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Analysis of police collision files for pedestrian fatalities in London, 2006-10

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Contents

Executive summary

In 2010 the Mayor's Transport Strategy included a commitment to improve the safety and security of all Londoners (Greater London Authority, 2010). The Transport Strategy states (page 201): *"Despite a fall in the number of casualties from road traffic collisions in recent years there is still an unacceptable number of casualties each year"*. In 2010, 126 people were killed on London's roads, of which almost half (58) were pedestrians (TfL, 2011).

This study analysed approximately 200 police fatal files where a pedestrian was killed in London in the period 2006-2010, with the overall aim of providing a better understanding of how fatal pedestrian collisions in London could be prevented. The files were broadly representative of fatal pedestrian collisions in London over the period.

The fatal files were coded into a database based on Haddon's Matrix, which included items related to the environment, the pedestrian, vehicle(s) and their driver(s)/rider(s) in terms of pre-event, event and post-event.

The project identified the factors or primary interventions, which if they had been in place may have prevented the collision occurring (primary prevention). Further, the project considered the causes of the injuries and where practical identified the secondary interventions, which if they had been in place may have reduced their severity.

In total, 198 fatalities from 197 collisions were coded. Several groups of fatalities were identified as being of special interest because of particular characteristics of the collisions. These groups generally accounted for a substantial proportion of the fatalities although some fatalities are included in more than one group. The groups with the largest numbers of fatalities were:

- Pedestrians impaired with alcohol (46, 23%);
- Pedestrians aged 80 years and above (41, 21%);
- Pedestrians using a pedestrian facility (49, 25%);
- Pedestrians crossing the carriageway choosing not to use the available crossing facility (37, 19%);
- Pedestrians in collisions with buses/coaches (33, 17%);
- Pedestrians struck by speeding vehicles (32, 16%).

Other groups of interest included pedestrians in collisions with HGVs (27, 14%), pedestrians in collisions with motorcycles (14, 7%), child pedestrians (18, 9%) and vehicles that mounted the footway (12, 6%).

In each case, the collisions within each group were analysed in terms of who was involved, the contributory factors, injuries and possible countermeasures.

For the pre-event:

- 65 pedestrians (33%) were 70 years or over
- 48 of the pedestrians (24%) were impaired by alcohol (combined with drugs in 10 cases) and 1 pedestrian was impaired by drugs only;
- 56% of the pedestrians were struck by a car, 17% by a bus or coach and 14% by an HGV;

- The vast majority of vehicles had no defects prior to the collision;
- 178 of the 197 collisions (90%) were on roads with a speed limit of 30mph or lower and 145 collisions (74%) occurred on A-roads;
- 64% of the collisions were within 20m of a junction; most commonly at a T, staggered junction or crossroads;
- There was a crossing facility within 50m of the collision site in 91 locations (46%);
- 117 (59%) pedestrian fatalities occurred between 6am and 6pm; however, at weekends there were greater numbers of pedestrian fatalities at night compared with during the day.

For the event:

- In 177 of the collisions (90%), the pedestrian was crossing the road, most commonly whilst the vehicle was travelling straight ahead;
- 49 pedestrians (25%) were crossing at a facility and 37 (19%) were crossing within 50m of a facility;
- 15 of the 27 HGVs which hit a pedestrian were moving off when they struck the pedestrian.

Contributory factors:

- 96 pedestrians (48%) were recorded with 'failed to look properly' as a contributory factor and this factor was most common for all age groups;
- 38% of adults aged between 16 and 59 were recorded with 'impaired by alcohol' as a contributory factor;
- 13 of the 82 pedestrians aged 60 or over (16%) were recorded with 'wrong use of pedestrian crossing facility' as a factor;
- The most commonly recorded contributory factor for vehicles was 'failed to look properly', recorded for 20% of vehicles; this was most common for all vehicle types except for HGVs, for which 'vision affected by blind spot' was more common (recorded for 12 out of 27 HGVs).

