

Clinically seriously injured (MAIS 3+) road casualties in Northern Ireland, 1999-2018



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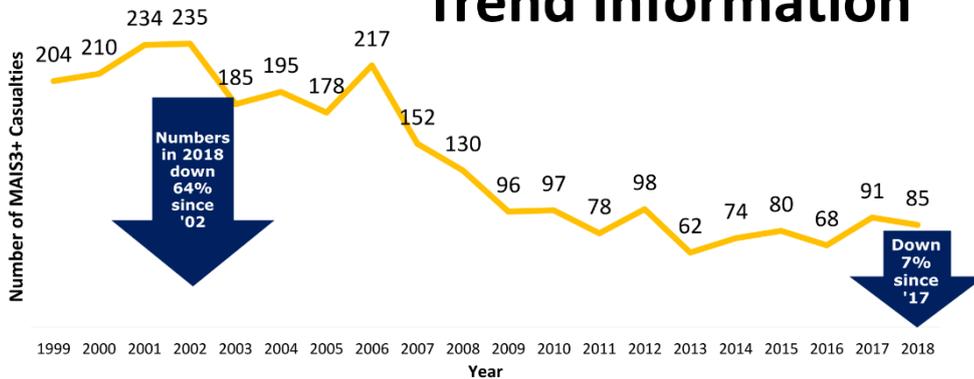
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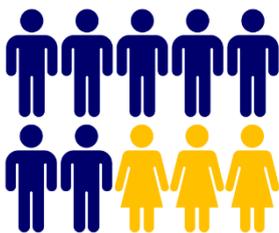
Trend Information



There were 85 MAIS 3+ road traffic casualties admitted to hospital in 2018.

The historic downward trend shows signs of levelling off in recent years.

Gender

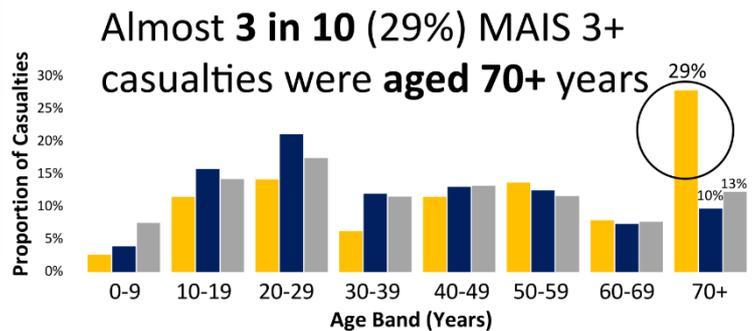


In 2014-2018
7 in 10 (70%)
MAIS 3+
casualties
were **male**

This compares with 65% of hospital admissions and 64% of PSNI reported serious injuries.

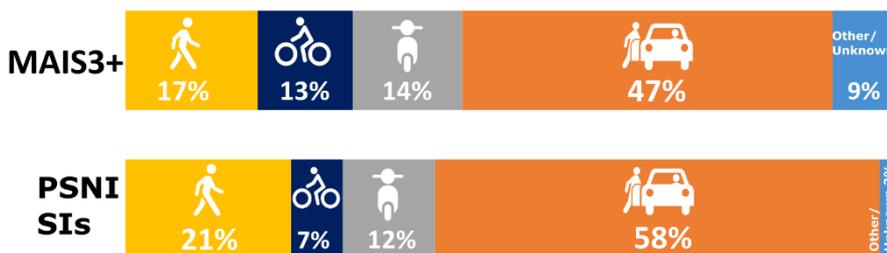
Age

■ MAIS3+
■ PSNI SIs
■ Hospital admissions



This compares with 13% of hospital admissions and 10% of PSNI reported serious injuries during the same period (2014-2018).

Road User Type



Vulnerable road users made up a greater proportion of MAIS 3+ casualties than they did of PSNI reported SIs in 2014-2018.

In 2014-2018, **9% of hospital admissions** for road traffic collisions were seriously injured based on the **MAIS 3+** definition.

In 2014-2018, **MAIS 3+** casualties accounted for **11% of PSNI reported serious injuries**.

Clinically seriously injured (MAIS 3+) road casualties in Northern Ireland, 1999-2018

The Abbreviated Injury Scale (AIS) is a clinical measure used to classify and describe the severity of injuries; it represents the threat to life associated with the injury. A score of 1 indicates a minor injury, while 6 refers to an unsurvivable injury. A casualty that sustains an injury with a score of 3 or higher on the AIS is classified as clinically seriously injured (MAIS 3+).

AIS-code	Injury	Example
1	Minor	Superficial laceration
2	Moderate	Fractured sternum
3	Serious	Open fracture of humerus
4	Severe	Perforated trachea
5	Critical	Ruptured liver
6	Unsurvivable	Total severance of aorta
9	Not known	

This is the fourth report in the series, and presents the 2018 update. The MAIS 3+ data in this report are produced using casualty admissions to hospitals in Northern Ireland between 1999 and 2018 with a clinically defined serious injury following a road traffic collision. See methodology on page 14 for further detail.

Key Points

- The MAIS 3+ series peaked in 2002 with 235 serious injury (SI) casualties, after which numbers began to fall. The most recent five years have shown evidence that the historic downward trend may now be levelling off.
- In the latest available year, 2018, there were 85 MAIS 3+ casualties – this is a decrease of 64% since the peak in 2002, and a decrease of 7% since 2017 when 91 were recorded.
- While the numbers of MAIS 3+ casualties are much lower than PSNI reported seriously injured¹, the overall trends are similar: both series have shown an historic decrease followed by signs of levelling off over the latest few years.
- Males accounted for seven-in ten (70%) of the total MAIS 3+ casualties in Northern Ireland in the five years from 2014 to 2018. This is greater than the proportions of male casualties reported in overall hospital admissions (65%) and PSNI serious injuries (64%).
- Almost three-in-ten (29%) MAIS 3+ casualties from 2014-2018 were aged 70 and over. This differs markedly from the age profile of overall hospital admissions for road traffic collisions and PSNI serious injuries, where 13% and 10%, respectively, were in this age band.
- Overall, 9% of hospital admissions for road traffic collisions in the five years 2014-2018 have injuries classified as MAIS 3+; however, the proportions differ slightly by road user type, with motorcyclists having the greatest proportion of admissions that were MAIS 3+ (10%) and pedal cyclists the fewest (7%).
- Comparing the number of hospital admissions to police reported serious injuries we see that a significant proportion (around 30% over the 20 years 1999-2018) of SI casualties are not known to the police. This under-reporting issue has been noted across many jurisdictions including GB and RoI.

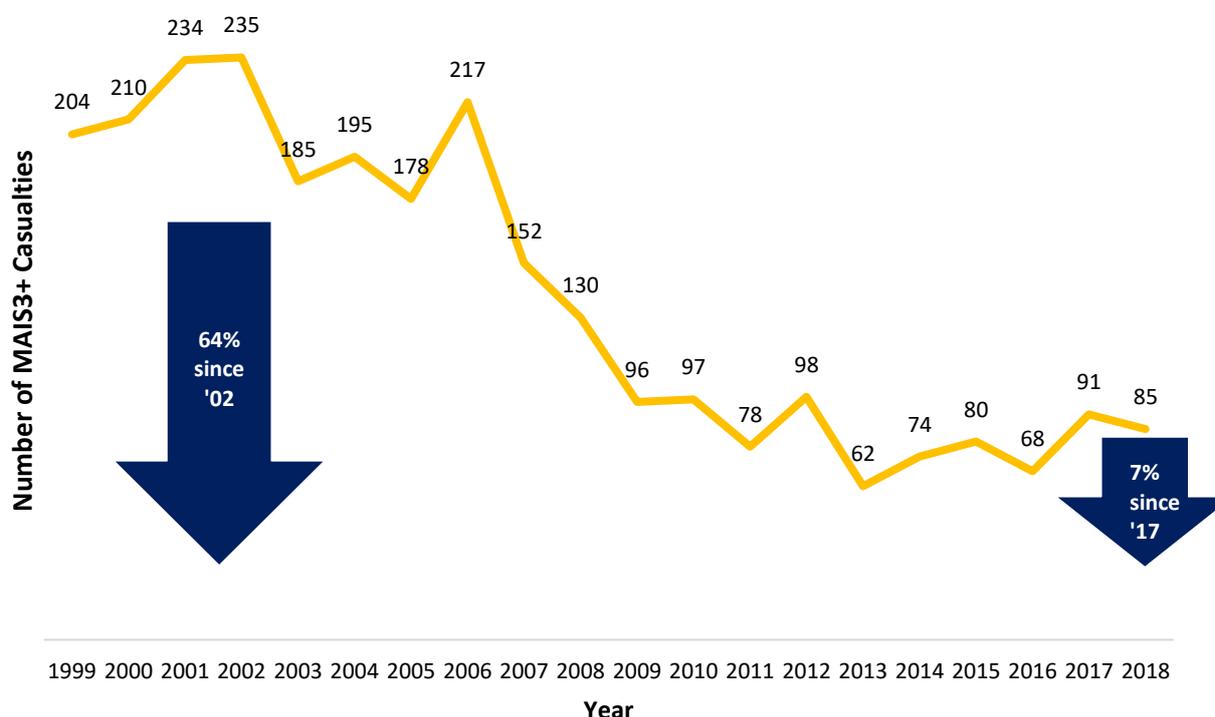
¹ The MAIS 3+ definition of a serious injury is set at a much higher threshold than the current PSNI definition which classes any hospital inpatient admission resulting from a traffic collision, irrespective of the nature of the injuries sustained by the casualty, as a serious injury.

