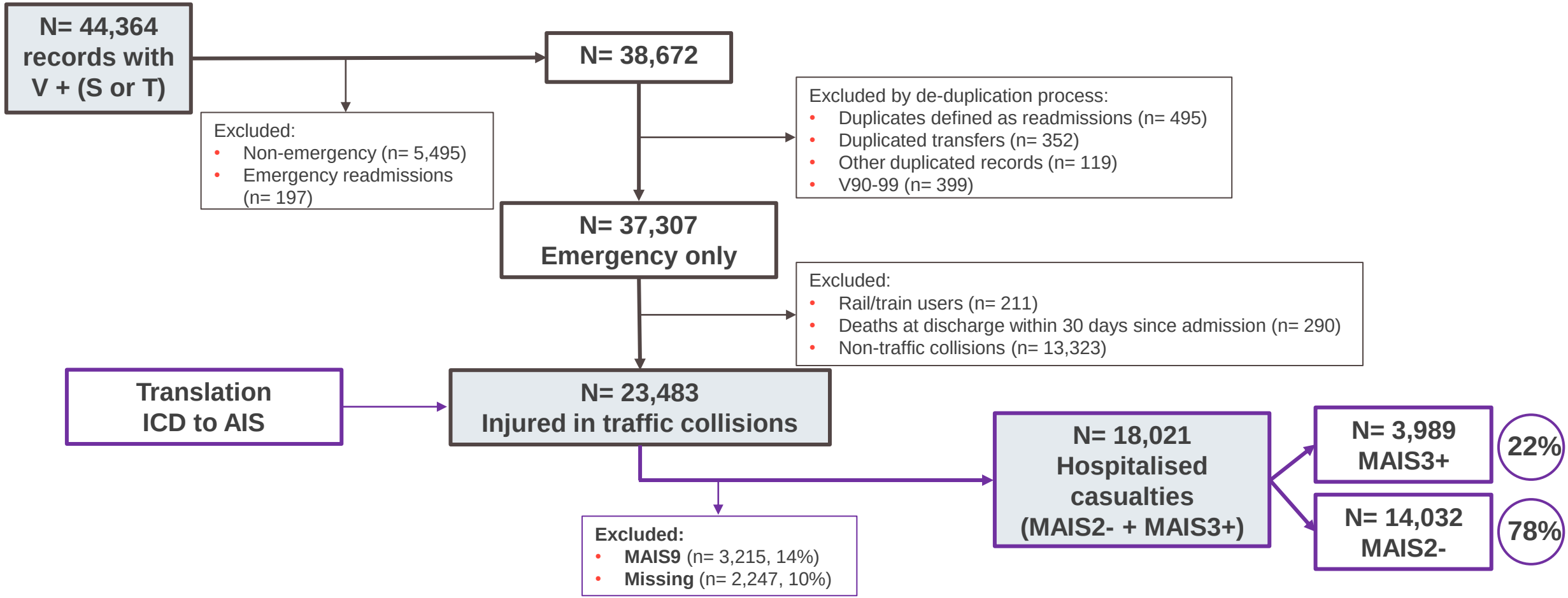
How do we obtain the sample of injured in-patients

- **HIPE database –** the main source of national data on hospital discharge records from acute hospitals in Ireland.
  - Access agreement, also access to training resources.
- Export discharges including **"(S or T) + V" ICD-10-AM codes (8 ed).**
- **Data cleaning and deduplication** process to include one record per in-patient, with guidance from experts from the Health Service Executive.
- **Inclusion criteria**: emergency admission, collision occurred on public roads.
- **Exclusion criteria**: readmissions, elective admissions, duplicated records, train/rail users, casualty died within 30 days since admission.
- ICD-10-AM injury codes **translated to AIS using AAAM map*;** then maximum AIS determined for each casualty: MAIS2-, MAIS3+, MAIS9, or missing.
  - **MAIS9** (unspecified severity), and **missing** codes (no translation possible) were excluded from the analysis.

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

Sample flow

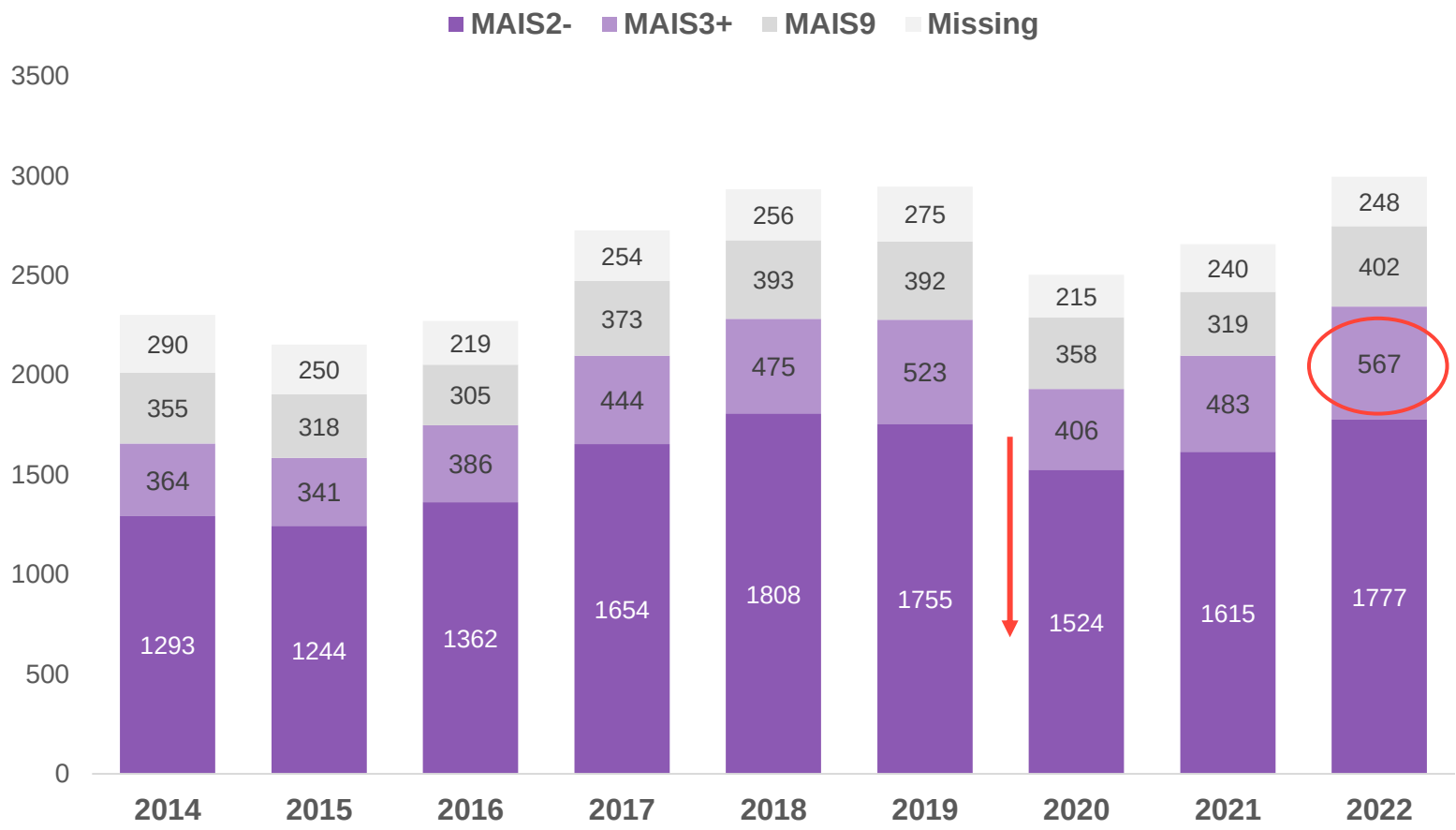
Results from data cleaning and deduplication – 2014-2022