For the post event:

- 68 drivers/riders (35%) were convicted following the collision, most commonly for careless driving (40);
- 24 vehicles (12%) failed to stop at the scene of the collision, all of which were later traced. For large vehicles such as HGVs or buses/coaches, the driver may not have realised that a collision had occurred.
- For the 50 cases where the post mortems were coded, the most common life-threatening injuries were head (34) and thorax (31) injuries; 18 had both head and thorax;

Overall, the most common countermeasures recorded were primary countermeasures.

1 Introduction

In 2010 the Mayor of London published the Mayor's Transport Strategy which included a commitment to improve the safety and security of all Londoners (Greater London Authority, 2010). The Transport Strategy states (page 201): *"Despite a fall in the number of casualties from road traffic collisions in recent years there is still an unacceptable number of casualties each year*". In 2010, 126 people were killed on London's roads, of which almost half (58) were pedestrians (TfL, 2011). This study aimed to provide a better understanding of how fatal pedestrian collisions in London could be prevented.

Police fatal road traffic collision reports provide a unique insight into the causes and consequences of fatal collisions and what may have prevented the collision or reduced its severity. By investigating the nature and causes of collisions it may be possible to understand how they could have been prevented. This study analysed 197 police fatal files where a pedestrian was killed in London during 2006-2010.

By analysing police fatal files, the project identified the factors or primary interventions which, if they had been in place, may have prevented the collision occurring (primary prevention). Further, the project considered the causes of the injuries and where practical identified the secondary interventions which, if in place, may have reduced the severity of the resulting injury (secondary prevention). The research methods presented here do not attempt to repeat the collision investigation carried out by the police but use a systematic approach based on the Haddon's Matrix (Haddon Jr, 1999).

2 Research Methods

A principal aim of the research was to identify the characteristics of collisions that result in fatally injured pedestrians, and to subsequently identify the relevant risk factors and propose prevention strategies.

The research involved several stages:

- an overview analysis of the STATS19 (ACCSTATS) data for 2006-2010;
- a small targeted literature review;
- a detailed content analysis of 200 police fatal files.

These stages are described below.

2.1 Overview of STATS19 data

STATS19 is the national database of all reported injury accidents on public roads. About 50 variables are recorded for each accident, including details of the accident circumstances, the vehicles involved and the resulting casualties. TfL maintains a database of collisions in London based on the STATS19 data named ACCSTATS, and the ACCSTATS data for pedestrian collisions between 2006 and 2010 was provided to TRL for this project. A brief overview of these data was used to set the context of the findings from the detailed analysis, the results of which are described in Appendix D. This ACCSTATS data was also used as a reference source to identify collisions in London where a pedestrian had been killed from 2006 to 2010, to enable the Metropolitan Police fatal files for a sample of these cases to be obtained.

2.2 Police Fatal Road Traffic Collision Files

The Archive of Police Fatal Road Traffic Collision Files held at TRL on behalf of the Department for Transport (DfT) includes collisions until mid 2009 and provides a unique insight into how and why fatal collisions occur on our roads. This detailed information is not available from any other source and can be used to gain a fuller understanding of the causes and consequences of a fatal collision.

The police fatal files include:

- Accident investigators' reports;
- Witness statements;
- Police summaries;
- Vehicle examiners' reports;
- Post-mortem reports;
- Scene photographs and plans; and
- Other expert evidence.

The data provide information to enable the study of the circumstances and contributory causes as well as the potential countermeasures.

The fatal files in the archive have been linked to STATS19 which allowed searches of the archive for relevant files. This study covers the period 2006-2010 where pedestrians

were killed in collisions within the Metropolitan and the City of London police force areas. A target of 200 pedestrian fatality files (see Section 2.3) was set for the analysis.

