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Reported Road Casualties Scotland 2020

A National Statistics Publication for Scotland

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Preface

This publication presents detailed statistics about the circumstances of personal injury road accidents in Scotland that were reported by the police using the Stats 19 statistical returns.

> **Given their size and detail, the tables referred to throughout the text are published separately. These tables are available as excel files on the Reported Road Casualties publication page.**

Each accident is classified according to the severity of the injury to the most seriously injured person involved in the accident. These statistics are used to inform public debate and support policy on road safety (through education and engineering programs).

This publication also includes statistics related to further analysis on specific road safety topics. For example:

- Valuation of road accident and casualties: Table 9 presents estimates of the value of preventing reported road accidents in GB and Scotland, based on DfT analysis.
- Drink drive estimates: Table 22 presents estimates of the levels of accidents and casualties involving drivers and riders with illegal alcohol levels using Procurator Fiscal data.

Review of Stats 19

National & local government police forces across Great Britain work closely to achieve an agreed standard for the system for collecting & processing statistics on road accidents involving personal injury. The statistics are subject to regular reviews as part of the continued drive to improve quality and meet user needs whilst minimising the burden of collection.

The most recent STATS19 review started in autumn 2018 and has made a number of recommendations on changes to STATS19 going forward. These were based on evidence and detailed discussion with the review group.

Key recommendations can be found in the full STATS19 review report.

For further information please contact: STATS19REVIEW@dft.gov.uk

Office for Statistics Regulation compliance check

In 2019, these statistics were assessed against the Code of Practice for Official Statistics by the Office for Statistics Regulation (OSR). The outcome of the review was that these statistics should continue to be classified as national statistics. More information about the findings of the review is available on the OSR website.

Further details on the role of the UKSA and the assessment process can also be found via the OSR website.

The status of the statistics

Most of the data used in this publication were extracted from the Road Accidents statistical database on the **16 September 2021**. The statistics given here may differ slightly from those published elsewhere (e.g. provisional figures published in *Key Reported Road Casualty Statistics* in June) because they were extracted on a different date and wouldn't incorporate any later changes (e.g. due to late returns or late corrections). Any late returns will be incorporated into the next available publication.

The information held in Transport Scotland's Road Accident Statistics database was collected by the police following each accident, and subsequently reported to Transport Scotland. Transport Scotland's statistics may differ slightly from the local authorities as changes or corrections that local authorities may have made, for use at local level, to their own data may not always be accounted for in the Transport Scotland database.

Casualty severity changes

From around June/July 2019 Police Scotland has been using a new accident and casualty data recording system called CRASH (Collision Reporting and Sharing). Before the introduction of CRASH, police officers would use their own judgement, based on official guidance, to determine the severity of the casualty (either 'slight' or 'serious'). CRASH is an injury-based recording system where the officer records the most severe injury for the casualty. The system then automatically converts the injuries to a severity level from 'slight' to 'serious'. It should be noted that in some cases although the most severe injury appears to be slight, if the casualty is subsequently admitted to hospital the casualty severity should be classed as serious.

Since CRASH removes the uncertainty that arises from officers having to assess the severity of casualties based on their own judgement, severity information collected in this way is expected to be more accurate and consistent. However, the move to an injury-based reporting system tends to result in more casualties being classified as 'serious' and therefore causes a discontinuity in the time series. The Department for Transport has carried out analysis to show what historical figures would have looked like if CRASH had been used previously. More information on the adjustment methodology can be found at the end of this section.

The years covered in the tables

Some tables present a time series so that any trends can be identified. However, more detailed tables provide figures in the form of 5-year annual averages (e.g. 2016-2020), and do not present figures for the latest single year. This smooths out levels of variation often present with low numbers of accidents and casualties. If readers require versions of the detailed tables for single years, these can be provided on request.

Road casualty reduction targets

In many of the tables, the latest figures are compared with the annual averages for 2004-08. This is to allow comparison against the 2020 Scottish specific casualty reduction targets published within the Scottish Road Safety Framework in 2009.

This publication provides the final assessment of the targets. Due to the changes in casualty severity recording, progress against some of the targets is measured using the adjusted figures produced by the Department for Transport, which show what historical figures would have looked like if the CRASH system had been used previously.

The Scottish Government recently published a new Road Safety Framework to 2030 which incorporates a new set of targets. Progress towards these new targets will be reported from next year within this publication.

Estimates of the total volume of road traffic

Some tables include estimates of traffic volumes, or accident or casualty rates calculated from them. The traffic estimates were provided by the Department for Transport (DfT), which produces estimates of the total volume of road traffic for Scotland and for other parts of Great Britain. Care should be taken when using these estimates and a detailed description can be found in Appendix D of this publication.

Other Scottish Transport Statistics

Reported Road Casualties Scotland is one of a series of Transport Statistics publications. Details of other Transport Scotland statistics can be found at http://www.transportscotland.gov.uk/analysis/statistics.

Key articles from previous editions of Reported Road Casualties Scotland

Article	Version of RRCS where article can be found
Estimating under- counting of Road Casualties in Scotland	RRCS 2010 http://bit.ly/2xSFW9v
Priorities in Scotland's Road Safety Framework to 2020- An assessment of relative levels and trends	RRCS 2011 http://bit.ly/2yHMoz6
Comparison of police casualty statistics with other sources	RRCS 2011 http://bit.ly/2yHMoz6
Vulnerable road users	RRCS 2014 http://bit.ly/2yqZLrx
In Focus: Pedal and motorcycle casualties	RRCS 2013 http://bit.ly/2yXQcxb
Road User Factsheet	RRCS 2017 https://bit.ly/2IVRkbl
Casualty rates for local authority roads by local authority area, and the likely range of random year-to-year variation in these figures	RRCS 2018 https://bit.ly/2SW0GZg

We welcome suggestions for improving the usefulness of the data and the publications. Comments and enquiries should be sent to the address below.

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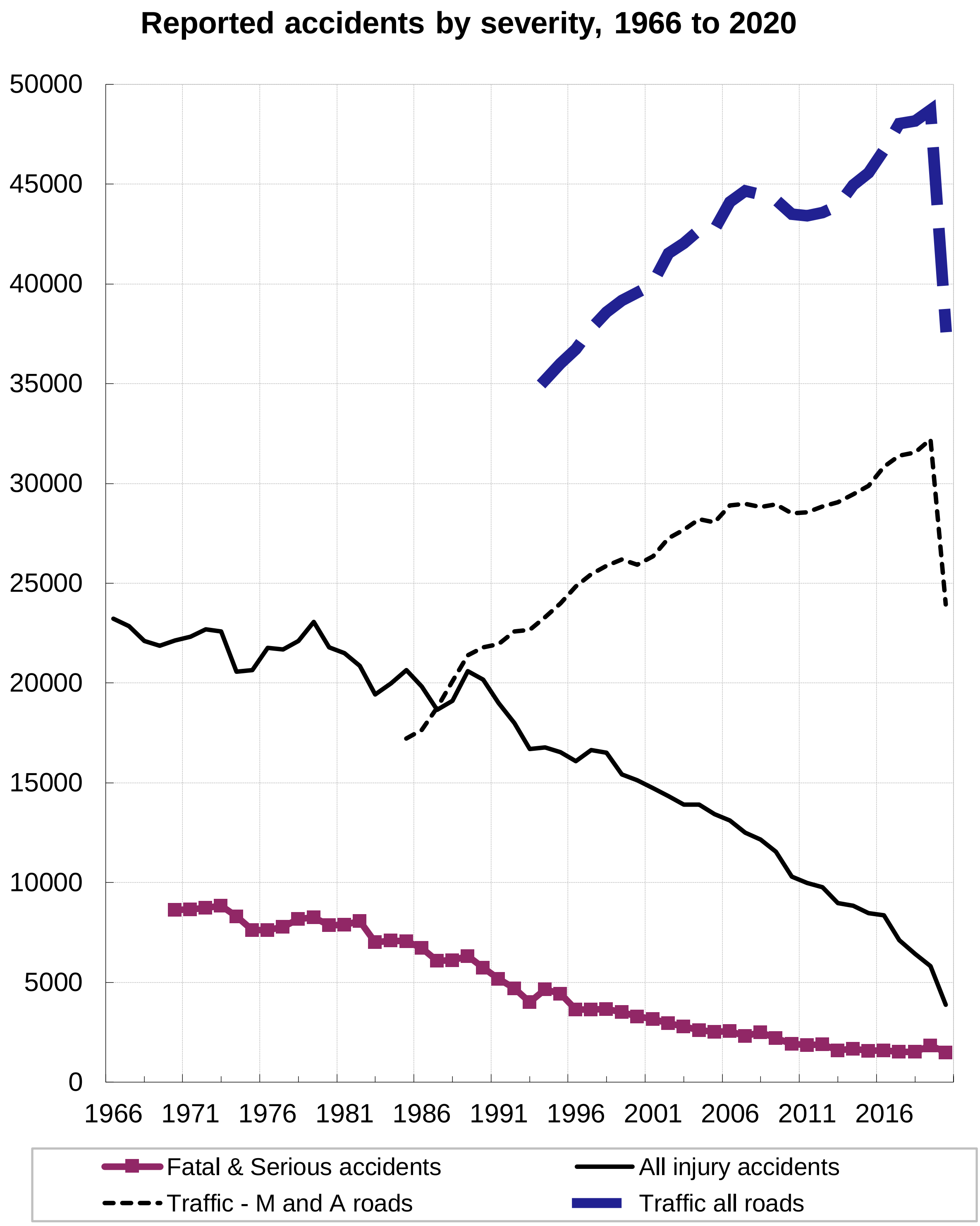
Figure 1 - Reported accidents by severity,1966 to 2020



Note for Figure 1: Due to changes in the way casualty severities are recorded, serious figures in 2019 and 2020 are not comparable with previous years.

Trends in the reported numbers of Injury Road Accidents and Casualties

Main Points

In 2019 Police Scotland started to use a new accident recording system. The introduction of this new system has changed the way casualty severity is recorded and, as a result, comparisons of the number of serious and slight casualties to earlier years should be made with caution. This publication includes adjusted figures in Tables 1a and 1b, produced by the Department for Transport, that allow users to make comparisons to previous years. Other breakdowns, such as severity by mode of transport and type of road, are presented on the basis of the unadjusted figures as reported by Police Scotland.

Table 1 shows the long-term trends in the reported numbers of injury road accidents and casualties, the population of Scotland, the number of vehicles licensed, the length of the road network and the volume of traffic. Information on the severities of the accidents, and of the injuries suffered by the casualties, is provided in Table 2. The numbers of injury road accidents were first recorded separately in 1966, while the numbers of casualties are available back to 1938, with annual collection of data starting in 1950. Figures 1 to 7 illustrate the trends in the reported numbers of injury road accidents and casualties including (in some cases) indications of the likely range of random year–to-year variations.

As mentioned in the introduction, injury accidents not reported by the public to the police won't appear in the returns. Note that each accident will result in one or more casualties. For example a fatal accident could result in two fatalities and a serious injury which would count as one accident and 3 casualties.

Accidents

- In 2020, there were 131 fatal accidents, 28 (18%) less than in 2019.
- In 2020 there were 1,371 serious injury accidents.
- In 2020 there were 2,376 slight injury accidents.

Casualties

- There were 141 people killed in road accidents in Scotland in 2020, 25 (15%) less than in 2019.
- 1,547 people were seriously injured in road accidents in 2020.

- 3,352 people were slightly injured in road accidents in 2020.
- There were a total number of 5,040 casualties in 2020 – 2,705 (35%) fewer than in 2019.

The reductions in the numbers of accidents and casualties in recent years are notable particularly given the rise in vehicle and subsequent traffic; e.g. in 2020 the number of vehicles licensed in Scotland was about thirteen per cent higher than in 2010. Prior to the coronavirus pandemic, motor traffic had been increasing steadily.

Reported Accidents

In 1966 there were just over 23,200 injury road accidents and the annual total remained around this level until 1973. Numbers then dropped considerably in 1974 and 1975 to about 20,600. This was the time of a fuel crisis when a national speed limit of 50 mph was introduced and the volume of traffic in Great Britain fell by 3% in 1974. Accident numbers increased again in 1976 and reached a peak of nearly 23,100 in 1979.

In the early 1980s numbers began to fall, and did so particularly sharply in 1983 when the total number of injury accidents fell by 7% in a single year to 19,400, serious accidents fell by 13% to just over 6,400, and fatal accidents fell by 11% to 568. The 1981 Transport Act came into force in 1983 and changed the law relating to drink driving, with the introduction of evidential breath testing. Compulsory front seatbelt wearing and new procedures for licensing learner motorcyclists were also introduced in 1983. After 1983 the total number of injury accidents increased again to over 20,600 in 1985, and the number of serious accidents rose to just over 6,500 while fatal accidents continued a downward trend.

By 1987 the total number of injury accidents had fallen to under 18,700, but in 1989 it rose to just over 20,600. 1989 was the most recent peak in the total number of injury accidents. Since 1989, the total number of injury accidents has fallen in 28 out of 32 years, and in 2020 it was at the lowest level ever recorded. The 2020 figure of 3,878 was 1,928 less than in 2019.

Since the late 1980s, the number of **fatal accidents** has fallen considerably e.g. from 517 in 1987 to 131 in 2020. For **serious accidents**, the trend has also been downwards. The number of serious accidents has fallen e.g. from 5,814 in 1989 to 1,369 in 2018. The number of **slight accidents** did not share such a clear downward trend between 1970 and 1998, oscillating between 12,000 and 15,000 with a recent peak level of 14,443 in 1990. However, they fell below 12,000 in 1999, and the 2018 figure of 4,904 was the lowest since slight accident numbers were first recorded in 1970.

As outlined above, Police Scotland's move to CRASH, an injury-based reporting system, has resulted in changes in severity reporting. Table 1a provides adjusted figures to show how many slight and serious accidents there would have been in previous years if they had been recorded using an injury-based reporting system. These experimental statistics, produced by the Department for Transport, make it possible to compare the most recent statistics to previous years. On the basis of the adjusted figures, the number of serious accidents in 2020 decreased by 37% on 2019, and the number of slight accidents decreased by 11.5%.

Reported Casualties

As the numbers of accidents have fallen, so have the numbers of casualties. Therefore, this section does not repeat the previous section's detailed analysis of how the numbers have changed. Details can be found in Table 2.

Numbers killed

In 2020 there were 141 people killed in road accidents in Scotland, a decrease of 15% on 2019. With a few exceptions, figures fell in each year since 1978, showing a clear, steady long-term downward trend, particularly between 1982 and 1994. Since then, figures have been fluctuating around a less pronounced downwards trend. The number in 2020 was below the average for the previous five years (161).

Numbers seriously injured

In 2020 there were 1,547 people seriously injured in road accidents. The long-term trend shows that the number of serious casualties peaked in the early 1970s at around 10,000 and generally fell since the early 1980s. The long-term downward trend appeared to level off at around 4,050 in the mid to late nineties, but the downward trend subsequently resumed. Table 1b provides adjusted figures to show how many serious casualties there would have been in previous years if they had been recorded using an injury-based reporting system. These experimental statistics, produced by the Department for Transport, make it possible to compare the most recent statistics to previous years. On the basis of the adjusted figures, the number of people seriously injured in 2020 decreased by 39% on 2019.

Numbers slightly injured

In 2020 there were 3,352 people slightly injured. Between 1970 and 1990, the figures fluctuated between 17,000 and 21,000. The fall between 1990 and 1995 was followed by an apparent levelling-off at around 17-18,000 in each of the years from 1996 to 1999. However, 2000 to 2018 showed consecutive falls suggesting a continuing downward trend. Table 1b provides adjusted figures to show how many slight casualties there would have been in previous years if they had been recorded using an injury-based reporting system. On the basis of the adjusted figures, the number of people slightly injured in road accidents in 2020 decreased by 31% on 2019.

Total numbers of casualties

In 2020 there was a total of 5,040 casualties, 2,705 (35%) fewer than in 2019 (the lowest number recorded). Between about 1970 and 1990, the figures fluctuated around a general downward trend. Subsequently, the casualty figures fell markedly from the level of the most recent short-term peak (over 27,000 in both 1989 and 1990), before appearing to level off. However, the downward trend resumed from 1999 to 2020.

Impact of the COVID-19 pandemic on reported road casualties

Due to the impact of COVID-19 and the associated restrictions on daily activity, there have been changes in people's travel behaviour over the course of 2020. The significant drop in casualty numbers in 2020 will have been significantly affected by these changes in travel.

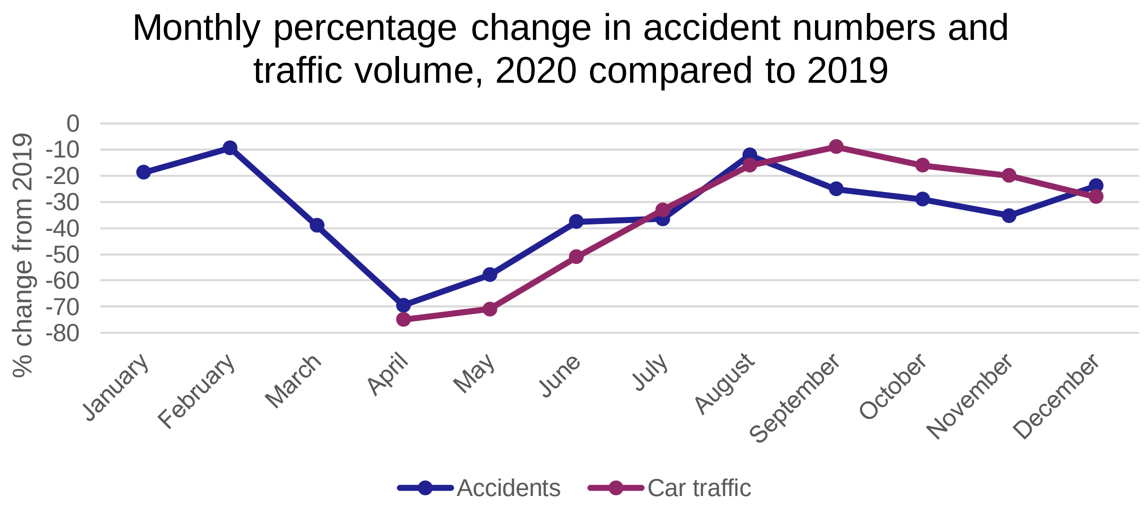
Motor traffic reductions

In 2020 there was a significant drop in the volume of motor traffic in Scotland. The UK government's Department for Transport (DfT) estimates that motor traffic volume dropped by 23% in Scotland in 2020 compared with the previous year (Road traffic estimates in Great Britain 2020: Table TRA0103).