Translation ICD to AIS

2014-2022

- The annual number of **MAIS9 and ‘missing’ records** remained steady over the years.
- Increasing number of **MAIS3+** casualties – the highest in 2022 (56% vs 2014; 8% vs 2019).
- All hospitalised casualties (MAIS3+ + MAIS2- records) declined in **2020**.



Exploring police underreporting

All hospitalised casualties vs police serious injuries

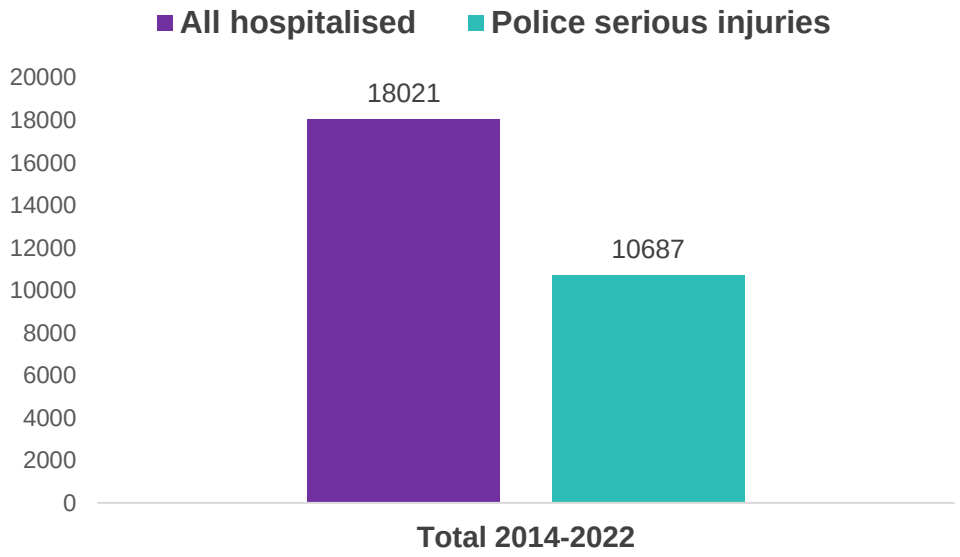
Period 2014-2022

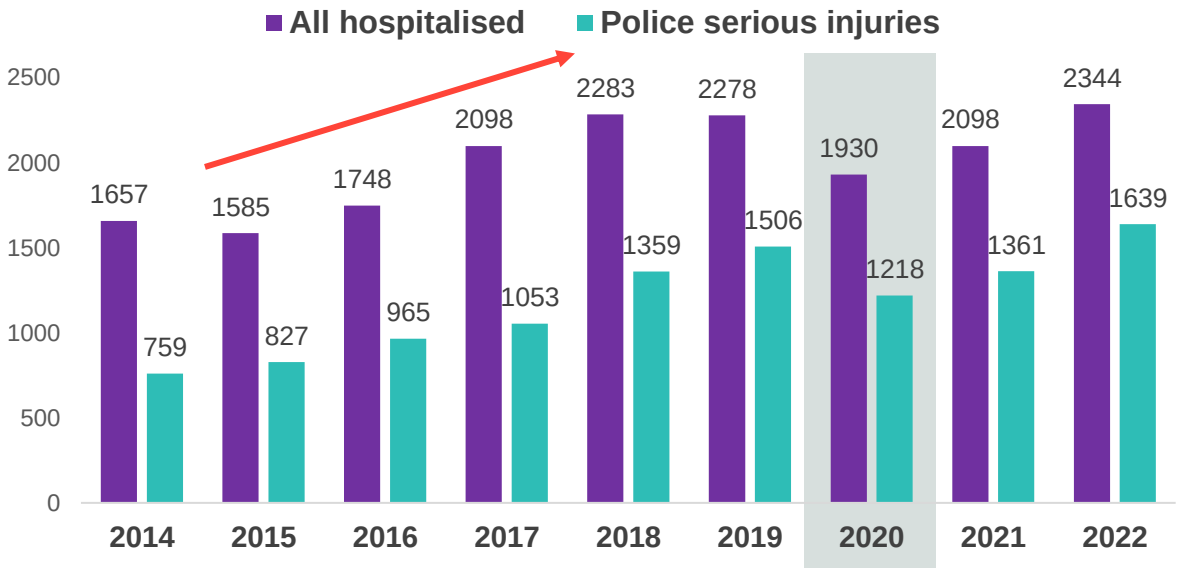
Hospitalised casualties and police serious injuries

Total and trend – 2014-2022

- Number of hospitalised casualties is almost 2 times higher than the number of police serious injuries.
  - Police definition of a serious injury includes ‘in-patients’.