The level of detail within the files is high, however, there is no provision for knowing certain details if the information was not pertinent to the collision. For example, the location where the pedestrian had started their journey was often unknown because it is not relevant to the Police investigation so they do not always record it. Thus for some variables there is a high proportion of unknowns.

All of the interpretation and coding of the police fatal road traffic collision files followed strict data handling and confidentiality guidelines defined in the Department for Transport protocol for accessing the fatal collision files. No personal information was collected or retained by this work programme.

2.3 Sampling

Most of the fatal files for 2006 and 2007 are contained in the archive and are stored at TRL. However, many of the 2008 files were not contained in the archive because the police do not release the files for at least one year (and possibly two) to allow for the investigations to be completed. In addition, the archive has not been added to by the Metropolitan Police since July 2009.

The number of files in total and in the sample is shown in Table 2-1.

Table 2-1: Location of the pedestrian fatal files by year

Year	File in TRL archive	File held by Metropolitan Police	Total	Sample achieved
2006	85	14	99	19
2007	75	34	109	81
2008	23	70	93	52
2009	0	87	87	36
2010	0	58	58	9
Total	**183**	**263**	**446**	**197**

It was the original intention to review 200 files, using a combination of those files held at TRL and those held by the Metropolitan Police. The sample was selected to be representative based on the following criteria (shown in Table 2-2):

- Inner/outer London;
- Vehicle which hit the pedestrian (motorcycle, car, bus or coach, LGV, HGV)
- Pedestrian age group (0-15, 16-24, 25-59, 60+)

This gave a total of 40 groups, for example 'pedestrians aged 16-24 hit by a car in inner London'.

All of the files held in the TRL archive were used, with the files from the Police used to complete the sample. Initially, the sample was selected at TRL and the Police were asked to provide details for specific cases. However, due to difficulties in locating some of the files, the Police were supplied with a list of all of the possible files in each of the 40 groups, together with the number of files needed in the sample for that group. Once the files had been located and transferred, the TRL team visited the Metropolitan Police

Traffic Criminal Justice Unit, at the North West Traffic Unit, Wembley to carry out the analysis of the files.

Table 2-2 shows the number of fatalities in total between 2006 and 2010, the intended sample and the sample achieved. In total, 198 pedestrian fatalities from 197 collisions were included in the database.

Table 2-2: Sample of fatalities for pedestrians (197 collisions, 198 fatalities) (table does not include pedal cycle and other)

Group		Total fatalities 2006-10	Intended sample	Sample achieved held at TRL	Sample achieved from Police	Total sample achieved
Vehicle type	Motorcycle	37	17	10	4	14
	Car	249	114	56	59	115
	Bus/coach	73	34	22	11	33
	LGV	19	9	6	3	9
	HGV	57	26	14	13	27
Pedestrian age group	0-15	48	22	13	6	19
	16-24	49	23	8	13	21
	25-59	155	71	42	31	73
	60+	183	84	45	40	85
Area	Inner	182	84	47	36	83
	Outer	253	116	61	54	115
Total		**435**	**200**	**108**	**90**	**198**

Definitions: LGV – Goods vehicles not over 3.5 tonnes, HGV – goods vehicle over 3.5 tonnes. Inner and Outer London – see Appendix B.6.

Pedestrians killed in collisions with pedal cycles or 'other' vehicles were not included in the sample as they were small in number and no meaningful results could be gained, however, these collisions were examined using the ACCSTATS data in Section A.1.1.1Appendix D.

2.4 File content analysis approach

The content analysis was based on the Haddon Matrix (Haddon Jr, 1999). The Haddon Matrix provides a framework for the analysis of the information on road collision injury factors. Haddon developed this method to identify interactions between the casualty, the vehicle and the environment through phases of the event and to identify appropriate countermeasures. The matrix defines three time phases: pre-crash(countermeasures which prevent the collision from occurring), crash (countermeasures which reduce the severity of injury) and post-crash (providing life-sustaining countermeasures and preventing secondary events from occurring). The Haddon Matrix considers personal factors, vehicle factors, and physical and social environmental factors during each of the three time phases (See Appendix A).

