Road Safety
Analysis

DECADE OF ACTION FOR ROAD SAFETY 2011-2020

STEPPING OUT

Pedestrian Casualties: an analysis of the people and circumstances

Commissioned By:

PACTS
Parliamentary Advisory Council for Transport Safety

Supported By:

IAM DRIVING ROAD SAFETY

SRF

Forward

PACTS is very pleased to have been able to commission this report into pedestrian casualties from Road Safety Analysis, made possible by the financial support of the Safer Roads Foundation and IAM (The Institute of Advanced Motorists). It is part of the contribution by these organisations towards the second UN Global Road Safety Week which this year focuses on pedestrian safety.

Not only is there every reason to reduce deaths and injuries on the roads but walking is the glue in our transport system; and, as public health authorities are increasingly recognising, something that we need to promote strongly to avoid an epidemic of disease and ill-health.

Compared with many countries around the world – when measured in terms of casualties per 100,000 population – the UK has a relatively good pedestrian casualty record. Yet there is no room for complacency and every reason to take more action and to do so now. Pedestrians present almost no threat to other road users yet suffer almost one quarter of total casualties killed or seriously injured on our roads.

It is often necessary to get behind the high-level statistics to understand what is really happening, which is exactly the purpose of this report. It shows a divergence in the trends for child and adult pedestrian casualties, suggesting that, in some areas, more attention needs to be directed to adult pedestrian safety, although some safety interventions would benefit adults and children alike.

A worrying finding of this report is that there seems to have been little progress in adult pedestrian casualty reduction over the past three to four years. The final casualty data for 2012 (due in late June 2013) will be an important indicator.

The report does not make detailed recommendations but is intended to enable central government, local authorities and the wider road safety community to design and target their interventions more effectively. These may include better street and crossing design, lower speeds limits and more pedestrian-friendly vehicle design, so that collisions can be prevented or, when they do occur, the consequences are less serious. They may also include better enforcement of traffic laws to reduce offences such as drink driving; and education publicity and training for all road users.

PACTS is pleased to have played a part in making this information available. We hope others will use it to deliver safer pedestrian environments that we can all enjoy.

David Davies

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Executive Summary

There is a great deal of information collected about casualties on Great Britain's roads and this is analysed on a regular basis by the Department for Transport, local authorities and police forces. This report considers long-term trends in pedestrian casualties and analyses recent results in detail providing insight into the casualty trends. As well as analysing the where, how and when of collision circumstances there is also a thorough review of the people involved, where they come from, their ages and socio-economic backgrounds.

Long-term and Recent Trends

- The total number of reported pedestrian casualties killed or seriously injured on Great Britain's roads has fallen significantly over the last 30 years from 19,035 in 1980 to 5,605 in 2010.
- Despite these falls the percentage of all killed or seriously injured casualties who were pedestrians has remained remarkably stable (22.9% in 2010 versus 22.4% in 1980)
- The rate of pedestrian casualty reduction has slowed over the last six years with almost no reduction at all since 2009 and a small increase in 2011 of 1.4%. Early evidence from 2012 suggests this trend is continuing
- 2011 saw a 5% increase in pedestrians killed or seriously injured, including a 12% increase in pedestrian deaths
- It is too early to tell if the increases in 2011 are due to expected variations in rates or are the start of an increase in pedestrian casualties, especially in the adult population. Analysis of provisional data from 2012 does not currently show a further increase but the data is not yet complete.

Characteristics of Collisions involving Pedestrian Casualties

- Adult and child pedestrian casualties have significantly different collision characteristics and need to be treated separately.
- Children are more likely to be injured in spring and summer (excluding August) but adults have higher casualty distributions between October and January.
- Children are more likely to be injured as pedestrians on weekdays at morning and afternoon school times
- Peaks around commuter times for adult casualties are less pronounced but there are significant numbers in late evening and night time.
- Adults are far more likely (34% to 15%) to be injured as a pedestrian in darkness than children.
- The vast majority of pedestrians are injured on roads which have a 30mph speed limit
- Most casualties (70% of children and 58% of adults) are not injured at or near a pedestrian crossing.
- More than three-quarters of collisions involving a pedestrian casualty (78%) have one or more contributory factor assigned to the pedestrian themselves.
- Of these factors, 3/5ths are due to the pedestrian failing to look properly.

People involved as pedestrian casualties

- The age at which pedestrians are most at risk is 12 years old with one in 651 children of that age reported as a pedestrian casualty.
- Pedestrian casualties, and more prominently child casualties, are more likely to come from deprived areas. Of all child casualties, 40% come from the most deprived 20% of society.
- There are significant differences in the mix of adult and child pedestrian casualties in different parts of GB ranging from equal proportions in Blackburn and Darwen down to as little as 11% child casualties in Westminster London Borough.
- People living in Daventry District (Northamptonshire) are least likely to be a pedestrian casualty with risk levels 60% lower than the national average.
- People living in Newham London Borough are most likely to be a pedestrian casualty with risk levels 111% higher than the national average. The report provides information rather than recommendations but there are some broad conclusions that should be considered carefully by all road safety stakeholder when engaging with pedestrians in their local area. Road safety interventions and campaigns should always be grounded in a strong evidential base and further local assessment may be required to better understand the problems pedestrians face around Great Britain.

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Introduction

Pedestrian safety has been a concern ever since the first recorded road death in Great Britain in 1896. There have been concerted efforts by successive governments to promote safety messages, educating pedestrians and motorists about risk on the road. Whatever campaign we grew up with as children, the messages have always been the same: take care when crossing the road. Quite rightly the focus has always been on child pedestrian safety with the desire to ingrain core principles at an early age believing these will serve us well though life.

The purpose of carrying out this study is to provide a new level of insight into the problems faced by pedestrians on Great Britain's highways using multiple data sources, most significantly the STATS19 dataset. Unless specified, the study uses data from the last six years (2006 – 2011) obtained from MAST Online and provides an in-depth review of the key factors involved in pedestrian injuries: When, Where, What, Why, Who.

These factors combined, give a full picture of the reasons why pedestrians are injured on the roads and provides knowledge and direction to different professionals working in road safety including engineers, police officers, educationalists and those who promote safety messages. Wherever appropriate the analysis reviews themes and trends for child (0 – 15 years old) and adult (16 years and over) pedestrian casualties separately. Unless specifically mentioned, the analysis uses data from all recorded severities of injury. Injuries not recorded by the police are not included within this analysis, this includes those only reported to the NHS or to insurance companies.

Before examining the circumstances of collisions involving pedestrian casualties it is necessary to review both the long-term and recent trends.

Historical Perspective

The last thirty years have seen significant improvements in road safety for all casualty classes, be it motorists, cyclists or pedestrians. This is against a backdrop of increasing traffic levels and has been achieved through a combination of measures including engineering (vehicle and road), enforcement and education. Figure 1 demonstrates the overall reduction in pedestrians killed or seriously injured (KSI) on the roads of Great Britain since 1980. Total reductions were greatest in the 1990s and there has been a slowing down of reductions more recently which is to be expected as the total numbers fall. What is worth noting however is the dashed line which demonstrates that as a percentage of all KSI casualties, pedestrian casualties have not changed and in fact the results from 2010 show a small increase on the level from 1980 (22.9% versus 22.4%). These results could be affected by changes in the balance of traffic and total length of journeys undertaken as a pedestrian and this analysis is outside the scope of this study.

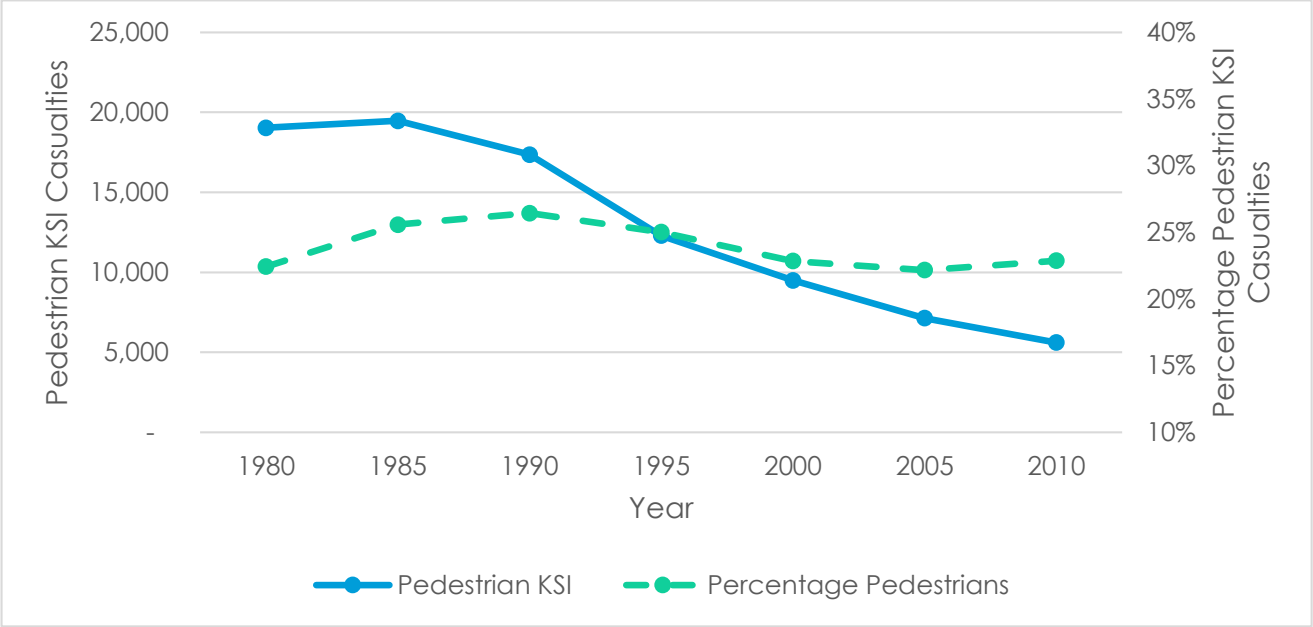


FIGURE 1. PEDESTRIAN KSI CASUALTIES IN GREAT BRITAIN 1980 - 2010

A more detailed analysis of trends over the last six years (Figure 2.) show the continued reduction in the total number of all recorded pedestrian injuries through to 2010 with the lowest figure ever recorded (25,845). In 2011 however there was a slight rise of 1.4% to 26,198.

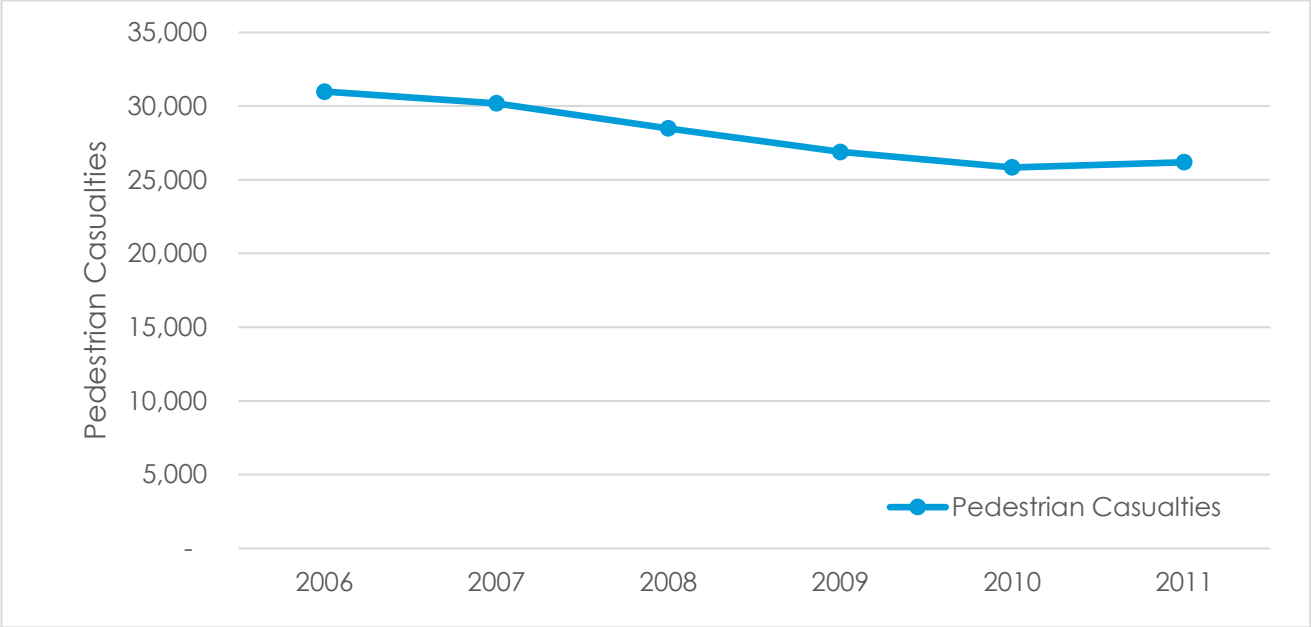


FIGURE 2. PEDESTRIAN CASUALTIES IN GREAT BRITAIN

These casualties can been broken down by severity and age group as seen in Figure 3. This highlights a significant difference in the percentage of casualties recorded as fatalities in the two age groups. Adults are five times more likely to be fatally injured (as opposed to any other severity) than children according to the analysis. What these results may well be demonstrating is a significant difference in under-reporting levels in adult casualties who are 'slightly' injured due to their reluctance to report incidents of this type to the police. There could also be other factors that increase an adult's chance of being fatally injured but that would require significant research together with more detailed analysis of those collisions, beyond the scope of STATS19.