In general terms, reductions in traffic should lead to smaller numbers of interactions between road users. Therefore, all else being equal, we would expect to see a decrease in the number of accidents as a result.

From relatively early in the pandemic Transport Scotland published a measure of traffic volume on the trunk road network, which accounts for around 40% of traffic volume in Scotland (Covid-19 National Transport Trend Data). The trend in casualties throughout the year broadly mirrors the changing levels of estimated car traffic.

Figure A - Monthly percentage change in accident numbers and traffic volume, 2020 compared to 2019



Comparisons with other countries

Due to consistent recording practices, fatalities are the most readily comparable class of casualty with other countries. The 15% drop in fatalities in Scotland in 2020 is broadly in line with reductions seen internationally. Road deaths in Great Britain as a whole (GB) saw a 17% decrease in 2020 as did road fatalities in the European Union (EU).

Trends for fatalities in the EU and GB followed a similar trend to casualties in Scotland, with the largest percentage drop occurring in April, as travel restrictions were introduced in many countries.

Over the course of the year there was a smaller reduction in fatalities (15%) than injured casualties (34%). It may be that during lockdown less serious accidents were not reported to the police to the same degree as in previous years. This pattern was seen across GB as a whole.

Please see the road casualty reports covering GB and the EU for further information.

Increased cycling

The only transport mode that did not see a reduction in casualties in 2020 was pedal cycle, with total pedal cycle casualties rising by 2%.

DfT produce estimates of cycling on the road network, which suggests that cycling on the road network increased by 61% in Scotland in 2020 (Road traffic estimates in Great Britain 2020: Table TRA0403).

A similar pattern was seen for GB as a whole, insofar as cycle fatalities increased in GB in 2020 amidst a 46% increase in road cycling.

Reduced bus use

Casualties amongst bus users saw a particularly notable drop of 58% in 2020. This may be partly explained by the significant drop in bus use during the pandemic. Total passenger numbers on local bus services in Scotland were down 53% in 2020 compared with 2019 (Quarterly bus statistics: Table BUS0106).

Reported Accidents by road type and severity

Table 4 shows separate figures for trunk roads and local authority roads. Trunk roads accounted for a minority of the total number of accidents in 2020: 30% of fatal accidents, 17% of serious accidents, and 17% of all accidents. The trunk road network's share of accident numbers in previous years were broadly similar.

Accident trends for different types of road will be affected by developments in the surrounding area (new city and town bypasses, construction of new roads with high average traffic flows etc.) Therefore, figures do *not* provide an accurate measure of the comparative change in the road safety performance of different types of road.

Several changes were made to the trunk road network with effect from 1st April 1996. Appendix E refers to them, and explains why the 1994-98 averages for trunk roads and for local authority major roads have been calculated by counting accidents which occurred prior to 1st April 1996 on the basis of whether they occurred on roads which were part of the post- 1 April 1996 trunk road network.

Accident rates

Accident rates showing the number of accidents per 100 million vehicle kilometres are contained in parts (b) and (c) of table 5. These are calculated by dividing the numbers of accidents on each type of road by the estimated volumes of traffic on those roads, which were provided by the Department for Transport, and which are available for all types of road with effect from 1993. The five-year average accident rates were calculated by dividing the total number of accidents which occurred in each five-year period by the total of the estimated volumes of traffic for the same period, rather than by calculating the averages of the individual accident rates for the five years.

Accident rates have fallen markedly since the early 1990s. The overall fatal accident rate has dropped from 0.66 per 100 million vehicle kilometres in 2005 to 0.35 in 2020 and the overall accident rate (all severities) reduced from 29.71 per 100 million vehicle kilometres to 10.24. Motorways had consistently lower accident rates than A roads. Leaving aside the relatively low rate for fatal accidents, minor roads (taken together as a group) tend to have higher accident rates than major roads, and accident rates tend to be higher for built-up roads (roads with speed limits of up to 40 mph) than for non built-up roads (ones with higher speed limits).

Part C of the table shows that estimated accident rates vary considerably by police force area. Some of this variation may be attributed to the distribution of traffic by road type within individual areas.

Accidents by month by road type

Table 6 refers.

The numbers of injury accidents over the years 2016-2020 were fairly evenly spread throughout the year, with minor peaks in February and August. (Months are standardised to 30 days to allow comparison).

On average, there were 12 fatal accidents per month in the years 2016 to 2020. Over the five year period, the number did not vary greatly between the months: the lowest average was 10, and the highest was 16.

Accidents by light condition and road surface condition

Table 7 refers.

The light and road surface conditions and the type of road (e.g. built-up) contribute to the severity of an accident. Severity rates are higher on non built-up roads than on built-up roads, likely due to the higher average speed. Severity rates are also higher in darkness than in daylight, likely due to poorer visibility.

For example, taking the annual averages for 2016-2020, 5.4% of injury road accidents on non built-up roads in darkness (32 out of 590) resulted in one or more deaths compared with 1.7% of accidents on built-up roads in darkness (18 out of 1,065) and 4.3% of accidents on non built-up roads in daylight (72 out of 1,676).

Car driver accident rates

Table 18b refers.

This table includes all car drivers involved in injury accidents regardless of whether they were injured or not, on the basis of whatever information is known about their ages and their sex. For example, someone whose sex was known, but whose age was not known, will be included in the all ages total for the appropriate sex. The grand total includes those for whom neither the age nor the sex was known.

As the car driver accident rates shown for each sex and age group are on a per head of population basis, rather than based on the numbers of driving licence holders or on the distance driven, they can provide only a general indication of the relative accident rates for each group. The statistics do *not* provide a measure of the relative risk of each group as car drivers, because they do not take account of the differing levels of car driving by each group.

Age & Gender

Car driver accident rates per head of population vary markedly by age and sex. In 2020, the overall rate was 1 accident per thousand population aged 17+. The peak occurs for males in the 17-25 age group, with a rate of 1.9 per thousand population in 2020. This rate is almost one and a half times those of females of the same age (1.2 per thousand in 2020).

The overall male car driver accident rate in 2020 was 1.3 per thousand population; lower than 2019 with rates for all age groups being lower than the previous year. The overall female car driver accident rate in 2020 was 0.7 per thousand population and all age groups showed decreases from the previous year.

Between 2010 and 2020, the male car driver accident rate fell from 3.6 to 1.3 per thousand population, while the female car driver accident rate has declined slowly from 2.2 to 0.7 per thousand in 2020. As a result, the overall, ratio of male to female car driver accident rates has increased from 1.6: 1 for 2010 to 1.9 : 1 in 2020.

Reported casualties by type of road

Table 23 refers.

In 2020, non built-up roads accounted for two-fifths of the total number of casualties (40%: 2,008 out of 5,040). However, because speeds are higher on non built-up roads than elsewhere (the definition is roads with a speed limit of more than 40mph), they accounted for almost three quarters of those killed (62%: 87 out of 141) and for just under half of the total number of seriously injured (44%: 687 out of 1,547).

Compared with 2010, the fall in the total number of casualties has been 65% for non built-up roads and 61% for those elsewhere. The difference in the numbers killed on non built-up roads is higher than those on built-up ones (down by 42% for non built-up roads compared with a reduction of 8% elsewhere). Over the years, some traffic will have been transferred away from built-up roads by the opening of city and town bypasses, and by the construction of non built-up roads with higher average traffic volumes. Therefore, these figures do *not* provide an accurate measure of the comparative change in the road safety performance of built-up and non built-up roads.

Casualties by mode of transport

Table 23 refers.

A total of 2,769 car users were injured in road accidents in 2020, representing 55% of all casualties. Of these car users, 71 died. There were 812 pedestrian casualties (16% of the total), of whom 34 died, 605 pedal cycle casualties (12% of the total), of whom 11 died, and 418 motorcycle casualties (8% of the total), of whom 16 died. Because of the numbers of car user, pedestrian, pedal cyclist and motorcyclist casualties, the figures for each of these four groups of road users are the subject of separate sections, which follow this one, and are followed by a section on child casualties, which gives details of their modes of transport.

Together, all the modes of transport other than the four mentioned above accounted for 436 casualties in 2020 (9% of the total), and for smaller percentages of the numbers of seriously injured. These included 84 bus and coach users injured in 2020, of whom 20 suffered serious injuries (none died). There were also 170 casualties who were travelling in light goods vehicles(6 died), 41 people in heavy goods vehicles(1 died), 66 users of taxis(one died), 13 users of minibuses(none died) and 62 people with another means of transport(1 died).

Car user casualties

A total of 2,769 car users were injured in road accidents in 2020, representing 55% of all casualties. Of these people, a total of 635 were seriously injured, 71 died. Non built-up roads accounted for just over a half of all car user casualties (51%: 1,401 out of 2,769). Perhaps because average speeds are higher on non-built up roads, they accounted for much higher percentages of the total numbers of car users who were killed (73%: 51 out of 71) or were seriously injured (65%: 413 out of 635). *(see Table 23)*

The number of car users killed in 2020 was 5 less than the 2019 figure and the total number of casualties of all severities was down by 40%. Since 2010, the number killed has dropped by 32%, and there has been a fall of 67% in the total number of car user casualties. *(see Table 23)*

Looking at the annual average over the years 2016-2020, the casualty rate for 16-22 year old car users was 1.89 per thousand population. This was much higher than the rate for car users in the older age groups, which varied from 0.59 to 1.00 per thousand population. *(see Table 32)*

On average, over the years 2016-2020, 69% of car user fatalities occurred on roads with a speed limit of 60mph. Such roads accounted for 36% of the total number of car user casualties of all severities, where more casualties occurred on roads with a 30 mph limit (39%). *(see Table 33)*

Adult car users

On weekdays, the peak time for adult car user casualties was from 4pm to 6pm. The 5pm to 6pm average of 310 (the average over the years 2016-2020) was 35% higher than the average of 230 in the morning 8am to 9am peak. *(see Table 28)*

Adult car user casualties varied by month, with fewest in April and most in August. August had 23% more adult car user casualties than April (annual averages over the years 2016-2020; months standardised to 30 days). *(see Table 29)*

Friday had the peak numbers of adult car user casualties over the years 2016-2020 with 16% more than the average daily number of adult car user casualties. *(see Table 30)*

Pedestrian casualties

There were 812 pedestrian casualties in 2020: 16% of all casualties. Of these, 323 were seriously injured and 34 died. Presumably due to their greater vulnerability, a higher proportion of the total number of people who were killed (24%) and seriously injured (21%) were pedestrians. In addition, 40% of pedestrian casualties were seriously injured (323 out of 812) compared with serious for all modes of 31% (1,547 out of 5,040). 95% of pedestrian casualties occurred on built-up roads (1,199 out of 1,265) in 2020. *(see Table 23)*

The overall number of pedestrian casualties was 36% lower than 2019. Since 2010, the number of pedestrians killed has fallen by 13 and there has been a 78% reduction in the total number of pedestrian casualties. Looking at the annual average for the period 2016 to 2020, the pedestrian fatality rate was highest for those aged 70+ (0.02 per thousand population). However, the 12-15 age-group had the highest 'all severities' pedestrian casualty rates (0.70 per thousand population). *(see Tables 23 & 32)*

The overall pedestrian 'all severities' casualty rate for males was 0.28 per thousand population, compared with 0.23 per thousand for females, using the averages for the period 2016 to 2020. *(see Table 34)*

Adult pedestrian casualties

On average in the period 2016 to 2020, the peak time for adult pedestrian casualties during the week was from 4pm to 6pm; at weekends it was from 5pm to 8pm. *(see Table 28)*

November and January were the peak months for adult pedestrian casualties, with each having 33% and 28% respectively more than the monthly average. Adult pedestrian casualties in the four winter months, November to February, were 23% more than the monthly average (annual averages over the years 2016-2020; months standardised to 30 days). *(see Table 29)*

Friday has the highest numbers of adult pedestrian casualties; 22% more than the daily average over the period 2016 to 2020. *(see Table 30)*

Pedal Cycle Casualties

There were 605 pedal cycle casualties in 2020, 13 more than the previous year. The number of seriously injured pedal cycle casualties in 2020 was 245. There were 11 pedal cycle fatalities in 2020, one more than 2019. Since 2010 there has been a 23% decrease in all pedal cycle casualties and the number of fatalities has fluctuated between 5 and 13. In 2020, 85% of pedal cycle casualties were on built-up roads *(see Table 23).* It should be noted that pedal cycle traffic is estimated to have seen an increase of 61% in 2020 compared with 2019.In terms of the averages for the period 2016 to 2020, the pedal cycle casualty rate per head of population was highest for those aged 23-29, 30-39 and 40-49 (all 0.19 per thousand population) and 26-29 (0.17 per thousand). Of course, it must be remembered that, as noted earlier, per capita casualty rates do not provide a measure of the relative risk, because they do not take account of the levels of usage of (in this case) pedal cycles. *(see Table 32)*

Adult pedal cycle casualties

Using the averages for the period 2016 to 2020, on weekdays, the peak numbers of adult pedal cycle casualties occurred from 4 pm to 7 pm and from 7 am to 9 am. At weekends the numbers were smaller, but appear to peak between 10 am to 1 pm. *(see Table 28)*

The peak months of the year for adult pedal cycle casualties were November and December which were 37-41% more than the monthly average (2016-2020 annual averages standardised to 30 days). *(see Table 29)*

The day of the week with the peak numbers of adult pedal cycle casualties was Wednesday, 23% higher than the daily average, over the years 2016-2020. There were substantially fewer adult pedal cycle casualties on Sunday, 42% less than the daily average. *(see Table 30)*

Motorcyclist casualties

A total of 418 motorcyclists were injured in road accidents in 2020, representing 8% of all casualties. Of these, 242 were seriously injured and 16 died. 50% of all motorcyclist casualties occurred on non built-up roads but (perhaps because of their higher average speeds) such roads accounted for almost 57% of those seriously injured, and 56% of those killed. *(see Table 23)*

The number of motorcyclist casualties in 2020 was 20% lower than in the previous year and the number killed fell by 9. The total number of motorcycle casualties rose each year from 1999 to a peak in 2001; since then, it has tended to decline. As a result, the figure for all casualties in 2020 was 54% lower than in 2010. Nineteen fewer motorcyclists died in 2020 than in 2010. *(see Table 23)*

On average, over the years 2016 to 2020, the motorcyclist casualty rate was highest for the 23-25 age group (0.20 per thousand population) followed by the 16-22 year old age group (0.18 per thousand population); other age-groups had smaller casualty rates. *(see Table 32)*

Looking at the averages for the period 2016 to 2020, the peak time of day for adult motorcyclist casualties was 4pm to 6pm on weekdays *(see Table 28)*, the peak months of the year were May(72 casualties), June (71 casualties) and August(73 casualties, amidst a general peak from May to September *(see Table 29)* and there were more casualties on Saturday and Sunday than on any of the other days *(see Table 30).*

Child (0-15) casualties

There were 493 child casualties in 2020, representing 10% of the total number of casualties of all ages. Of the child casualties, 144 were seriously injured, and six died *(see Table 24)*.

There were four more children killed in 2020 than in 2019. The total number of child casualties decreased by 36% on 2019. Since 2010, the number of children killed has risen by two. *(see Table A and Table 25)*

In terms of the averages for the period 2016 to 2020, on weekdays, the peak time for child casualties was from 3pm to 5pm, with 29% of all weekday casualties in those two hours. A further 26% occurred in the three hours between 5pm and 8pm There was another peak in the morning, between 8am and 9am There was no real clear peak at weekends: the numbers of casualties were very broadly the same each hour from 12 noon to 7pm *(see Table 27)*

August was the peak month for child casualties, with 27% more than in an average month. February had 9% and September 12% more than an average month. (2016-2020 annual averages standardised to 30 days). *(see Table 29)*

Using the averages for 2016 to 2020, Friday was the peak day of the week for child casualties, with 16% more than an average day. Sunday, on the other hand, had 25% less than an average day. *(see Table 30)*

Child (0-15) casualties by mode of transport

In 2020, there were 226 child pedestrian casualties. They accounted for 28% of all pedestrian casualties of all ages (226 out of 812). Of the child pedestrian casualties, 80 were seriously injured and 3 died. *(see Table 24)*

There were 60 child pedal cycle casualties in 2020 (10% of the total of 605 pedal cycle casualties of all ages). The child pedal cycle casualties included 24 who were seriously injured, one died. *(see Table 24)*

In 2020, there were 181 child casualties in cars, 7% of the total number of car user casualties of all ages (181 out of 2,769). Of the child casualties in cars, 30 were seriously injured (two died). *(see Tables 23 and 25)*

Child (0-15) casualty rates (per head of population)

Children's casualty rates (per head of population) increase with age: using the averages for the years 2016-2020 taken together, for children aged 0-4 the rate was 0.44 per thousand population, whereas it was 0.87 per thousand for those aged 5-11 and for the 12-15 age group it was 1.33 per thousand. The pedestrian casualty rate for younger children (0-4 years) was 30% of that for 5-11 and 17% of the 12-15 year old rate. *(see Table 32)*

The pedestrian casualty rate for boys in the 0-4 age group was 47% higher than that for girls. The difference between the sexes was even more pronounced in driver or rider casualty rates. *(see Table 34)*

The overall child pedestrian casualty rate at 0.39 per thousand child population was almost double the corresponding rate for adult pedestrian casualties. *(see Table 32)*

Motorists, breath testing and drink-driving

Breath testing of drivers

Tables 19, 20, and 21 refer.