What is the need for MAIS 3+?

The [current reporting](#) of serious injuries is derived from [PSNI data](#). It is based on the judgement of the reporting police officer, following defined guidelines, rather than on medical expertise. The main limitation is the extent to which PSNI data represents the true level of collisions that occur; research carried out suggests that a considerable proportion of non-fatal casualties in GB (and by extension in NI) are not known to the police. The PSNI data are directly comparable with GB and ROI but are not generally considered comparable with other international jurisdictions due to significant differences in the grading of severity of injury which can be applied. Reporting serious injury casualties using MAIS 3+ will therefore provide a more accurate, clinical definition of serious injury, while simultaneously correcting for the underreporting of police data and international definitional differences. It is the definition of road traffic serious injury currently recommended by the EU but, it should be stressed again, is at a much higher severity threshold than the existing PSNI definition.

MAIS 3+ in Northern Ireland

Chart 1: MAIS 3+ road casualties in Northern Ireland, 1999-2018

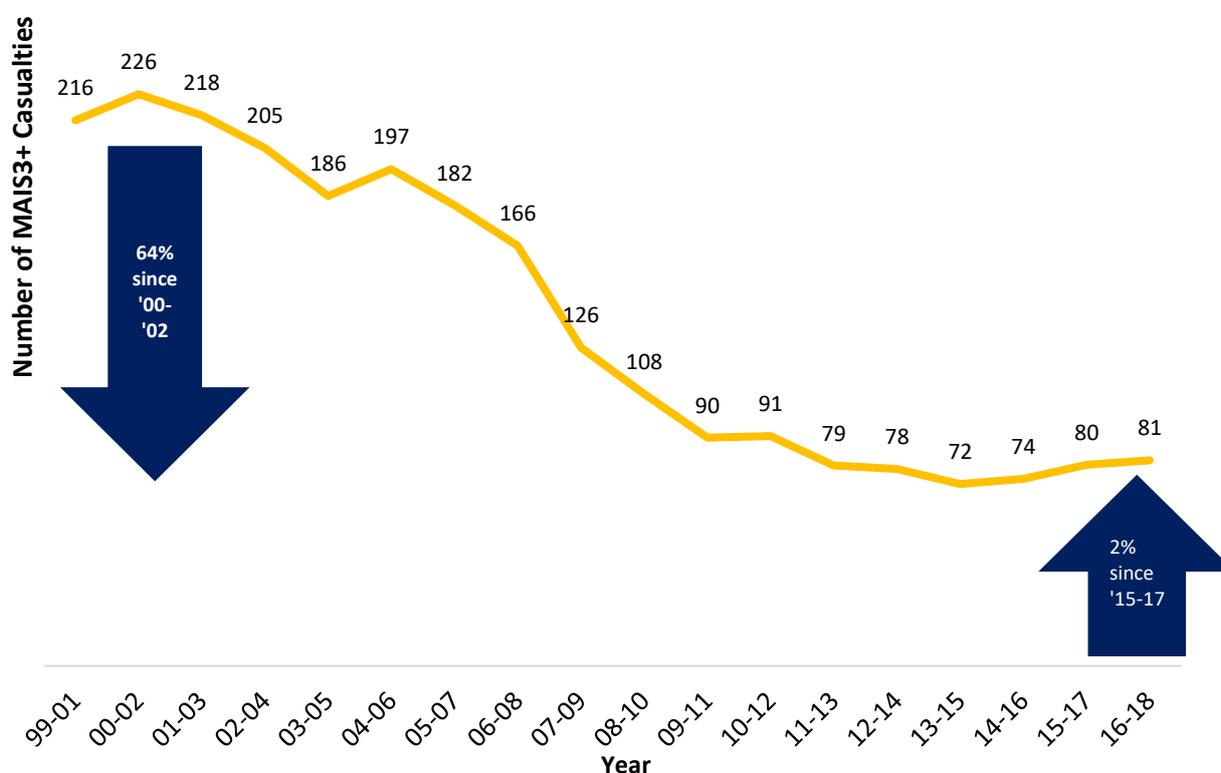


NB: A single patient may have more than one admission of care arising from a single collision; however, the number of such cases is expected to be very small.

Chart 1 on the previous page shows the number of clinically seriously injured (MAIS 3+) road casualties in Northern Ireland from 1999 to 2018. The series peaked in 2002 with 235 serious injury (SI) casualties, after which numbers began to fall (with a temporary rise in 2006). There was another peak of 98 clinical SIs in 2012, followed by a sharp decrease of over one-third (37%) to 62 in 2013, the series low. There is evidence that the historic downward trend may now be reversing, with increasing SI numbers reported in three of the last five years. Despite this, numbers remain 64% below the 2002 peak.

There has been considerable variability year-on-year across the period, although this is to be expected given the relatively small number of admissions in NI that meet the higher MAIS 3+ severity threshold. For this reason, the smoothed trend is presented below.

Chart 2: MAIS 3+ road casualties in Northern Ireland, 1999-2018 (3-Year Rolling Average)



The rolling average in Chart 2 shows more clearly the downward trend. In the time period examined, the SIs reached their highest level in the period 2000-02 (average SIs = 226), after which the numbers started to fall. The temporary rise in 2006 is, however, still evident. The latest 3 years, 2016-2018 had an average number of 81 SIs, a reduction of almost two-thirds (64%) on the series peak; however, the figure is up 2% since 2015-2017. The smoothed trend, which showed large reductions earlier in the series, began to show a much reduced rate of reduction around the beginning of last decade; the most recent data would indicate that the rate has levelled off and begun to increase. It will be interesting to see whether this further increases in future years.

MAIS 3+ compared with police-reported data

Table 1: Admissions to hospital for road traffic collisions and PSNI reported serious injuries in Northern Ireland, 1999-2018

Year of admission	Number of admissions*	MAIS3+	MAIS3+/ Admissions	PSNI Serious Injuries	MAIS3+ /PSNI SIs	PSNI SIs/ Admissions
1999	2,429	204	8%	1,509	14%	62%
2000	2,409	210	9%	1,786	12%	74%
2001	2,405	234	10%	1,682	14%	70%
2002	2,290	235	10%	1,526	15%	67%
2003	1,865	185	10%	1,288	14%	69%
2004	1,833	195	11%	1,183	16%	65%
2005	1,695	178	11%	1,073	17%	63%
2006	1,751	217	12%	1,211	18%	69%
2007	1,687	152	9%	1,097	14%	65%
2008	1,440	130	9%	990	13%	69%
2009	1,355	96	7%	1,035	9%	76%
2010	1,130	97	9%	892	11%	79%
2011	978	78	8%	825	9%	84%
2012	1,030	98	10%	795	12%	77%
2013	1,026	62	6%	720	9%	70%
2014	989	74	7%	710	10%	72%
2015	986	80	8%	711	11%	72%
2016	924	68	7%	828	8%	90%
2017	908	91	10%	778	12%	86%
2018	865	85	10%	730	12%	84%
1999-2018	29,995	2,769	9%	21,369	13%	71%
2014-2018	4,672	398	9%	3,757	11%	80%

* A single patient may have more than one admission of care arising from a single collision; however, the number of such cases is expected to be very small.