A database was developed in Microsoft Access, in consultation with TfL, to store the information collected from the fatal files. Many of the fields had 'drop-down' menus and

check boxes which allowed searches. In addition several descriptive text fields were included to enrich the findings and provide a narrative of the collision.

The database is a hierarchical design with a unique code for each collision. There was a record for the environment, a record for information about the fatal casualty and a record for each vehicle involved (vehicle information and driver information). Detailed coding instructions were developed and are included in Appendix B. The database also included the ACCSTATS reference number so that records could be linked to the STATS19 information for the collision.

As part of the content analysis the researchers considered the evidence contained in the file and suggested contributory factors (based on the STATS19 system, see Appendix B.8) and potential countermeasures from a list of possible interventions (see Appendix C). The researchers could enter as many contributory factors and countermeasures as were applicable to the case, although STATS19 only allows for six factors, assigning them to the pedestrian or drivers/riders of vehicles involved in the collisions, each as 'possible' or 'maybe'.

Instructions were written to assist the coders and to ensure that the files were coded in a similar and consistent manner, and several files were coded by more than one team member to check inter-coder reliability. In addition, an experienced senior team member checked all the coding for the files, in particular the assigning of countermeasures and collision types.

In addition to this database a TRL specialist classified the injuries from a subset of 50 post mortem reports that were available at TRL using the Abbreviated Injury Scale (AAAM, 2005) which is an internationally recognised method of classifying trauma and measuring injury severity. Each injury description is assigned a unique six digit numerical code in addition to the AIS severity score. The first digit summarises the body region; the second digit identifies the type of anatomical structure; the third and fourth digits identify the specific anatomical structure or, in the case of injuries to the external region, the specific nature of the injury; the fifth and sixth digits identify the level of injury within a specific body region or anatomical structure. Finally, the digit to the right of the decimal point is the AIS severity score. MAIS denotes the Maximum AIS severity score of all injuries sustained by a casualty. It is a single number that attempts to describe the seriousness of the injuries suffered by a casualty. The AIS system therefore allows injuries to be coded by their type and severity in terms of threat to life. The AIS code (851812.3) shown in Figure 2-1 represents a fracture of the femur, where the AIS severity score is 3 (serious). This study specifically uses the AIS code for the body region injured and the AIS severity score.

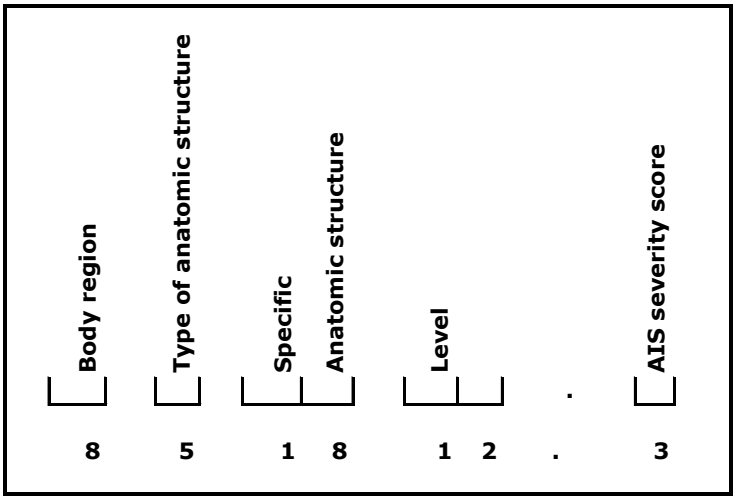


Figure 2-1: Example of an AIS code

The AIS severity score classifies individual injuries by body region on a six point ordinal severity scale ranging from AIS 1 (minor) to AIS 6 (currently untreatable), shown in Table 2-3.