These tables cover all motorists who were known to be involved in injury road accidents (excluding, for example, those untraced drivers involved in hit and run accidents). Here, a motorist is defined as the driver or the rider of a motor vehicle (including, for example, motorcyclists)

In 2020, 52% of motorists involved in injury accidents were asked for a breath test (this ranged from 33% to 70% across the police force divisions). The breath test proved positive (or the motorist refused to take the test) for 4.2% of those drivers breathalysed. This represented 2.2% of the total number of motorists involved in accidents (including those who were not asked for a breath test). Although there was a general downward trend in these percentages, in the last couple of years these have been rising as seen in Table 19.

Tables 20 and 21 show the time and day of the accident (Table 20) and for a number of years (Table 21). Table 21 shows that, in 2020, of the 133 positive / refused cases, 38% occurred between 9 pm and 3 am (23% between 9 pm and midnight, plus 15% between midnight and 3 am). Table 20 shows that, using 2016 to 2020 averages, the number of positive / refused cases, expressed as a percentage of motorists involved in accidents, was highest (at around 12%) between midnight and 6 am, but varied depending upon the day of the week, from 9% (the average for 3 am to 6 am for Monday-Thursday) to 17% (3 am to 6 am on Saturdays). Table 20 shows that, although the period from 9 pm to midnight had the highest number of positive / refused cases, the equivalent percentages were not as high, because between 9 pm and midnight there were many more motorists involved in accidents than between midnight and 3 am.

Drink-drive accidents and casualties

Table 22 shows the estimates (made by the Department for Transport) of the numbers of injury road accidents involving illegal alcohol levels. They are higher than the number of drivers with positive breath test results (or who refused to take the breath test) as they include allowances for the numbers of cases where drivers were not breath tested because of the severity of their injuries, or because they left the scene of the accident. Information about blood alcohol levels of road users who died within 12 hours of being injured in a road accident is supplied by the Procurators Fiscal.

The estimates show that the numbers of drink-drive accidents and casualties fell by 62% and 65% respectively between 2009 and 2019 (the latest year for which estimates are available): from a rounded estimate of 660 to roughly 230 (accidents) and from around 920 to some 350 (casualties). While fluctuating from year to year, the number of people killed as a result of drink-drive accidents is estimated to be the two thirds of the number in 2019 (20) as it was in 2009. The number of serious casualties is estimated to have dropped by 44% (from roughly 160 in 2009 to some 90 in 2018).

Comparisons of Scottish figures against those of other countries

Casualty rates: against England & Wales

Tables C to F refer.

Historically, killed casualty rates per head of population in Scotland have been above those for England & Wales, whereas the serious and total casualty rate is usually lower in Scotland than in England & Wales. In 2020, Scotland's casualty rates were 17% higher (killed), 9% lower (serious) and 50% lower (all severities).

Child rates

In 2020, the Scottish rates were 25% higher (serious) than those in England and Wales and 29% lower (all severities). In the case of all casualties this represented an improvement in Scotland's figures relative to England & Wales (compared with the 2004-08 average).

Due to the relatively small number of fatalities a 5 year average is used for comparison here. In the period 2016-2020, child fatality rates in Scotland were on average 40% higher than England and Wales, however, in three of the five years the rates were lower.

It should be noted that the ratio of the fatality rates for Scotland and for England and Wales can fluctuate markedly from year to year, particularly for the child fatality rates due to the relatively small numbers in Scotland (which may be subject to year-to-year changes which are large in percentage terms). Therefore, subsequent paragraphs do not refer to the fatality rates for children using different modes of transport. In addition, it should be remembered the rates for some other sub-groups may be affected by year-to-year fluctuations: for example, the numbers are relatively small for most categories of child killed and seriously injured casualties in Scotland.

Mode of transport

The casualty rates of car users in Scotland have for many years been substantially higher than those of England & Wales for killed and seriously injured casualties, while for all severities the rate has been much lower. In 2020, Scotland's car user fatality rate was 43% higher than that of England & Wales, the seriously injured rate was 5% higher and the all severity car user rate was 51% lower. For child car users, the seriously injured rate was 44% higher in Scotland and the all severities rate was 33% less than that of England and Wales.

In 2020, the pedestrian killed rate per thousand was 19% higher in Scotland than England & Wales, and the serious and all severities rates were 1% and 36% lower respectively. The child pedestrian casualty rates in Scotland were higher for killed (97%) and seriously injured (28%) but lower for all severities (14%) compared to those for England & Wales.

Pedal cyclists casualty rates (all ages) in Scotland were substantially lower than in England & Wales in 2020 for seriously injured (25% lower) and for all severities (58% lower). However, the child pedal cycle casualty serious rate was 28% higher and the all severities rate 14% lower in Scotland than in England & Wales. These differences may reflect the fact that, according to the National Travel Survey, on average, people in Scotland do not travel as far by bicycle as people in England and Wales.

Further information about the numbers of casualties in England and Wales, and for Great Britain as a whole, can be found in Reported Road Casualties Great Britain 2020 which is published by the Department for Transport.

Road deaths: International comparison 2019 & 2020 (provisional)

Tables G and H refer.

Introduction

This section compares Scotland's road death rates in 2019 and 2020 (provisional) with the fatality rates of some countries in Western Europe and some developed countries world-wide. The comparisons involve a total of up to 44 countries (including Scotland, and count *each* of the UK, Great Britain, England, Wales and Northern Ireland as individual countries). The fatality rates were calculated on a per capita basis (the statistics given are rates per million population), and the countries were then listed in order of their fatality rates in Table G sections (a), (b), (c) and (d). In cases where two countries appear to have the same rate, the order takes account of decimal places which are not shown in the tables. A table of car user fatality rates which were calculated on a per motor vehicle basis is no longer shown due to a lack of consistent data.

Tables G and H were provided by the Department for Transport, which obtained the figures for foreign countries from the International Road Traffic and Accident Database (IRTAD).

In accordance with the commonly agreed international definition, most countries define a fatality as being due to a road accident if death occurs within 30 days of the accident. However, the official road accident statistics of some countries limit the fatalities to those occurring within shorter periods after the accident. The numbers of deaths, and the death rates, which appear in the IRTAD tables take account of the adjustment factors used by the Economic Commission for Europe and the European Conference of Ministers of Transport to represent standardised 30-day numbers of deaths.

Latest Results

In 2020, Scotland's provisional overall road death rate of 26 per million population was the eighth lowest of the 42 countries surveyed (counting each of Scotland, England, Wales and Northern Ireland as separate countries, but *not* counting the overall GB and UK figures).

Pedestrians

In 2019, Scotland's pedestrian fatality rate was 8 per million population. Scotland ranked 22 of the 41 countries for which figures are available (again counting Scotland, England, Wales and Northern Ireland separately, and again *not* counting the GB and UK figures).

Car Users

When the car user fatality rate is calculated on a per capita basis, Scotland has a car user fatality rate of 14 per million population: the eleventh lowest of 41 countries, again *not* counting the GB and UK figures.

Age

The fatality rates per head of population for up to 31 countries (including Scotland, England, Wales and Northern Ireland as separate countries, but not counting the overall GB and UK figures) are shown, for each of four broad age-groups, in Table H. Again, the ordering takes account of decimal places not shown in the table. In most cases, Scotland has one of the lowest rates per capita. The Scottish rate is the fourth lowest for casualties aged 0-14. It was the lowest for those aged 15-24, sixth lowest for those aged 25-64 and fifth lowest for 65+ (in each case, *not* counting the overall GB and UK figures).

International comparisons of road safety are based on road death rates, as this is the only basis for which there is an international standard definition. As indicated above, the OECD IRTAD tables provide comparable figures for each country, after making adjustments to the data for countries which do not collect their figures on the standard basis. One should not try to compare different countries' overall road accident casualty rates (i.e. the total numbers killed or injured, relative to the population of each country) because there is no internationally-adopted standard definition of an injury road accident. There are considerable differences between countries in the coverage of their injury road accident statistics. For example, many countries count only accidents which result in someone being admitted to hospital – so their figures would not include the kinds of accident which, in Britain, are classified as causing only slight injuries or certain types of serious injury. Because many countries' definitions of injury road accidents are much narrower than the definition used in the UK, their reported numbers of injury road accidents will appear low relative to ours – so comparing the reported numbers of people injured in road accidents may provide a misleading impression of different countries' road safety records.

Casualty Reduction Targets: Scotland's Road Safety Framework to 2020

Introduction

The Scottish Government recently published a new Road Safety Framework to 2030.

The previous road safety framework was launched in June 2009 and included Scotland-specific targets due for delivery in 2020. These targets and milestones are included. Each reduction target is assessed against the 2004/08 average.

In addition to the above four targets a pre-existing target (a ten per cent reduction in the slight casualty rate) continued to be adopted. Progress is assessed towards a milestone in 2015 and the final target by means of an indicative trend based on a constant annual percentage reduction.

Target	2015 milestone % reduction	2020 target % reduction
People killed	30%	40%
People seriously injured	43%	55%
Children (aged < 16) killed *	35%	50%
Children (aged < 16) seriously injured	50%	65%

As outlined above, the number of serious and slight casualties cannot be directly compared to previously recorded figures due to changes in severity reporting.

Progress against the serious casualty reduction targets are therefore based on adjusted figures, produced by the Department for Transport. The adjusted figures show how many slight and serious casualties there would have been in previous years if they had been recorded using the same sort of reporting system that Police Scotland use currently.

To illustrate the reductions necessary the following table shows the adjusted 2004 to 2008 baseline, the latest position as well as the level of casualties inferred by the 2015 milestones and 2020 targets. The 2004-2008 baseline and the 2015 milestone have been calculated on the basis of the adjusted figures produced by the Department for Transport.

	2004-2008 average	2020	2015 milestone	2020 target
People killed	292	141	204	175
People seriously injured	4,865	1,547	2,773	2,191
Children (aged < 16) killed (3 year average)	15	4	10	8
Children (aged < 16) seriously injured	626	144	313	219

Charts showing performance are presented in figure 8. More detail about the calculation of these indicative lines is included in the methodology of assessment section.

Summary of Progress

Due to changes in severity reporting, progress against this target for serious and slight casualties is measured on the basis of adjusted figures provided by the Department for Transport. These figures illustrate how many casualties there would have been in previous years if they had been recorded using an injury-based recording system.

The 2020 figures show:

- 141 people were reported as killed in 2020, 52 per cent (151) below the 2004-2008 average of 292.
- 1,547 people were reported as seriously injured in 2020, 68 per cent (3,318) below the 2004-2008 average of 4,865.
- 6 children were reported as killed in 2020, meaning the average for the 2018-2020 period was 4 a year, this is 76 per cent (11) below the 2004-2008 average of 15.
- 144 children were reported as seriously injured in 2020, 77 per cent (482) below the 2004-2008 average of 626.
- The slight casualty rate of 8.85 casualties per 100 million vehicle kilometres in 2020 was 67 per cent below the 2004-2008 baseline average of 27.01.

This means that all 5 targets have been met.

Figure 8 shows progress towards the casualty reduction targets for 2020.

Figure 8 (A) - Reported casualties killed

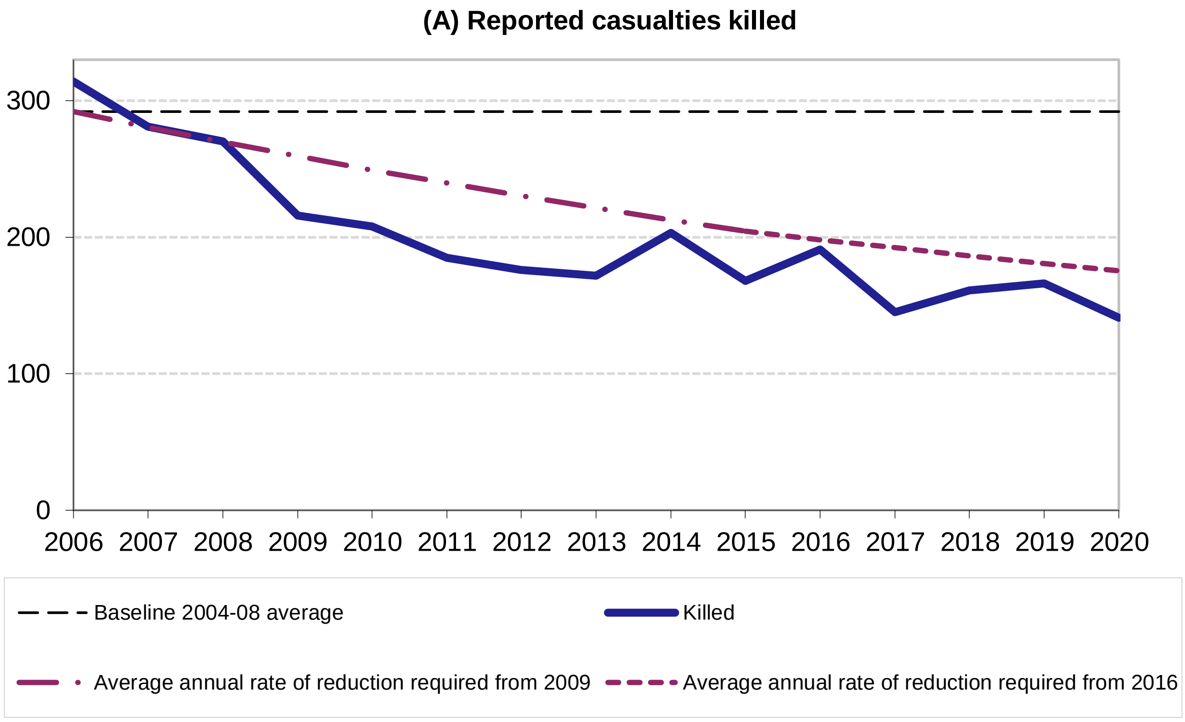
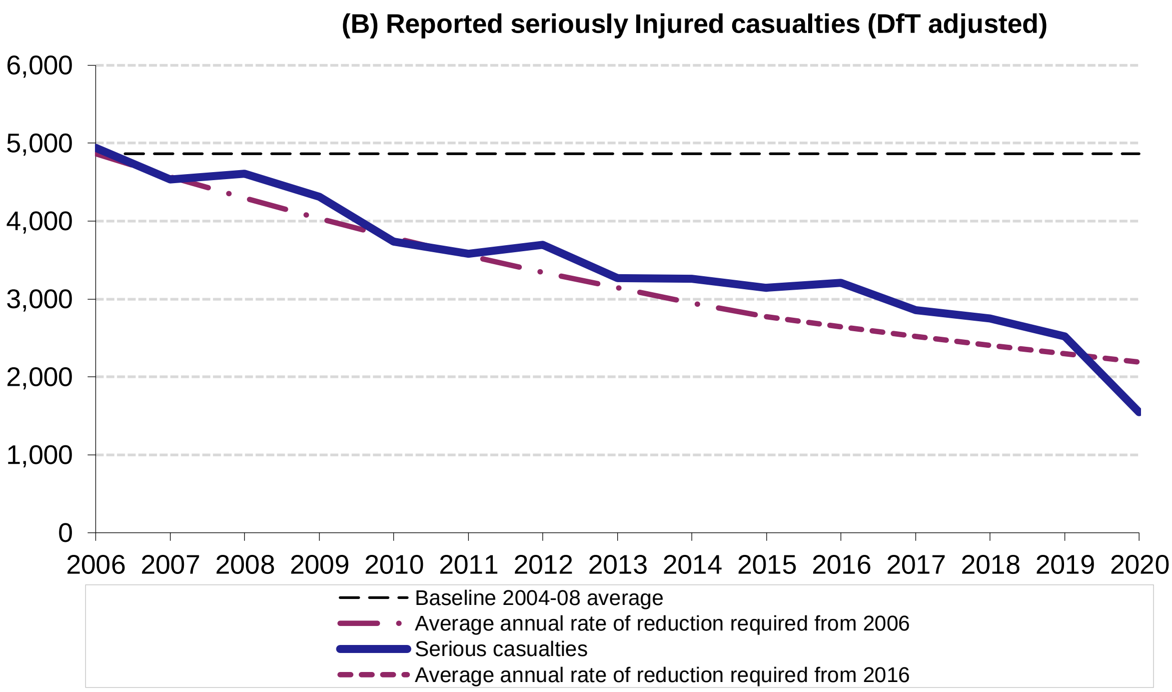


Figure 8 (B) - Reported seriously injured



Note for figure 8(B): Due to the changes in the recording of casualty severities, progress against this target is measured on the basis of adjusted figures.