- The number of hospitalised casualties and police serious injuries increased over the period, and declined in 2020.



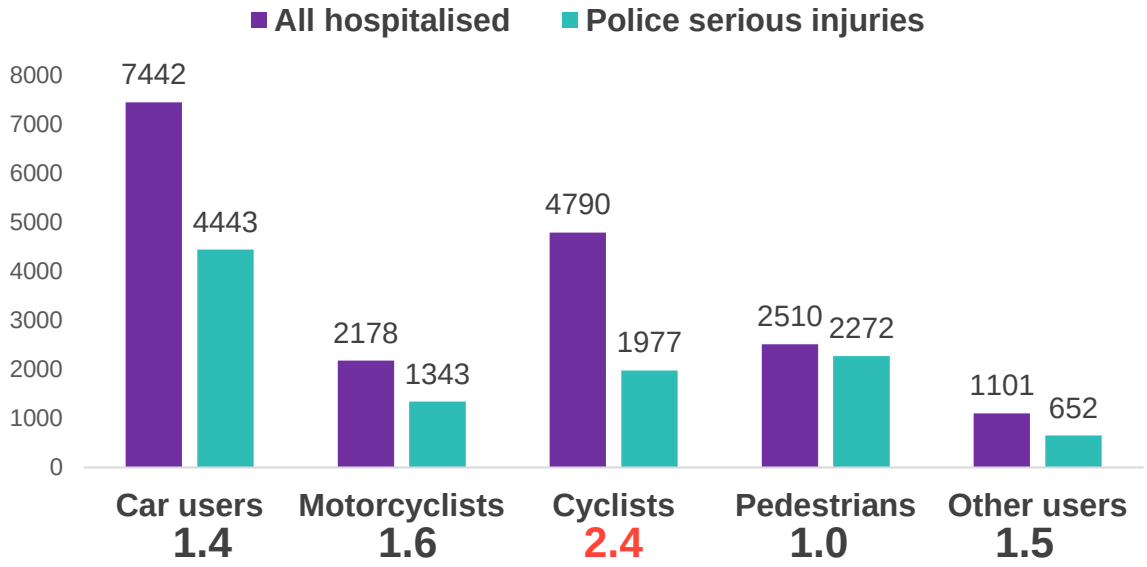


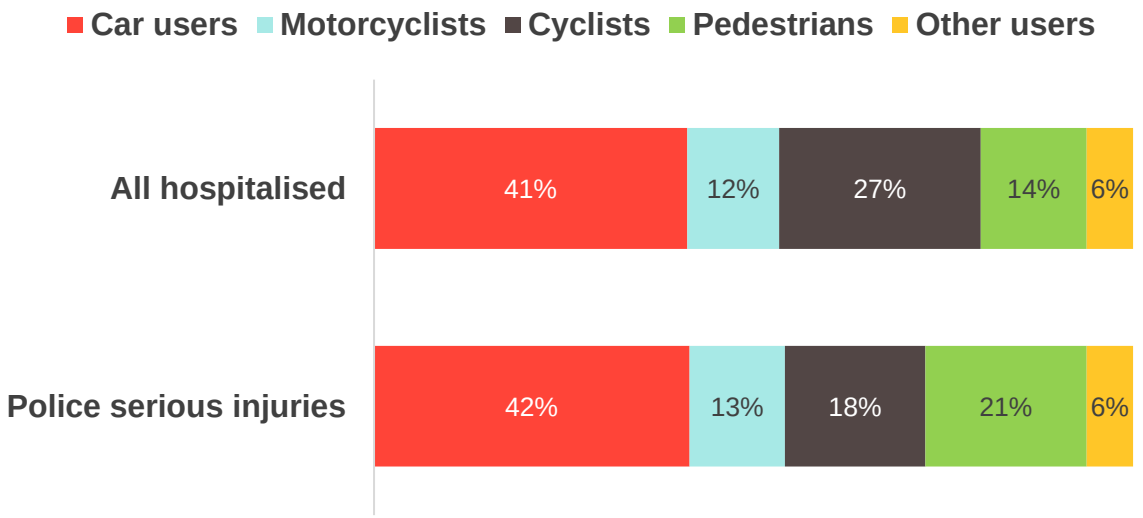
Police data is current as of 7 April 2024. Data for 2020 onwards is provisional and subject to change.

Total by road user type

All hospitalised vs police serious injuries – 2014-2022

- Police underreporting was observed for each road user type separately.
- The ‘size’ of the difference was the highest for pedal cyclists:
  - There were between 2 and 3 hospitalised cyclists for each cyclist recorded by the police.
  - Cyclists accounted for 27% of hospitalised casualties and 18% of police serious injuries.
- The absolute number of pedestrians was very similar between datasets.