Table 2-3: Description of AIS severity scores

AIS severity score	Description
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Maximum (currently untreatable)

3 Literature review

3.1 Introduction

The aim of the literature review was to summarise key pieces of literature relating to the causes of pedestrian collisions, especially fatal collisions and countermeasures which could help to prevent collisions or reduce the severity of the injury.

3.2 Literature search

The review was conducted using literature provided by TfL as well as key pieces of literature acquired from a brief, targeted literature search. Six papers relating to pedestrian casualties were reviewed. Causes of incidents were reviewed, along with interventions and countermeasures (primary and secondary).

3.3 Causes of pedestrian collisions

3.3.1 The New York City Pedestrian Safety Study and Action Plan (New York City Department of Transportation, 2010)

The Department of Transport in New York City undertook an extensive study of pedestrian safety using data from over 7,000 severe and fatal pedestrian injury collisions over eight years. The following factors were found to contribute to pedestrian-involved collisions:

- **Driver inattention** was a factor in over one third (36%) of pedestrian KSI collisions. Collisions involving driver inattention were more than twice as likely to be fatal than other collisions.
- Many collisions (27%) occurred when the driver **failed to yield** to a pedestrian, mainly at signalised junctions.
- Pedestrian KSI collisions often occurred while the pedestrian was **crossing against the signal** (20%). A fatality was over 50% more likely when the pedestrian was crossing against the signal rather than with it.
- Pedestrian KSI collisions were more than three times as likely if the vehicle was **turning left** [equivalent of right in the UK] rather than right [equivalent of right in the UK]. One reason for this is that the driver's visibility can be obscured by the A-pillar.
- **Speed** was a factor in 21% of pedestrian KSI collisions (including excessive speed, unsuitable speed for the conditions, and limited sight distance). Twenty percent of pedestrian KSI collisions which involved 'unsafe vehicle speeds' were fatal, compared to 10% of those which did not involve 'unsafe vehicle speeds'.
- In New York City, 8% of fatal pedestrian collisions involved a driver who had been drinking, and again these collisions were more than twice as likely to be fatal.
- Collisions which occurred while the vehicle was **lane changing** were also more than twice as likely to result in a fatality.

3.4 Interventions/countermeasures

3.4.1 Factors influencing pedestrian safety: A literature review (UK, Martin, 2006)

Martin (2006) undertook a review of technical literature relating to pedestrians and ways in which their behaviour might be influenced to reduce numbers of casualties on London's roads. The following interventions and countermeasures relating to the pedestrian environment were identified:

- Road safety **education** can be delivered via a variety of methods which aim to promote safe behaviour. For example pedestrians could be educated to improve awareness of other road users' needs, to develop strategies to minimise the risk of being involved in a collision, or to increase general road safety knowledge. Young pedestrians are generally easier to influence than older pedestrians.
- **Footway widening** is likely to result in improved pedestrian safety and reduce conflict with traffic.
- **Carriageway narrowing** has also been shown to reduce average driving speeds and thus improve pedestrian safety
- **Removal of on-street parking** can help to improve pedestrian safety as collisions often occur when pedestrians are crossing between parked cars (although the presence of parked cars on the street is also associated with a reduction in travelling speed).
- The introduction of **20mph zones** is associated with a substantial reduction in pedestrian injury collisions and casualty severity.
- The use of **stop lines** at crossings can encourage drivers to stop further back from the crossing and therefore reduce the risk of drivers running red lights or edging onto the pedestrian crossing before the green light. This has been shown to reduce pedestrian conflicts.
- **Raised zebra or signal-controlled crossings** can help to reduce vehicle speed on the approach to the crossing and encourage vehicles to give way to pedestrians.
- A **central refuge** can improve safety by providing pedestrians with a safe place to stop while crossing a busy road.
- **Guard railings** are intended to reduce conflicts between pedestrians and vehicles and to discourage pedestrians from crossing the road at unsuitable points.
- Improved **lighting** can improve pedestrian safety at night.