This level of potential under-reporting, although not quantified, should be remembered when reviewing the later analysis.

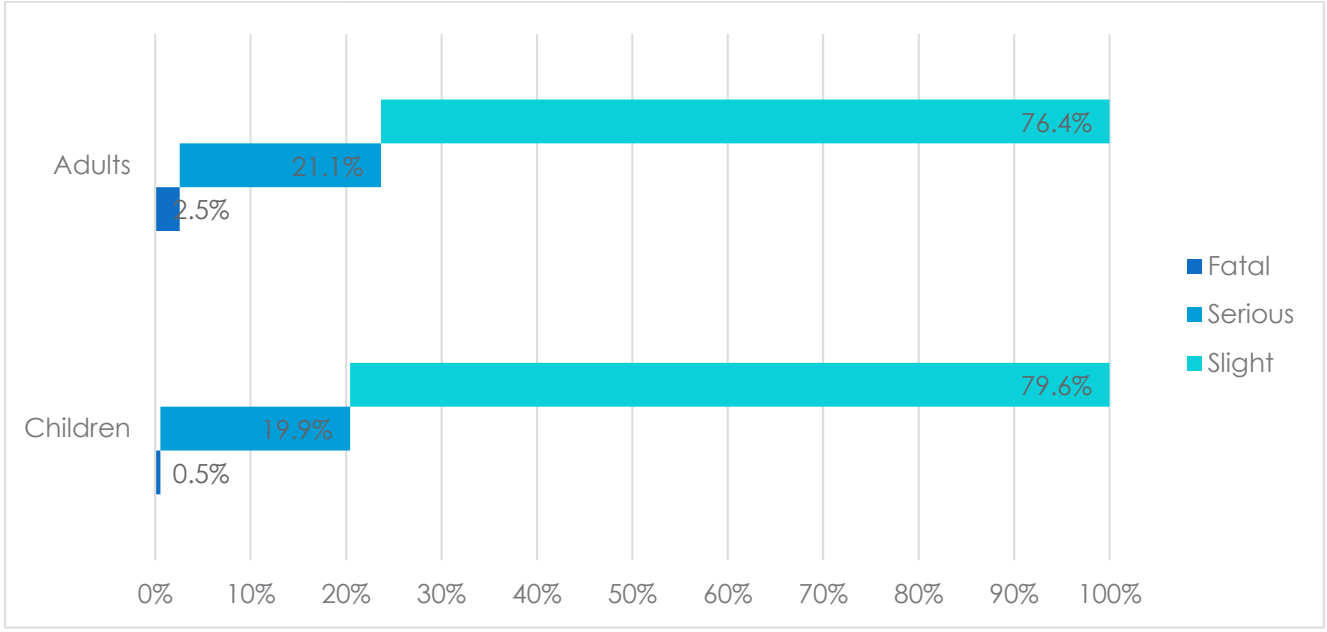


FIGURE 3. PEDESTRIAN CASUALTIES BY AGE GROUP AND SEVERITY

2012

The most recently published full-year dataset covers 2011 with the 2012 results to be released in June 2013. Quarterly estimates are published by the Department for Transport however and these can be used to review the recent trends, notably the increase in pedestrian casualties in 2011.

Figures 4.1 and 4.2 show the quarterly pedestrian casualties broken down by adults and children together with annual and Q1- Q3 totals. This analysis first of all shows that the increase seen in 2011 was only in the adult category with figures rising by 475. Child pedestrian casualties actually fell by 122 compared to 2010. This change could be in part due to changing modes of travel if more adults were choosing to walk rather than use other forms of transport. It is also entirely possible that the increase could be an anomaly within the bounds of expected variation against the long-term trend. What is clear though is that there has been very little change between 2009 and 2012.

The 'anomaly' theory appears to be supported when data from just the first three quarters of each year are analysed. Using these figures there was no significant increase in pedestrian casualties in 2011 with the annual increase being solely affected by a large number of recorded pedestrian casualties in Q4 of 2011. Furthermore, if this analysis is extended into 2012 there appears to be a significant fall in the total number of recorded pedestrian casualties. Most of this reduction appears to be in the child group, and not in adults.

These analyses are based on raw STATS19 figures and do not account for changes in pedestrian journeys or population.

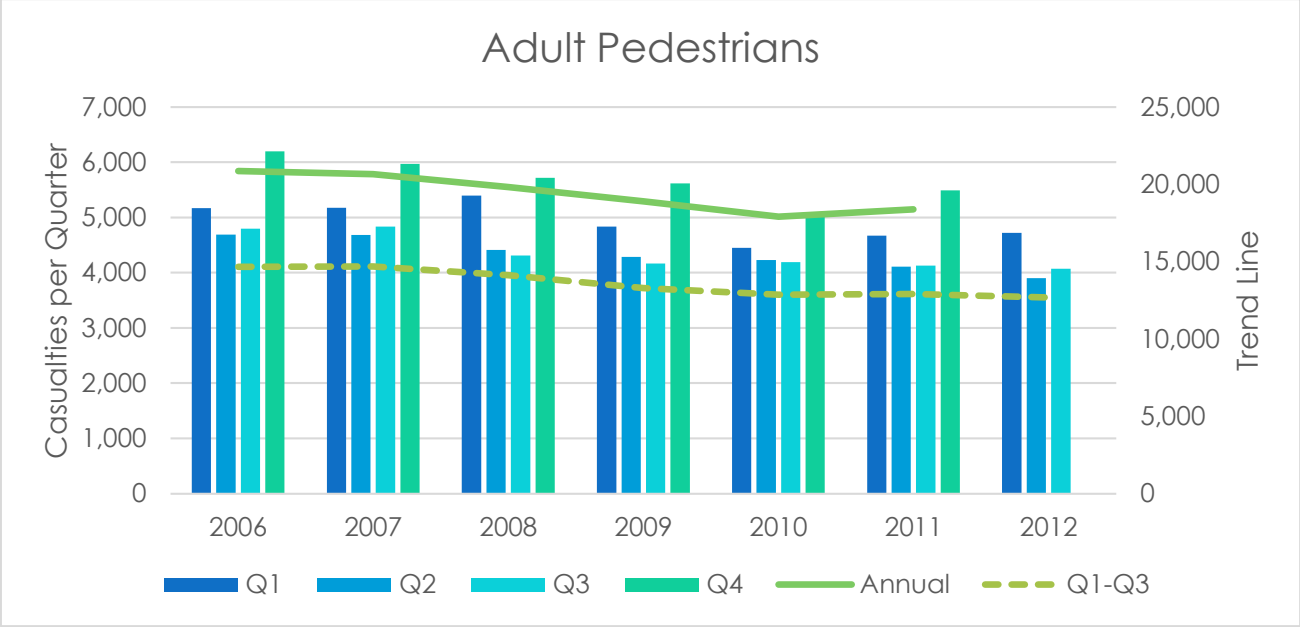


FIGURE 4.1. ADULT PEDESTRIAN CASUALTIES IN GREAT BRITAIN BY QUARTER 2006 - 2012

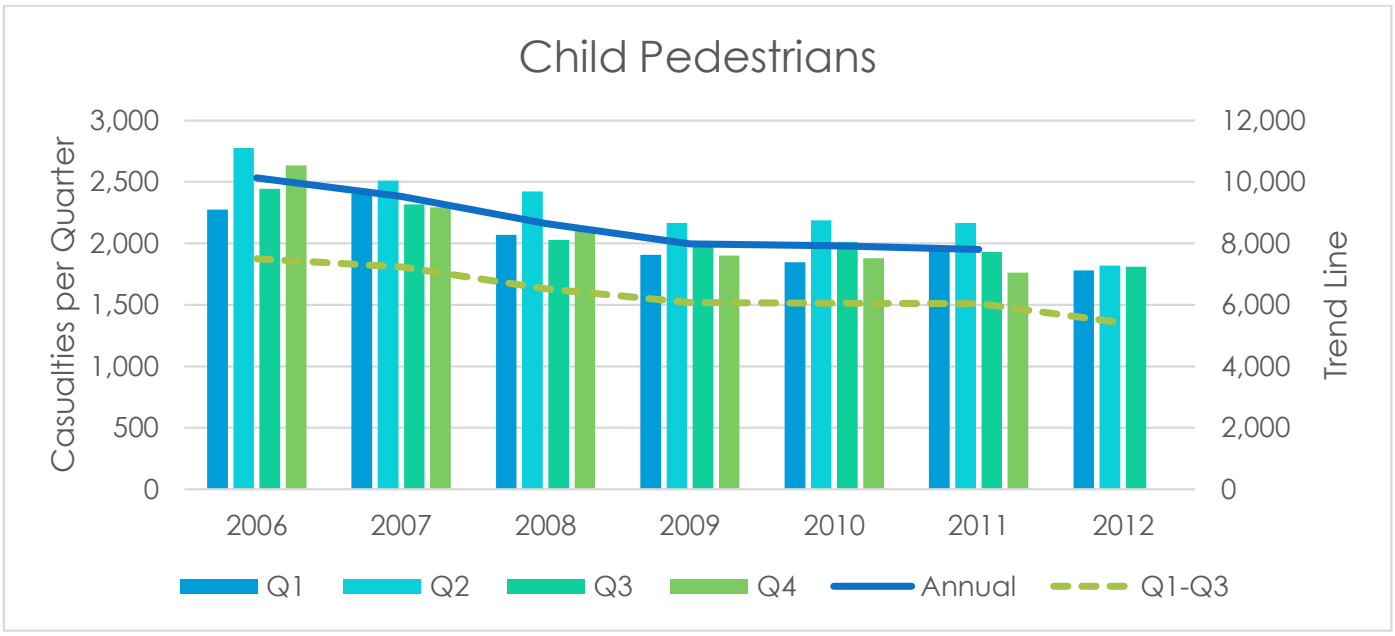


FIGURE 4.2. CHILD PEDESTRIAN CASUALTIES IN GREAT BRITAIN BY QUARTER 2006 - 2012

Characteristics of Collisions involving Pedestrian Casualties

When

There are several ways in which the temporal analysis of pedestrian casualties can be undertaken and in this study will consider month, day of week and hour of day, all separated by age group.

Figure 5 looks at the distribution of collisions by month and demonstrates quite different trends in the two groups. Children are less likely to be pedestrian casualties in the winter months (December has the lowest distribution of casualties of any month) with numbers rising in March and reducing again in October. There is also a noticeable dip in August which is associated with the school holidays. Adult casualty trends are almost the reverse with higher casualty distributions between October and January. This trend may be related to weather and light conditions or possibly greater pedestrian activity. This trend is worthy of further analysis but is beyond the scope of this report.

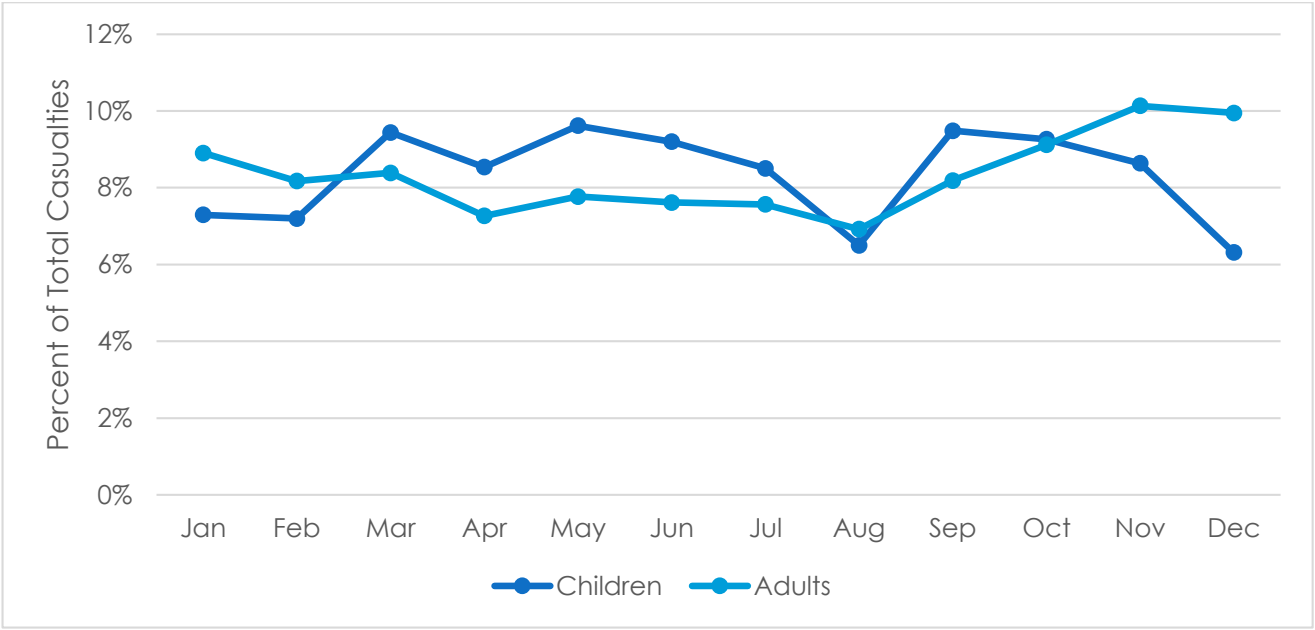


FIGURE 5. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP AND MONTH

The distribution of pedestrian casualties by day of the week in both groups is similar with Friday being the peak day and lower distributions on Sunday. Adult casualties are still prevalent on Saturdays however and the distribution on Sundays is significantly higher than for the child group.