Of the 29,995 hospital admissions in NI for road traffic collisions between 1999 and 2018, only 2,769 (9%) were classified as seriously injured based on the MAIS 3+ definition. In the most recent five years, 2014-2018, the proportion is the same. It should be noted that the MAIS score was unknown in 15% of cases, so the true number of MAIS 3+ admissions may be significantly higher. See Table 1 above.

The number of MAIS 3+ casualties in NI is much lower than seriously injured casualties reported by PSNI; over the 20 year period 1999-2018, the numbers of MAIS 3+ casualties accounted for 13% of PSNI serious injuries. In 2014-2018, this reduces to 11%. This reflects the higher severity threshold for a serious injury on the MAIS scale offset, to a certain extent, by the PSNI under-reporting issue.

In general, PSNI defines a serious injury² as one for which a person is detained in hospital as an 'in-patient' or if they have one or more injuries from a predefined list. The 20 year total for PSNI SIs was 21,369, and by contrast, the 20 year total for admissions to hospital for road traffic collisions was 29,995. This highlights the fact (mentioned previously) that there is a significant proportion (around 30%) of SI casualties not known to the police. This under-reporting issue has been noted across

² Full PSNI definition of serious injury: an injury for which a person is detained in hospital as an 'in-patient', or any of the following injuries whether or not the person is detained in hospital: fractures, concussion, internal injuries, crushing's, burns, severe cuts and lacerations or severe general shock requiring medical treatment.

many jurisdictions including GB and RoI. The most recent three years have shown the highest levels of reporting – with PSNI SIs accounting for between 84% and 90% of hospital admissions; the previous series high was 84% in 2011. It is unclear why the recent proportions are so high, and it will be interesting to see whether future years maintain this level.

Chart 3: MAIS 3+ casualties from road traffic collisions and PSNI reported serious injuries, Northern Ireland 1999-2018

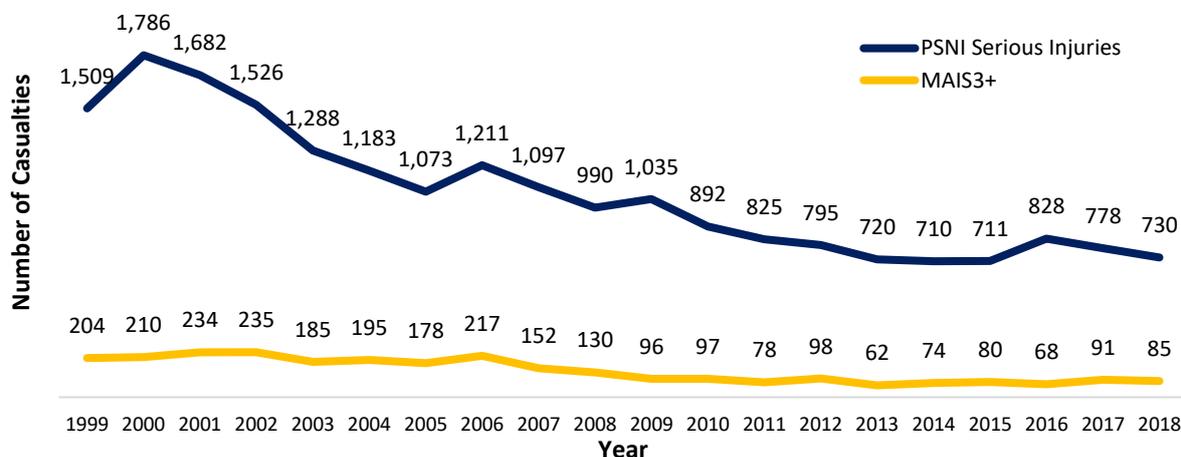
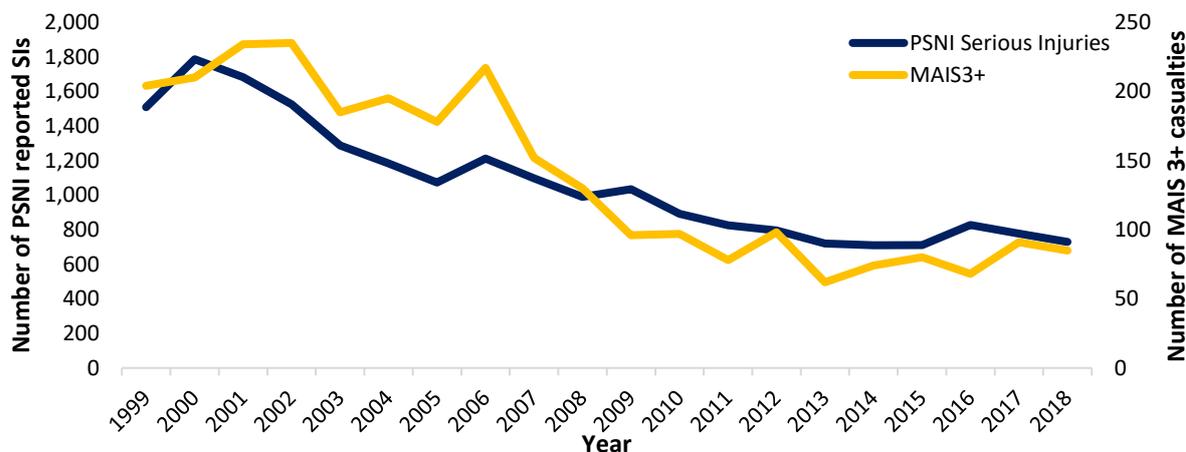


Chart 4: MAIS 3+ casualties from road traffic collisions and PSNI reported serious injuries, Northern Ireland 1999-2018 (Alternate Version – MAIS 3+ Casualties displayed on second axis)



Charts 3 and 4 show the PSNI SIs and MAIS 3+ casualty numbers; in Chart 4, the overall trends can be better compared. Notwithstanding the difference in the levels of SIs reported by each definition, it is noteworthy that both series have shown an historic decrease followed by signs of levelling off in recent years. The large peak seen in MAIS 3+ casualties in 2006 was echoed in the PSNI data; however, the greater variability associated with the much smaller numbers of MAIS 3+ casualties mean its peak is more pronounced.

Over the years there has been some disparity between the trends – for example, in 2016, PNSI SI casualty numbers increased while MAIS3+ casualty numbers decreased; in 2017 the opposite was true – the numbers of PSNI SIs decreased while MAIS3+ casualties increased. In 2018, both trends are in line again, with PSNI SIs decreasing by 6% and MAIS3+ casualties decreasing by 7% on 2017. Minor inconsistencies like these are not something to be too concerned about - with different reporting systems, there will always be divergences. Importantly, the overall trend in both series is consistent – a decrease early in the reported series followed by a levelling off in recent years.

Analysis of MAIS 3+ casualties

Gender

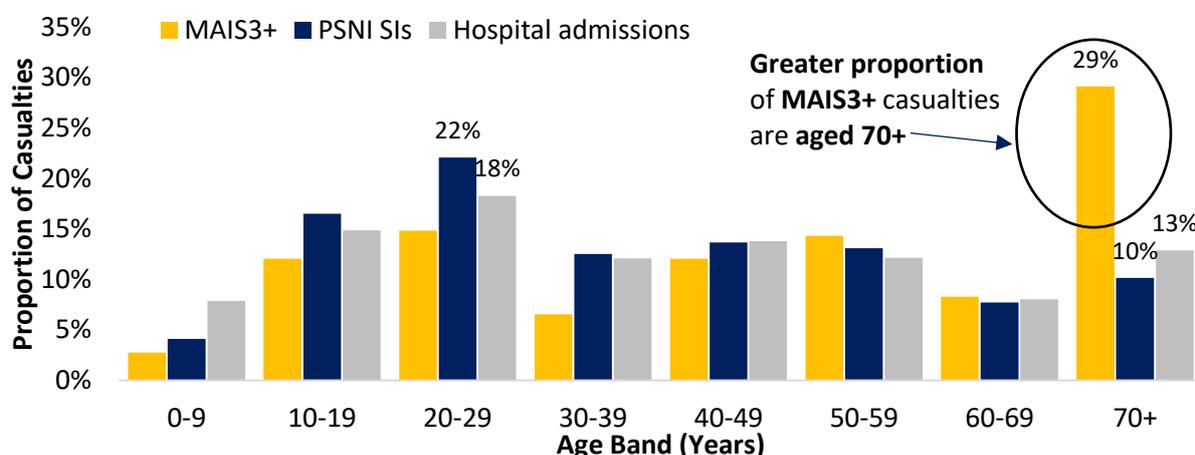


7 in 10 MAIS 3+ casualties are **male**

Males accounted for seven in ten (70%) of the total MAIS 3+ casualties in Northern Ireland in the five years from 2014 to 2018. This is greater than the proportions of male casualties reported in overall hospital admissions (65%) and PSNI serious injuries (64%).