Figure 8 (C) - Reported children killed

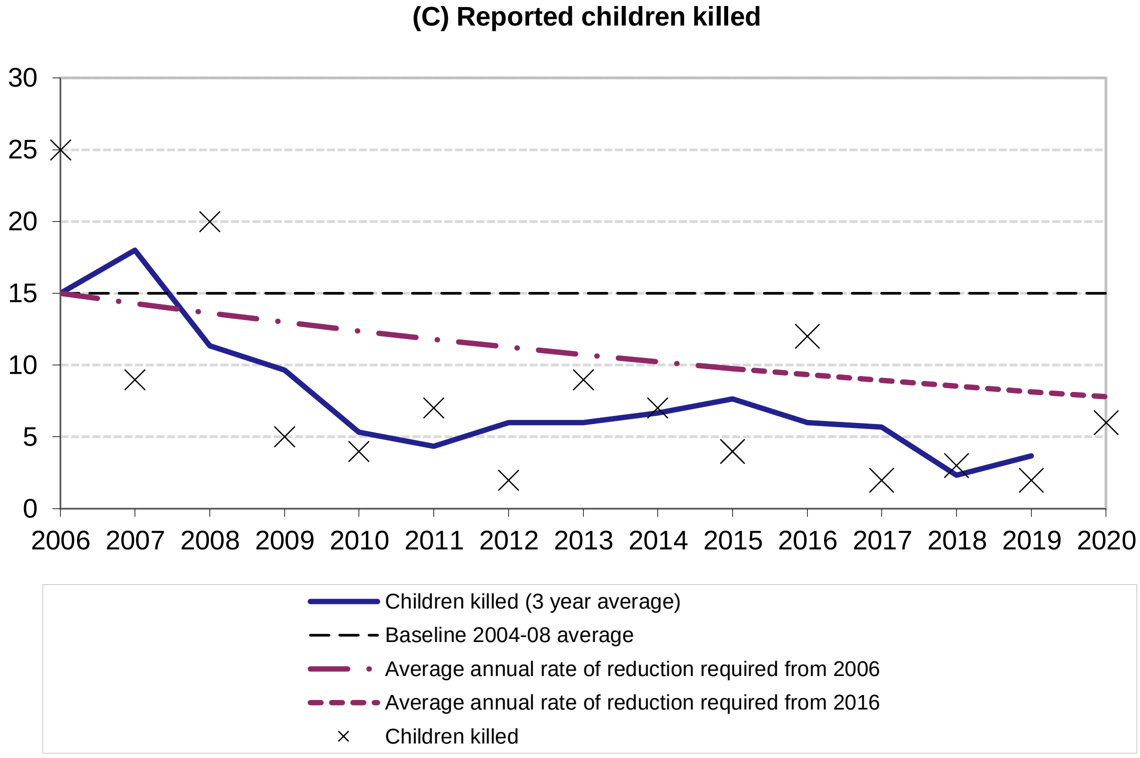
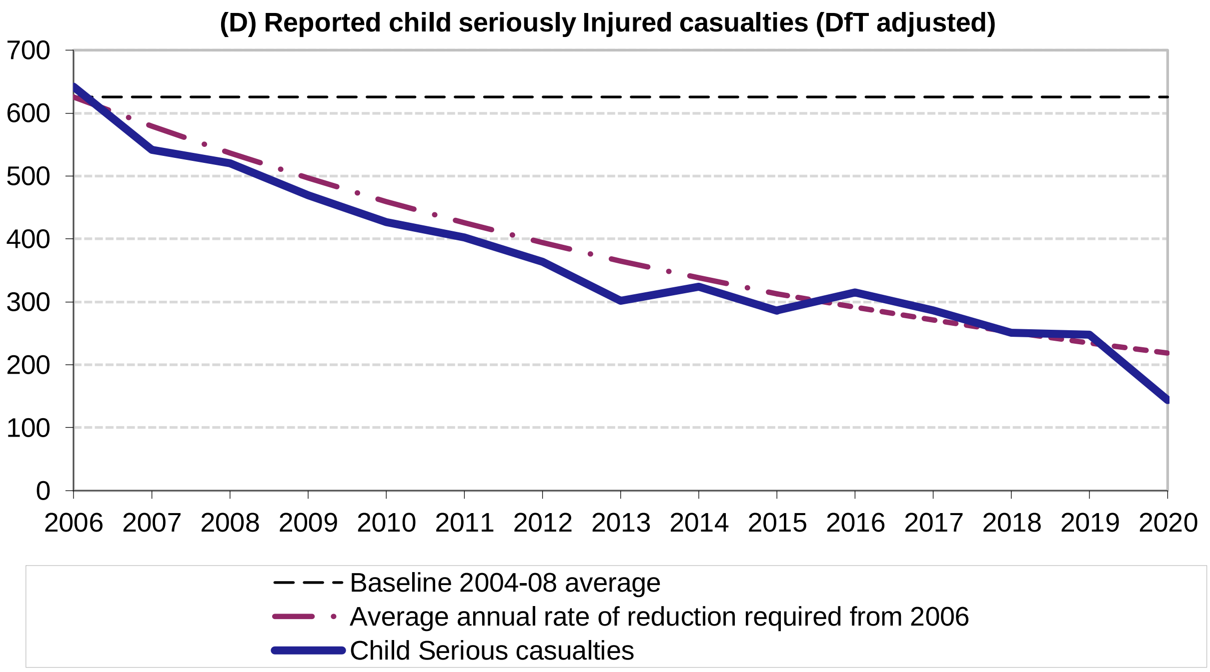


Figure 8 (D) - Reported child seriously Injured casualties



Note for figure 8(D): Due to the changes in the recording of casualty severities, progress against this target is measured on the basis of adjusted figures.

Commentary

Numbers killed

As shown in Table Ia a reduction of 14.2 per cent compared to the 2015 milestone of 204 was required in 2020 to reach the target. The 2020 figure of 141 is 31% below the 2015 milestone figure and therefore exceeded the target.

Numbers Seriously Injured (adjusted)

As shown in Table Ia, a reduction of 21 per cent compared to the 2015 milestone of 2,773 was required in 2020 to reach this target. The 2020 figure of 1,547 is 44 per cent less than this and therefore exceeded the target.

Children killed

The number of child fatalities is relatively small and the average of 4 over the last three years exceeds the 50 per cent reduction target set for 2020. Table Ib shows the average number of child fatalities for 2018-2020 for each mode (apart from 'other') is below the 2004-2008 baseline.

Child pedestrian fatalities have fallen from an average of 6 per year in 2004-2008 to an average of 2 per year in 2018-2020.

Child pedal cycle fatalities have fallen from an average of 2 per year in the baseline period to an average of zero in the last three years. The number of child fatalities as passengers in cars has fallen as well from an average of 6 per year in the baseline period to one per year in the 2018-2020 period,.

Children seriously injured (adjusted)

As shown in Table Ia, a reduction of 24.9 per cent compared to the 2015 milestone of 313 was required in 2020 to remain on the trajectory for this target. The 2020 figure of 144 is 54 per cent below the trajectory and therefore exceeded the target.

Slightly injured casualties (adjusted)

Because of the limited availability of detailed reliable road traffic estimates for Scotland, Table Ib shows the *numbers* of slight casualties (rather than slight casualty *rates*) for categories of road user. The table also shows the overall total volume of traffic and the overall adjusted slight casualty rate.

Table Ib shows that adjusted slight injuries per million vehicle kilometres are 63 per cent below the 2004-2008 average.

The number of slight casualties has fallen compared to the baseline for all modes of transport. The largest reduction was for bus / coach (90%). Car users make up around two-thirds of slight casualties and there has been a reduction of 74% compared to the baseline period. Pedal cycles on the other hand have shown a 27% decrease on the 2004-2008 average.

Other statistics for monitoring progress

Table 40 in the main section of this publication shows the baseline figures for each local authority area relating to the targets for the numbers killed (separately for trunk roads, local authority roads and all roads), along with the corresponding figures for each of the past ten years and the latest five years' averages. *Table 42* shows figures for each Police Force division related to all killed and children killed.

Method for assessing progress towards the casualty reduction targets

One way of assessing progress towards the targets is to compare actual casualty numbers in each year with an indicative line that starts at the baseline figure in 2006 (mid-point of the 2004 to 2008 average) and falls, by a constant percentage reduction in each subsequent year, to the milestone for 2015 and from there to the target for 2020. This is the approach adopted by the GB Road Safety Advisory Panel. Other approaches could have been used: there are many ways of producing lines that indicate how casualty numbers might fall fairly steadily to the targets for 2020.

The method adopted to produce the indicative target lines shown in Figure 8 involves a constant percentage reduction in each year after 2006 to the 2015 milestone, then a constant percentage reduction between 2015 and 2020. The resulting indicative target lines represent the percentages of the baseline averages which are shown in the table below. They are not straight lines, because of the compounding over the years effect of constant annual percentage reductions (to two decimal places, the falls are: 3.89% per annum for killed to meet the 2015 milestone and 3.02% between 2015 and 2020). For seriously injured casualties the falls are 6.06% and 4.61%. For child killed 4.67% and 4.37% or children seriously injured 7.41% and 6.90%.

Previous targets

In 1987 the UK Government adopted a target to reduce road casualties by one third from the 1981-85 annual average by the year 2000. The number of people killed on the roads in Scotland in 2000 was 49% below the 1981-85 average number of fatalities per year, and therefore the target of a one-third reduction by the year 2000 was exceeded for fatalities. For seriously injured casualties, the 2000 figure was 57% below the 1981-85 average, so the target was bettered for seriously injured casualties. However, the figure of 16,618 slight casualties in 2000 was only 9% below the 1981-85 average and so the target of a one-third reduction was not achieved for slight casualties. And, the total number of casualties in 2000 was 24% below the 1981-85 average, and therefore the target of a one-third reduction in the total number of casualties was not met.

In March 2000, the UK Government, the then Scottish Executive and the National Assembly for Wales announced a new national road safety strategy and casualty reduction targets for 2010**.** The number of people killed or seriously injured on the roads in Scotland in 2010 was 55% below the 1994-98 average, and therefore the target of a 40% reduction by the year 2010 was exceeded for fatalities. For children killed or seriously injured, the 2010 figure was 73% below the 1994-98 average, a greater reduction than the 2010 target of a 50% fall. The slight casualty rate of 25.67 casualties per 100 million vehicle kilometres in 2010 was 45% below the 1994-98 baseline average of 46.42 – a greater reduction than the 2010 target of a 10% fall.

The likely range of random year-to-year variation in road accident and casualty numbers for Scotland as a whole

Because road accidents may occur at random, the numbers of accidents, and the numbers of casualties in those accidents, can fluctuate from year to year. Figures 2 to 5 show, for Scotland as a whole, the numbers of:

- fatal road accidents (1972 to 2020);
- road deaths (1949 to 2020);
- people killed or seriously injured (1950 to 2020);
- children killed or seriously injured (1981 to 2020).

The number of years covered by each chart reflects the availability of the relevant figures. The blue dots are the values in each year, and the blue lines indicate the year-to-year variation. The grey dashed lines show the likely range of random year-to-year variation in the figures: based on statistical theory, one would expect that only about 5% of years would have figures outwith these ranges. Appendix G describes how these ranges were produced: the limits of the likely ranges of values are calculated in a similar way to 95% confidence intervals. It also explains why they cannot be produced for all years. It should be noted that figures for combined fatal and serious, serious and slight severities cannot be compared to previous years due to changes in the way casualty severities were recorded in 2019 and 2020.