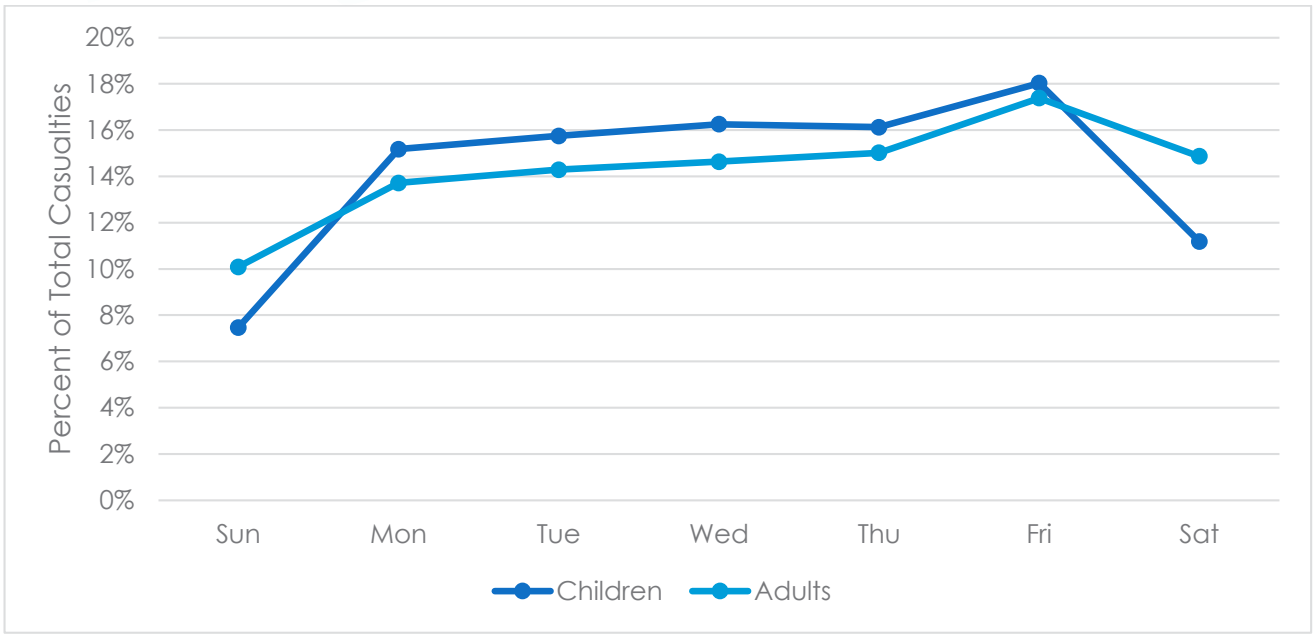


FIGURE 6. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP AND DAY OF WEEK

The distribution of casualties on weekdays and weekends is investigated in more detail in figures 7.1 and 7.2. These charts individually detail the time of day during which casualties are recorded broken down by adults and children as well as weekday and weekend. The child casualty trend fulfils expectations in terms of weekday trends[2] with peaks between 8 and 9 am and 3 and 5 pm. The peak in the afternoon is largest, perhaps reflecting parental involvement in picking up children after school. One theory is that children are more likely to be dropped off in the morning by parents on their way to work but are more likely to make their own way home in the afternoon, affording them more opportunity to wander and take more risks. It is not possible to say how exactly how many more journeys are undertaken as a pedestrian in the afternoon. Weekend trends show the greatest number of casualties occurring in the afternoon and early evening.

Adult distributions are significantly different with no significant early morning peak compared to the following hours of the day until the afternoon peak between 3 at 5pm. The drop-off in late evening on weekdays is less pronounced than that seen in children and may be associated with social activities. This evening distribution is even higher at weekends with a peak in distribution between 12pm and 1am. It is only after 3am that pedestrian casualty distributions fall significantly below those recorded in the daytime.

[2] This also includes weekdays during school holidays. Due to the variance of school holidays around the country separating out theses weeks would be a difficult and time-consuming task.

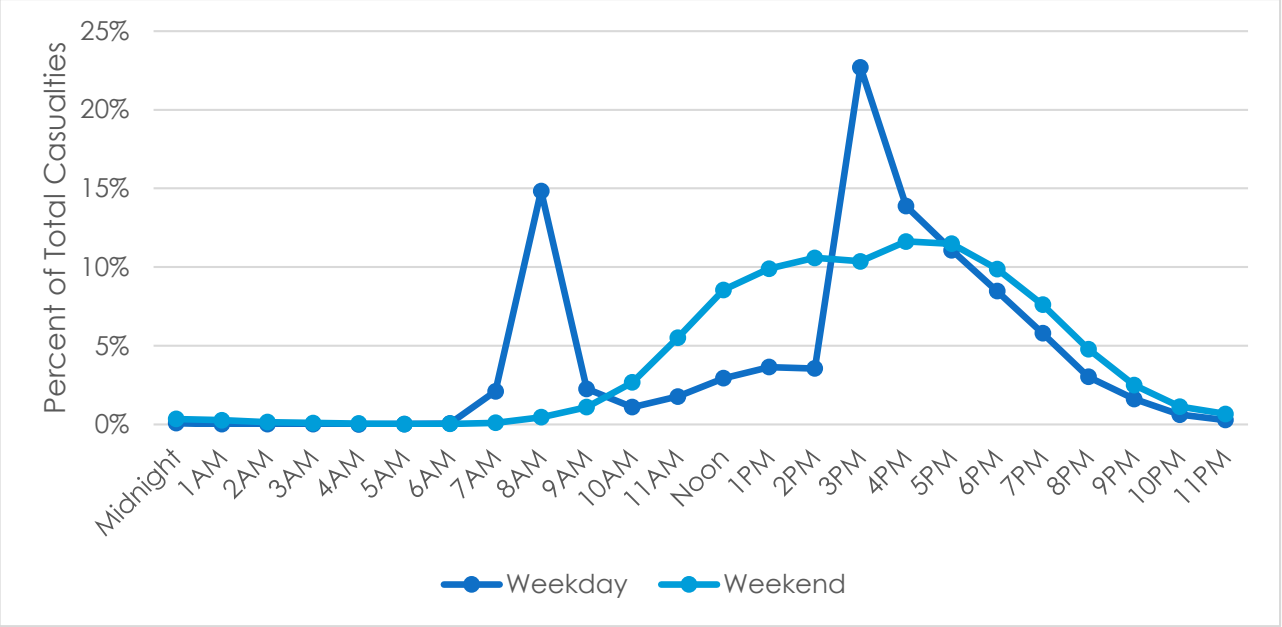


FIGURE 7.1. DISTRIBUTION OF CHILD PEDESTRIAN CASUALTIES BY WORKING DAY AND HOUR

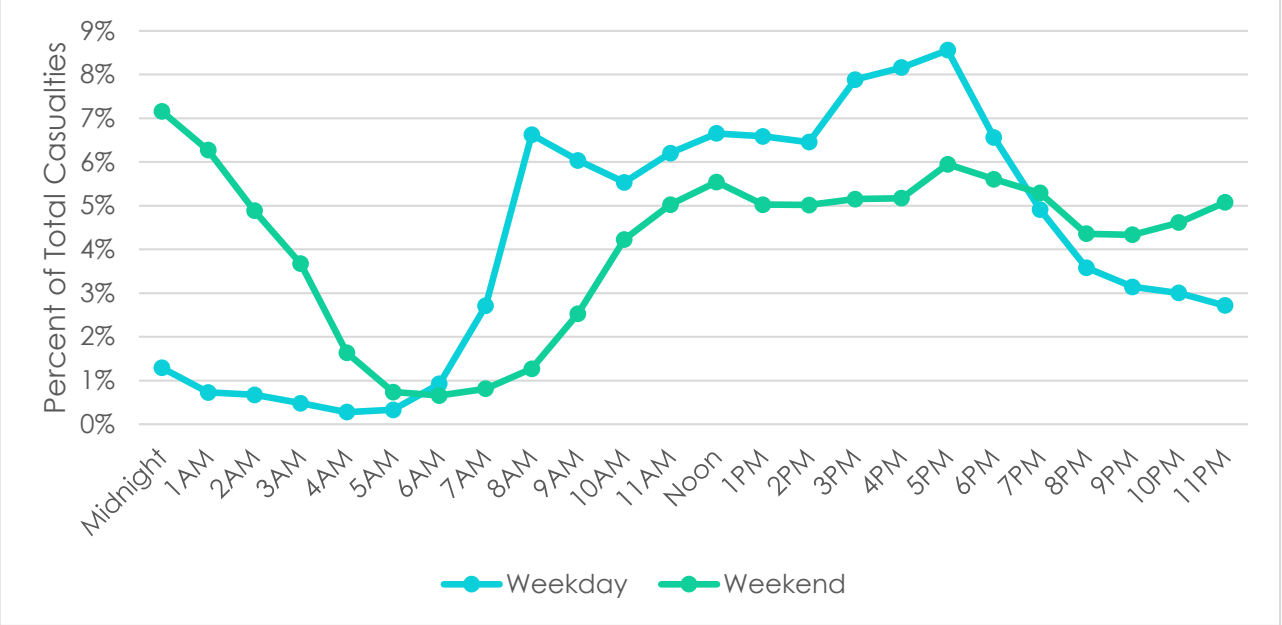


FIGURE 7.2. DISTRIBUTION OF ADULT PEDESTRIAN CASUALTIES BY WORKING DAY AND HOUR

The increased propensity for adult casualties to occur in the evenings is also demonstrated in the analysis of light conditions in figure 8. Adult casualty distributions in darkness are more than double those seen for children (34% versus 15%). Many child pedestrian campaigns focus on visibility in poor lighting conditions and although important, it is worth noting that this represents less than a sixth of casualties.

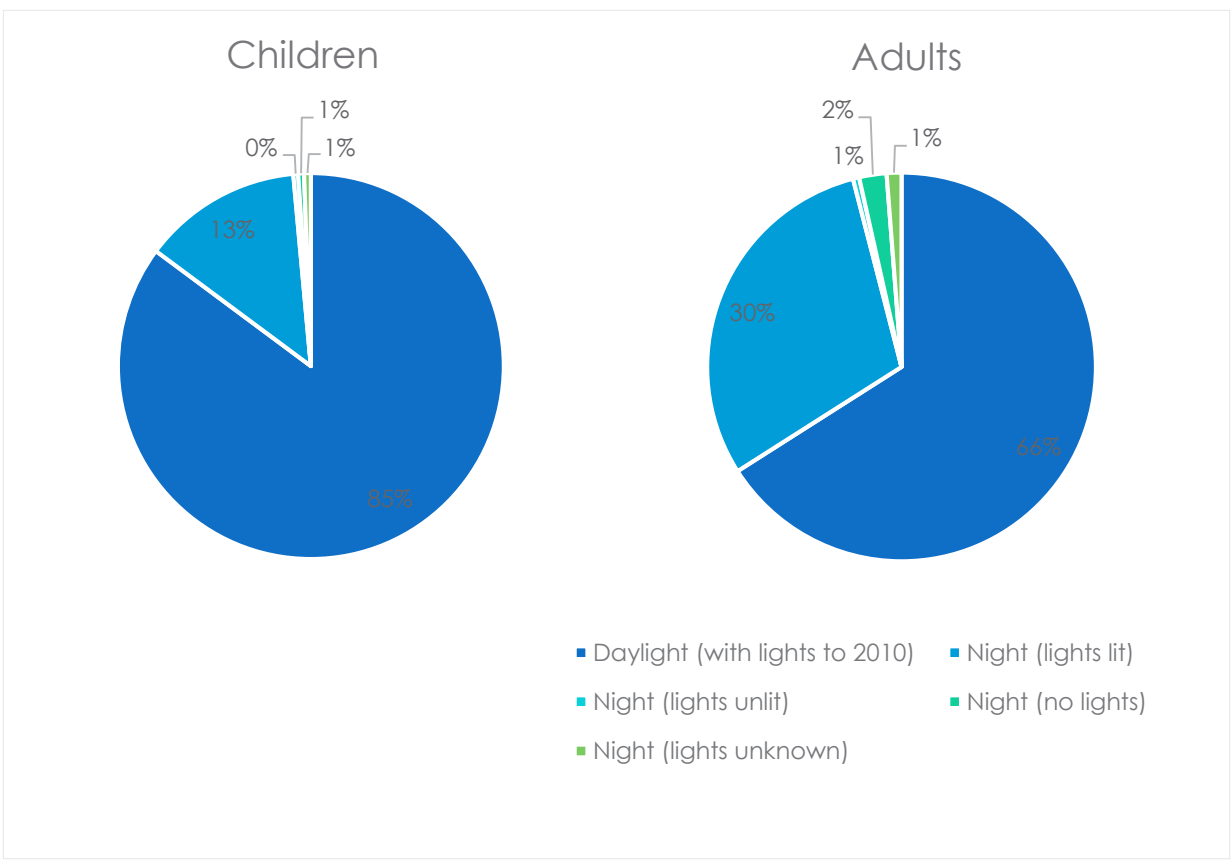


FIGURE 8. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP AND LIGHTING CONDITION

Where

The places pedestrians are injured will largely depend on the characteristics of the areas in which they live, work and undertake leisure activities. The national data (Figure 9) for adults and children differ significantly when road class is analysed with children more likely to be injured on unclassified i.e. local roads. Adults have much more even distribution between unclassified and 'A' roads. Understanding the types of road where pedestrians are injured is important in designing appropriate education campaigns.