Age

Chart 5: MAIS 3+ casualties by age³, Northern Ireland 2014-2018

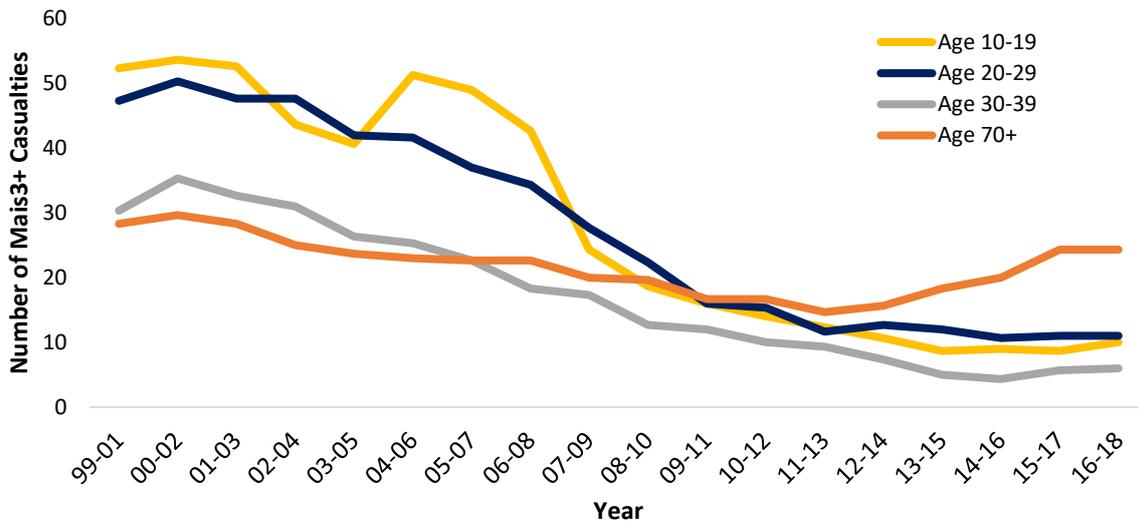


Almost three-in-ten (29%) MAIS 3+ casualties from 2014-2018 were aged 70 and over. This differs markedly from the age profile of overall hospital admissions for road traffic collisions and PSNI serious injuries, where 13% and 10%, respectively, were in this age band. The high proportion of MAIS 3+ casualties which were aged 70 and over is perhaps not surprising given people in this age band are likely to be more vulnerable than those who are younger, and you may expect an older person would suffer more serious injuries if in a collision. Their increased vulnerability is further emphasised by miles travelled data: according to the 2016-2018 Travel Survey in Northern Ireland, persons aged 70 and over travel significantly fewer miles per person per year than any other age band except those aged 0-9 (3,515 miles for persons aged 0-9; 3,696 miles for persons aged 70+; 5,868 miles for all persons).

When looking at the full trend of available data (1999-2018 for hospital admissions; 2002-2018 for PSNI SIs), it would seem the difference is not as pronounced, with 16% of MAIS 3+ casualties falling within the 70+ category, compared with 8% for both hospital admissions and PSNI SIs. The greater differences observed more recently is largely a result of decreases in the number of MAIS3+ casualties aged 10-39 alongside increases in numbers for those aged 70+ – see Chart 6 overleaf.

³ For MAIS3+ casualties and hospital admissions, this refers to the age at the start of the admission; for PSNI serious injuries it is the age at time of collision.

Chart 6: MAIS 3+ casualties by age at start of admission, Northern Ireland 1999-2018 (Selected age bands) (3-Year Rolling Average)



At the start of the reporting period, the numbers of MAIS 3+ casualties aged 10-29 were far in excess of those aged 70+, while those aged 30-39 were just slightly above. All four groups have seen a decline over the years; however, the number of older person casualties did not fall to the same extent as numbers in other age groups, and in more recent years they have started to increase steeply. The result is that numbers of casualties aged 70+ are now greater than those in the younger three groups. It is interesting to note that the large spike in casualty numbers mentioned previously, which appeared in 2006, was caused by the 'Aged 10-19' group.

Looking at both age and gender, females aged 70+ accounted for the greatest proportion of overall MAIS 3+ casualties in 2014-2018 (15%), with males aged 70+ accounting for a further 14%. In comparison to aged 70+, a much lower proportion of MAIS 3+ casualties is reported for females in all other age categories. However, it is different for males: male MAIS 3+ casualties are more evenly split across age bands, with a similar proportion to those aged 70+ reported for males aged 20-29 years, and just slightly lower proportions reported for those aged 40-59 years. The PSNI SI trend shows that young male casualties are the most frequently reported (15% aged 20-29), with fewer in other age categories. In both MAIS 3+ and PSNI SI trends we see that the proportions of male casualties far exceeds females in the younger age groups; however, the large spike in MAIS 3+ casualties aged 70+, for both males and females, is not seen in the PSNI data. See Charts 7 and 8 below.

Chart 7: MAIS 3+ by age and gender, 2014-2018

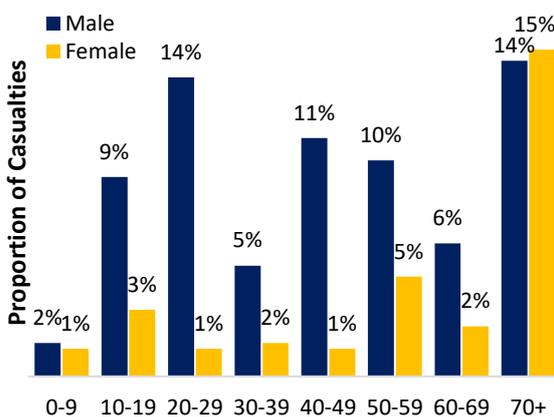
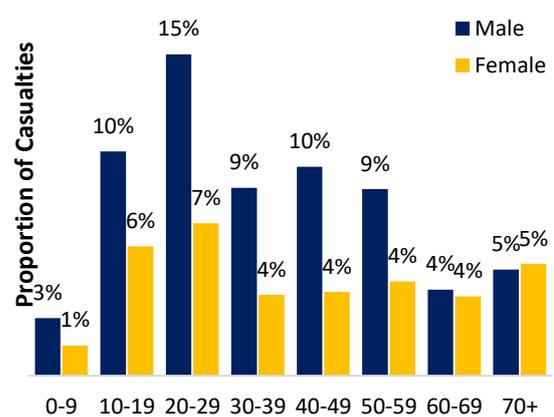


Chart 8: PSNI SIs by age and gender, 2014-2018



Road user type

Chart 9: MAIS 3+ casualties compared with PSNI reported seriously injured casualties, by road user type, Northern Ireland 2014-2018

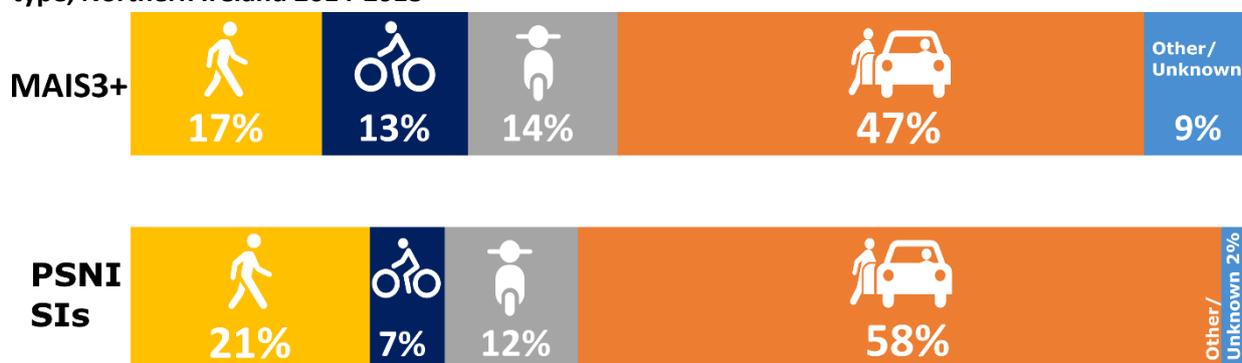


Chart 9 above shows a comparison of MAIS 3+ casualties with PSNI serious injury casualties, by road user type, over the period 2014-2018. As expected, the most frequently recorded road user type for MAIS 3+ casualties was car (47%). However, the equivalent proportion of PSNI Serious Injuries is 58%. Therefore, the numbers of casualties that were travelling by the more vulnerable modes (pedestrian, motorcycle and pedal cycle) made up a slightly greater proportion of the MAIS 3+ total than they did of the PSNI SIs (43% compared with 40%, respectively). Like the over-representation of older people in the MAIS 3+ numbers, this again is not surprising: you might expect that a motorcyclist or cyclist, for example, would suffer injuries at the more severe end of the scale if in a collision than someone travelling by car. However, it should also be noted that GB research has shown that there is significant under reporting of non-fatal pedal cyclist casualties in police data and it would not be unreasonable to assume this would also be the case in NI, which may also help to explain at least part of the difference. It is also interesting that pedestrians account for a higher proportion of PSNI SIs compared to the clinical definition despite their increased vulnerability.