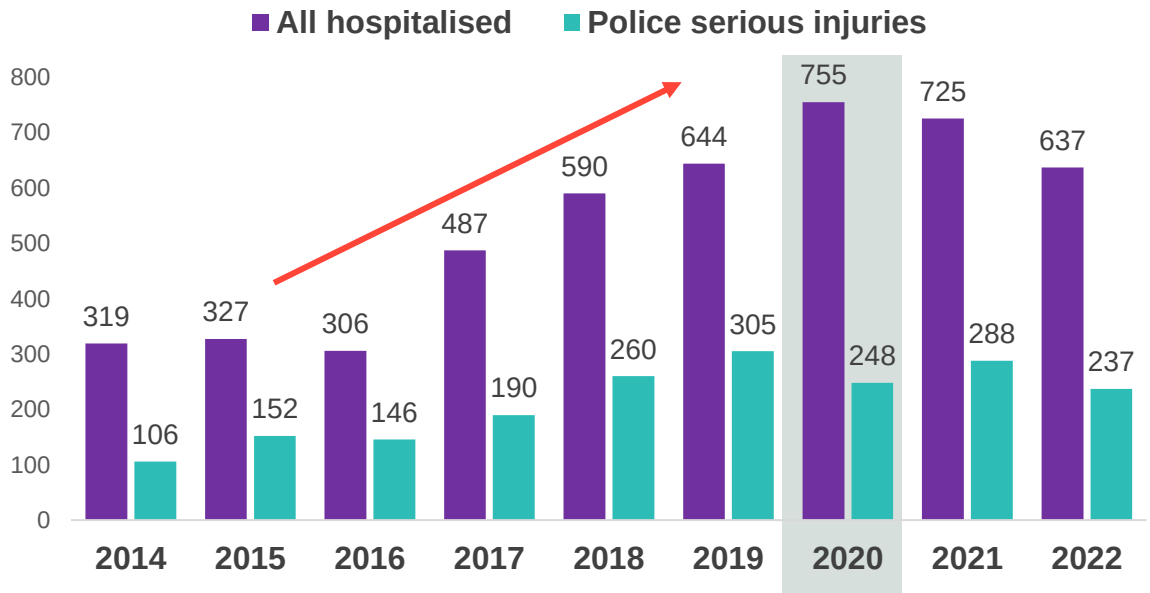


AGS data is current as of 7 April 2024. Data for 2020 onwards is provisional and subject to change.

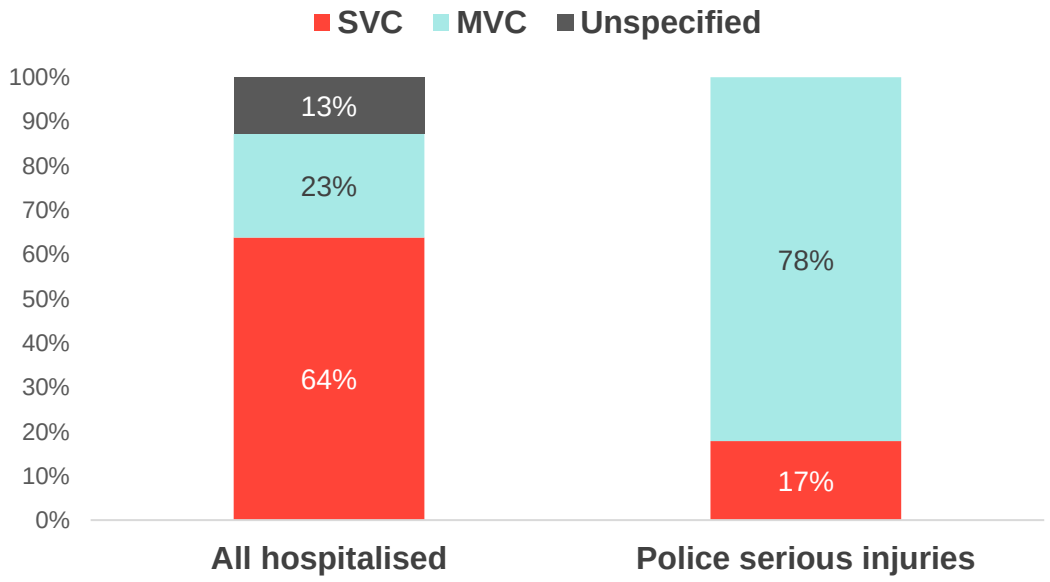
Pedal cyclists

All hospitalised vs Police seriously injured – 2014-2022

- The discrepancy between the number of cyclists in hospital and police records was observed each year.
- In 2020, the number of police seriously injured cyclists declined but the number of hospitalised cyclists increased.



- 64% of hospitalised cyclists were injured in **single vehicle collisions (SVC)** vs 17% of police serious injuries.
- SVCs in hospital data increased over the period, even during 2020.



AGS data is current as of 20 October 2023. Data for 2020 onwards is provisional and subject to change.