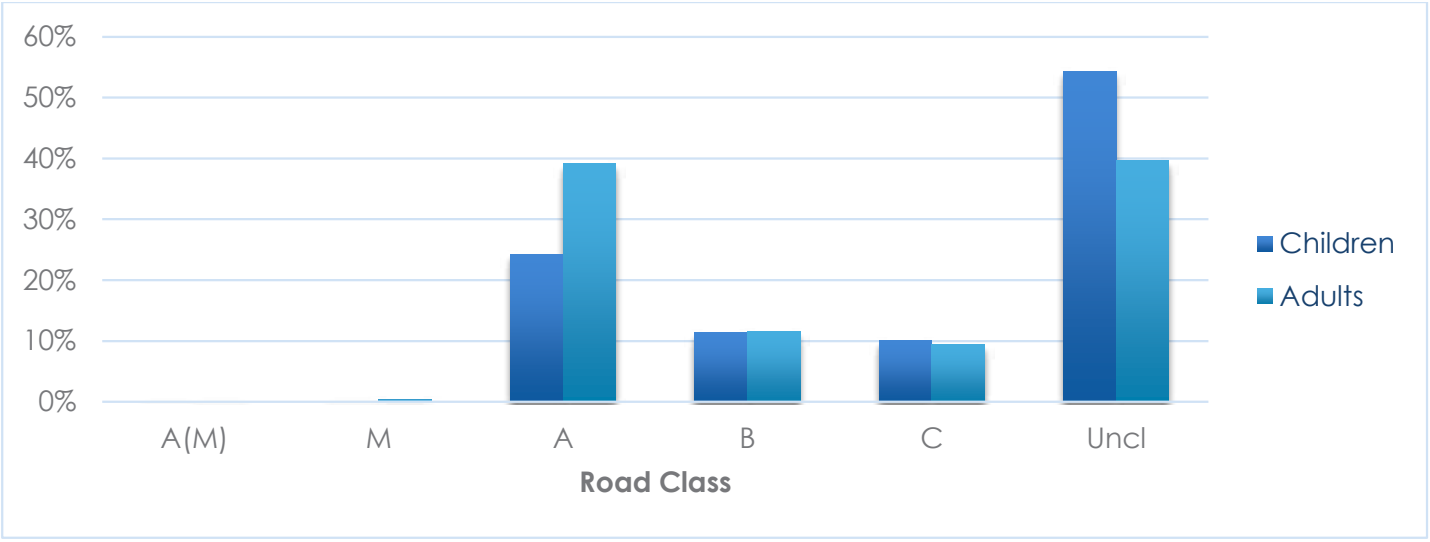
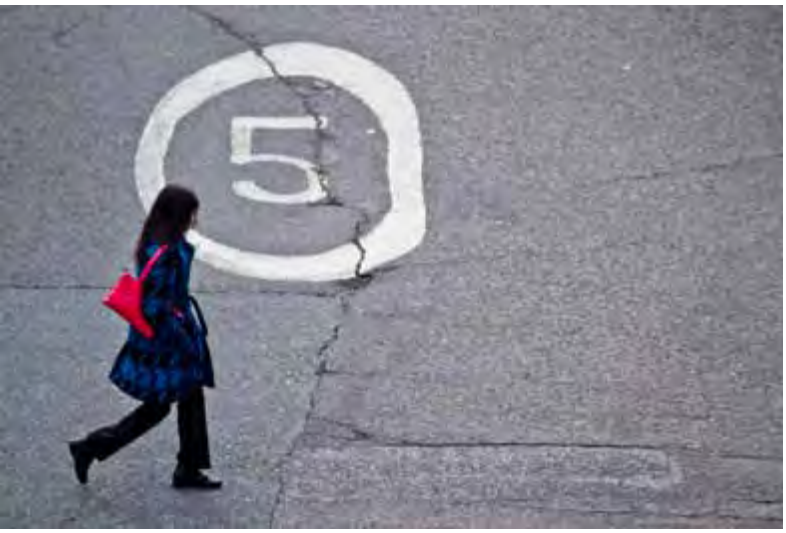


FIGURE 9. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP AND LIGHTING CONDITION

It is unsurprising to discover that the vast majority of pedestrians are injured on urban roads with only 13% on rural roads (Figure 10 and this trend is equally true for both adults and children).



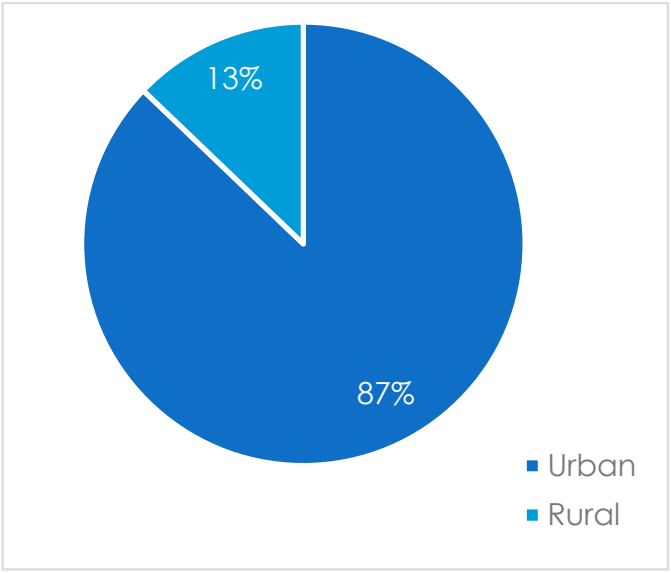


FIGURE 10. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY URBAN AND RURAL ROADS

Casualty severity is often higher in rural areas however (27.9% KSI versus 21.9% KSI in urban areas).

Analysis has also been carried out on speed limits with predictable results showing around 90% of casualties injured in 30 mph limits. This will almost certainly reduce as the length of road covered by 20mph limits increases and the lengths of 30mph limits decrease. There is no difference between adult and child casualty trends by speed limit.

Children are more likely to be injured on sections of road that are not at or near a pedestrian crossing with 70% injured away from a crossing facility. The figure for adults is slightly lower at 58%.

It is also possible to find out more about the types of road by analysing the vehicle and pedestrian movements at the time of the collision. Once 'unknowns' are removed from the dataset an interesting difference in child and adult casualties can be noticed with 75% of children hit by vehicles proceeding ahead compared to only 59% for adults. This means adult pedestrians are proportionality more at risk at junctions which are often riskier to use. Pedestrian movements are reviewed in Figure 11 where again subtle differences between adults and children can be seen. A significant number of adults are injured whilst walking or stationary in the carriageway (16%).

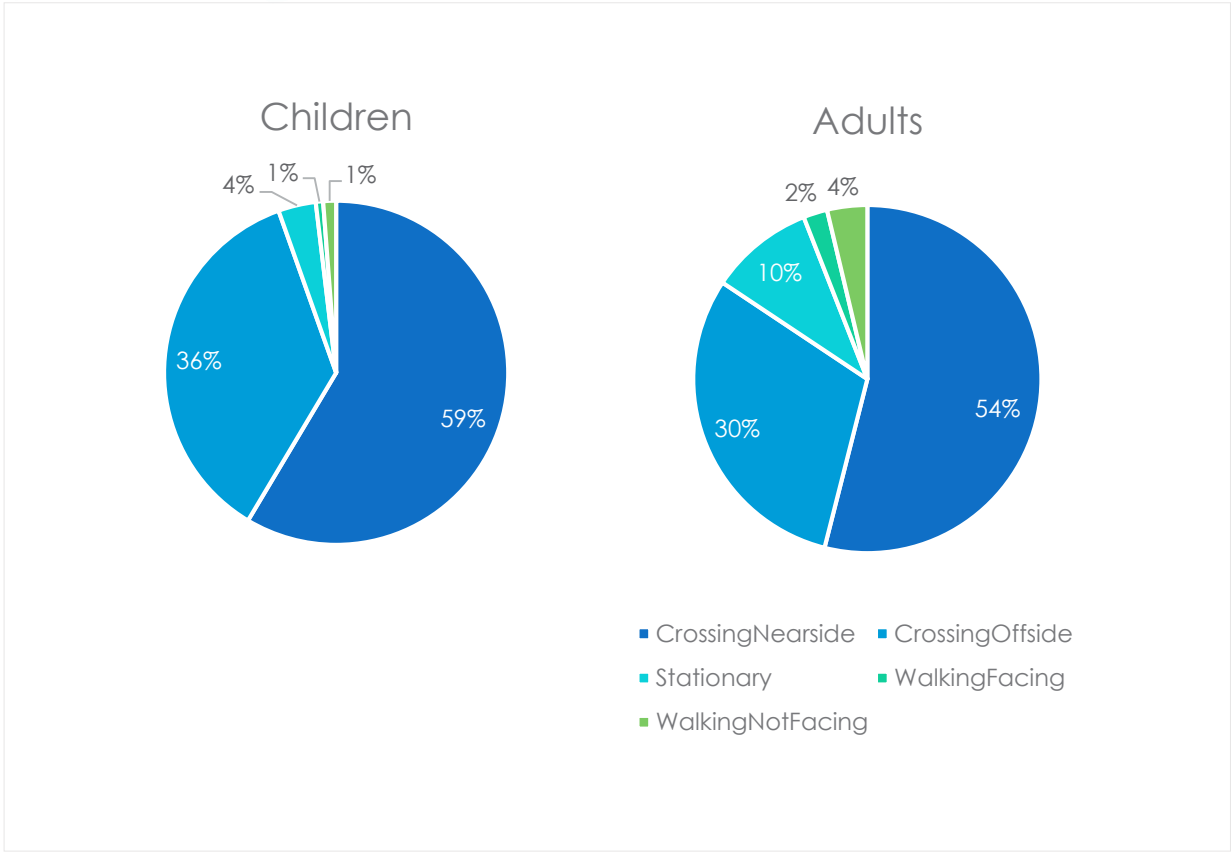


FIGURE 11 – DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP AND PEDESTRIAN MOVEMENT

What

It is possible using MAST Online to analyse what vehicle first hit the injured pedestrian and this can again be broken down by age (Figure 12). Cars are unsurprisingly the type of vehicle most likely to hit and injure a pedestrian but there are some differences between the age groups. Adults are more likely than children to be hit by other motorised vehicles including buses and good vehicles. Pedestrians hit by goods vehicles are more likely to be severely injured or killed with 27.2% of casualties classified as KSI versus 22.3% for those hit by a car.