3.4.2 Designing road vehicles for pedestrian protection (USA, Crandall, Bhalla, & Madeley, 2002)

Vehicle design features aimed to improve pedestrian protection were reviewed including:

- **Pop-up bonnets** (also known as active hood lift systems in America), which provide a greater clearance between the bonnet and stiff underlying structures (e.g. engine components) in the event of a frontal impact, thus allowing for controlled deceleration of the pedestrian's head and reduced risk of head injury. Pop-up bonnets are currently available on only a few car models.
- The application of an **energy-absorbing layer** on the bumper combined with altered bumper geometry, height and orientation can reduce the risk of lower limb injuries.

- **Deeper bumper profiles** and support bars positioned below the bumper can also reduce knee-related injury by limiting rotation of the leg.

3.4.3 Protecting vulnerable road users from injury (France, Constant & Lagarde, 2010)

This study described further measures to protect vulnerable road users from injury, including:

- In-vehicle advanced **sensing systems** to track road users.
- Pedestrian **education** to improve awareness of road hazards and pedestrian responsibilities.
- The use of **conspicuity** aids, especially at night, to improve the visibility of pedestrians.

3.4.4 Development of night-vision system (Japan, Tsuji, Hattori, Watanabe, & Nagaoka, 2002)

This study developed a **night vision** system to detect high-temperature objects using infrared cameras. The position and location of the pedestrian are used to calculate the risk of a collision. Active night vision systems are currently available on certain premium vehicles only.

3.4.5 EU Regulation 78/2009

The EC Directive on pedestrian protection (2003/102/EC) was originally written in two phases. Phase one came into force in October 2005 and was applicable to new type-approvals, with the intention that all old type-approved vehicles that are still in production must be approved to the Phase one requirements by the end of 2012. Originally, Phase two of the EC Directive was to come into force for new type-approvals in September 2010 and new vehicles by September 2015. However, it was suggested that Phase two of the EC Directive was not achievable and consequently TRL were commissioned to conduct a feasibility study. As a result of the feasibility study, Phase two of the European legislation was revised; the revised Phase two was included in EC Regulation Number 78/2009, which was published in February 2009. This superseded the EC Directive and also brought together the Frontal Protection Systems (Bull-bar) legislation and adds requirements for Brake Assist Systems (the latter being required to compensate for the pedestrian protection feasibility adjustments).

Table 3-1 outlines the effective dates for each of the pedestrian protection phases of the EC Regulation and for the Brake Assist System (BAS) requirement (but Front Protection System requirements are not shown).

Table 3-1: Outline of dates from when each phase of the Regulation is effective

Vehicles	EC Regulation (78/2009)					
	Phase one		Phase two		Brake Assist System	
	New Types	New Vehicles	New Types	New Vehicles	New Types	New Vehicles
M1 ≤ 2500 kg and N1 derived from M1 ≤2500 kg	11/2009	12/2012	2/2013	2/2018	11/2009	2/2011
M1 > 2500 kg			2/2015	8/2019	11/2009	2/2011
N1 other (not derived and/or >2500 kg)			2/2015	8/2019	2/2015	8/2015

EU Regulation 78/2009 outlines manufacturer and member state obligations relating to type-approval, and states that "pedestrian protection can be significantly improved by a combination of passive and active measures which afford a higher level of protection than the previously existing provisions".

3.5 Summary

A number of interventions and countermeasures relating to the pedestrian environment have been identified, including education, infrastructure changes, and improved lighting. Vehicle design also has an important role to play in the protection of passengers.

4 Analysis of police files in terms of Haddon's Matrix

The sample consisted of 198 pedestrian fatalities from 197 collisions that occurred in London between 2006 and 2010. This section shows the results related to Haddon's Matrix, which splits the details of the collision and its participants into nine cells in a matrix as shown below. The matrix below shows examples in each cell; the full Haddon's Matrix is shown in Appendix A.