MAIS3+ casualties

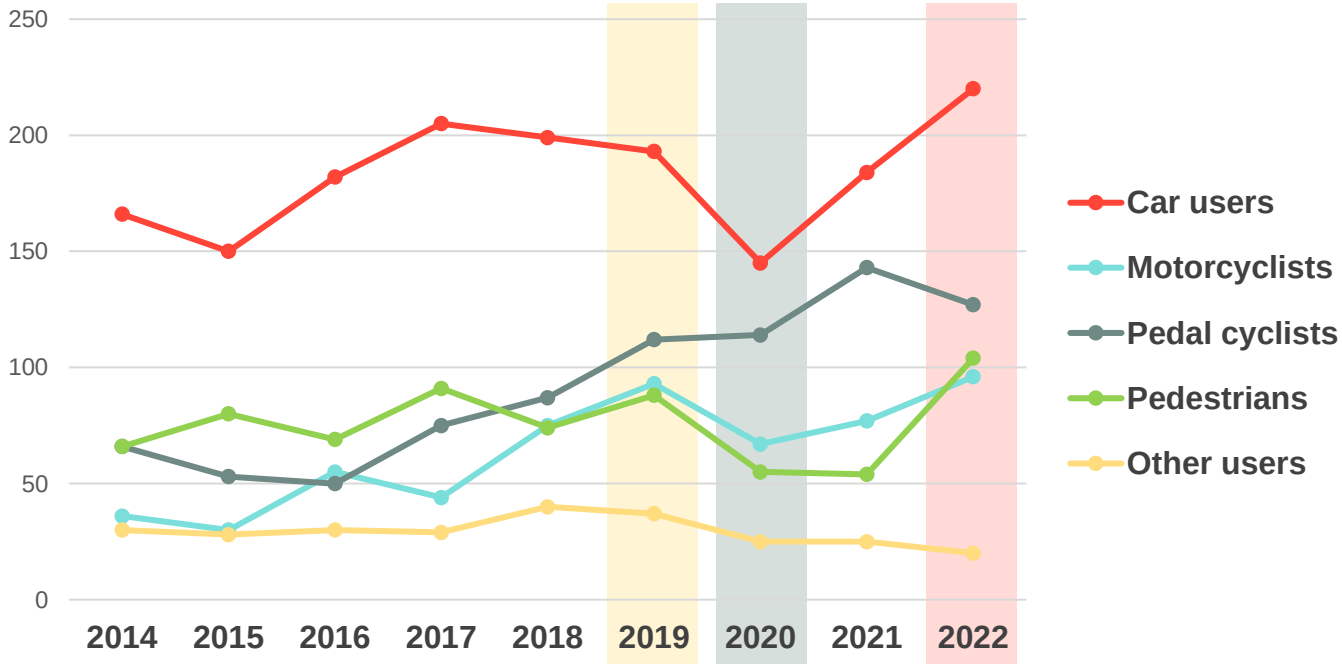
Hospital data, 2014-2022

Road user types

MAIS3+ casualties – hospital data, 2014-2022

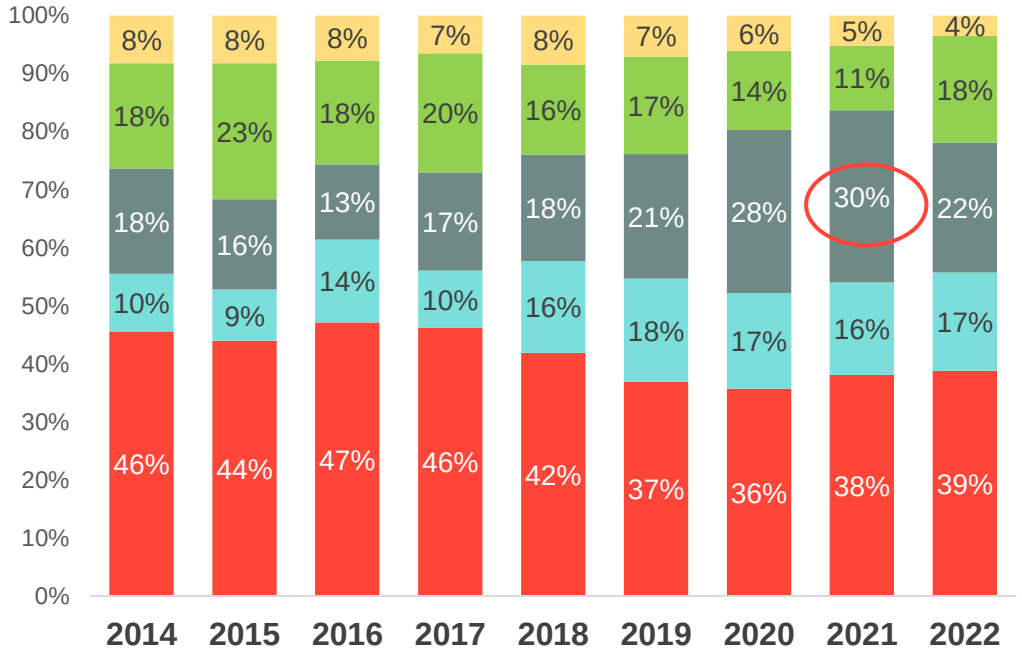
Number of MAIS3+ casualties

- Increase in the number of MAIS3+ car users and pedestrians in 2022.



Distribution of MAIS3+ casualties

- Share of MAIS3+ cyclists increased over the years.