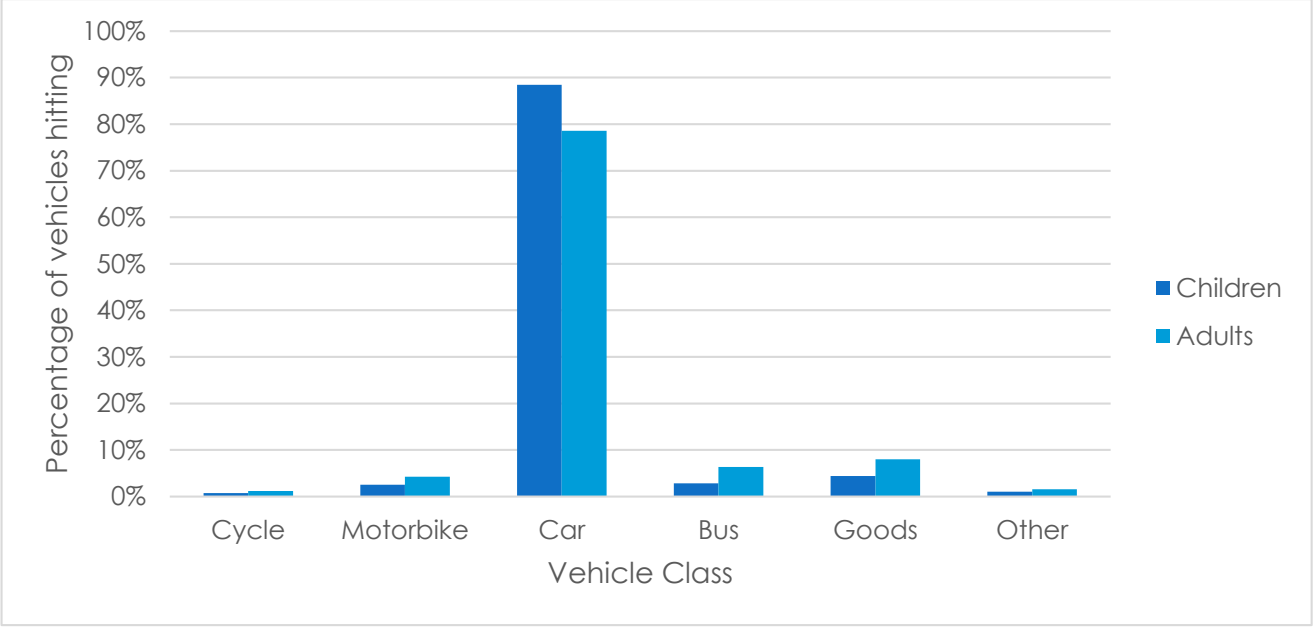


FIGURE 12 – TYPE OF VEHICLE TO FIRST HIT AN INJURED PEDESTRIAN BY AGE GROUP

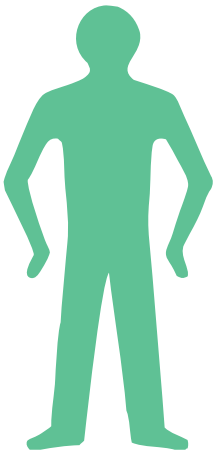
Why

Although not available in the current version of MAST[3] it is possible to analyse contributory factors associated with pedestrians and the vehicles that hit them. Contributory factor (CF) analysis requires care and a sound knowledge of data collection methods and in this case only collisions attended by an officer have been reviewed. It is not currently possible to separate contributory factors for adults and children as they are attributed to vehicles rather than casualties. The CFs say why a collision occurred and do not necessarily attribute blame, even though they may imply this. For example, just because a pedestrian does not look properly it doesn't mean the collision is their fault, it's just one of the reasons why the collision occurred.

In the analysis CFs are split into two categories; those applied to the pedestrian and those to the driver. In 78% of collisions, pedestrian CFs are applied with only 28% having driver error associated with them. It is possible for a single collision to have up to six individual CFs assigned to it and many of these will describe errors made by multiple parties.

When the individual CFs are analysed (Figure 13) there is clearly a very large percentage of collisions where the pedestrian has failed to look before crossing (60%). Other failings of pedestrians show in the top ten including 'careless, reckless, in a hurry' (25%), 'failed to judge vehicle's path or speed' (17%), 'masked by stationary vehicle' (17%), and 'impaired by alcohol' (11%). The most common failings of drivers and riders are 'failed to look properly' (20%) and 'careless, reckless, in a hurry' (8%).

This analysis appears to paint a poor picture of pedestrians in relation to their contributions to the collision with several contributory factors indicating actions that if displayed by a motorist would result in a prosecution. That said, the majority of failings are down to simple inattention or carelessness and without dramatically improving respect for the roads and people's attention through education and training the most effective way to reduce these injuries would be to reduce vehicle speeds or provide better segregation.



[3] Permission has been granted by the Department for Transport in this instance

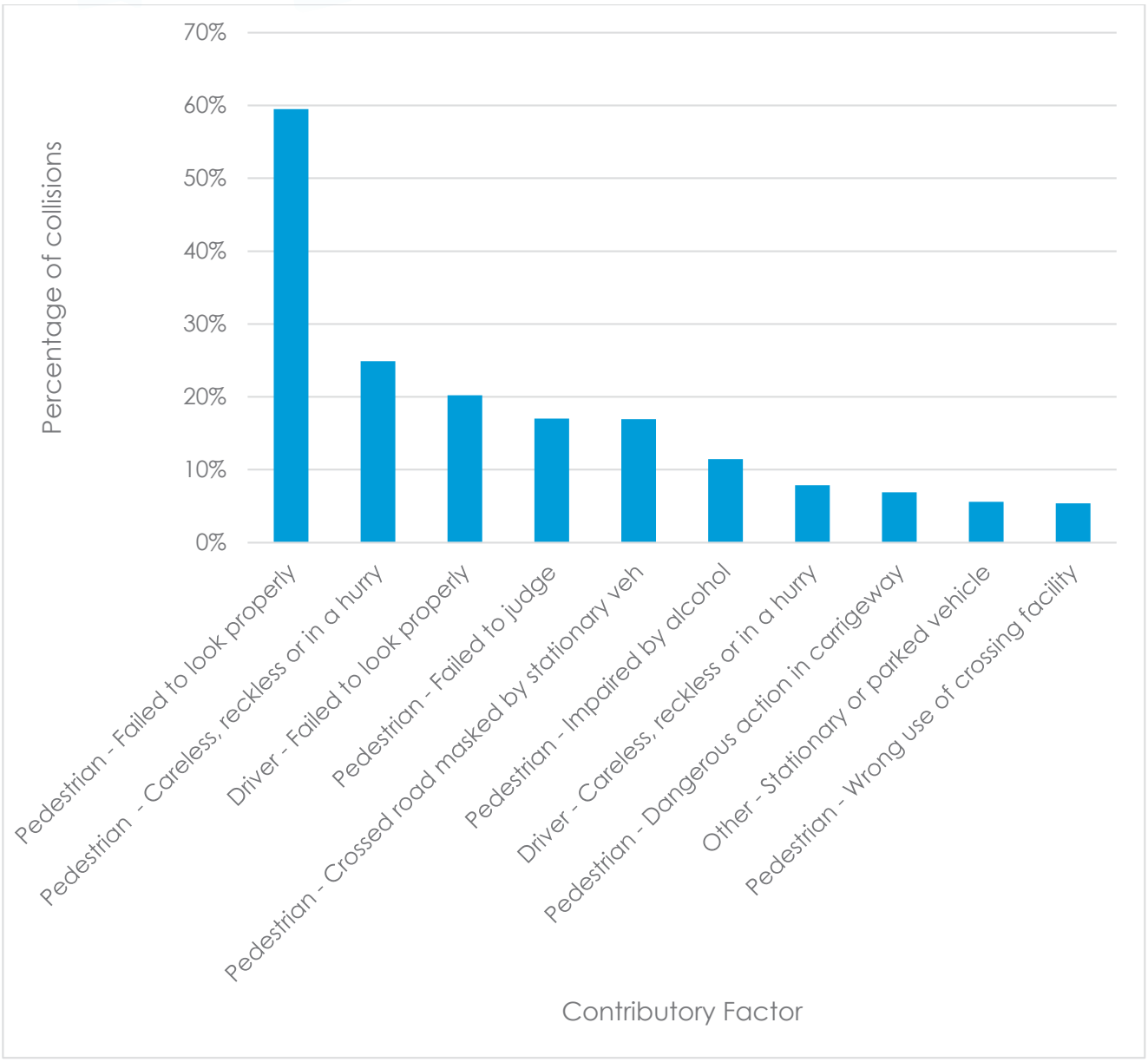


FIGURE 13 – MOST PREVALENT CONTRIBUTORY FACTORS IN COLLISIONS INVOLVING A PEDESTRIAN CASUALTY

Further detailed analysis of CF data shows that there have been some small changes in reporting patterns over the last three years. There has been a small rise in drivers 'failing to look properly' (21.4% between 2009 and 2011 versus 19.5% between 2006 and 2008), 'failing to judge other's path or speed' (4.8% from 3.5%), and 'passing too close; (4.1% from 3.3%). A similar small increase was seen in the 'slippery road surface' CF (2.7% from 2.0%) but no changes at all in pedestrian-related CFs.

It is also possible to break down individual CFs by hour of day and this shows that there is a peak in pedestrian-alcohol-related collisions in the late evening.

Who

The study has already considered one element of the 'who' dimension with a constant analysis of the age of casualties throughout. Figure 14 shows the recorded split in casualties between the two age groups 0-15 years old and 16+. As explained earlier in the study there is likely to be a higher level of under-reporting of adult casualties and therefore this split could be over-estimating the percentage of casualties that are children. The gender split is shown in Figure 15 with a slight over-representation of males in the casualty statistics.

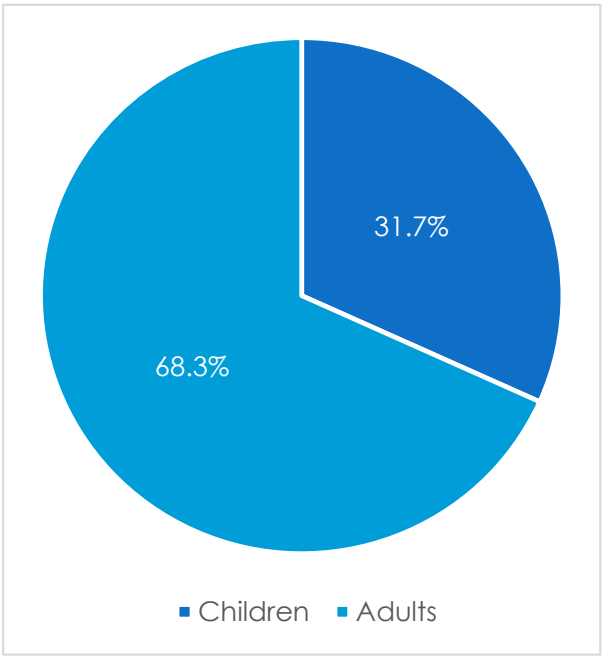


FIGURE 14. PEDESTRIAN CASUALTIES BY GENDER

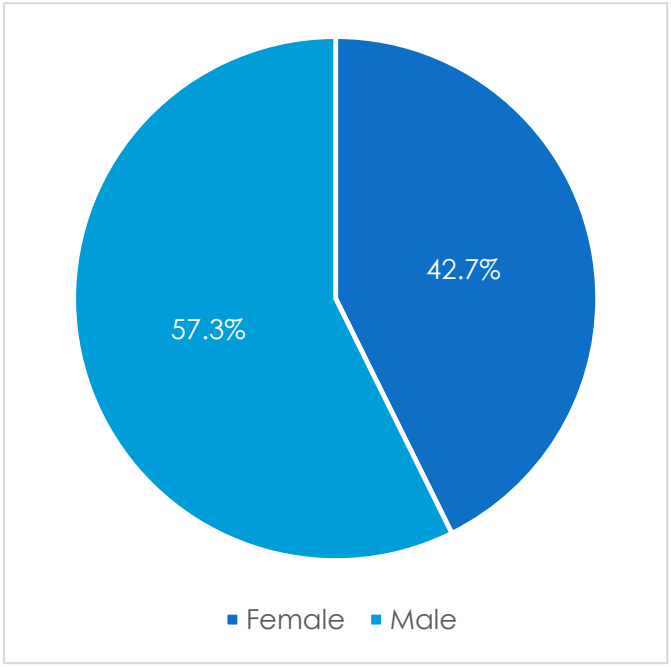


FIGURE 15. PEDESTRIAN CASUALTIES BY AGE GROUP

The over-representation of males in the figures can be reviewed in more detail by analysing the individual age and gender split seen in Figures 16.1 and 16.2. The gender differentiation is already clear by the age of two and this continues until the age of 70 by which time the results are skewed by the changing gender balance in the population. There is a noticeable convergence between the ages of 13 and 15 before males again become more dominant.

These two charts also clearly show the level of risk by age and age group but the peaks and troughs by age group are flattened by the split in gender. In order to more accurately analyse risk by age it should be expressed as a rate per head of population as shown in figure 17.