Figure 2 - Scottish fatal reported road accidents: 1972 onwards

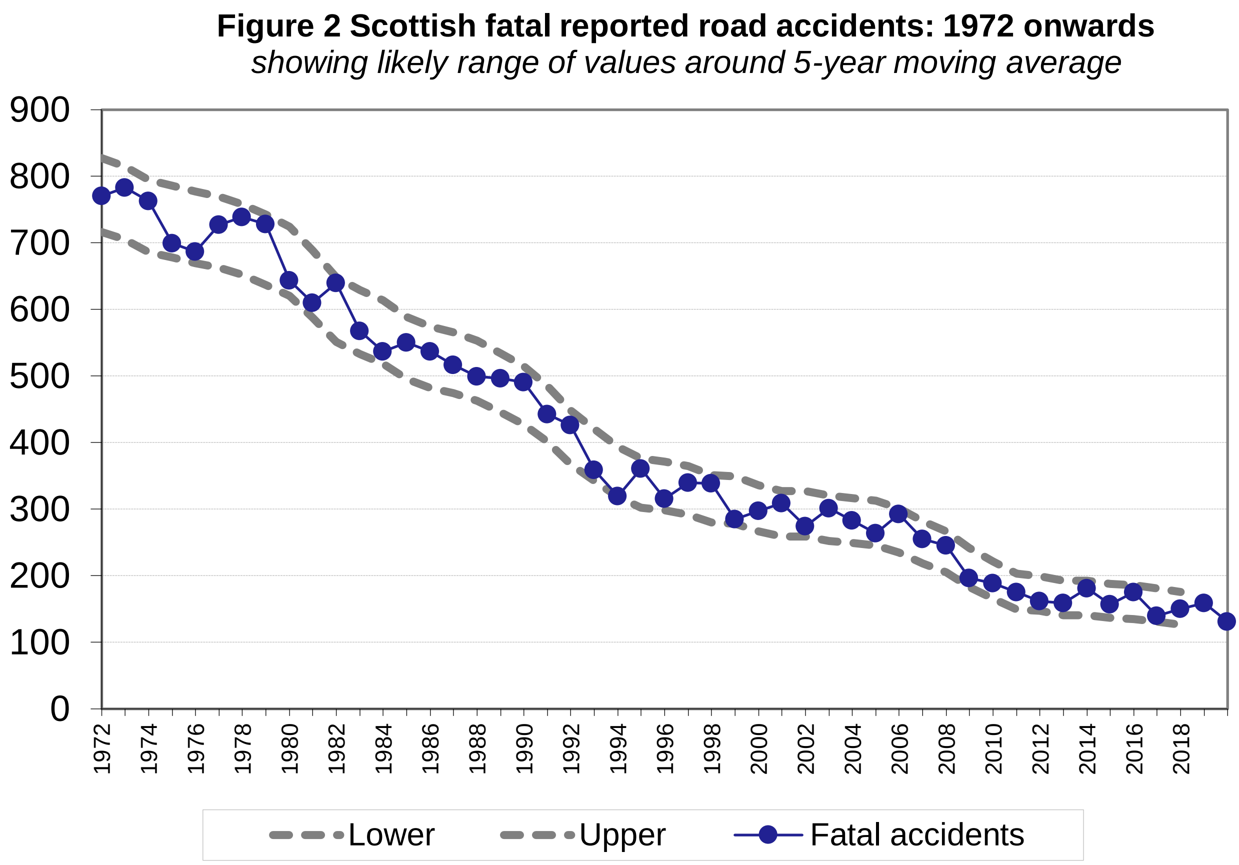


Figure 3 Scottish reported road accident deaths:1949 onwards

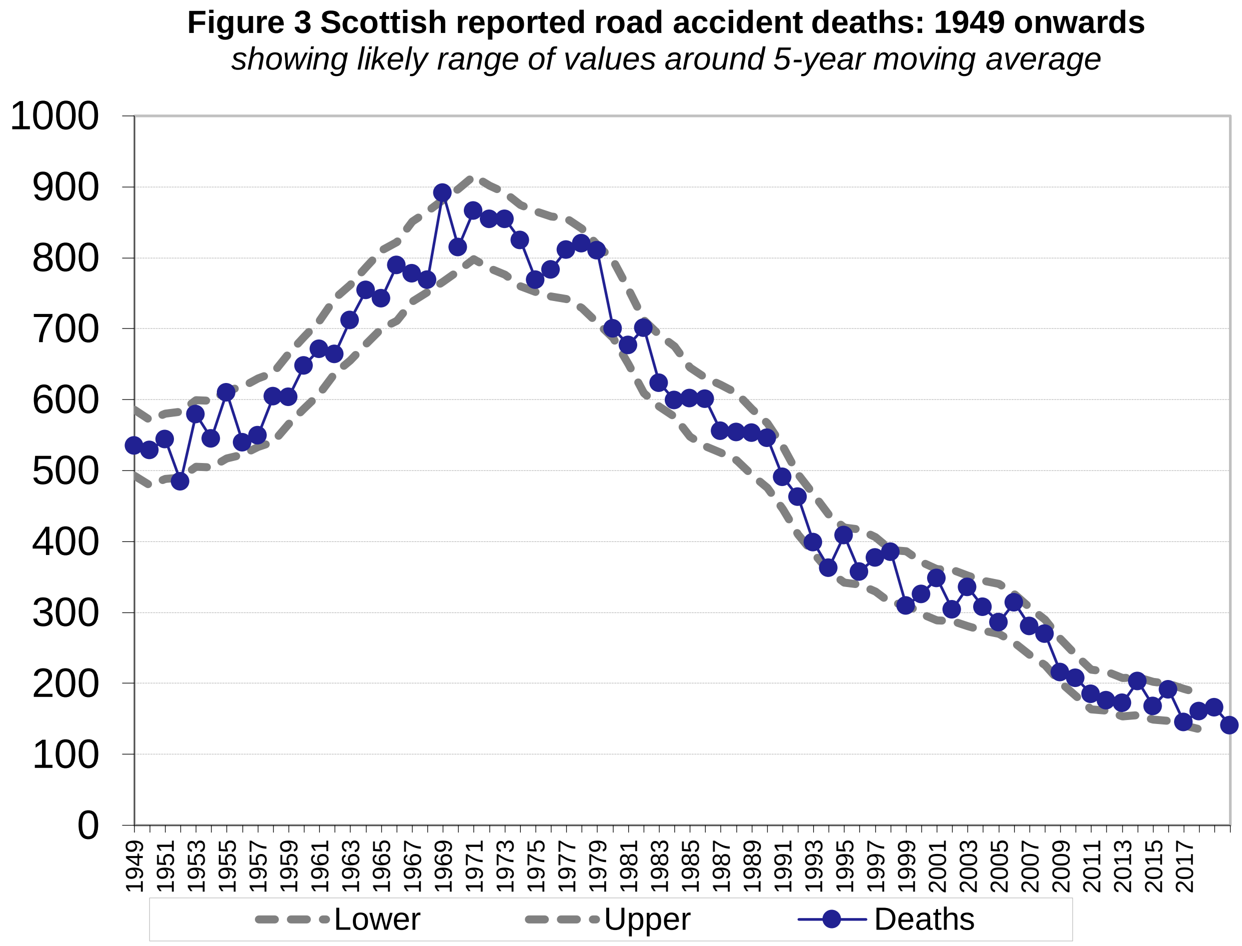


Figure 4 Killed and seriously injured reported casualties

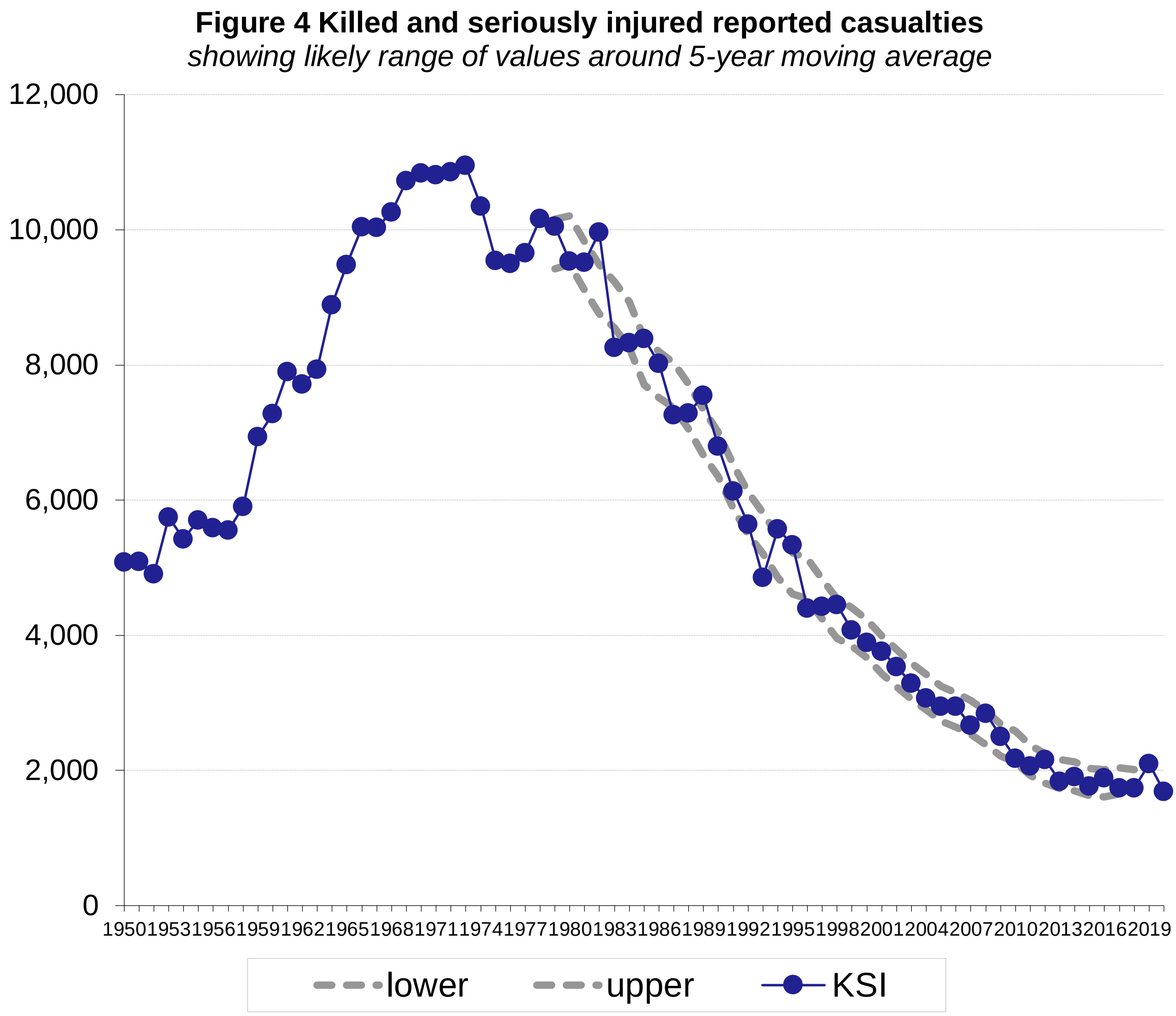
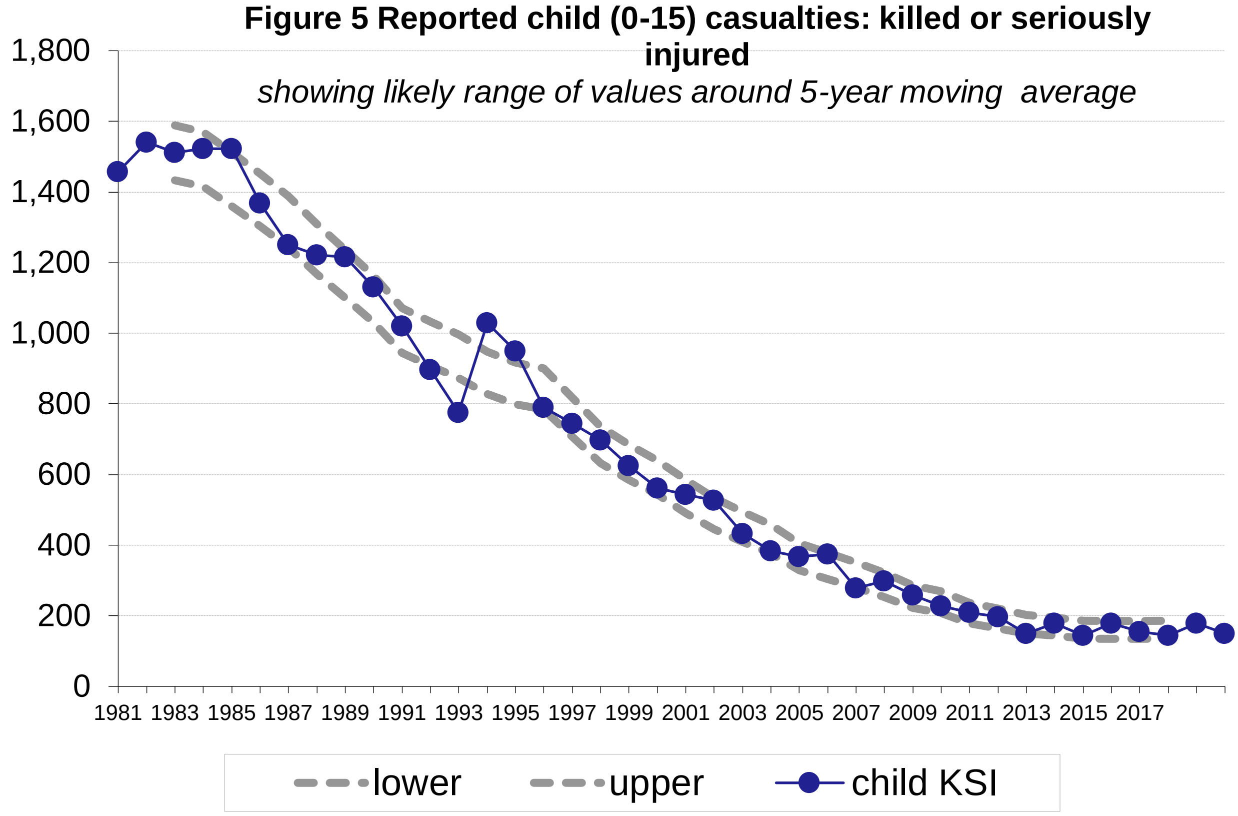


Figure 5 Reported child (0-15) casualties: killed or seriously injured



Fatal accidents, and deaths in road accidents

Figures 2 and 3 show that the number of fatal accidents is within its likely range of values in every year, and the number of road deaths is within its likely range of values in all but three years. These results are reasonable: one would expect a few years' figures to be outside the likely range of random year-to-year variation, given that there are over 40 years' figures for fatal accidents and over 60 years' figures for road accident deaths. Figures 2 and 3 therefore show that, despite the large percentage changes such as the falls in deaths of 19% between 1998 and 1999, and of 13% between 2001 and 2002, the figures almost always remain within the expected ranges. Hence, one should not put too much weight on a single large percentage change.

Killed or seriously injured (KSI) casualties

Figure 4 has many years' figures (around a third) outwith the calculated likely range of values. The reason for this is that *statistical variability is not the only reason for year-to-year changes* – other factors have contributed to sharp falls and rises in KSI casualty numbers. For example, the sharp fall shown in 1983 may be partly due to the introduction of seat belt wearing (for drivers and front seat passengers in most cars and light vans). Similarly, the sharp rise in 1994 may be due in part to the change in hospital practices where more casualties were kept in overnight for observation.

Such factors change the underlying rate of occurrence of accidents and/or casualties, and therefore, in effect, introduce a break into the series of moving average values. The method used to calculate the likely range of random variation cannot take account of the effect of such changes.

Only Figure 4 has figures outwith the calculated interval due to the likely ranges of random year-to-year variation calculated for small numbers being quite wide in percentage terms. This is because, for a Poisson process (see Appendix G), by definition, the greater the frequency of occurrence of events, the smaller the proportion that the standard deviation of the frequency (which is the square root of that number) represents of that number. For example:

- with 100 cases, the square root is 10 – or 10% of the value;
- with 400 cases, the square root is 20 – 5% of the value;
- with 10,000 cases, the square root is 100 – only 1% of the value.

As a result, if a factor (like the introduction of the compulsory wearing of front seat belts) were to cause the same percentage fall in each of the four types of accident and casualty numbers used in the charts, the following might be observed. The percentage fall could be *within* the relatively wide percentage range of likely random variation around the *smaller* numbers, but *outwith* the relatively narrow percentage range of likely random variation around the *larger* numbers. The ranges in Figures 2, 3 and 5 appear to be sufficiently wide to encompass the effects of changes such as those mentioned above. That is, the effects of the changes in their first years may fall within the likely range of random variation.

Of course, over the longer-term, such changes should make significant contributions to the reductions in casualty numbers and their severity. However, the intervals in Figure 4 include a much smaller than expected proportion of the figures. This is because the likely range of random variation for KSI casualties represents only a small percentage of the total, and factors like those mentioned above appear to have had a greater percentage effect than was seen in their first years.

Children killed or seriously injured

Figure 5 shows the year-to-year fluctuations in the numbers of children killed or seriously injured (for the years for which figures are readily available) are generally within the expected ranges. The exceptions are around 1994, when health boards' policies changed, with the result that more child casualties were admitted to hospitals for overnight observation. This changed the classification of many injuries from slight to serious.

When changes in operational practice or to administrative processes have a marked effect on the statistics, the resulting year-to-year changes can be much greater than those expected due to normal random year-to-year variation – so it is not surprising there are figures outwith the expected ranges around 1994.

Contributory factors to reported road accidents

Summary

This section describes the scope and limitations of the information on contributory factors collected as part of the road accident reporting system and presents Scottish results from the fourteenth year of collection.

- Driver/rider errors or reactions were reported in 56% of all reported accidents with failed to look properly the most common type (involved in 29%).
- Travelling too fast for the conditions or excessive speed was reported in 10% of all reported accidents and 21% of fatal accidents.
- Pedestrian only factors were reported in 23% of fatal accidents whilst failed to look properly and loss of control were the most frequently reported driver/rider factors (involved in 31% and 20% of fatal accidents respectively).

Introduction

From 2005, all police forces across Great Britain reported contributory factors as part of the stats19 collection. These were developed to provide insight into why and how road accidents occur. Their aim is to help identify the key actions and failures that led directly to the actual impact, to aid investigation of how it might have been prevented. Care should always be taken when interpreting the factors as they:

- reflect the reporting officer's opinion at the time of reporting the accident (or the opinion of a person whose duties include deciding which CFs should be recorded based on the officer's report).
- are based on the information which was available at that time, so may not be the result of subsequent extensive investigation (indeed, subsequent enquiries could result in the reporting officer opinion changing).

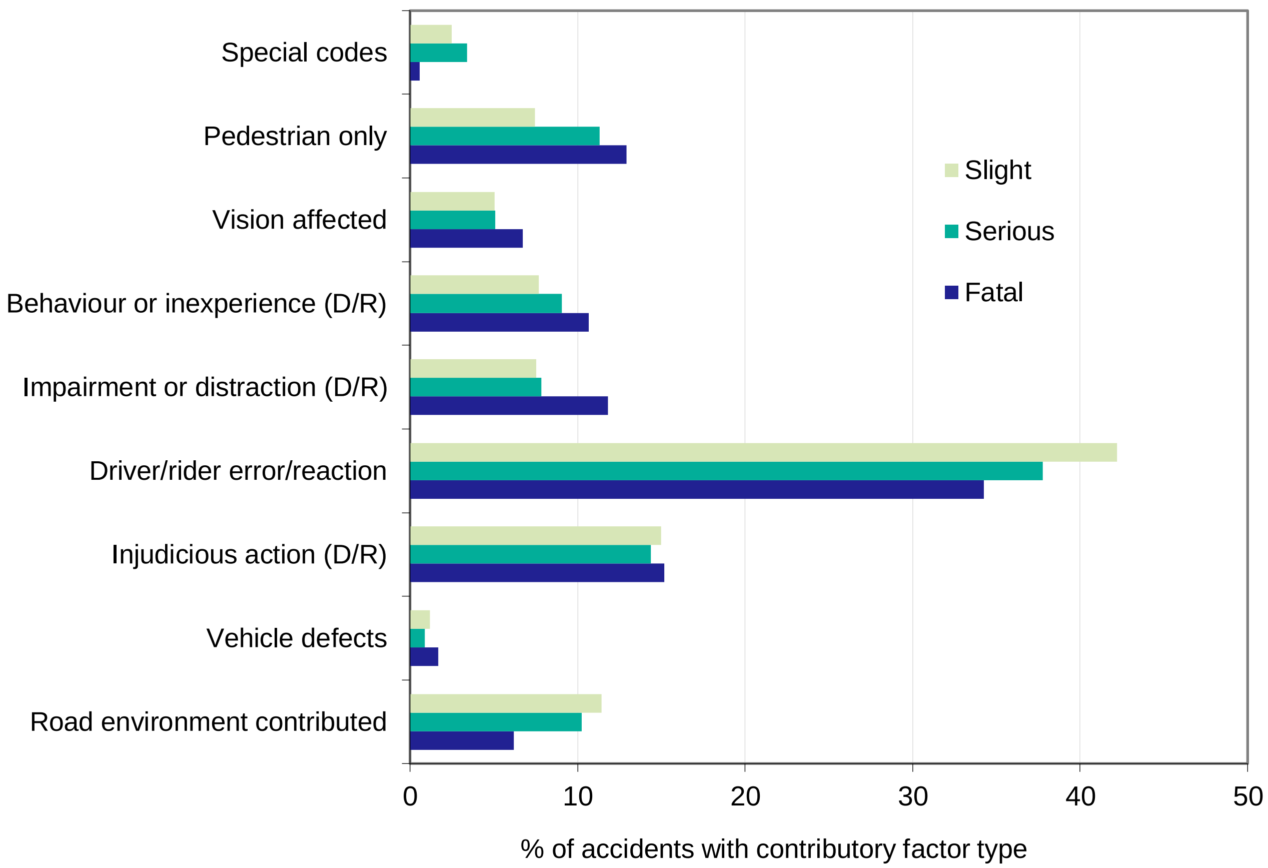
A reporting office attending the scene of a road accident may select up to 6 contributory factors (from a list of 77) to assign to that accident. Multiple factors may be listed against any participant or vehicles in the accident, (therefore percentages in the tables provided may not sum to 100).

Because of this, analysis of contributory factor information requires careful consideration; figures will differ depending on the focus of the analysis. Care should be taken when interpreting tables provided here which consider different aspects of the data (i.e. accidents, vehicles/participants, casualties and frequencies).

This section presents analysis from accidents in Scotland reported to the police in 2020, with the following background note describing the collection of the contributory factor system in more detail.

Note that most tables are by individual contributory factor so care needs to be taken when carrying out analysis. Adding together numbers for individual contributory factors will result in some double counting e.g. some accidents will have 'exceeding speed limit' and 'driving too fast for the conditions' recorded as a factor.

Figure 11 - Contributory factor type: Reported accidents by severity, 2020



Accidents

Categories

Each of the 77 contributory factors fits into one of nine categories. Figure 11 shows the percentage of accidents reported to the police with associated contributory factors in each these categories.

- Driver/rider error was the most frequently reported category for each type of severity of accident and was reported in 56% of accidents reported to the police).
- Pedestrian contributory factors (where the factor has been attributed to an injured or uninjured pedestrian involved in the accident), were reported in 13% of reported accidents, rising to 23% of fatal accidents.
- Injudicious action (including travelling too fast for conditions, following too close or exceeding speed limit) was involved in 21% of all reported accidents and 27% of fatal accidents.
- Road environment factors were reported in 15% of reported accidents.

Factors

On average there were 1.7 contributory factors listed per reported accident with more factors recorded for fatal accidents and fewer for slight accidents. Table M shows the numbers (and percentages) of reported accidents in which each contributory factor was reported.

- Failed to look properly was the most frequently reported contributory factor, involved in 29 % of all reported accidents. This was followed loss of control (13%), by failed to judge other person's path/speed (12%), poor turn/manoeuvre and Slippery road (both 10%) and Careless/reckless or in a hurry (8%), were also in the top six.
- Travelling too fast for the conditions or excessive speed was reported in 10% of all reported accidents and 21% of fatal accidents (Note that the individual percentages for each of these factors cannot simply be added together to obtain combined totals.)
- For fatal accidents, failed to look properly was the most frequently reported driver/rider factor involved in 31% of accidents. Failed to judge other persons path/speed was reported in 16%, travelling too fast for conditions and careless / reckless /in a hurry (both in 13%) and exceeding the speed limit in 12%. Pedestrian failed to look properly and Pedestrian wearing dark clothing at night were involved in 9% and 8% of fatal accidents respectively.

Table M also shows how the incidence of some CFs varies with the severity of the accident. For example: *loss of control* is cited in 13% of all accidents for which CFs were recorded but 20% of fatal accidents; *following too close* is cited in 4% of all accidents but 2% of fatal ones and *exceeding speed limit* is cited in 4% of all accidents but 12% of fatal ones.

Note that repeats of the same contributory factor within an accident are excluded from the table, however an accident will appear more than once if more than one different contributory factor is reported.

Changes over time

Table N compares the top ten contributory factors listed in 2020 against previous years. These top ten factors remained the same in all five years, though the order and frequency changed over the 14 years of collection.

Vehicle & pedestrians

Table O shows the number and percentage of vehicles assigned each type of contributory factor (for each vehicle involved in an accident reported to the police). Table P shows this for pedestrians only.

Tables O & P show that:

- Failed to look properly was the most frequently reported factor both overall (reported in 17% of all vehicles' factors), and for every vehicle except motorcyclists.
- Loss of control (19%) was the most commonly reported factor for motorcyclists.
- Failed to judge other person's path/speed was the second most common factor reported for cars or taxis (7%).
- Failed to judge other person's speed and loss of control were the second most common factors associated with cyclists (associated with 5% of bicycles).
- Failed to judge other person's speed/path was the second most common factor reported for good vehicles (reported in 10%).
- Travelling too fast for the conditions was associated with a total of 4% of all vehicles involved in reported accidents.
- Pedestrians involved in accidents were most likely to have failed to look properly as an associated contributory factor (recorded in 38% of all pedestrian accidents), followed by failed to judge vehicle speed/path and crossed road masked by stationary/parked vehicle (both 9%), impaired by alcohol (8%) and careless/reckless or in a hurry (7%).

Table O also shows that many contributory factors were rarely recorded for most vehicles, for example:

- loss of control was recorded for 19% of motorcycles but only 0% of vehicles in the bus/coach/minibus grouping;
- sudden braking was recorded for 6% of buses but for only 1% of all vehicles involved.