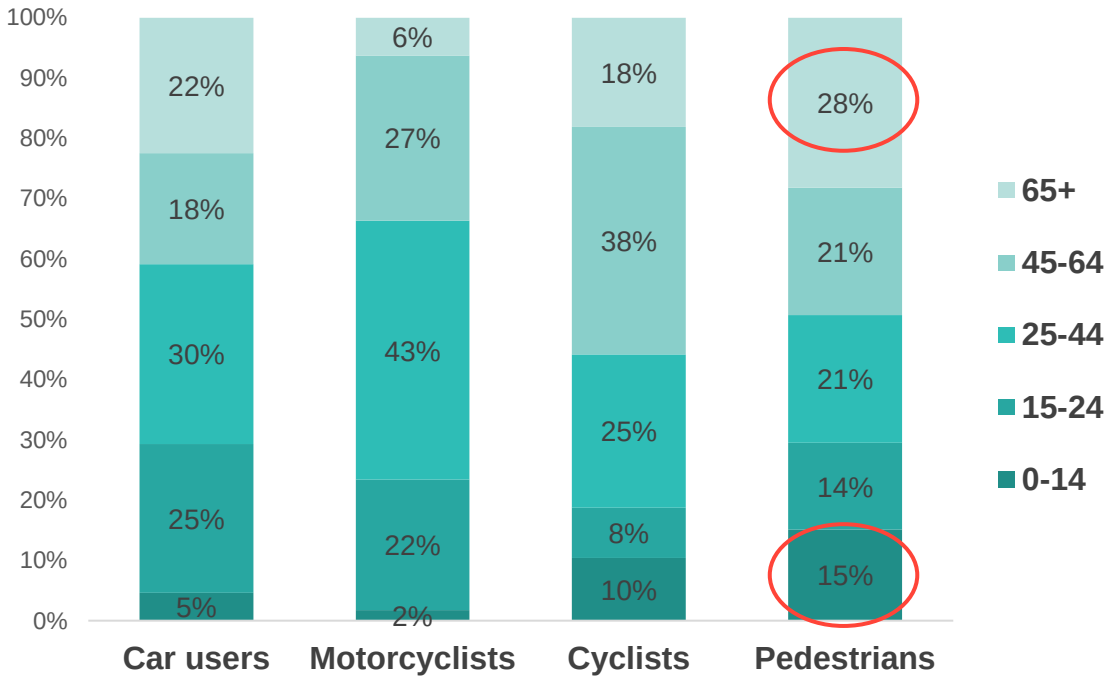


Age and gender

MAIS3+ casualties – hospital data, 2014-2022

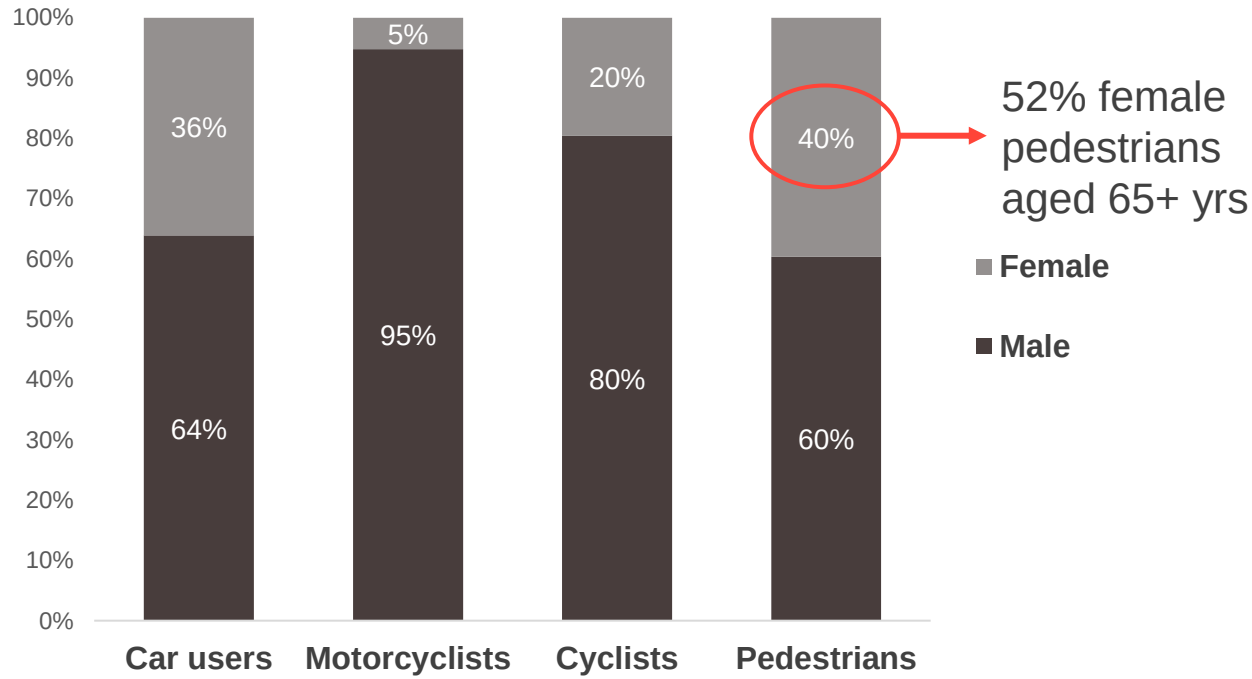
Age distribution of MAIS3+ casualties

- High prevalence of children and senior casualties among MAIS3+ pedestrians.



Gender distribution of MAIS3+ casualties

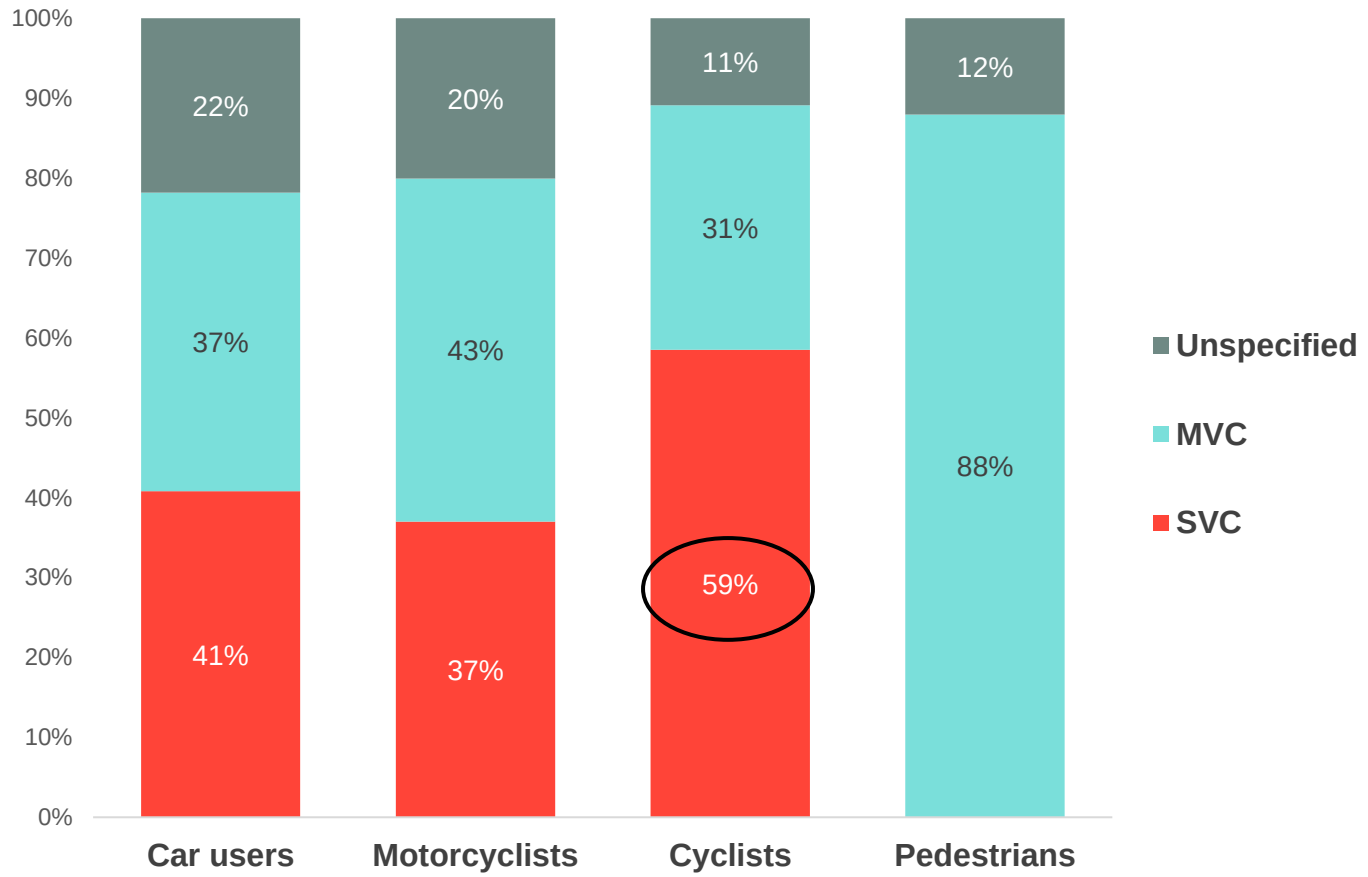
- Most MAIS3+ casualties were males.