Chart 10: Admissions to hospital for road traffic collisions by road user type and severity, Northern Ireland 2014-2018

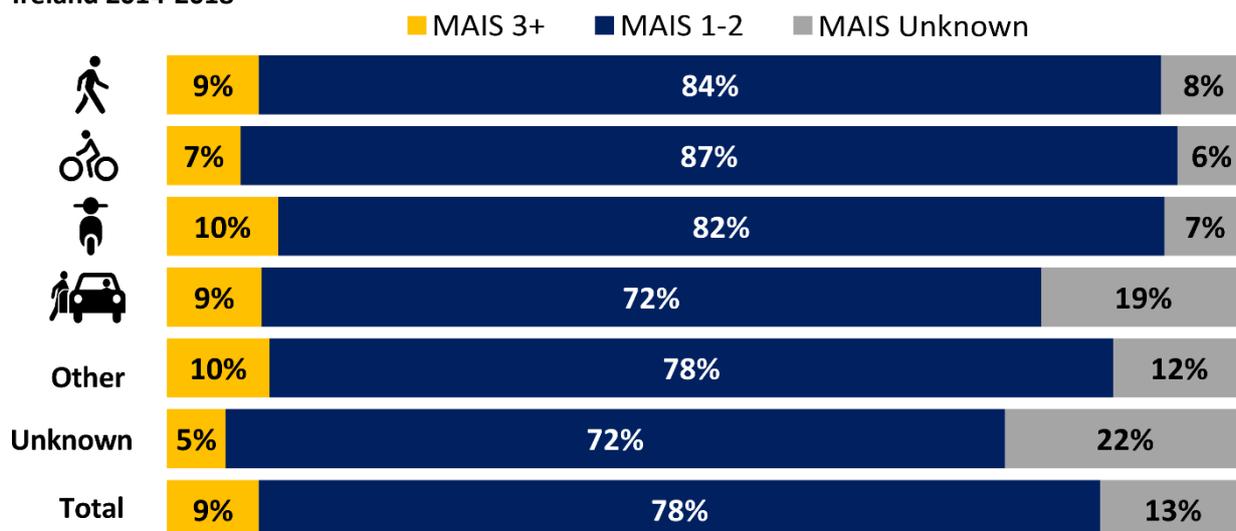


Chart 10 above shows the admissions to hospital in Northern Ireland for road traffic collisions, split by road user type and severity of injury. Of the admissions between 2014 to 2018, 9% were

MAIS 3+, 78% had a MAIS score of 1 or 2 with the remaining 13% having unknown MAIS. This differs slightly by road user type, with motorcyclists reporting the greatest proportion of admissions that were MAIS 3+ (10%) and pedal cyclists the fewest (7%). This analysis, however, is somewhat confounded by the high percentage of unknowns across the various road user categories; in particular car user admissions, where 19% were unclassified, more than double the proportion of the more vulnerable road user groups. It is currently unclear why such a high proportion of car user admissions have been unable to be classified by the MAIS 3+ measure.

Chart 11: Number of MAIS 3+ casualties by road user type, Northern Ireland 2014-2018

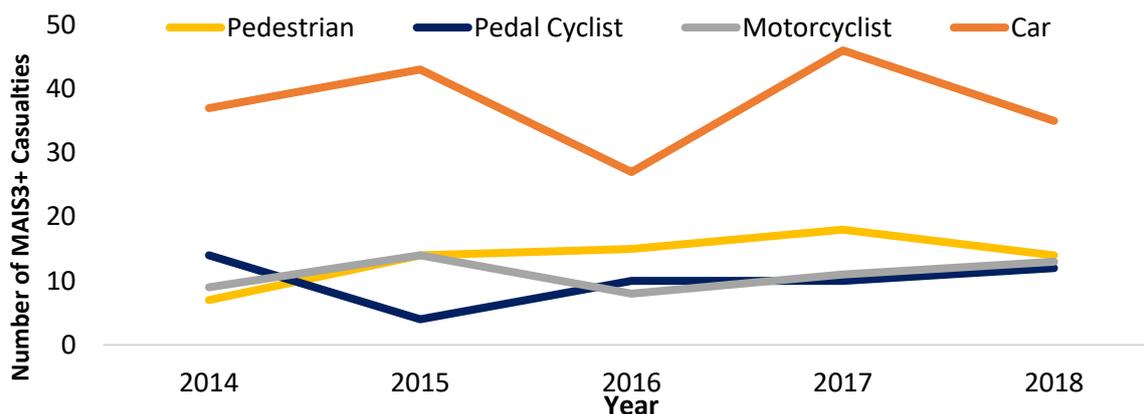
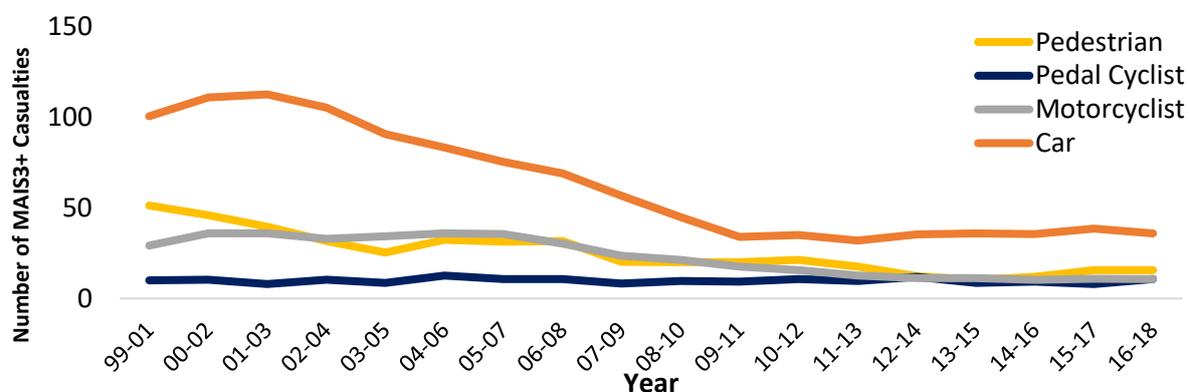


Chart 12: Number of MAIS 3+ casualties by road user type, Northern Ireland 1999-2018 (3-Year Rolling Average)



When looking at the number of MAIS 3+ casualties by road user type for the most recent five years, it's clear that each series experiences year-on-year volatility exacerbated by the small numbers in these sub-groups. For that reason, the rolling average chart (Chart 12) has been included to give a clearer indication of which direction the trends are moving. The smoothed trend would suggest there has been little change over the years to pedal cyclist MAIS 3+ casualties (the moving average tends to regress to a mean of 10 casualties); however, this must be seen in light of an increased level of cycling over largely the same time period (there has been a 68% increase in average miles cycled per person per year in Northern Ireland from 19 miles in 1999-2001 to 32 miles in 2016-2018). The three other main road user types have all experienced varying degrees of decline. Car user numbers have experienced the greatest decrease, from 113 casualties, on average in 2001-03, to 32 in 2011-13. This can partly be explained by improvements in vehicle safety. In the most recent years, however, the average numbers of car user MAIS 3+ casualties have levelled off somewhat.