On average, fewer contributory factors were recorded for goods vehicles (an average of 0.16 per goods vehicle involved in a reported accident) and bus or coaches (an average of 0.22), compared to an overall average of 0.70 factors per vehicles.

Note that percentages differ from Tables M & N which presents the percentage of accidents with each contributory factor. As more than one vehicle may be involved in an accident, the average number of factors associated with an individual vehicle is generally lower.

Pairing of factors

Table Q shows the most frequent pairs of contributory factors assigned to the same reported road accident participant in 2020.

- The most frequently-occurring combination is driver/rider failed to look properly + (driver/rider) failed to judge other person's path/speed, which was recorded on 110 occasions.
- As would be expected, the CFs identified (earlier) as most frequent to appear in several of the most frequently-occurring combinations – for example, (driver/rider) failed to look properly occurs in the first three of the most frequently-occurring combinations.

However, the numbers indicate that even the most frequently-occurring combination of CFs arose in only a small proportion of all accidents.

Casualties

Tables R & S show the number (and percentage) of fatal and seriously injured casualties involved in accidents where each contributory factor was reported. Unsurprisingly the pattern is similar to that seen in Tables M & N showing the number of accidents with each factor reported. Comparison shows that accidents with *pedestrian only* factors reported had lower numbers of casualties per accident.

Note a casualty will appear in the tables against each (unique) factor associated with the accident (resulting in the casualty) and therefore may appear more than once. As with the accident tables, repeats of the same contributory factor within an accident are excluded.

Fatalities

Table R shows the Contributory Factors associated with the largest numbers of deaths were:

- (driver/rider) failed to look properly– 31 deaths (representing 13% of all deaths in accidents for which CFs were recorded);
- loss of control – 20 deaths (9%);
- (driver/rider) failed to judge other persons path/speed – 16 deaths (7%);
- (driver/rider) careless / reckless /in a hurry - 15 deaths (7% of fatalities) ;
- Exceeding the speed limit – 14 deaths (6%);
- Travelling too fast for the conditions – 13 deaths (6%)
- Poor turn or manoeuvre – 11 deaths (5%);

Seriously injured

Table S shows the CFs associated with the largest numbers of serious injured were:

- (driver/rider) failed to look properly – 254 (representing 15% of all serious injuries in accidents for which CFs were recorded);
- loss of control – 165 serious injuries (9%);
- (driver/rider) failed to judge other persons path/speed –109 serious injuries (6%) ;
- (driver/rider) careless / reckless / in a hurry – 102 (6%);
- Slippery road (due to weather) – 94 (5%)
- Travelling too fast for the conditions – 94 (5%)
- Poor turn or manoeuvre – 94 (5%)

Overall frequencies of recording

In 2020 at least one contributory factor was recorded in 100% of reported accidents where a police officer attended the scene (2,324). A total of 3,936 factors were recorded, resulting in an average of 1.7 factors per accident.

Around 87% (3,417) of all factors listed related to vehicles (and their drivers/rider) and the road environment. Around 10% (400) related to pedestrians who were casualties. Relatively few related to uninjured pedestrians (35 or 0.9%).

Table T presents a ranking of all 77 factors by the frequency of reporting in 2020. (Note that figures differ from earlier tables as repeats of factors within the same accident are counted). It is apparent that some CFs are not used often – many were used fewer than 100 times.

Note that data relating to all reported CFs were used to produce Tables O to T. In cases where the same CF applies to more than one vehicle in the same accident, it is counted once for each of them. These tables therefore differ from Tables M & N (which exclude repeats of the same CF within an accident).

Possible vs. Very likely

Reporting officers record whether it was thought **very likely** or just **possible** that a factor contributed to the occurrence of the accident. Table T also shows how often each CF was described as very likely, and how often as possible.

Overall, just over three quarters of CFs (77%) were described as very likely, but the percentage varied markedly between different CFs. Excluding those used fewer than 100 times, the following were described as **very likely** on at least 76% of occasions on which they were used:

- Pedestrian failed to look properly (88%)
- Loss of control (88%)
- (driver/rider) failed to look properly (83%)
- Poor turn or manoeuvre (82%)
- (driver/rider) Careless / reckless /in a hurry (76%)

and the following were described as very likely between 59 and 73 of the occasions on which they were used:

- Disobeyed Give Way or Stop sign or markings (94%)
- Impaired by alcohol (92%)
- Following too close (76%)
- Exceeding speed limit (64%)

Conclusion

The collection of contributory factors has been part of the GB wide police reporting system for 14 years. It is clear contributory factor information can provide useful indications of the circumstances that may have led to a reported road accident.

These can also be attributed to the different participants within the accident, which can help build a picture of how the accident may have occurred.

However, there are limitations to the system and care should be taken when both analysing and interpreting the results. This should help ensure the data is used in the correct manner and that consistent messages/results are achieved by users.

We welcome comments on the analysis presented here or any questions regarding the contributory factor system.

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Background: The collection of Contributory Factor data

Guidance on recording road accidents is provided in the Department for Transport's *Stats20* document which includes the following points on CFs:

- CFs reflect the reporting officer's opinion at the time of reporting, and may not be the result of extensive investigation;
- subsequent enquiries could result in a change in the reporting officer's opinion;
- the CFs are largely subjective, and depend upon the skill and experience of the investigating officer to reconstruct the events which led directly to the accident;
- the need to exercise judgement when recording CFs is unavoidable;
- CFs should be identified on the basis of evidence from sources such as witness statements and vehicle and site inspections;
- the evidence may be of variable quality, so the officer should record very likely or possible for each CF;
- when there is conflicting evidence (e.g. conflicting witness statements), the reporting officer should decide on the most credible account of the accident and base the codes on this, taking into account all other available evidence.

Some CFs may be less likely than others to be recorded, since clear evidence of them may not be available, or may be very difficult to obtain, after an accident has occurred (e.g. in the case of the nervous, uncertain or panic factor). Participants and witnesses may provide incomplete or conflicting accounts of what happened. The CF data therefore depend upon the skill and experience of the reporting officer to reconstruct the events which led directly to the accident, and so are more subjective in nature than other Stats 19 data. This should be kept in mind when using these results.

Regardless of the number of vehicles involved in the accident, *at most six* sets of CF data can be recorded per accident. Each set contains three pieces of information:

- a factor which is thought to have contributed to the occurrence of the accident – selected from list of 77 , such as:
  - exceeding speed limit (CF code 306);
  - travelling too fast for the conditions (307);
  - failed to look properly (405);
  - impaired by alcohol (501);
  - impaired by drugs (illicit or medicinal) (502)
- the participant in the accident to whom the factor is related:
  - whether this is a:
    - Vehicle – in which case the factor may relate to the driver/rider or to the road environment;
    - Casualty – a pedestrian or a passenger in a vehicle; or
    - Uninjured pedestrian.
  - if a Vehicle or a Casualty, the relevant Stats 19 reference
- whether it was thought very likely or just possible this factor contributed to the occurrence of the accident

Therefore more than one factor may be recorded for the same participant and any given factor may be recorded for two or more different participants, subject to the limit of a maximum of six sets of CF data per accident.

Appendix B of this publication illustrates the CF codes and their descriptions, including a brief set of completion instructions for the reporting officer. More detailed information is available in the DfT's Stats 20 document (pages 10; 84 -101) and the procedure for allocating them – for example:

- the CFs may be recorded in any order (so nothing can be inferred from the order in which they appear);

- more than one CF may be related to the same road user; and
- the same CF may be related to more than one road user.

Worked example

Clearly, there could be a lot of CF information in the case of an accident which involved several vehicles, if it was thought that several of them contributed to its occurrence. The following is an example of the potential complexity of the CF data. Car 1 is rapidly travelling along a straight road when Car 2 suddenly appears in front of it, having emerged from a pub car park. The driver of Car 1 brakes sharply, to avoid a collision. As Car 2 drives off, Car 1 is hit from behind by a motorcycle, whose rider and passenger are both killed. The following *might* be recorded as the CF data for this accident:

CF no.	Participant	Contributory Factor	How likely?
1	Car 1	Exceeding speed limit	Possible
2	Car 2	Impaired by alcohol	Possible
3	Car 2	Failed to look properly	Very likely
4	Car 1	Sudden braking	Very likely
5	Motorcycle	Following too close	Very likely
6	Motorcycle	Exceeding speed limit	Possible

This accident has *three* participants and *six* CFs, two of which are the *same* (exceeding speed limit) but apply to *different* participants (Car 1 and Motorcycle). This example will be referred to from time to time, when describing some of the CF results.

Quality

As the CFs were added to the Stats 19 data specification at the start of 2005, the results for 2005 could have been affected by teething troubles. In June 2006, the Liaison Group on Road Accident Statistics (LGRAS) discussed a paper on aspects of the quality of the data. It also remains the case the recording of CFs varies between Police Forces. In 2009, there were around 2.1 CFs per accident for Scotland; varying between 1.5 and 2.6 between Forces. In addition, while most Police Forces' CFs are allocated by the reporting officer, in one Force they are allocated by a small team of specialist CRASH investigators. It may be that a higher degree of accuracy exists for fatal and serious accidents than for slight accidents, as the former may be attended by more experienced road policing officers.

On introduction inconsistencies arose between the CF code and the Type of Participant code (around 3-4% in 2005). The most frequent problem was the combination of the CF code for pedestrian failed to look properly with the Type of Participant code for a Vehicle. In such cases, it wasn't possible to deduce (from the data) which was incorrect. Since then additional quality assurance was introduced leading to an improvement in quality (currently around 1% of cases).

There may be other changes in some of the patterns of the reporting of CFs, as a result of such discussions, the introduction of additional computer cross-checks of the data, Police Forces' increasing experience of the collection and recording of such information, and the use of the data by the Police, local authorities and central government.

Accident Costs: Details of Calculations

Tables 9 to 11 refer.

The Department for Transport estimate the values assigned to the cost of road casualties and accidents in Great Britain, for use in cost-benefit analysis of the prevention of road casualties and accidents in road schemes.

The valuation of casualty costs calculated for Great Britain for all levels of severity are based on a willingness to pay human cost approach. This is intended to encompass all aspects of the costs of casualties including both the human cost and the direct economic cost.

Types of Costs

The human cost covers an amount to reflect the pain, grief and suffering to the casualty, relatives and friends, and, for fatal casualties, the intrinsic loss of enjoyment of life over and above the consumption of goods and services. The economic cost covers loss of output due to injury and medical costs.

The cost of an accident also includes:

- the cost of damage to vehicles and property; and
- the cost of police and insurance administration.

A summary of the DfT's latest findings can be found in Reported Road Casualties GB: 2020.

Scotland analysis

The average cost per accident in Scotland and the total cost of all accidents in Scotland are presented in Tables 10 and 11. These are calculated using the GB casualty costs and the number of casualties by severity in accidents in Scotland. The average costs per accident for Great Britain and Scotland differ because of differences in the average numbers of casualties per accident, and the proportions of fatal and serious casualties in an accident.

Also estimated are the number of damage only accidents and their average costs.

Figures are presented in constant 2019 prices. Therefore estimates of values in earlier years have been calculated by applying 2019 values to previous years.

Further information on the methodology can be obtained from the DfT:

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Department for Transport

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LONDON
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Email: itea@dft.gov.uk
Tel: 020 7944 6177

Drink-drive accidents and casualties

Table 22 refers

The numbers of drink-drive accidents and casualties fell by 62% and 65% respectively between 2009 and 2019 (the latest year for which estimates are available): from a rounded estimate of 660 to roughly 230 (accidents) and from around 920 to some 350 (casualties). While fluctuating from year to year, the number of people killed as a result of drink-drive accidents is estimated to be the two thirds of the number in 2019 (20) as it was in 2009. The number of serious casualties is estimated to have dropped by 44% (from roughly 160 in 2009 to some 90 in 2018).

Drink-drive estimates: background

The Department for Transport (DfT) annually estimates the number of reported drink drive accidents: i.e. those reported injury road accidents involving drivers with illegal alcohol levels (above the current drink-drive limit of 80 milligrams (mg) of alcohol per 100 millilitres (ml) of blood or 35 micrograms per 100ml of breath in England and Wales or 50 milligrams (mg) of alcohol per 100 millilitres (ml) of blood or 22 micrograms per 100ml of breath in Scotland from the 5th December 2014).

DfT published GB final figures in August 2021. Scotland estimates are presented in Reported Road Casualties GB Table ras51019 which was updated with 2019 data in September 2021. Because of the uncertainty involved figures are rounded to the nearest ten.

The DfT's publication outlines the estimation methods in detail. It draws on Stats 19 reported road accident data (where motor vehicle drivers or riders failed or refused to provide a sample of breath) and Procurators Fiscal (and Coroners in England and Wales) data on blood alcohol levels of drivers who died within 12 hours of being injured in a road accident. The estimates include allowances for the numbers of cases where drivers or riders are not breath tested due to the accident being a hit and run accident. Drink drive casualties are defined here as any casualties resulting from a drink drive accident.

Estimates for 2020 are not yet available because of the timing of the provision of the data regarding blood alcohol levels of fatalities from Procurators Fiscal (and Coroners in England and Wales) to DfT. At this stage the sample of 2020 data is insufficient to allow a breakdown by country.

There are no estimates for Scotland of the number of alcohol-related injury road accidents which involve legal alcohol levels (i.e. alcohol levels up to and including the current drink-drive limit of 80mg of alcohol per 100ml of blood), nor are there any estimates for Scotland of the numbers of *non*-injury (damage only) road accidents involving illegal alcohol levels.

The figures here differ from the number of drivers with positive (or refused) breath tests. While the Police aim to breath test all drivers involved in an accident this isn't always possible (e.g. hit and run drivers or due to severity of casualty). Recently, just under two thirds of motorists involved in injury road accidents in Scotland have been breath tested.

Appendix A – Calendar of events affecting road traffic

1964-65: Road Traffic Act 1964 – Wider powers for speed limits. Trial 70 mph speed limit on motorway and other previously de-restricted roads. 50 mph speed limit on selected roads during summer.

1967: Seat belts compulsory on new cars – Permanent 70 mph speed limit on all roads. An offence to drink and attempt to drive with over 80 mg of alcohol per 100 ml of blood.

1968-69: Transport Act 1968 allowed regulations on length of drivers' working hours – 3 year old vehicles need test certificate.

1970: New regulations on lorry and PSV drivers' hours of work.

1973: Reorganisation of local government in Scotland, 9 regions and 3 islands areas and 53 districts.

1973-74: Safety helmets compulsory for 2-wheeled motor vehicle users – 50 mph national maximum speed limit, later motorway 70 mph, dual carriageway 60 mph – Vehicle lighting regulations.

1974: Road traffic act 1974 placed a duty on authorities to study road accidents and take measures to prevent them.

1975: Temporary 50 and 60 mph limits extended.

1976: Licensing Scotland Act 1976 – extension of licensing hours until 11pm – effective from 13 December 1976.

1977: 50 and 60 mph limits raised to 60 and 70 mph.

1977: Licensing Scotland Act 1976 – extension of Sunday opening – effective from October 1977.

1978: 60 and 70 mph limits permanent – New rules on maximum hours which may be worked by goods vehicle drivers.

1982: New 2-part motorcycle test from 29 March – Application of 2 year limit on provisional motorcycle licence took effect from 1 October.

1983: Transport Act 1981 introduced evidential breath testing and made seat belt wearing law for drivers and front seat passengers of most cars and light vans. Learner motorcyclists now only allowed to ride machines of up to 125 cc.

1984: Regulations introduced requiring spray reducing devices to be fitted to lorries and trailers.

1985: In December, Scottish Police Authorities introduced a policy of breath testing all drivers in an accident wherever possible.

1986: Deregulation of buses from 26 October 1986 as a result of the Transport Act 1985.

1986: All new cars manufactured from 1 October to be fitted with rear seat belts. Seat belt legislation made permanent. European Road Safety Year.

1987: Legal requirement introduced requiring all newly registered cars to be fitted with rear seat belts or child restraints from 1 April. Government sets a target to achieve a one-third reduction in road accident casualties by the year 2000.

1988: All coaches first used from 1 April 1974 using a motorway must have 70 mph limiters fitted by 1 April 1991.

1989: Penalty points increased for careless driving, driving without insurance and failing to stop after or to report an accident. Seat belt wearing by rear child passengers became law in cars where appropriate restraints have been fitted and are available. Accompanied motorcycle testing became mandatory.

1990: Compulsory basic training for motorcyclists introduced and learner drivers banned from carrying pillion passengers. High Risk Offenders Scheme for problem drink-drivers extended. New regulations requiring those accompanying learner drivers to be at least 21 years old and to have held a licence for 3 years. Scottish Road Safety Year.

1991: Seat belt wearing by rear adult passengers became law in cars where belts are fitted and available. New road hump regulations introduced to reduce traffic speed.

1992: Subsequent to the Road Traffic Act 1991, new road traffic offences and penalties came into force, including retesting of dangerous drivers. The Traffic Calming Act 1992 came into force enabling roads authorities to introduce a wide range of traffic calming measures. Requirement for minimum tread depth of 1.6 mm introduced for cars and light vans. All new goods vehicles over 7.5 tonnes fitted with 60 mph speed limiters.

1993: First speed enforcement cameras introduced in Scotland. The MOT test extended, including new checks on mirrors, windscreen condition, fuel tanks, seat and door security and number plates.

1994: First 20 mph zones introduced in Scotland. Traffic Calming (Scotland) Regulations came into force.

1995: Pass Plus scheme introduced for new drivers which encourages new drivers to take more lessons by offering discount on motor insurance.

1996: Local Government etc. (Scotland) Act 1994 implemented with the creation of 32 unitary authorities replacing the previous regions and districts.

1996: Driving theory test introduced from 1 July for car and motorcycle learners. Road Traffic (New Drivers) Act 1996 – requires newly qualified drivers to retake the driving test if they acquire 6 or more penalty points within 2 years of passing their test – effective from 1 June 1997. Requirement for coaches and minibuses to be fitted with seat belts when carrying children on organised trips, including journeys between home and school – effective from February, 1997. End of concession, where seat belts are fitted, whereby 3 children could share a double seat.