Collision type

MAIS3+ casualties – hospital data, 2014-2022

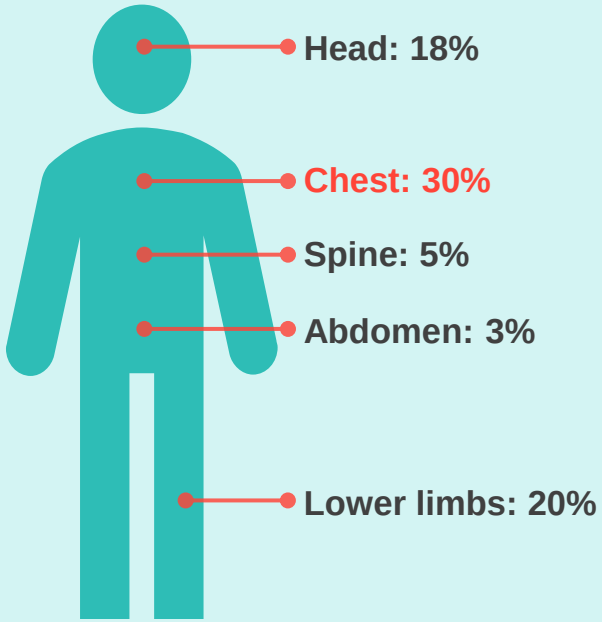
- 76% - 89% of casualties in multivehicle collisions (MVCs) were in a collision with a car, truck, or van.



Injuries

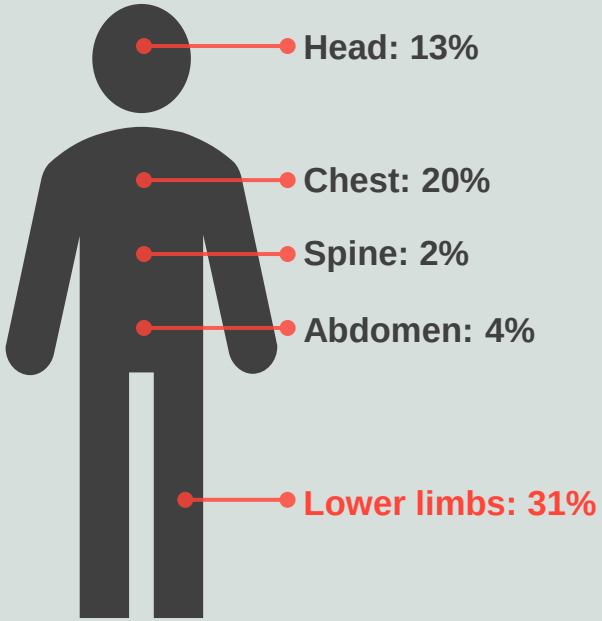
MAIS3+ casualties – hospital data, 2014-2022

Car users



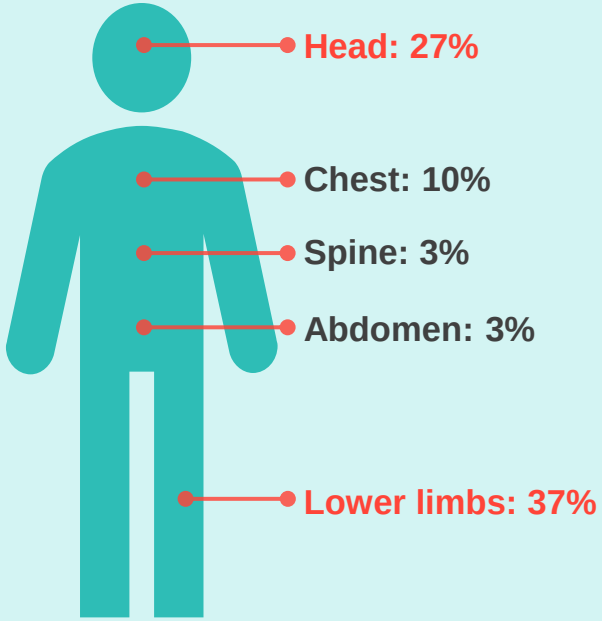
Multiple serious injuries: 23%

Motorcyclists



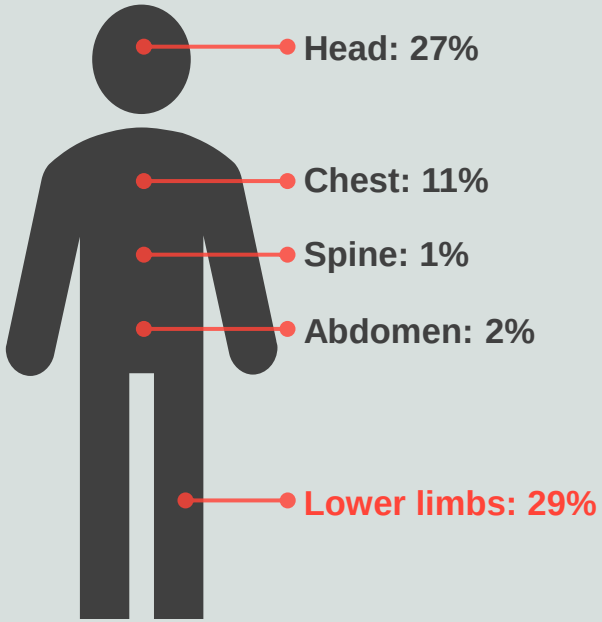
Multiple serious injuries: 30%

Cyclists



Multiple serious injuries: 18%

Pedestrians



Multiple serious injuries: 30%

- Brain injuries accounted for 53 - 70% of serious head injuries
- All lower limb injuries were serious fractures
- 80 - 90% of chest injuries were internal