Comparison with England⁴

Table 2: Comparison of NI road traffic casualties with England, 1999-2018

Year of admission	MAIS3+/Police SIs		Police SIs/ Admissions		MAIS 3+/Admissions	
	NI	Eng	NI	Eng	NI	Eng
1999	14%	12%	62%	95%	8%	11%
2000	12%	12%	74%	95%	9%	12%
2001	14%	13%	70%	94%	10%	12%
2002	15%	13%	67%	92%	10%	12%
2003	14%	15%	69%	82%	10%	12%
2004	16%	16%	65%	74%	11%	12%
2005	17%	17%	63%	65%	11%	11%
2006	18%	18%	69%	66%	12%	12%
2007	14%	19%	65%	65%	9%	12%
2008	13%	19%	69%	62%	9%	12%
2009	9%	21%	76%	58%	7%	12%
2010	11%	21%	79%	57%	9%	12%
2011	9%	22%	84%	57%	8%	12%
2012	12%	23%	77%	57%	10%	13%
2013	9%	24%	70%	55%	6%	13%
2014	10%	26%	72%	55%	7%	14%
2015	11%	28%	72%	54%	8%	15%
2016	8%	27%	90%	58%	7%	16%
2017	12%		86%		10%	
2018	12%		84%		10%	
1999-2018	13%	18%	71%	69%	9%	13%
Most recent 5 years	11%	26%	80%	56%	9%	14%

Notes:

1. England Hospital admission data for road casualties is currently only available up to 2016
2. There are currently no estimates of MAIS3+ casualties in England for 2017 or 2018.
3. Most recent 5 years: 2014-2018 in NI; 2012-2016 in England

As stated previously, over the 20 year period 1999-2018, the numbers of MAIS 3+ casualties in Northern Ireland accounted for 13% of PSNI serious injuries. By comparison, the equivalent proportion in England was greater, at 18% (see Table 2 above). The difference is greater still if considering the most recent five years of available data – 11% in NI in 2014-2018 compared with 26% in England in 2012-2016. The number of MAIS 3+ casualties is much lower than the number of seriously injured casualties recorded by police because MAIS 3+ captures more severe injuries than the definition of serious injury in police reported data; however, it was at first surprising that the proportion was that much smaller in NI (less than half the level in England in the most recent five years). Further investigation was carried out to determine whether this variation could be explained, with focus first on how representative police serious injuries were of the true level of collisions that occurred.

Hospital admissions data in England are currently only available up to 2016, however data for 1999 to 2016 shows that police serious injuries accounted for 69% of overall admissions. By comparison, the equivalent figure (1999-2018) in NI was 71%, which would seem to indicate that a broadly similar level of underreporting is present in both jurisdictions across the full period. See Table 2 above. However, splitting the time series, we can see that under-reporting of serious injuries in police data

⁴ At present, hospital admissions data is not available for Scotland or Wales.

is an increasing problem for England (Police SIs/Admissions averaged 92% in 1999-2003, falling to 56% in 2012-2016). By comparison, the trend in NI has shown an increase over the years (in 1999-2003, an average of 68% of hospital admissions were accounted for by PSNI numbers, rising to 80% in 2014-2018). In 2003, the proportion of Police SIs/Admissions in England was 82%, which is closest to the most recent five-year figure of 80% in NI – and looking at the proportion of MAIS 3+ that were accounted for by Police SIs, we see that the proportion in England in 2003 was 15%, which is much closer to the NI figure of 11% for 2014-2018. Even so, in proportionate terms it is still approximately 40% higher.

If we next examine hospital admissions, we see that from 1999-2018, MAIS 3+ casualties account for 9% of road casualty hospital admissions in NI, while the equivalent figure is 13% in England (1999-2016), or over one-third greater. See Table 2 above. Therefore, it looks to be the case that fewer casualties in NI have the most severe injuries, and the question must be asked as to why this may be so. A possible reason is discussed below.

Chart 13: Police recorded road traffic serious injury casualties by road user type in Northern Ireland and England, 2014-2018

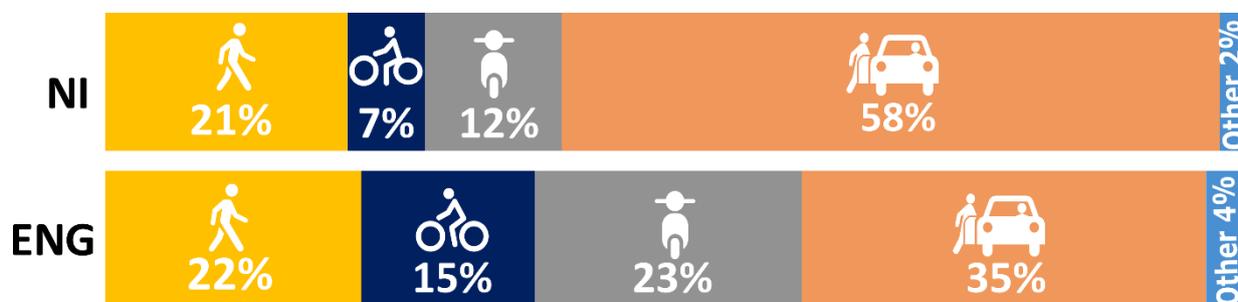


Chart 13 above shows the police reported serious injury road traffic casualties by road user type in Northern Ireland and England for the most recent five years. As expected, the most frequently reported road user type was car in both NI and England; however, the proportion varied greatly between the two jurisdictions (58% in NI compared with 35% in England). Therefore, the numbers of casualties that were travelling by the more vulnerable modes (pedestrian, motorcycle and pedal cycle) made up a smaller proportion of the police serious injury casualty total in NI than they did in England (40% compared with 60%, respectively). This road user profile may therefore offer an explanation as to why there were fewer casualties in NI that have the most severe MAIS 3+ injuries: with a smaller proportion of vulnerable road users reported in police serious injury casualties here, and based on the assumption that vulnerable road users are more likely to suffer the most serious injuries if in a collision, it would follow that NI has a smaller proportion of MAIS 3+ casualties in hospital.

To conclude, comparing NI road traffic casualties with England from 1999-2018, we see that MAIS 3+ casualties in NI account for a smaller proportion of police reported seriously injured than in England; in the five most recent years, 2014-2018, the difference is much greater. Examining the available data to try and explain this difference leads us to two possible reasons: firstly, there appears to be greater underreporting of police serious injuries in England than in NI; and secondly, the profile of the road user type differs across the two jurisdictions, with a smaller proportion of vulnerable road users in the NI police data being reflected in fewer MAIS 3+ hospital admissions here.

Methodology

The AIS

When a patient is admitted to hospital, clinical details of their conditions are coded to the International Classification of Diseases 10th revision (ICD-10)⁵. A standard look-up table has been developed by the European Commission to convert the ICD-10 diagnostic codes of road traffic related hospital admissions to the Abbreviated Injury Scale (AIS). This then provides for international comparisons of road traffic serious injuries on a consistent basis.

The AIS severity score is an ordinal scale of 1 to 6 (1 indicating a minor injury and 6 being unsurvivable) developed by the Association for the Advancement of Automotive Medicine (see table below). An admission to hospital may have a number of different injuries, with differing severities. The Maximum Abbreviated Injury Scale (MAIS) is therefore the AIS score of the most severe injury that a patient sustains; if a patient has one injury with an AIS score of 2 (moderate) and another with AIS of 4 (severe) then their MAIS score is 4. Patients with a MAIS of 3 or above (MAIS 3+) are considered to be clinically seriously injured.

Abbreviated Injury Scale

AIS-code	Injury	Example
1	Minor	Superficial laceration
2	Moderate	Fractured sternum
3	Serious	Open fracture of humerus
4	Severe	Perforated trachea
5	Critical	Ruptured liver with tissue loss
6	Unsurvivable	Total severance of aorta
9	Not known	

Producing the MAIS 3+ numbers used in this report

In addition to providing details of the injuries sustained, the ICD-10 codes also provide information on how a patient's injuries were caused. Hospital patients who have an external cause of injury relating to a road transport collision (codes V01 to V89, excluding V81) were extracted from the hospital admissions inpatient database over 1999 to 2017. Only casualties whose injuries related to collisions that occurred on a public highway (i.e. road traffic collisions) were included. Each admission was therefore assigned to a MAIS category as follows:

- MAIS 3+ if any of the patient's codes were AIS 3 or above
- MAIS<3 if all of the patient's codes were AIS1-2
- Unknown if all of the patient's codes were unknown
- Unknown if none of the patient's codes were AIS 3 or above and at least one code was unknown

Future Work

Our intention is to provide an annual update going forward. Future work will also investigate reasons for the differences in the unclassified MAIS category across road user groups.