1997: New Zebra, Pelican and Puffin crossing regulations introduced, with Puffin crossings prescribed for the first time.

1998: New Road Humps regulations came into force giving local authorities wider powers to establish road humps.

1999: Amendment to the Road Traffic Regulation Act 1984 gave local authorities power to introduce traffic calmed 20 mph zones and 20 mph speed limits, with or without traffic calming measures, at suitable locations. Revised Highway Code published.

2000: The Government announced a new road safety strategy and casualty reduction targets for the period to 2010 in “Tomorrow’s Roads – Safer for Everyone”. A review of speed policy was conducted and reported in ‘New Directions in Speed Management’.

2001: Amendment to the Road Traffic Regulation Act 1984 made it clear that school crossing patrols can stop traffic for children of all ages and adults and gave local authorities greater flexibility in the times that school crossing patrols can operate. Scottish Executive awarded nearly £15 million to local authorities for cycling, walking and safer streets projects, including safer routes to school schemes.

2002: New Home Zones (Scotland) Regulations came into force. These set out the procedures local authorities must follow when designating home zones.

2003: Revised guidance on school transport issued to local authorities. Scottish School Travel Advisory Group report published. Scottish Executive provided the funding to implement the report's key recommendation to create school travel co-ordinator posts within each Scottish local authority.

2004: Publication of the first three year review of the GB road safety strategy and casualty reduction targets, set out in "Tomorrow's Roads – Safer for Everyone".
2006: Road Safety Act passed. The Act made provision for a wide range of road safety matters, including drink driving, speeding, driver training and driver and vehicle licensing. Revised guidance on setting local speed limits issued to local authorities.

2007: Publication of the second three year review of the GB road safety strategy and casualty reduction targets, set out in "Tomorrow's Roads – Safer for Everyone". Publication of DfT Child Road Safety Strategy, which included measures by the Scottish Government to reduce child road casualties.

2008: GB consultation – Learning to Drive – published, on changes to the driver training and testing regime. GB consultation on Road Safety Compliance, covering speeding, drink driving, seat belts, drug driving and careless driving, published.

2009: Scotland's Road Safety Framework to 2020 published. The Framework sets Scottish specific targets for casualty reductions in the period to 2020, in line with an aspirational vision of a future where no-one is killed on Scotland's roads and the injury rate is greatly reduced.

2009/2010: ACPOS launched a Vehicle Forfeiture Scheme for Drink Drivers.

2010: Have You Clicked? Year long campaign launched on 19 April.

2010: 25 years of Road Safety Scotland. 2010 marks the 25th anniversary of Road Safety Scotland (RSS), previously operating as the Scottish Road Safety Campaign (SRSC)

2011: Launch of the United Nations Decade of Action for Road Safety 2011-2020.

2011: Publication of National Debate on Young Drivers' Safety presenting the findings of a national debate on young driver issues undertaken across Scotland.

2011: Publication of the New Strategic Framework for Road Safety by the UK Government.

2014: Devolution of powers to the Scottish Parliament in relation to the Drink-Drive alcohol blood limit, and certain national speed limits

2013: UK Government introduced changes for drivers guilty of offences such as tailgating or middle lane hogging with fixed penalty notices of a £100 fine and three penalty points being issued. Existing fixed penalty fines for most driving offences, including mobile phone use and not wearing a seat belt rise from £60 to £100.

2013: Publication of a review of the Guide to Improving School Transport and its accompanying report were issued to all local authorities in Scotland.

2014: Transport Minister, Keith Brown, announced plans to legislate in the next Scottish Parliament to ensure that seatbelts are provided on all dedicated school transport in Scotland.

2014: Following consultation that showed overwhelming support, Ministers reduced the drink drive limit from 80 mg per 100 ml of blood to 50 mg per 100 ml

2014: The A9 average speed camera system went live on 28 October alongside an increase in the HGV speed limit on the single carriageway sections between Perth and Inverness.

2015: Publication of “Good Practice Guide on 20 mph Speed Restrictions”

2015: Scottish Road Safety Week pilot undertaken.

2015: British Road Safety Statement published by the UK Government.

2016: The output of the Mid-term Review of Scotland’s Road Safety Framework is published.

2016: An updated Strategic Road Safety Plan for the trunk road network is published

2016: Scotland Act 2016 devolves speed limit, traffic sign and parking regulation powers to the Scottish Parliament.

2017: The Scottish Government announces plans to create a new criminal offence of drug driving.

2017: The Seat Belts on School Transport (Scotland) Bill is introduced to the Scottish Parliament by Gillian Martin MSP, with support from the Scottish Government. This aims to make a legal requirement for fitting seat belts on all dedicated school transport. National guidance with information on seat belt fitting, wearing and monitoring is published in June 2018 ahead of the Act coming into effect on 1 August 2018.

2018: The Scottish Government announces commitment to bring forward the necessary secondary legislation that will specify 17 drug types to be included as part of the new offence and the associated limits for each drug type, in Scotland in 2019.

2018: Learner drivers can now take motorway driving lessons

2019: European Parliament approves new minimum EU vehicle safety requirements that will come into force from May 2022 for new models and from May 2024 for existing models. European Commission publishes its Staff Working Document EU Road Safety Policy Framework 2021-2030 - Next steps towards "Vision Zero”. From 1 July vehicle manufacturers must install a noise-emitting device– which sounds like a traditional engine – in new electric and hybrid vehicles. In July DfT publishes its revised Road Safety Statement and two-year action plan. From 21 October, Scotland adopts a ‘zero tolerance’ approach to the eight drugs most associated with illegal use, with limits set at a level where any claims of accidental exposure can be ruled out. Meanwhile, a list of other drugs associated with medical use will have limits based on impairment and road safety risk.

2019: EU directive on road infrastructure safety management formally adopted in October.

2020: New general safety regulations published in December 2019 came into force in January, updating existing rules on car safety contained in the general safety regulation (EC) 661/2009 and the pedestrian safety regulation (EC) 78/2009. - new mandatory EU vehicle safety measures

2020: Stockholm Declaration is agreed by UN Member States in February. This is followed by the adoption of the UN resolution A/74/L.86 “Improving global road safety” on 30 August.
July 2020: New UK Government regulations allowing trials of rental e-scooters on UK roads came into force

February 2021: publication of Scotland's Road Safety Framework to 2030 by the Scottish Government

April 2021: UK Government Automated and Electric Vehicle Act 2018 came into force; it makes provisions for a list to be kept by the Secretary of State for Transport of motor vehicles that are able to safely and lawfully drive themselves. It introduced new provisions to compensate the victims of accidents caused by AVs. To reduce the need for victims to be involved in prolonged litigation, the insurer is liable to compensate the victim without proof of fault. The insurer may then reclaim damages from any other party liable for the accident.

April 2021: consultation outcome of the Automated Lane Keeping System (ALKS) Call for Evidence published by UK Government, setting out set out how vehicles fitted with ALKS technology could legally be defined as self-driving, as long as they receive GB type approval and that there is no evidence to challenge the vehicle's ability to self-drive.

May 2021: UK first media reporting guidelines for crashes published

July 2021: DfT published their response to Review of The Highway Code to improve road safety for cyclists, pedestrians and horse riders. Subject to Parliamentary approval, DfT will work with the Driver and Vehicle Standards Agency to update The Highway Code.Online and hard copy versions of the revised code will be produced before the end of 2021.

Sept 2021: School transport guidance 2021 published by the Scottish Government

Sept 2021: review of INDG382 Driving for Work complete and published by HSE

Sept 2021: Scottish Government commits to ensure all appropriate roads in built up areas have a safer speed limit of 20 mph by 2025

October 2021: Traffic Regulation Order Regulations laid before Scottish parliament

Appendix C - Consultation & reviews

Introduction

This Appendix describes the arrangements for consulting users and providers of the road accident statistics. It also discusses the regular reviews of the Stats 19 road accident statistics specification, describing the changes to the Stats 19 specification in 2005 and the future recommendations resulting from the recent (2008) review.

The Liaison Group on Road Accident Statistics (LGRAS)

Transport Scotland (TS) consults the Liaison Group on Road Accident Statistics (LGRAS), whose members include representatives of each Police Force and of the Association of Chief Police Officers (Scotland), of some individual local authorities and of the Society of Chief Officers of Transportation in Scotland, and of other types of user of the statistics, including the Royal Society for the Prevention of Accidents, the Institute of Road Safety Officers in Scotland, a transport consultant, and an academic researcher. LGRAS meets, on average, once a year. It discusses matters such as the arrangements for the supply of the road accident statistics data, the quality of the information collected and implications of using the data for certain purposes, the likely availability of other information, proposals for changes to the Stats 19 road accident statistics specification, and improvements.

Further details of LGRAS (including papers and minutes) are available on the Transport Scotland website.

The Standing Committee on Road Accident Statistics (SCRAS)

Users and providers of reported road accident statistics across Great Britain are consulted via the Standing Committee on Road Accident Statistics (SCRAS), chaired by the Department for Transport (DfT). Its members include representatives Police Scotland, TS, and other interested parties from across Great Britain. SCRAS is responsible for reviewing the GB-wide Stats 19 road accident statistics specification (see below) and discusses other aspects of the collection and use of the road accident statistics.

Further information is available from Anil Bhagat at the DfT (Tel: 020 7944 3078).

Reviews of the Stats 19 road accident statistics specification

National & local government police forces across Great Britain work closely to achieve an agreed standard for the system for collecting & processing statistics on road accidents involving personal injury. The statistics are subject to regular reviews (led by SCRAS) as part of the continued drive to improve quality and meet user needs whilst minimising the burden of collection.

The most recent STATS19 review started in autumn 2018 and has made a number of recommendations on changes to STATS19 going forward. These were based on evidence and detailed discussion with the review group.

Key recommendations can be found in the full STATS19 review report.

For further information please contact: STATS19REVIEW@dft.gov.uk

Appendix D - Definitions and points to note

The definition of severity used in the Road Accident statistics

The classification of the severity of an accident (as fatal, serious or slight) is determined by the severity of the injury to the most severely injured casualty. The police usually record this information soon after the accident occurs. However, if further information becomes available which would alter the classification (for example, if a person dies within 30 days of the accident, as a result of the injuries sustained in the accident) the police change the initial classification of the severity.

For the purposes of the Road Accidents statistical returns:

a ***fatal injury*** is one which causes death less than 30 days after the accident;

a ***fatal accident*** is an accident in which at least one person is fatally injured;

a ***serious injury*** is one which does *not* cause death less than 30 days after the accident, *and* which is in one (or more) of the following categories:

(a) an injury for which a person is detained in hospital as an in-patient

or (b) any of the following injuries (whether or not the person is detained in hospital): fractures, concussion, internal injuries, crushings, severe cuts and lacerations, severe general shock requiring treatment

or (c) any injury causing death 30 or more days after the accident;

a ***serious accident*** is one in which at least one person is seriously injured, but no-one suffers a fatal injury;

a ***slight injury*** is any injury which is neither fatal nor serious – for example, a sprain, bruise or cut which is not judged to be severe, or slight shock requiring roadside attention;

a ***slight accident*** is one in which at least one person suffers slight injuries, but no-one is seriously injured, or fatally injured.

From the middle of 2019 Police Scotland started to use the new CRaSH system for recording details of an accident. This provides a more detailed definition of the severity of casualties. The following table lists the options for determining how severe an injury is. It should be noted that in some cases in 2020 although the most severe injury appears to be slight, if the casualty was subsequently admitted to hospital the casualty severity was classed as serious. The introduction of CRaSH has meant that the severity of injuries is recorded more accurately and has led to an increase in the number of serious injuries. Figures are therefore not directly comparable with those for the previous years.

Classification of injury severity using the CRASH reporting system

Injury in CRASH	Detailed severity	Severity classification
Deceased	Killed	Killed
Broken neck or back	Very Serious	Serious
Severe head injury, unconscious	Very Serious	Serious
Severe chest injury, any difficulty breathing	Very Serious	Serious
Internal injuries	Very Serious	Serious
Multiple severe injuries, unconscious	Very Serious	Serious
Loss of arm or leg (or part)	Moderately Serious	Serious
Fractured pelvis or upper leg	Moderately Serious	Serious
Other chest injury (not bruising)	Moderately Serious	Serious
Deep penetrating wound	Moderately Serious	Serious
Multiple severe injuries, conscious	Moderately Serious	Serious
Fractured lower leg or ankle or foot	Less Serious	Serious
Fractured arm or collarbone or hand	Less Serious	Serious
Deep cuts or lacerations	Less Serious	Serious
Other head injury	Less Serious	Serious

Injury in CRASH	Detailed severity	Severity classification
Whiplash or neck pain	Slight	Slight
Shallow cuts or lacerations or abrasions	Slight	Slight
Sprains and strains	Slight	Slight
Bruising	Slight	Slight
Shock	Slight	Slight

Over the years, improvements in vehicle design, and the provision and use of additional safety features, together with changes in the law (eg on the fitting and wearing of seat belts), will all have helped to reduce the severity of the injuries suffered in some accidents. Road safety measures should also have reduced the levels of injuries sustained. For example, if traffic calming schemes reduce average speeds, people may suffer only slight injury in collisions that previously would have taken place at higher speeds and so might previously have resulted in serious injury.

However, it is also possible that some of the changes shown in the statistics of serious injuries and slight injuries may be due to changes in administrative practices, which may have altered the proportion of accidents which is categorised as serious. For example, the distinction between serious and slight injuries could be affected by factors such as changes in hospitals' admission policies. All else being equal, the number of serious injury cases would rise, and the number of slight injury cases would fall, if it became standard procedure for a hospital to keep in overnight, for precautionary reasons, casualties with a particular type of injury.

The increase in the number of serious injury accidents in 1994 was partly attributed to a change in the health boards' policies in admitting more child casualties for overnight observation, which in turn changed the classification of many injuries from slight to serious. The number of child casualties recorded as having serious injuries in 1994 was 35% higher than in the previous year. There could also be changes in hospitals' procedures that would reduce the numbers of serious injury cases.In addition, there is anecdotal evidence that changes in procedures for assigning severity codes may affect the categorisation of injuries. For example, different severity codes might be assigned by a police officer who was at the scene of an accident and by a clerk who bases the code on a police officer's written description of the accident.

Other definitions

Accident: The statistical returns include only those accidents which result in personal injury, which occur on roads (including footways), in which a vehicle is concerned, and which become known to the police. The vehicle need not be moving and it need not be in collision. The statistics are therefore of injury road accidents only: damage-only accidents are not included in the figures.

***Adults**:* People aged 16 and over.

***Built-up roads**:* accidents which occur on built-up roads are those which occur on roads which have speed limits of up to 40 miles per hour (*ignoring* temporary speed limits on roads for which the normal speed limit is over 40mph). Therefore, an accident on a motorway in an urban area would *not* be counted as occurring on a built-up road, because the speed limit on the motorway is 70mph. An accident on a stretch of motorway with a temporary speed limit of 30mph would *not* be counted as occurring on a built-up road, because the normal speed limit is 70mph.

***Buses and coaches**:* Include works' buses and (in past years) trams and trolley buses. Vehicles are coded according to their construction, irrespective of their use at the time of the accident. Thus, vehicles of bus construction which are privately licensed are included under 'buses and coaches', while Public Service Vehicle licensed minibuses are included under minibuses.

***Cars**:* Include estate cars and three-wheeled cars.

***Casualty**:* A person killed or injured in an accident. One accident may give rise to several casualties.

***Children**:* People under 16 years old.

***Darkness**:* From half an hour after sunset to half an hour before sunrise, ie 'lighting-up time'.

***Drivers**:* Persons in control of vehicles other than pedal cycles and two-wheeled motor vehicles.

***Goods vehicles**:* Vans, lorries, tankers, milk floats, tractor units travelling without their trailer units.

***Heavy goods vehicles**:* From 1994, heavy goods vehicles have been defined as goods vehicles with a maximum permissible gross vehicle weight of more than 3.5 tonnes. Prior to 1994, they were defined as those with an *un*laden weight of more than 1.5 tons (1.52 tonnes).

***Junction**:* A place at which two or more roads meet, whatever the angle of the axes of the roads (including roundabouts), or within 20 metres of such a place.

***Killed**: Sustained injuries which caused death less than 30 days after the accident.*

***Light goods vehicles**:* From 1994, light goods vehicles have been defined as goods vehicles with a maximum permissible gross vehicle weight of up to 3.5 tonnes. Prior to 1994, they were defined as those with an *un*laden weight of 1.5 tons (1.52 tonnes) or less.

***Major roads**:* Motorways and A roads.

***Minor roads**:* B roads, C roads and unclassified roads.

***Motorcycles**:* Includes all two wheeled motor vehicles.

***Motorists**:* The drivers or riders of motor vehicles (including, for example, motorcyclists).

***Motorways**:* Include A(M) roads.

***Non built-up roads**:* Roads for which the normal speed limit (*ignoring* any temporary speed limits) is more than 40mph.

***Other vehicles**:* Include ambulances, fire engines, pedestrian-controlled vehicles with motors, railway trains or engines, refuse vehicles, road rollers, tractors, excavators, mobile cranes, tower wagons, army tanks, etc – and from 1999, motor caravans. Other non-motor vehicles include those drawn by an animal, ridden horses, invalid carriages without motor, street barrows, etc.

***Passengers**:* Occupants of vehicles, other than the person in control, including pillion passengers.

***Pedal cycles**:* Including toy cycles ridden on the carriageway, tandems and tricycles. Pedal cyclists includes any passengers of pedal cycles.

***Pedestrians**:* Includes people riding toy cycles on the footway, people pushing bicycles, people pushing or pulling other vehicles or operating pedestrian-controlled vehicles, those leading or herding animals, occupants of prams or wheelchairs, and people who alight safely from vehicles and are subsequently injured.

***Riders**:* People in control of pedal cycles or two-wheeled motor vehicles.

***Road users**:* Pedestrians and vehicle riders, drivers and passengers.

***Trunk roads**:* Roads for whose upkeep Scottish Government Ministers are responsible.

***Users of a vehicle**:* All occupants, ie driver (or rider) and passengers, including persons injured while boarding or alighting from the vehicle.