Outcomes

MAIS3+ casualties – hospital data, 2014-2022

		Car users	Motorcyclists	Cyclists	Pedestrians
N days at hospital	5+ days	64%	66%	52%	69%
	Mean (SD)	17.3 (34.8)	14.3 (25.6)	10.8 (25.3)	19.1 (33.8)
	1+ days at ICU	38%	36%	15%	30%
Destination at discharge	Home	61%	66%	79%	59%
	Nursing home	6%	2%	2%	10%
	Rehabilitation	1%	1%	1%	1%
	Another hospital	29%	28%	16%	27%
	Other	3%	3%	2%	2%

24 days among pedestrians aged 65+ years

78% aged 65+ years

Conclusions and future steps

Conclusions

Key learning points

- Hospital data requires extensive preparation before translation and analysis – collaboration with health service on first phase was essential.
- The ICDmap allowed to assign MAIS to 90% of casualties in our hospital sample. For 14% of casualties the MAIS assigned was unspecified (MAIS9, excluded from analysis).
- Police underreporting was observed for all road users – was the lowest for pedestrians and the highest for pedal cyclists.
- Underreporting of cyclist serious injuries was more marked during the pandemic.
- The prevalence of single-vehicle collisions in hospital data is noteworthy and may contribute to explain this difference between police and hospital records.
- The number of MAIS3+ records steadily increased since 2014 to a peak of 567 casualties in 2022.
- Studying hospital data at a wider scale provided a more holistic understanding of the profile of casualties injured in road traffic collisions.
  - How best to leverage hospital data to inform road safety policy?
  - Dissemination strategy – making results accessible for all stakeholders and the public (reports, infographics, seminar with health partners)

Future steps

- Publication of reports on MAIS3+ casualties and police serious injuries, by road user type at RSA.ie.
  - Already published: High-level results 2014-2022, cyclist report 2014-2022, methodology report.
- Exploration of new sources of data on serious injuries:
  - Major Trauma dataset – direct AIS coding, TARN methodology.
  - Ambulance data.
- Study the feasibility of linking police and hospital data.
- Consideration of the serious injury target based on MAIS3+.

Acknowledgements

- RSA Research Department
- MAIS3+ serious injuries project Board members
  - Dr Howard Johnson, National Health Intelligence Unit, HSE
  - Dr Fionnuala Donohue, National Health Intelligence Unit, HSE
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  - Ms Sharon Heffernan, Statistician, RSA

Thank you

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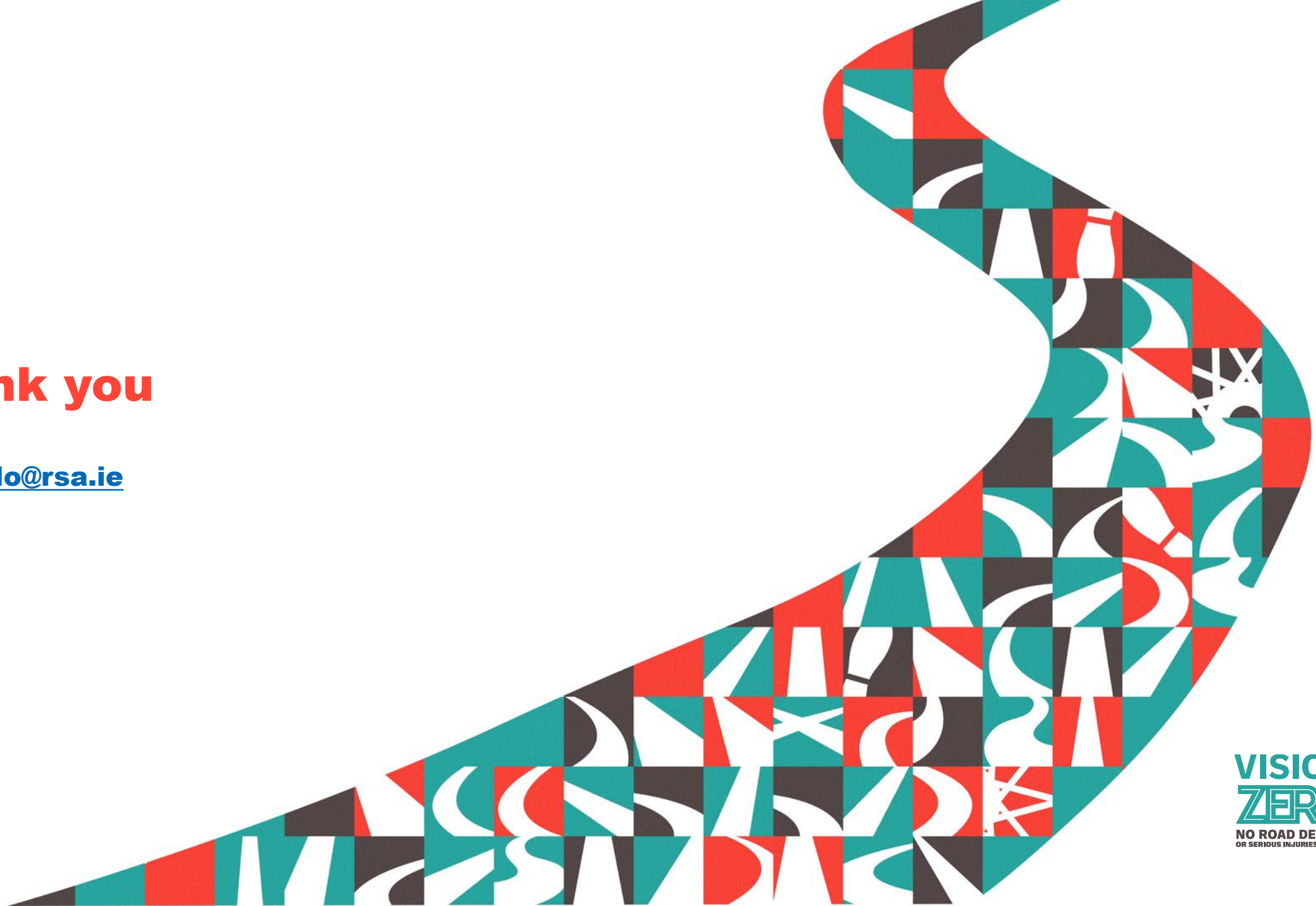

VISION ZERO
NO ROAD DEATHS
OR SERIOUS INJURIES BY 2050