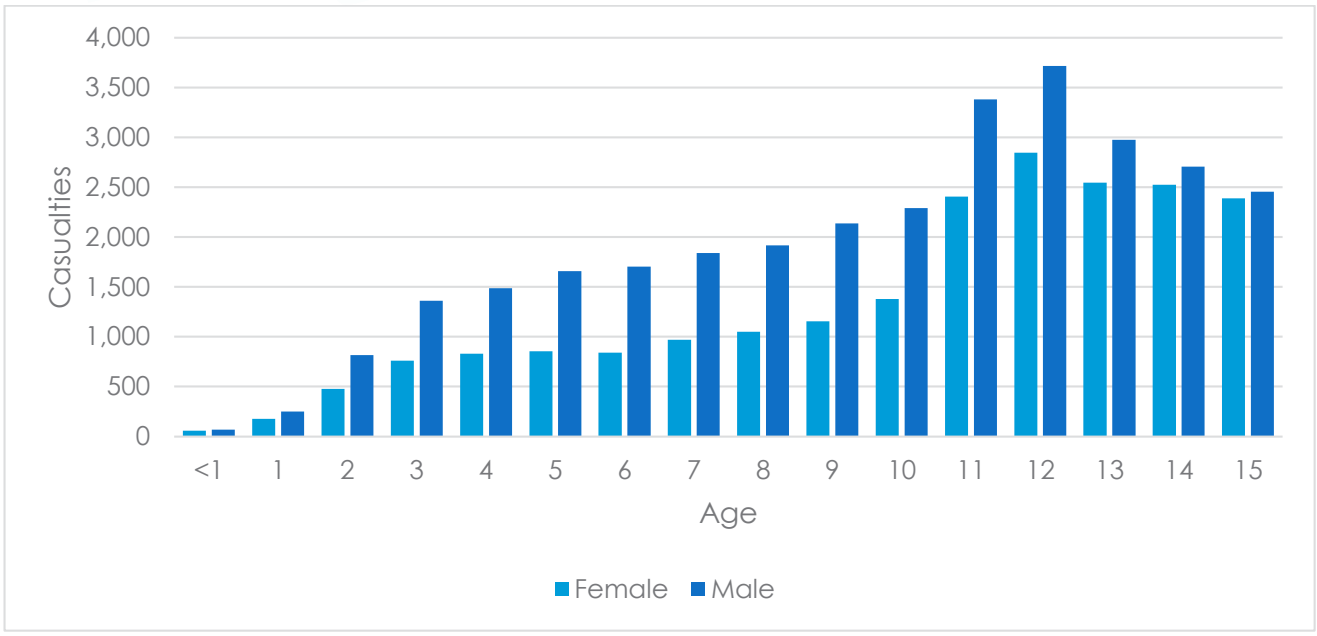


FIGURE 16.1. CHILD PEDESTRIAN CASUALTIES BY AGE AND GENDER

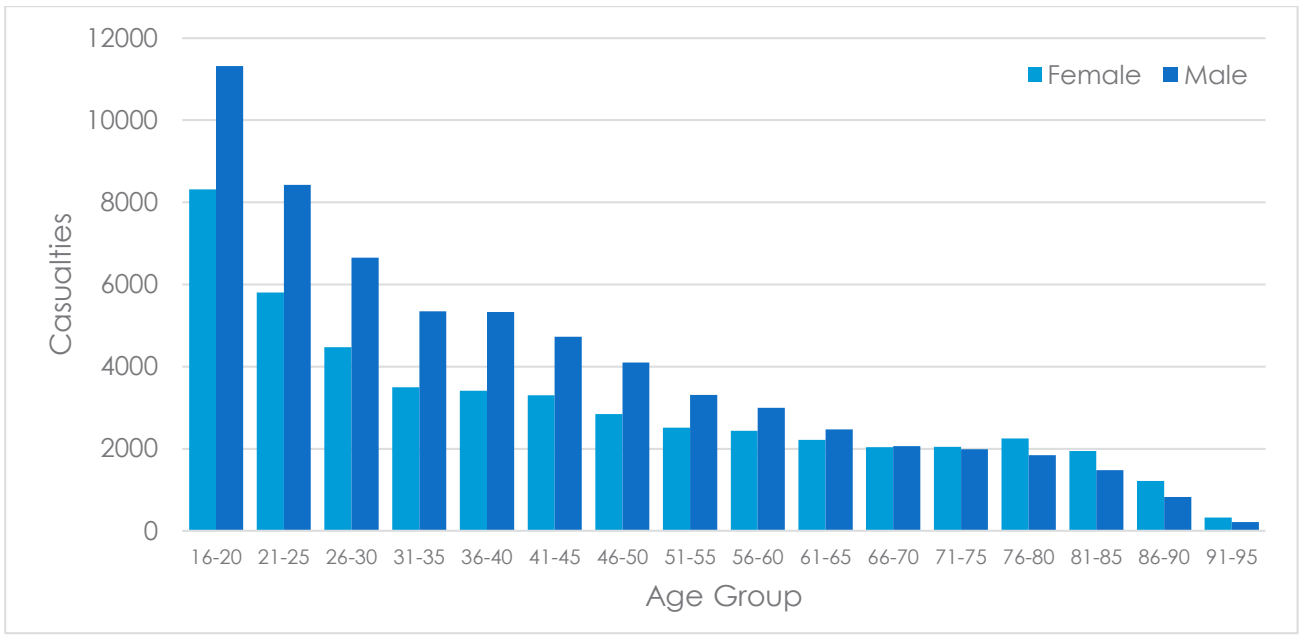


FIGURE 16.2. ADULT PEDESTRIAN CASUALTIES BY AGE GROUP AND GENDER

When rates per 10,000 population are reviewed the peak in the 11-13 year old age group is very clearly shown with a high rate of over 15 casualties per 10,000 population per year. Rates then drop consistently, to a low point at age 64 after which rates rise slightly again. Relative risk is a valuable analysis with greater opportunity to reduce risk in those groups with above-average results. A more detailed analysis would include information about pedestrian movements or journeys completed by age or age group in order to further pin down true levels of risk but these data are not available.

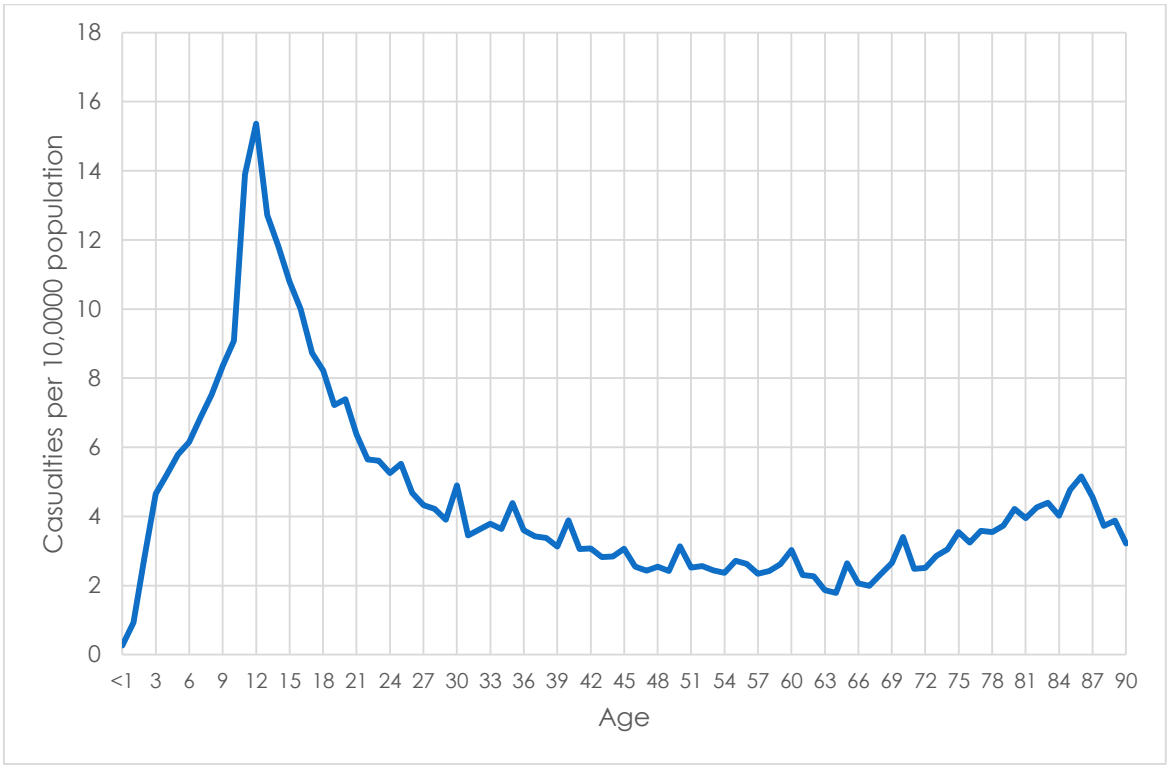


FIGURE 17. PEDESTRIAN CASUALTIES BY AGE PER 10,000 POPULATION

Index of Multiple Deprivation (IMD)

IMD uses a range of economic, social and housing data to create a single deprivation score for each small area of the country. The analysis uses deciles, which creates ten groups of equal frequency, ranging from the 10% most deprived areas to the 10% least deprived areas. Figure 18 shows the distribution of pedestrian casualties by age group and IMD decile revealing a significant trend towards more casualties from more deprived areas. Over 40% of all child casualties are from the lowest two deciles highlighting a great disparity in levels of risk. The trend is also seen with adult casualties although it is less pronounced. It has only been possible to match 80% of child pedestrian casualties to an IMD decile and 77% of adult casualties which is due to missing or inaccurate postcode data. There has been no significant change in the distribution of pedestrian casualty IMD deciles over the last six years.

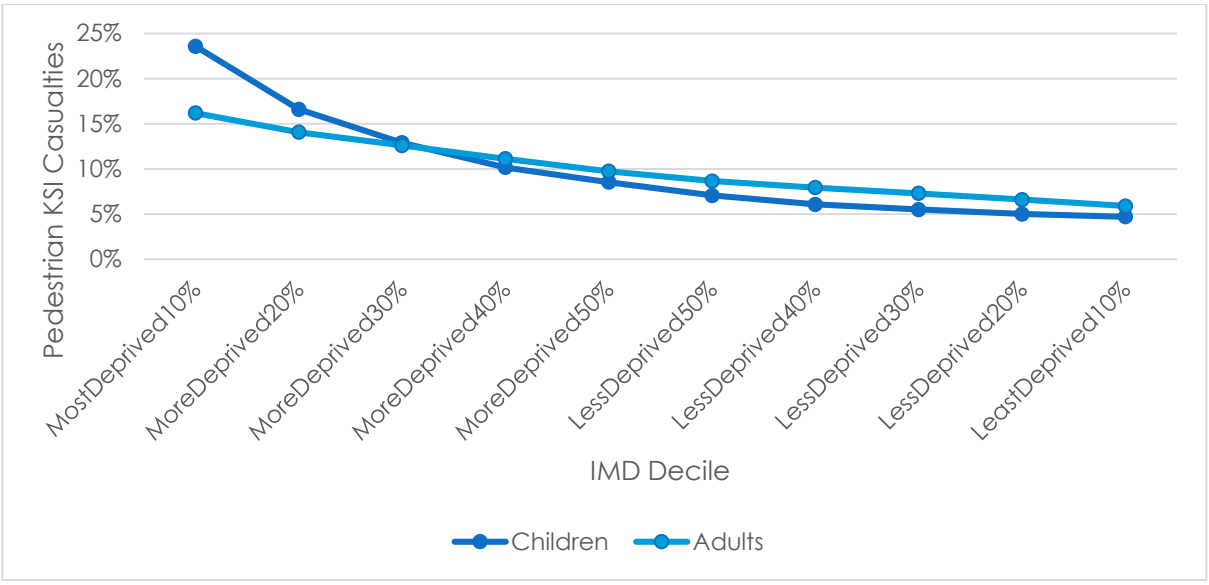


FIGURE 18. PEDESTRIAN CASUALTIES BY AGE GROUP AND INDEX OF MULTIPLE DEPRIVATION (IMD) DECILE

Geographical Variance

There are two ways to measure risk for an individual area; Road Risk and Resident Risk.

Road Risk measures the number of collisions recorded within an area and uses traffic flow data to allow meaningful comparisons between different areas. For the reasons outlined in the 'National Signposts'[4] report this method is flawed when comparing areas with very different traffic and road densities. It would also simply highlight the areas with the most traffic as having the highest risk to pedestrians.

This report uses Resident Risk which examines casualties on the basis of where they live rather than where they crashed. Residency is the most appropriate basis for measuring socio-demographic factors which influence road risk and a rate per head of population can be used to compare areas.

Nationally, about 20% of casualties and drivers have no postcode reported in police STATS19 returns. There is considerable variation between police forces, with missing postcode rates ranging from as low as 5% in some areas to as much as 43% in others. However, casualties and drivers with missing postcodes have been included in this analysis. For these cases, the most likely distribution of residency has been estimated using an algorithm specially constructed by Road Safety Analysis. The technique used is explained in detail in an appendix to this report.

It is necessary to adjust casualty figures in this way for three reasons. Firstly, it ensures that the overall casualty total when reporting resident risk agrees exactly with figures published in Reported Road Casualties Great Britain. Secondly, it improves relevance and reliability by providing the largest possible sample size. Thirdly, it minimises distortion of casualty rates due to local postcode reporting practices: if no adjustment was made, then residents in police forces which report relatively few postcodes would seem to experience deceptively low risk, while conversely residents in forces which report almost all postcodes would appear to face misleadingly high risk.

Before considering the risk levels in individual areas a review of the difference between pedestrian casualty distributions by age group have been reviewed (Figures 19.1 and 19.2). This is information that local authorities are already aware of but it is worth highlighting the significant differences recorded around the country. Westminster London Borough has the lowest percentage of pedestrian casualties that are children (11%) followed by Kensington and Chelsea London Borough (12%) and Camden London Borough (16%). Other areas with low child pedestrian percentages include rural areas such as West Somerset (16%) and East Cambridgeshire District (19%). The national average distribution has already been shown in Figure 14 and demonstrates a national average of 31.7%. The area with the highest percentage of child pedestrian casualties is Blackburn with Darwen Borough (50%) followed closely by Burnley Borough (49%) and Oldham Metropolitan Borough (48%). Other areas with high child pedestrian percentages are typically urban areas from the north of England.