***Vehicles involved in accidents**:* Any vehicle directly involved in an accident where at least one injury is sustained by a pedestrian or vehicle driver, rider or passenger. Vehicles which collide after the initial accident which caused injury are not included, unless they aggravate the degree of injury or lead to further casualties.

Some other points to note

Driver and casualty postcodes, and estimated distances between homes and the locations of accidents

Postcodes were added to the Stats 19 returns in 1999. It was accepted that their collection would have to be phased in, as they became readily available from police administrative systems. Indeed, the Stats 20 instructions state if the postcode is not immediately available, leave blank. As a result, blank (or the not known code) is used more often than should be the case in future. There are also codes for non-UK residents and for parked and unattended vehicles.

The straight line (or as the crow flies) distance between the location of the accident and the home of a driver, rider or casualty was estimated using the postcode of the person's home. The grid co-ordinates of the centre of the postcode were obtained from the General Register Office for Scotland's postcode directory file. These were taken as an approximation to the grid co-ordinates of the person's home, and used in conjunction with the grid co-ordinates of the location of the accident (as reported by the police) to estimate the distance. A similar approach was used in the small proportion of cases where there was only the start of a postcode (eg the police might record EH10 if they knew that someone lived in Edinburgh 10, but they could not provide the full postcode) or where only the postal district or postcode sector could be matched with the postcode directory. A distance could not be estimated if the postcode were blank, coded not known or non-UK resident, did not contain a valid postal district, or were for a place outwith Scotland.

Vehicle type: coding of motor caravans

The vehicle type code formerly used for 'Minibus/motor caravan' (code 10) was changed in 1999:

- **Minibus:** the code 10 category now covers only minibuses;
- **Motor caravans** are not identified as a separate category – they are now included with 'Other motor vehicles' (code 14)

As a result, the figures for the categories described in the tables as minibus and other are on different bases for (a) 1998 and earlier years and (b) 1999 and later years. The scale of the discontinuity is not known, because motor caravans have not been identified separately in the statistical returns. However, it is likely that this change has contributed to the fall in the minibus figures between 1998 and 1999, and the rise in the other figures.

Estimates of the total volume of road traffic

Some tables include estimates of traffic volumes, or accident or casualty rates calculated from them. The traffic estimates were provided by the Department for Transport (DfT), which produces estimates of the total volume of road traffic for Scotland and for other parts of Great Britain.

DfT's estimates are based on an urban/rural classification of roads, *not* on the built-up/non built-up classification of roads used in the traffic estimates that were made up to 2002 (which is still used for the accident and casualty statistics). In general:

- an urban road is a road (other than a Motorway) that lies within the boundaries of an urban area with a population of 10,000 or more in 2001;
- a built-up road is one that has a speed limit of 40 m.p.h. or less

As traffic on a particular road can be classed as rural whilst accidents occurring on it classed as built-up, it would be incorrect to estimate an area's accident rate for built-up roads by dividing its number of accidents on built-up roads by its estimated volume of traffic on urban roads. Therefore, estimates of built-up and non built-up accident rates are provided in Table 5 *only* for Scotland *as a whole* – and these estimates may *not* be precise, due to the nature of the classifications.

The DfT traffic estimates provide only a rough indication of the likely total volume of traffic in each Council area. These are not National Statistics. For example, DfT believes that its estimates of the volume of traffic on minor roads (i.e. B, C and unclassified roads) for Scotland as a whole are of acceptable quality. However, the 320 or so counts now taken per year at minor road sites across Scotland represent an average of 10 per local authority per year – clearly too few to be the basis of reliable estimates for individual local authority areas for each year. DfT therefore estimate the total volume of traffic on minor roads in individual local authority areas in other ways (outlined in *Scottish Transport Statistics)*. The resulting estimates, which are consistent with the overall totals for Scotland as a whole, provide only a broad indication of the likely total volume of traffic on minor roads in each local authority area. As a result:

- it is not possible for DfT to quantify the possible margins of error around them;

- they are not classed as National Statistics;
- more detailed breakdowns of the estimates for individual local authority areas (e.g. separately for B, C and unclassified roads; or for urban roads and rural roads) are not published

In addition, DfT's estimates of traffic on major roads in each local authority area are also not classed as National Statistics. They too are based on limited data: as manual traffic counts are taken on a rotating census basis, there may be several years between successive counts at a particular site. Therefore, DfT notes that there could be large errors in its traffic estimates for the major roads in some of the smaller local authority areas. Similar considerations apply to DfT's estimates of the total volume of traffic on all roads in each area, which are produced by adding together its estimates of traffic on major roads and on minor roads.

In conclusion: DfT provides its estimates of the volume of traffic in each local authority area as the best that it can produce from the limited amount of data available to it – rough indications of the likely volume of traffic in each area, for use with caution, as no better estimates are available.

Appendix E - Local Government Reorganisation and the Trunk Road Network

Introduction

This Appendix explains how statistics for the areas of the new Councils were produced for the period prior to local government reorganisation on 1 April 1996. It then describes the trunk road network the changes made to it then, and their effect on the statistics. The next section is about identifying accidents which occurred prior to 1 April 1996 on the roads which formed the post- 1 April 1996 trunk road network, so that figures could be produced on a consistent basis pre- and post-1996. Subsequent sections explain how the effect of the change for individual Council areas can be assessed, how the 1994-98 averages for trunk roads and local authority roads were calculated, and how accident and casualty rates for 1995 and earlier years were calculated. The final section mentions how the statistics for some types of road in some areas may be affected by the opening of new roads.

Local Government re-organisation

The reorganisation of local government established new Councils with effect from 1st April 1996, to replace the former Regions, Districts and Island Areas. Statistics for the areas covered by the new Councils for earlier years (back to 1981) were derived in three ways:

- In the case of the former Island Areas, by allocating all the accidents which occurred in each Island Area to the relevant Council.
- In those cases where a whole District fell in a new Council's area, by allocating all the accidents which occurred in that District to the area of the new Council.
- In the case of accidents occurring in the five Districts which had major parts falling in several new Councils' areas, by a special exercise, which used the grid co-ordinates recorded for each individual accident to allocate it to the area of one of the new Councils, using a computer mapping system. This was successful for 99% of accidents for these five Districts, consistently over all years from 1981. The remaining 1% of the accidents in the five Districts were assigned to the new Council in which the majority of the District's accidents fell. This should cause only a very small error (considerably less than 1%) for any of the new Councils, in any year.

The Trunk Road Network

Trunk roads are those roads for whose upkeep Scottish Ministers are responsible. The Government's view, when it reviewed the trunk road network in 1994, was that the trunk road network should:

- provide the road user with a coherent and continuous system of routes which serve destinations of importance to industry, commerce, agriculture and tourism;
- define nationally important routes which will be developed in line with strategic national transport demands; and
- ensure that those roads which are of predominantly local importance are managed locally.

Currently, the trunk road network in Scotland consists of all the Motorways plus some (but not all) of the A roads. In some cases, the trunk road network may include the whole of a particular road; in other cases, only certain stretches of a road may be part of the trunk road network. For example, only that part of the A7 which runs south of the junction with the A6091 near Galashiels is part of the current trunk road network: the northern part is *not* a trunk road.

Changes to the trunk road network in April 1996, and their effect on the statistics

Following the review of the trunk road network, several changes were made with effect from 1st April 1996 (coinciding with the reorganisation of local government). Some roads (or stretches of road) which had previously been part of the trunk road network were transferred to local authority control: examples include the A7 from near Edinburgh to near Galashiels, and the A91 from the M90 to St Andrews. Some roads which had previously been the responsibility of local authorities became part of the new trunk road network: examples include the A720 Edinburgh City bypass east of the M8 extension and the A95 from Aviemore to Keith. The overall result was that, on 1st April 1996, about 214 miles of road ceased to be trunk road, and about 361 miles of road became trunk road.

Because of these changes to the trunk road network, the original figures for the numbers of accidents which occurred on trunk roads before and after 1st April 1996 were on different bases, and a comparison could be misleading. Comparisons of the figures for local authority roads could also be misleading, particularly when one looked at the figures for the areas covered by certain Councils, because they may relate to significantly different road networks before and after 1 April 1996.

Identifying accidents which occurred before April 1996 on the roads which formed the post- 1 April 1996 trunk road network, to enable comparison of the numbers before and after 1996

In order to get figures for some of the years before 1996 which were on the basis of the post- 1 April 1996 road network, a special exercise was undertaken. This identified, from among the accidents which took place between 1st January 1992 and 31st March 1996, those which occurred on the stretches of road which form the new trunk road network (i.e. the trunk road network that took effect from 1st April 1996). As a result, the information that is available in the Transport Statistics branch database enables figures to be produced for the numbers of road accidents on trunk roads, and on local authority roads, using the following definitions of the status of the road:

a. status *at the time* of the accident - these figures are available for all years

b. status in terms of the *old* network - available up to 31 March 1996 only

c. status in terms of the *new* network - available for all years from 1992

It should be noted that the definitions under (b) and (c) above should, strictly speaking, be expanded:

i. For accidents which occurred *before* 31st March 1996, (b) is actually the status *at the time* of the accident (rather than the status *at 31 March 1996*): the two will differ in the case of any roads whose status changed *before* 31 March 1996. For example, if a road ceased to be a trunk road on (say) 15 May 1994, then definition (b) would show it as a trunk road for accidents before that date, and would show it as a local authority road thereafter.

ii. For accidents which occurred *after* 1st April 1996, © is actually the status *at the time* of the accident (rather than the status *at 1 April 1996*): the two will differ in the case of any roads whose status changed *after* 1 April 1996. For example, if a road ceased to be a trunk road on (say) 8 July 1996, then definition © would show it as a trunk road for accidents before that date, and would show it as a local authority road thereafter.

Assessing the effect of the April 1996 changes on the figures for trunk roads and for local authority roads, for individual local authority areas

Because data for 1992 to 1995 are available both on the basis of the old trunk road network and on the basis of the new trunk road network, one can see the extent of the change in the number of accidents on the trunk road network that was caused by the transfer of roads (or stretches of roads) between the trunk road network and the local authority road network. Similarly, one can compare the figures on the two bases for the local authority road network to see the extent of the change in the total number of accidents on that network that was caused by the transfers.

1992-95 averages on both bases were included in, for example, Tables 4 and 40© of *Road Accidents Scotland 2000*. The figures in the first of these tables showed that the April 1996 changes had little effect on the trunk road network's overall share of the total number of accidents in Scotland as a whole. However, the figures in the second table showed that the changes did have a noticeable effect on the trunk road network's share in some parts of Scotland. For example, the 1992-95 annual average number of casualties, on all types of road, in the area which is now covered by Highland Council was 1,079. Of these, an average of 423 (39%) occurred on the roads which formed the pre- 1 April 1996 trunk road network, and 495 (46%) occurred on the roads which formed the post- 1 April 1996 trunk road network. Therefore, the April 1996 changes could have a noticeable effect on the 1994-98 averages for trunk roads and local authority major roads for some local authority areas.

How the statistics for some types of road in some areas may be affected by the opening of new roads

Finally, it should be noted that analysis by type of road does *not* take account of changes in the numbers of accidents which result from *traffic* transferring from one kind of road to another when a new road opens. For example, when a new road is built, the majority of the traffic which uses it may be traffic that previously used another road. In some cases (eg when a motorway is constructed to replace an existing trunk road) the original road which carried the traffic may cease to be a trunk road when the new road opens, because the new road replaces it as a trunk road. However, the records of the accidents which occurred on the original road will continue to show that they occurred on the original road: they will *not* be amended to be counted against the new road. In such a case, when the statistics are analysed on the basis of the new networks, those accidents which occurred on the original road will be counted as occurring on what is now part of the new local authority road network, and those accidents which occurred on the new road will be counted as occurring on the new trunk road network. When one looks at series of figures for the new networks for a number of years, which span the year of the change, the figures for the new local authority network would fall, and the figures for the new trunk road network might rise, in the year in which the new road was opened, because of the transfer of traffic from the original road (which was a trunk road then, but is now part of the local authority road network) to the new road (which is part of the new trunk road network).

Appendix G - Calculations of the likely range of random year-to-year variation in road accident and casualty numbers

Introduction

This Appendix describes the methods that were used to calculate the likely range of random year-to-year variation in road accident and casualty numbers for Scotland as a whole that are shown in Figures 2, 3, 4 and 5. Two different methods were used: a simple method for Figures 2, 3 and 5, and a more complex method for Figure 4.

Calculating the likely ranges of values for Figures 2, 3 and 5

In the case of Figures 2, 3 and 5, the likely ranges of values were calculated on the assumption that the numbers are the outcome of a Poisson process. This is a process in which events occur at random, with the probability of an event occurring depending upon the underlying rate of their occurrence (*not* upon how long it has been since a previous event, *nor* upon the number of events that have occurred in a recent period). For the purpose of producing these charts, it was assumed that the underlying rate of occurrence in each year is the same as the value of the 5-year moving average centred on that year. (That is why there are no grey dashed lines for the last two years: one cannot calculate a 5-year moving average centred on 2020 until one has the values for 2021 and 2022).

A characteristic of a Poisson distribution is that the mean and the (statistical) variance are the same. Because the numbers are all much larger than 100, the assumption of asymptotic normality applies, and one would expect only about 5% of cases to fall outwith a 95% confidence interval range of plus or minus two standard deviations. Therefore, the upper and lower limits shown on the chart were calculated simply as the moving average plus and minus twice the standard deviation (for smaller numbers, exact ranges could have been calculated using the inverse Chi-square distribution).In the case of Figures 2, 3 and 5, the standard deviation was taken to be the square root of the assumed variance (i.e. the square root of the assumed underlying rate, and therefore the square root of the moving average).

In terms of statistical theory, this approach is appropriate for the number of fatal accidents (shown in Figure 2). However, it is a simplification in the case of the numbers of casualties of various types (shown in Figures 3, 4 and 5), because they have *two* random elements: the occurrence of an accident, and the number of casualties in it. The numbers of casualties would therefore be expected to have a greater range of statistical variability than that resulting from a simple Poisson process. However, as it happens, the simple approach appears to suffice for Figures 3 and 5 (probably because the numbers involved are relatively small, and therefore, as discussed in Section 1.4 of the Commentary, the calculated ranges are quite wide in percentage terms) – but the larger numbers in Figure 4 require a more complex method of calculation of the likely range of values.

Calculating the likely range of values for Figure 4

An initial version of Figure 4 was produced using the approach described above – i.e. the numbers of casualties were assumed to be the result of a Poisson process whose underlying rate for each year was the moving average for that year. The standard deviation was simply calculated from the square root of the moving average, and the ranges were simply +/- twice this standard deviation. However, the initial version of the chart showed that this approach under-estimated greatly the variability of the figures, as over half the years (53%) had values which were outwith the calculated ranges.

It was noted earlier that the variation in the number of casualties is likely to be greater than that which would result from a simple Poisson process. A method to deal with this extra-Poisson variation is discussed in a paper by Washington State Department of Health, *Guidelines for using Confidence Intervals for Public Health Assessment*.

The paper discussed the statistical problem of multiple admissions. For example, an asthma patient may be admitted many times, so that multiple admissions for an individual person are not likely to be independent of each other. A person who is hospitalised once for asthma is more likely to be hospitalised for asthma again than someone who has never been hospitalised for asthma. Therefore, the total count of admissions may not follow a Poisson distribution, and it is typical for the total count in such a situation to exhibit greater variability than would be expected from a Poisson process. As a result, simple methods of estimation (like those used to produce Figures 2, 3 and 5) will produce intervals which are too narrow.

The method proposed for calculating the variance in such a case is set out at section 4.6.2 of the Washington State Department of Health paper.

There is a clear analogy here with the road casualty figures. In our terms:

- d is the number of killed and seriously injured casualties;
- dj is the number of killed and seriously injured casualties for accident j;and
- P is the total number of injury accidents (including slight accidents)

We want to calculate the variance of *d*.

Because $R = d / P$ it follows that $d = R * P$ and the variance of d can be calculated from the variance of R.

The calculation of the variance of R requires one to sum the squares of the d_js – i.e. the squares of the numbers of people who were killed or seriously injured in each injury accident. These numbers were extracted from the Transport Scotland's computer database, which holds details of individual injury accidents back to 1979. For example, in 1979 there were 23,064 injury accidents. 14,800 of these had only slight casualties, 7,077 had one KSI casualty, 843 had two KSI casualties, 195 had three KSI casualties, and so on. The sum of the squares of the d_js is then simply $(7{,}077 * 1^2) + (843 * 2^2) + (195 * 3^2)$ + and so on. The variance of R can therefore be calculated for each year for 1979 onwards. Because figures for the numbers of casualties in each injury accident are not available for earlier years, it is not possible to calculate variances on this basis for years before 1979.

There is an added complication in our case as the total number of injury accidents (our P), which was assumed to be the result of a Poisson process, is *also* subject to random year-to-year variation, and therefore also has a variance associated with it. The standard deviation here can be calculated in the simple way, just the square root of the moving average value.

Then, because $d = R * P$, the variance of d is calculated as the variance of R plus the variance of P. (There is no covariance between the d_j and the P_j, because the value of P_j is equal to one for every value of d_j, since each P_j is a single injury accident).

The likely ranges of values are then calculated in the usual way, with the interval being +/- twice the standard deviation.

Figure 4 was prepared on this basis. This method appears to produce more realistic measures of the variability of the number of KSI casualties, but there are many years' figures (around a third) outwith the calculated ranges. The likely reason for this is that *statistical variability is not the only reason for year-to-year changes* – other factors have contributed to sharp falls and rises in KSI casualty numbers, as discussed in the publication Commentary. As the Commentary mentioned, in effect, *such factors change the Poisson process's underlying rate of occurrence of accidents and/or casualties*, and therefore, in effect, introduce a break into the series of moving average values. The method used to calculate the likely range of random year-to-year variation cannot take account of the effect of such changes.

Errors in the previous edition

This list covers errors which occurred in the preparation of the tables or the commentary in *Reported Road Casualties Scotland*.

We apologise for the following errors, which we have found in the previous edition.

Table C The figures for both all ages and child serious casualties for England and Wales were for Great Britain.

If there are time-series tables that include years for which the previous edition's figures were wrong, these are correct in the current publication.

A National Statistics Publication for Scotland

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

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