⁵ For more information on ICD-10 see apps.who.int/classifications/icd10/browse/2016/en#!/IX

Annex of Tables

Table 1a: Admissions* to hospital in Northern Ireland for road traffic collisions, by severity of injury based on the Abbreviated Injury Scale: 1999-2018

	Mais 1-2	Mais 3+	Mais Unknown	Total
1999	1,891	204	334	2,429
2000	1,794	210	405	2,409
2001	1,819	234	352	2,405
2002	1,723	235	332	2,290
2003	1,406	185	274	1,865
2004	1,365	195	273	1,833
2005	1,278	178	239	1,695
2006	1,265	217	269	1,751
2007	1,311	152	224	1,687
2008	1,114	130	196	1,440
2009	1,044	96	215	1,355
2010	850	97	183	1,130
2011	757	78	143	978
2012	798	98	134	1,030
2013	800	62	164	1,026
2014	786	74	129	989
2015	760	80	146	986
2016	723	68	133	924
2017	697	91	120	908
2018	681	85	99	865
Total	22,862	2,769	4,364	29,995

* A single patient may have more than one admission of care arising from a single collision; however, the number of such cases is expected to be very small.

Table 1b: Admissions* to hospital in Northern Ireland for road traffic collisions, by severity of injury based on the Abbreviated Injury Scale: 1999-2018 Three-year Rolling Average

	Mais 1-2	Mais 3+	Mais Unknown	Total
1999-2001	1,835	216	364	2,414
2000-2002	1,779	226	363	2,368
2001-2003	1,649	218	319	2,187
2002-2004	1,498	205	293	1,996
2003-2005	1,350	186	262	1,798
2004-2006	1,303	197	260	1,760
2005-2007	1,285	182	244	1,711
2006-2008	1,230	166	230	1,626
2007-2009	1,156	126	212	1,494
2008-2010	1,003	108	198	1,308
2009-2011	884	90	180	1,154
2010-2012	802	91	153	1,046
2011-2013	785	79	147	1,011
2012-2014	795	78	142	1,015
2013-2015	782	72	146	1,000
2014-2016	756	74	136	966
2015-2017	727	80	133	939
2016-2018	700	81	117	899

* A single patient may have more than one admission of care arising from a single collision; however, the number of such cases is expected to be very small.

Table 2: Admissions to hospital for road traffic collisions and PSNI reported serious injuries in Northern Ireland, 1999-2018

Year of admission	Number of admissions*	MAIS3+	MAIS3+/ Admissions	PSNI Serious Injuries	MAIS3+ /PSNI SIs	PSNI SIs/ Admissions
1999	2,429	204	8%	1,509	14%	62%
2000	2,409	210	9%	1,786	12%	74%
2001	2,405	234	10%	1,682	14%	70%
2002	2,290	235	10%	1,526	15%	67%
2003	1,865	185	10%	1,288	14%	69%
2004	1,833	195	11%	1,183	16%	65%
2005	1,695	178	11%	1,073	17%	63%
2006	1,751	217	12%	1,211	18%	69%
2007	1,687	152	9%	1,097	14%	65%
2008	1,440	130	9%	990	13%	69%
2009	1,355	96	7%	1,035	9%	76%
2010	1,130	97	9%	892	11%	79%
2011	978	78	8%	825	9%	84%
2012	1,030	98	10%	795	12%	77%
2013	1,026	62	6%	720	9%	70%
2014	989	74	7%	710	10%	72%
2015	986	80	8%	711	11%	72%
2016	924	68	7%	828	8%	90%
2017	908	91	10%	778	12%	86%
2018	865	85	10%	730	12%	84%
1999-2018	29,995	2,769	9%	21,369	13%	71%
2014-2018	4,672	398	9%	3,757	11%	80%

* A single patient may have more than one admission of care arising from a single collision; however, the number of such cases is expected to be very small.

Table 3: Hospital admissions, MAIS3+ casualties, and PSNI reported serious injuries for road traffic collisions, by gender: Northern Ireland, 2008-2018

Year	Hospital Admissions				MAIS3+				PSNI SIs*			
	Male	Female	Total	% Male	Male	Female	Total	% Male	Male	Female	Total	% Male
1999	1636	793	2,429	67%	156	48	204	76%				
2000	1563	846	2,409	65%	137	73	210	65%				
2001	1678	727	2,405	70%	185	49	234	79%				
2002	1535	755	2,290	67%	167	68	235	71%	1011	515	1,526	66%
2003	1260	604	1,864	68%	144	41	185	78%	836	452	1,288	65%
2004	1260	573	1,833	69%	141	54	195	72%	777	406	1,183	66%
2005	1192	503	1,695	70%	134	44	178	75%	701	372	1,073	65%
2006	1130	621	1,751	65%	141	76	217	65%	800	411	1,211	66%
2007	1173	514	1,687	70%	110	42	152	72%	741	356	1,097	68%
2008	997	443	1,440	69%	92	38	130	71%	634	356	990	64%
2009	920	435	1,355	68%	70	26	96	73%	679	356	1,035	66%
2010	731	399	1,130	65%	65	32	97	67%	551	341	892	62%
2011	629	349	978	64%	51	27	78	65%	525	300	825	64%
2012	679	351	1,030	66%	65	33	98	66%	537	258	795	68%
2013	690	336	1,026	67%	46	16	62	74%	466	254	720	65%
2014	653	336	989	66%	55	19	74	74%	472	238	710	66%
2015	640	346	986	65%	59	21	80	74%	437	274	711	61%
2016	584	340	924	63%	47	21	68	69%	529	299	828	64%
2017	586	322	908	65%	63	28	91	69%	497	281	778	64%
2018	574	291	865	66%	55	30	85	65%	484	246	730	66%
Total	20,110	9,884	29,994	67%	1,983	786	2,769	72%	10,677	5,715	16,392	65%
2014-2018	3,037	1,635	4,672	65%	279	119	398	70%	2,419	1,338	3,757	64%

*The department holds PSNI data from 1999

Table 4a: Hospital admissions, MAIS3+ casualties, and PSNI reported serious injuries for road traffic collisions, by age: Northern Ireland, 2014-2018

Casualty	Age	Year					2014-2018
		2014	2015	2016	2017	2018	
Hospital Admissions	0-9	76	76	84	77	55	368
	10-19	173	148	138	120	116	695
	20-29	208	187	151	161	147	854
	30-39	113	117	114	104	117	565
	40-49	138	140	124	123	120	645
	50-59	88	122	121	116	121	568
	60-69	77	77	72	74	76	376
	70+	116	119	120	133	113	601
	Total	989	986	924	908	865	4,672
% 70+	12%	12%	13%	15%	13%	13%	
MAIS 3+	0-9	2	1	3	3	2	11
	10-19	7	11	9	6	15	48
	20-29	12	14	6	13	14	59
	30-39	4	4	5	8	5	26
	40-49	14	8	9	10	7	48
	50-59	6	13	12	14	12	57
	60-69	10	5	7	5	6	33
	70+	19	24	17	32	24	116
	Total	74	80	68	91	85	398
% 70+	26%	30%	25%	35%	28%	29%	
PSNI	0-9	30	31	37	31	25	154
	10-19	125	121	146	108	120	620
	20-29	170	167	184	156	153	830
	30-39	86	91	92	91	111	471
	40-49	103	104	111	116	79	513
	50-59	79	86	108	112	107	492
	60-69	47	50	60	74	59	290
	70+	65	61	90	90	76	382
	Total	710	711	828	778	730	3,757
% 70+	9%	9%	11%	12%	10%	10%	

Note: There were five PSNI reported serious injuries with unknown age. For MAIS3+ casualties and hospital admissions, age refers to the age at the start of the admission; for PSNI serious injuries it is the age at time of collision.

Table 5a: MAIS3+ casualties and PSNI reported serious injuries for road traffic collisions, by age and gender: Northern Ireland, 2014-2018

Age	MAIS3+			PSNI		
	Male	Female	Total	Male	Female	Total
0-9	6	5	11	101	53	154
10-19	36	12	48	393	227	620
20-29	54	5	59	563	267	830
30-39	20	6	26	329	142	471
40-49	43	5	48	366	147	513
50-59	39	18	57	327	165	492
60-69	24	9	33	151	139	290
70+	57	59	116	186	196	382
Total	279	119	398	2,419	1,338	3,757

Note: There were five PSNI reported serious injuries with unknown age. For MAIS3+ casualties and hospital admissions, age refers to the age at the start of the admission; for PSNI serious injuries it is the age at time of collision.