Local Authority	% Child Casualties	Local Authority	% Child Casualties
Westminster London Borough	11%	Blackburn with Darwen Borough	50%
Kensington and Chelsea London Borough	12%	Burnley Borough	49%
Camden London Borough	16%	Oldham Metropolitan Borough	48%
West Somerset	16%	Pendle Borough	48%
Wandsworth London Borough	17%	Barnsley Metropolitan Borough	46%
St. Albans District	18%	Barrow Borough	46%
City of London	18%	Hartlepool Borough	45%
Islington London Borough	18%	North East Lincolnshire	45%
East Cambridgeshire District	19%	Hyndburn Borough	45%
Colchester Borough	19%	Mansfield District	45%

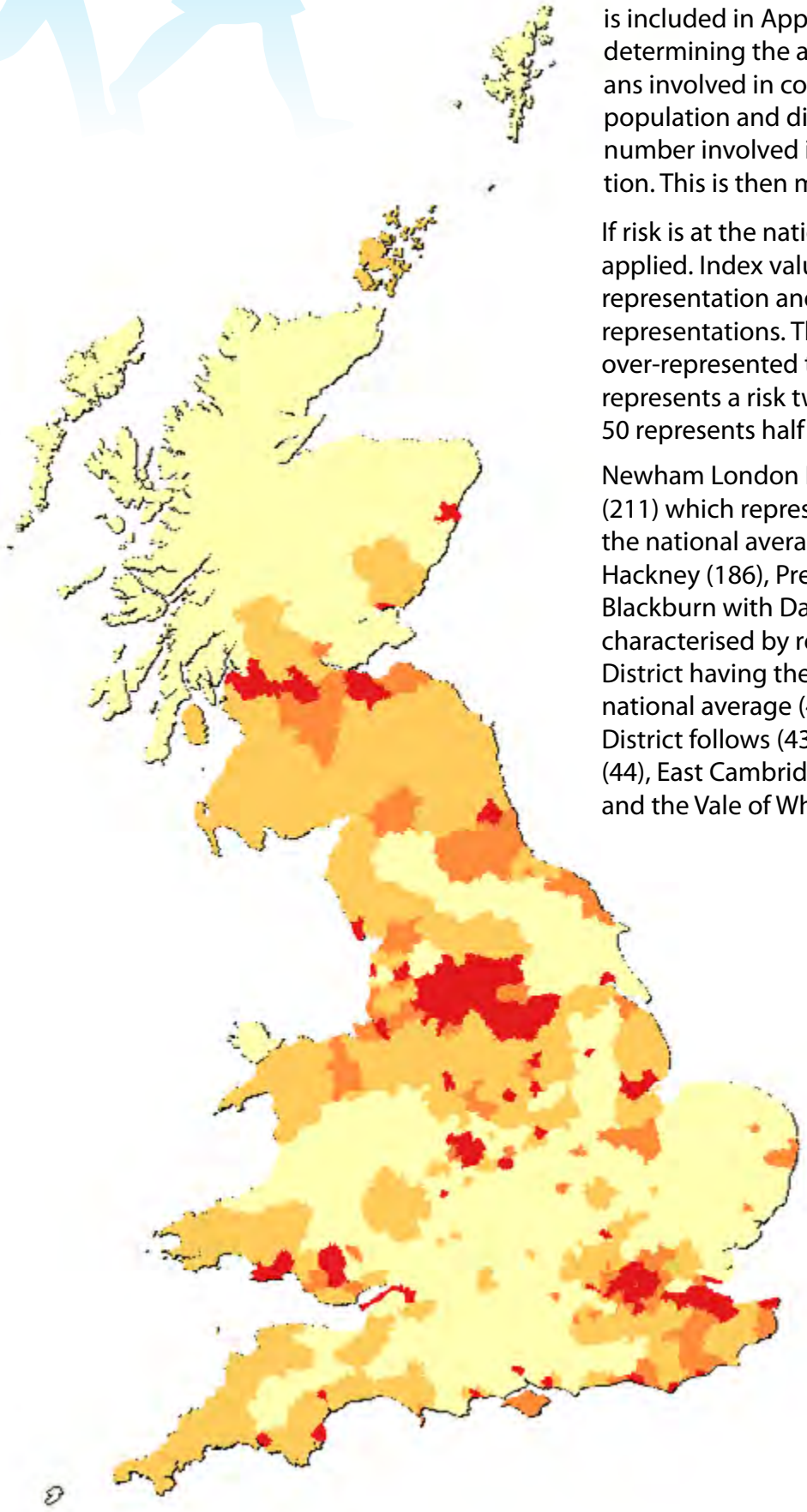
FIGURE 19. DISTRIBUTION OF PEDESTRIAN CASUALTIES BY AGE GROUP

[4] http://www.roadsafetyanalysis.org/wp-content/uploads/2012/10/National-Signposts-2012.pdf

This report has created a pedestrian risk index for Great Britain which is illustrated in the map in Figure 20. Areas with higher risk are shown in red and orange as indicated on the key. A full table of results is included in Appendix B. Indices were calculated by determining the annual average number of pedestrians involved in collisions as a percentage of that area's population and dividing this by the average annual number involved in collisions by the overall population. This is then multiplied by 100 to create an index.

If risk is at the national average a value of 100 is applied. Index values of over 100 indicate an over-representation and indices under 100 indicate under-representations. The larger the number, the more over-represented that group is. An index value of 200 represents a risk two times that average and a value of 50 represents half the average risk.

Newham London Borough has the highest risk rating (211) which represents risk levels more than double the national average. Other areas of high risk are Hackney (186), Preston (183), Haringay (181) and Blackburn with Darwen (179). Low risk areas are characterised by relatively rural areas with Daventry District having the lowest risk, 60% lower than the national average (40). Neighbouring Harborough District follows (43) followed by South Cambridgeshire (44), East Cambridgeshire (45), the Western Isles (45) and the Vale of White Horse (45).



Recent Improvements

As well as looking at average risk over the last six years it is possible to look at change between the first three years (2006-2008) and the second three years (2009-2011). This will give an idea of the areas where there have been improvements in relative pedestrian safety performance. Sometimes the numbers involved can be quite small and the analysis should be treated with some caution. Orkney had the best improvement nationally with a reduction in pedestrian casualties of 51% (albeit with small numbers) followed by Clackmannanshire (-45%), Rutland County (-37%), Torridge District (-37%), North Devon (-34%). Poorly performing areas are more evenly distributed between rural and urban areas with Enfield Borough highest (58% increase) followed by Redditch Borough (55%), South Holland District (55%), East Lindsey District (51%), and Tandridge District (49%).

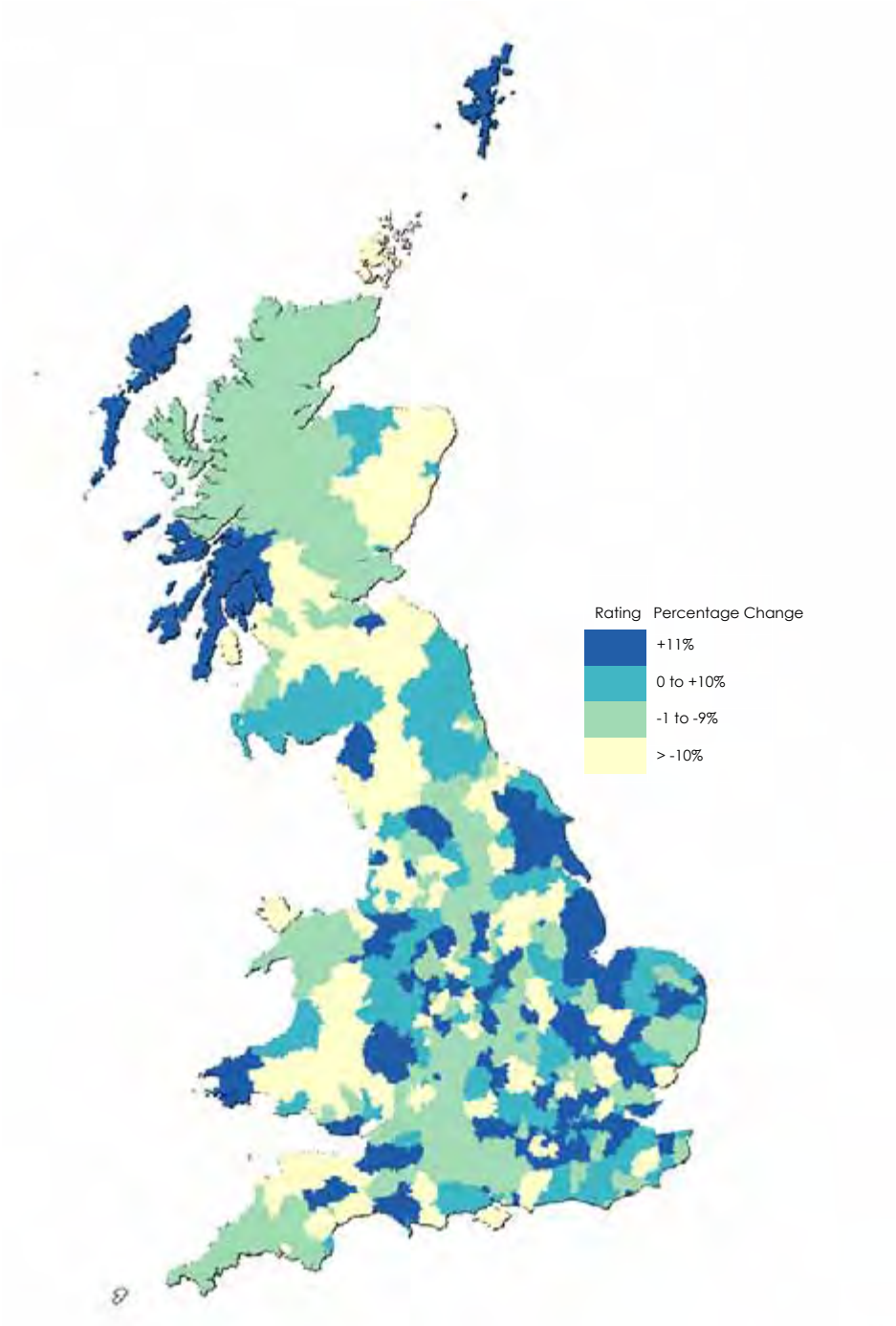


FIGURE 21 – RESIDENT PEDESTRIAN RISK CHANGE BY LOCAL AUTHORITY DISTRICT

Appendix A
Correction for missing postcode data

Because this report calculates resident risk by population, it is necessary to correct for regional variation in postcode reporting. Otherwise, areas in force areas which are poor at reporting postcodes would have lower resident casualty figures and therefore better risk rates than they should, and forces which are meticulous at reporting would be penalised. This would be inaccurate, misleading and unfair. It is also important to ensure that the total number of casualties attributed to every authority in the report added up exactly to the overall total, so local risk rates can be compared directly to each other and meaningfully to the national rate.

The procedure below describes in detail how adjusted authority resident casualty figures are derived. Each step is illustrated by an example, involving two fictional entities: a police force called Southshire Constabulary, and the unitary council area of Northtown Borough Council which is elsewhere in the country, far from Southshire.

The following data was extracted from MAST Online:

- Casualties with unknown postcodes reported by each force in Britain;
  Southshire Constabulary had 8,381 casualties where Casualty Home was 'Unknown'
- Total casualties reported by each force in Britain, from which the number of postcodes successfully reported by each force was calculated;
  Southshire Constabulary reported 47,400 casualties altogether, so they reported 39,019 casualty postcodes (47,400 minus 8,381)
- All casualties categorised by authority area of residency according to reported postcode, broken down by the force area in which the crash occurred.
  There were a total of 4,882 casualties reported across Britain with a Northtown postcode, of which 183 were reported as injured in a crash in the Southshire Constabulary force area

For each home authority, the proportion of residents known to have crashed in each police force area was calculated.
3.75% of Northtown resident casualties sustained their injury in Southshire (183 divided by 4,882)

For each combination of home authority and police force area of crash, the proportion of all casualties in that police force area who were known to live in the authority in question was calculated.
0.47% of all postcodes reported by Southshire Constabulary are in Northtown, calculated as 183 divided by 39,019

The number of unknown casualties reported by each force from each authority was calculated, assuming that unknown casualties follow the same distribution as the known ones.
About 39.3 of Southshire's unknown casualties were assigned to Northtown (0.47% of 8,381)

The adjusted casualty total for each combination of home authority and police force area of crash was calculated.
About 222.3 Northtown residents were included in the total casualties reported by Southshire Constabulary, 183 with known postcodes plus an assumed 39.3 from casualties with unknown postcodes

These calculations were checked by adding up the adjusted totals for all authorities. The result is exactly equivalent to the actual casualty total as published in **Reported Road Casualties Great Britain** and MAST Online.

Exactly the same process was repeated for casualty and driver figures for each relevant each road user group, to derive a distinct set of correction factors for each.
Southshire Constabulary reported 3,924 child casualties in the force area including 919 missing postcodes, and 5 Northtown resident children were known to have suffered injury in Southshire out of a total of 291 known Northtown resident child casualties altogether

This algorithm makes certain assumptions, which may affect the results to some degree. These assumptions and their possible consequences are made explicit below.

- **Missing casualty postcodes arise mainly because of internal reporting practices within police forces**, so all reporting of postcodes in STATS19 by any given force is probably affected to about the same extent regardless of where each individual casualty resides. However, if reporting officers were significantly more likely to report recognised local postcodes than less familiar ones, then this calculation could slightly overestimate resident casualty figures for authorities with unusually high concentrations of local casualties (often more rural or remote areas), and conversely slightly underestimate for authorities with high concentrations of non resident casualties (often those in urban areas or with long stretches of trunk routes).

- **The reporting of foreign resident casualties in STATS19 is unreliable**. In principle, foreign residents should be reported with the special code'2' in place of the postcode, but in practice only 3,019 instances of this were returned between 2006 and 2011. If taken at face value this would mean that only 0.22% of all casualties on Britain's roads (1 casualty in every 454) were foreign residents, and that they account for only 1.4% of all casualties reported without a postcode. However, anecdotal evidence and common sense suggest that there is widespread and significant under-reporting of foreign resident casualties.
- **There are significant inconsistencies between forces in recording foreign residents**. For instance Kent Police reported only eight casualty postcodes with '2' over the entire six year period while Northern Police, which lies hundreds of miles distant from most major points of entry to Britain and is over five times smaller in terms of population, reported 295 in the same period. **Since there is insufficient data to represent foreign resident casualties in a robust manner, the only consistent course of action is to distribute all casualties without postcodes as if they were British residents**, including the relatively few records which contain the official foreign resident STATS19 code. This assumption will increase all adjusted resident casualty figures to a small but unquantifiable extent. It may also disproportionately affect a few authorities where an unusually high number of casualties reported in the local force area could in fact be foreign residents (often those containing heavily used points of entry to Britain), or where the code '2' is in fact widely reported.
- **Postcodes in Northern Ireland are reported as 'Unknown'**, because casualty figures on Northern Ireland's roads do not fall in the scope of STATS19 reporting and therefore are not yet included in MAST. Consequently, the considerations explained above concerning authorities with unusually high foreign resident casualty rates may also apply to any authorities where an unusually high number of casualties reported in the local force area could in fact be residents of Northern Ireland.

TABLE 1 - PEDESTRIAN KSI CASUALTIES OVER TIME

Year	Pedestrian KSI Casualties	All KSI Casualties	% Pedestrians
1980	19035	84859	22.4%
1985	19470	76145	25.6%
1990	17360	65658	26.4%
1995	12297	49154	25.0%
2000	9498	41564	22.9%
2005	7129	32155	22.2%
2010	5605	24510	22.9%

TABLE 2 - SEVERITY OF PEDESTRIAN CASUALTIES 2006-2011

Severity	Child Casualties	Child %	Adult Casualties	Child %
Fatal	281	0.5%	2970	2.5%
Serious	10335	19.9%	24588	21.1%
Slight	41409	79.6%	89002	76.4%
Total	52025		116560	

TABLE 3 - ADULT PEDESTRIAN CASUALTIES BY QUARTER

Year	Q1	Q2	Q3	Q4	Annual	Q1-3
2006	5167	4690	4799	6195	20851	14656
2007	5174	4682	4837	5971	20664	14693
2008	5393	4411	4311	5719	19834	14115
2009	4833	4287	4165	5619	18904	13285
2010	4452	4228	4190	5046	17916	12870
2011	4668	4108	4127	5488	18391	12903
2012	4720*	3900*	4070*			12690

**DfT Provisional Estimates for 2012*

TABLE 4 - CHILD PEDESTRIAN CASUALTIES BY QUARTER

Year	Q1	Q2	Q3	Q4	Annual	Q1-3
2006	2275	2777	2444	2635	10131	7496
2007	2405	2511	2317	2294	9527	7233
2008	2070	2424	2027	2127	8648	6521
2009	1906	2166	2010	1901	7983	6082
2010	1846	2189	2013	1881	7929	6048
2011	1949	2165	1931	1762	7807	6045
2012	1780*	1820*	1810*			5410

**DfT Provisional Estimates for 2012*

Table 5 – Pedestrian Casualties by Month

Month	Child Casualties	Child %	Adult Casualties	Adult %
January	3795	7.3%	10381	8.9%
February	3745	7.2%	9528	8.2%
March	4911	9.4%	9778	8.4%
April	4442	8.5%	8470	7.3%
May	5003	9.6%	9058	7.8%
June	4787	9.2%	8878	7.6%
July	4426	8.5%	8820	7.6%
August	3382	6.5%	8067	6.9%
September	4934	9.5%	9542	8.2%
October	4820	9.3%	10630	9.1%
November	4494	8.6%	11811	10.1%
December	3286	6.3%	11597	9.9%

Table 6 - Pedestrian Casualties by Day of Week

Weekday	Child Casualties	Child %	Adult Casualties	Adult %
Sunday	3885	7.5%	11760	10.1%
Monday	7896	15.2%	15986	13.7%
Tuesday	8196	15.8%	16654	14.3%
Wednesday	8458	16.3%	17057	14.6%
Thursday	8390	16.1%	17504	15.0%
Friday	9380	18.0%	20265	17.4%
Saturday	5820	11.2%	17334	14.9%

Table 7 - Adult Pedestrian Casualties by hour and weekday/weekend

Hour	Weekday Casualties	Weekday %	Weekend Casualties	Weekend %
Midnight	1127	1.3%	2082	7.2%
1am	636	0.7%	1824	6.3%
2am	586	0.7%	1421	4.9%
3am	421	0.5%	1068	3.7%
4am	241	0.3%	476	1.6%
5am	287	0.3%	214	0.7%
6am	806	0.9%	191	0.7%
7am	2639	2.7%	236	0.8%
8am	5794	6.6%	369	1.3%
9am	5280	6.0%	736	2.5%
10am	4841	5.5%	1230	4.2%
11am	5425	6.2%	1461	5.0%
Noon	5818	6.7%	1612	5.5%
1pm	5758	6.6%	1461	5.2%
2pm	5644	6.5%	1459	5.0%
3pm	6894	7.9%	1499	5.2%
4pm	7136	8.2%	1504	5.2%
5pm	7486	8.6%	1730	5.9%
6pm	5737	6.6%	1631	5.6%
7pm	4293	4.9%	1539	5.3%
8pm	3130	3.6%	1268	4.4%
9pm	2750	3.1%	1231	4.3%
10pm	2626	3.0%	1342	4.6%
11pm	2375	2.7%	1476	5.1%

TABLE 8 CHILD PEDESTRIAN CASUALTIES BY HOUR AND WEEKDAY/WEEKEND

Hour	Weekday Casualties	Weekday %	Weekend Casualties	Weekend %
Midnight	34	0.1%	34	0.4%
1am	8	0.0%	26	0.3%
2am	12	0.0%	15	0.2%
3am	9	0.0%	9	0.1%
4am	5	0.0%	6	0.1%
5am	14	0.0%	3	0.0%
6am	26	0.1%	4	0.0%
7am	891	2.1%	10	0.1%
8am	6280	14.8%	45	0.5%
9am	960	2.3%	107	1.1%
10am	468	1.1%	260	2.7%
11am	754	1.8%	536	5.5%
Noon	1245	2.9%	830	8.6%
1pm	1543	3.6%	961	9.9%
2pm	1507	3.6%	1028	10.6%
3pm	9604	22.7%	1006	10.4%
4pm	5874	13.9%	1128	11.6%
5pm	4689	11.1%	1115	11.5%
6pm	3587	8.5%	959	9.9%
7pm	2451	5.8%	739	7.6%
8pm	1283	3.0%	465	4.8%
9pm	687	1.6%	243	2.5%
10pm	264	0.6%	110	1.1%
11pm	118	0.3%	65	0.7%

TABLE 9 - PEDESTRIAN CASUALTIES BY LIGHTING CONDITIONS

Lighting Conditions	Child Casualties	Child %	Adult Casualties	Adult %
Daylight (with lights to 2010)	44307	85%	76916	66%
Night with Lights Lit	6960	13%	34955	30%
Night with Lights Unlit	210	0%	600	1%
Night with No Lights	256	0%	2652	2%
Night with Lights Not Known	292	1%	1437	1%

TABLE 10 - PEDESTRIAN CASUALTIES BY ROAD CLASS

Road Class	Child Casualties	Child %	Adult Casualties	Adult %
A(M)	0	0%	26	0%
M	20	0%	339	0%
A	12629	24%	45577	39%
B	5892	11%	13415	12%
C	5207	10%	10966	9%
Unclassified	28277	54%	46237	40%

TABLE 11 - PEDESTRIAN CASUALTIES BY URBAN/RURAL ROADS

Urban/Rural Roads	Child Casualties	Child %	Adult Casualties	Adult %
Urban	45544	88%	101375	87%
Road	6476	12%	15179	13%

Table 12 - Pedestrian Casualties by the Vehicle Type That Hit Them

Associated Vehicle	Child Casualties	Child %	Adult Casualties	Adult %
Cycle	370	0.7%	1385	1.2%
Motorbike	1322	2.5%	4959	4.3%
Car	45999	88.4%	91576	78.6%
Bus	1475	2.8%	7411	6.4%
Goods	2303	4.4%	9331	8.0%
Other	536	1.0%	1847	1.6%

Table 13 - Manoeuvres of Pedestrian Casualties

Pedestrian Manoeuvre	Child Casualties	Child %	Adult Casualties	Adult %
Crossing Nearside	26434	59%	47621	54%
Crossing Offside	16249	36%	26820	30%
Stationary	1596	4%	8553	10%
Walking Facing	311	1%	1969	2%
Walking Not Facing	546	1%	3288	4%

Table 14 - Contributory Factors assigned to pedestrian Collisions

Contributory Factors*	Pedestrian Collisions	% Collisions
Pedestrian -Failed to look properly	60933	59.51%
Pedestrian – Careless, reckless or in a hurry	25509	24.91%
Driver – Failed to look properly	20693	20.21%
Pedestrian Failed to judge other person's path or speed	17427	17.02%
Pedestrian – Crossed road masked by stationary vehicle	17341	16.93%
Pedestrian – Impaired by alcohol	11731	11.46%
Driver – Careless, reckless or in a hurry	8068	7.88%
Pedestrian – Dangerous action in carriageway	7073	6.91%
Other – Stationary or parked vehicle	5744	5.61%
Pedestrian – Wrong use of crossing facility	5492	5.36%

**Up to six contributory factors can be assigned to one individual collision and the figures shown the percentage of all collision involving a pedestrian casualty where each contributory factor was assigned.*

Table 15 - Age Group and Gender Split for Pedestrian Casualties

Gender/Age	Female	Male	% Split
Children	21262	30754	31.7%
Adults	48675	63147	68.3%
% Split	42.7%	57.3%	

Table 16 - Age and Gender for Child Pedestrian Casualties

Age	Female	Male
<1	58	67
1	178	249
2	477	816
3	759	1362
4	830	1486
5	854	1657
6	842	1702
7	971	1840
8	1049	1918
9	1154	2136
10	1378	2291
11	2407	3381
12	2846	3715
13	2546	2974
14	2524	2707
15	2389	2453

Table 17 - Age and Gender for Adult Pedestrian Casualties

Age	Female	Male
16-20	8313	11321
21-25	5804	8423
26-30	4470	6657
31-35	3500	5347
36-40	3413	5330
41-45	3301	4731
46-50	2841	4103
51-55	2511	3309
56-60	2438	2998
61-65	2213	2467
66-70	2038	2063
71-75	2050	1989
76-80	2254	1841
81-85	1943	1476
86-90	1212	827
91-95	323	217

Table 18 - IMD for Pedestrian Casualties

IMD	Child Casualties	Child %	Adult Casualties	Adult %
Most Deprived 10%	9783	23.6%	14432	16.2%
More Deprived 20%	6883	16.6%	12539	14.1%
More Deprived 30%	5344	12.9%	11220	12.6%
More Deprived 40%	4212	10.2%	9911	11.1%
More Deprived 50%	3541	8.5%	8675	9.7%
Less Deprived 50%	2925	7.0%	7716	8.7%
Less Deprived 40%	2512	6.1%	7065	7.9%
Less Deprived 30%	2277	5.5%	6490	7.3%
Less Deprived 20%	2073	5.0%	5884	6.6%
Least Deprived 10%	1945	4.7%	5243	5.9%

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PACTS
Parliamentary Advisory Council for Transport Safety

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SRF Safer Roads Foundation

IAM Driving Road Safety

An open data format table is available to download containing the analysis of pedestrian risk by local authority. The file containing the mappable data is here http://www.roadsafetyanalysis.org/wp-content/uploads/2013/05/LocalAuthorityIndexes.csv

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About Road Safety Analysis

Since its formation in early 2010, Road Safety Analysis has become a market leader in supplying innovative, creative and competitive services to the road safety sector. Built on the principles of social enterprise, Road Safety Analysis is focussed on developing and delivering a range of road safety services that are evidence based and highly cost effective.

With extensive experience in the road safety field and yet a wide range of specialties in areas such as analysis, insight reporting, social marketing, communications strategy, evaluation & partnership development, Road Safety Analysis are keen to support the profession with services that make a difference.

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