Table 5b: Proportion of MAIS3+ casualties and PSNI reported serious injuries for road traffic collisions, by age and gender: Northern Ireland, 2014-2018

Age	MAIS3+			PSNI		
	Male	Female	Total	Male	Female	Total
0-9	2%	1%	3%	3%	1%	4%
10-19	9%	3%	12%	10%	6%	17%
20-29	14%	1%	15%	15%	7%	22%
30-39	5%	2%	7%	9%	4%	13%
40-49	11%	1%	12%	10%	4%	14%
50-59	10%	5%	14%	9%	4%	13%
60-69	6%	2%	8%	4%	4%	8%
70+	14%	15%	29%	5%	5%	10%
Total	279	119	398	2,419	1,338	3,757

Note: There were five PSNI reported serious injuries with unknown age. For MAIS3+ casualties and hospital admissions, age refers to the age at the start of the admission; for PSNI serious injuries it is the age at time of collision.

Table 5c: Proportion of hospital admissions for road traffic collisions that have MAIS3+ injuries and proportion of PSNI injuries that are serious, by age and gender: Northern Ireland, 2014-2018

Age	MAIS3+			PSNI		
	Male	Female	Total	Male	Female	Total
0-9	2%	4%	3%	8%	4%	6%
10-19	8%	5%	7%	12%	8%	10%
20-29	9%	2%	7%	10%	5%	7%
30-39	5%	3%	5%	7%	4%	6%
40-49	10%	3%	7%	9%	5%	7%
50-59	10%	9%	10%	11%	6%	9%
60-69	11%	5%	9%	10%	10%	10%
70+	19%	19%	19%	14%	14%	14%
Overall	9%	7%	9%	10%	6%	8%

Note: There were five PSNI reported serious injuries with unknown age. For MAIS3+ casualties and hospital admissions, age refers to the age at the start of the admission; for PSNI serious injuries it is the age at time of collision.

Table 6a: MAIS3+ casualties and PSNI reported serious injuries for road traffic collisions, by road user type: Northern Ireland, 2014-2018

Road User	MAIS3+		PSNI SIs	
	#	%	#	%
Pedestrian	68	17%	778	21%
Pedal Cyclist	50	13%	256	7%
Motorcyclist	55	14%	457	12%
Car	188	47%	2,185	58%
Other/Unknown	37	9%	81	2%
Total	398		3,757	

Table 6b: Hospital admissions for road traffic collisions, by road user type and severity of injury based on the Abbreviated Injury Scale: Northern Ireland, 2014-2018

Road User		Mais 3+	Mais 1-2	Mais Unknown	Total
Pedestrian	#	68	668	62	798
	%	9%	84%	8%	
Pedal Cyclist	#	50	637	46	733
	%	7%	87%	6%	
Motorcyclist	#	55	439	40	534
	%	10%	82%	7%	
Car	#	188	1,553	406	2,147
	%	9%	72%	19%	
Other	#	28	230	36	294
	%	10%	78%	12%	
Unknown	#	9	120	37	166
	%	5%	72%	22%	
Total	#	398	3,647	627	4,672
	%	9%	78%	13%	

Table 6c: Number of MAIS 3+ casualties by road user type, Northern Ireland 1999-2018

Year	Road User						Total
	Pedestrian	Pedal Cyclist	Motorcyclist	Car	Other	Unknown	
1999	57	12	16	92	7	20	204
2000	48	12	35	92	13	10	210
2001	49	6	37	118	12	12	234
2002	41	13	36	123	6	16	235
2003	29	5	35	97	4	15	185
2004	25	13	28	96	11	22	195
2005	22	8	40	79	11	18	178
2006	50	17	40	75	14	21	217
2007	22	7	27	72	9	15	152
2008	23	8	24	60	5	10	130
2009	16	10	20	38	12	0	96
2010	21	11	20	37	2	6	97
2011	23	7	13	27	5	3	78
2012	20	14	14	41	7	2	98
2013	10	8	11	28	3	2	62
2014	7	14	9	37	6	1	74
2015	14	4	14	43	3	2	80
2016	15	10	8	27	6	2	68
2017	18	10	11	46	6	0	91
2018	14	12	13	35	7	4	85

Table 6d: Number of MAIS 3+ casualties by selected road user type, Northern Ireland 1999-2018
Rolling Average

Year	Road User			
	Pedestrian	Pedal Cyclist	Motorcyclist	Car
1999-2001	51	10	29	101
2000-2002	46	10	36	111
2001-2003	40	8	36	113
2002-2004	32	10	33	105
2003-2005	25	9	34	91
2004-2006	32	13	36	83
2005-2007	31	11	36	75
2006-2008	32	11	30	69
2007-2009	20	8	24	57
2008-2010	20	10	21	45
2009-2011	20	9	18	34
2010-2012	21	11	16	35
2011-2013	18	10	13	32
2012-2014	12	12	11	35
2013-2015	10	9	11	36
2014-2016	12	9	10	36
2015-2017	16	8	11	39
2016-2018	16	11	11	36

Table 7a: Admissions to hospital, MAIS3+ casualties, and PSNI reported serious injuries for road traffic accidents, England 1999-2016

Year of admission	Number of admissions	MAIS3+	MAIS3+/ Admissions	Police serious injuries	MAIS3+/ Police SIs	Police SIs/ Admissions
1999	35,346	4,019	11%	33,710	12%	95%
2000	34,673	4,055	12%	32,951	12%	95%
2001	34,317	4,025	12%	32,176	13%	94%
2002	33,849	4,188	12%	31,285	13%	92%
2003	35,555	4,311	12%	29,292	15%	82%
2004	36,324	4,267	12%	27,057	16%	74%
2005	38,617	4,399	11%	25,210	17%	65%
2006	37,393	4,453	12%	24,856	18%	66%
2007	37,027	4,541	12%	24,218	19%	65%
2008	35,736	4,287	12%	22,246	19%	62%
2009	36,874	4,386	12%	21,326	21%	58%
2010	34,369	4,092	12%	19,702	21%	57%
2011	35,471	4,368	12%	20,123	22%	57%
2012	35,089	4,534	13%	20,139	23%	57%
2013	34,767	4,643	13%	18,957	24%	55%
2014	36,579	5,119	14%	19,953	26%	55%
2015	36,365	5,433	15%	19,466	28%	54%
2016	36,852	5,870	16%	21,402	27%	58%
'99-'16	645,203	80,990	13%	444,069	18%	69%
'99-'11	465,551	55,391	12%	344,152	16%	74%
'12-'16	179,652	25,599	14%	99,917	26%	56%

Notes:

1. England Hospital admission data for road casualties is currently only available up to 2016
2. There are currently no estimates of MAIS3+ casualties in England for 2017 or 2018.

Table 7b: Comparison of NI road traffic casualties with England, 1999-2018

Year of admission	MAIS3+/Police SIs		Police SIs/ Admissions		MAIS 3+/Admissions	
	NI	Eng	NI	Eng	NI	Eng
1999	14%	12%	62%	95%	8%	11%
2000	12%	12%	74%	95%	9%	12%
2001	14%	13%	70%	94%	10%	12%
2002	15%	13%	67%	92%	10%	12%
2003	14%	15%	69%	82%	10%	12%
2004	16%	16%	65%	74%	11%	12%
2005	17%	17%	63%	65%	11%	11%
2006	18%	18%	69%	66%	12%	12%
2007	14%	19%	65%	65%	9%	12%
2008	13%	19%	69%	62%	9%	12%
2009	9%	21%	76%	58%	7%	12%
2010	11%	21%	79%	57%	9%	12%
2011	9%	22%	84%	57%	8%	12%
2012	12%	23%	77%	57%	10%	13%
2013	9%	24%	70%	55%	6%	13%
2014	10%	26%	72%	55%	7%	14%
2015	11%	28%	72%	54%	8%	15%
2016	8%	27%	90%	58%	7%	16%
2017	12%		86%		10%	
2018	12%		84%		10%	
Overall	13%	18%	71%	69%	9%	13%
2012-2016	10%	26%	76%	56%	8%	14%
2014-2018	11%		80%		9%	

Notes:

1. England Hospital admission data for road casualties is currently only available up to 2016
2. There are currently no estimates of MAIS3+ casualties in England for 2017 or 2018.

Table 7c: Police recorded road traffic serious injury casualties by road user type in Northern Ireland and England, 2014-2018

Road User	2014-2018			
	NI		England	
	#	%	#	%
Pedestrian	778	21%	23,585	22%
Pedal cyclist	256	7%	16,074	15%
Motorcyclist	457	12%	24,381	23%
Car	2,185	58%	37,360	35%
Other	81	2%	4,605	4%
Total	3,757		106,005	



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