Table 4-1: Haddon's Matrix with examples (full matrix in Appendix A)

	Pedestrian	Environment	Vehicle and driver
Pre-event	Age, gender, impairments	Date, time, traffic conditions	Vehicle type, driver age, vehicle speed
Event	Manoeuvre	Crossing facilities	Manoeuvre
Post-event	Injuries occurred		Convictions following collision

4.1 Pre-event

This section describes the pre-event, namely the personal characteristics of the pedestrian, the other vehicles and participants involved and the road environment.

4.1.1 The pedestrian

There were 112 male and 86 female pedestrians in the sample of fatalities. Figure 4-1 presents the age distribution of the pedestrians. From this it can be seen that a large proportion of the sample were aged over 70 and one-fifth of the sample were aged 80 or over (41 fatalities).

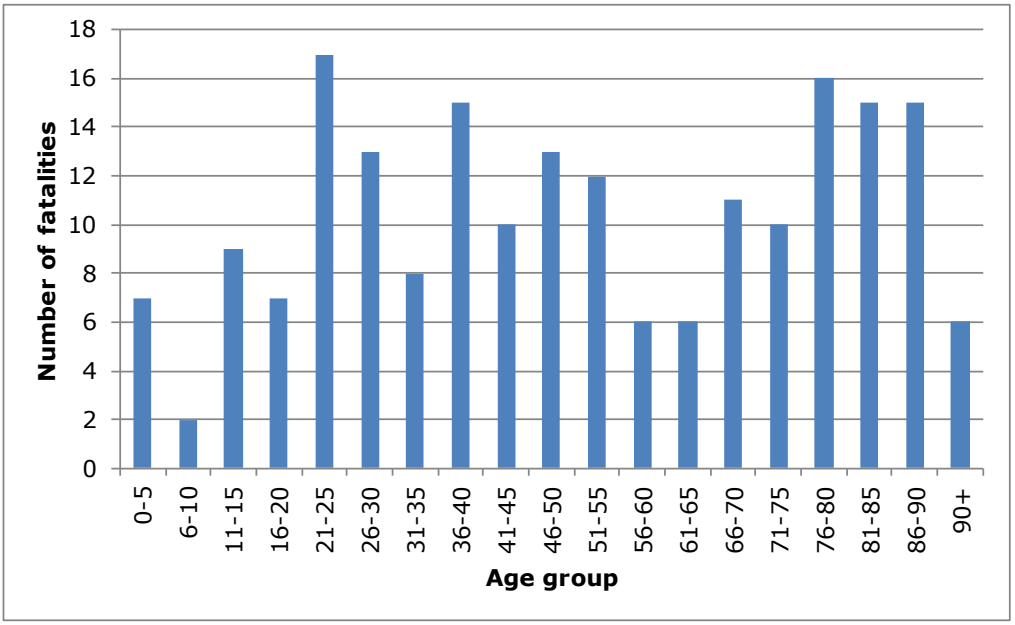


Figure 4-1: Number of pedestrian fatalities by age group

The ethnic group of the pedestrian was determined using a variety of information from the police reports for 148 of the pedestrians. Table 4-2 shows this information grouped using the major categories from the ethnic classification system as used in the 2001 Census for England and Wales. The majority of the fatalities, where ethnicity was known, were white.

Table 4-2: Fatal file description of the ethnicity of the pedestrian fatalities

Pedestrian ethnicity	Total
White	110
Asian or Asian British	16
Black or Black British	14
Chinese or other ethnic groups	6
Mixed	2
Unknown	50
Total	**198**

The area of residence was known for all but 13 of the pedestrians: 165 were from London (56 inner, 109 outer), 12 were from other UK regions and eight were visitors from abroad. The journey purpose was known for 136 of the pedestrians; 108 were leisure journeys, 14 were shopping, eight were pupils going to/from school and six were walking to/from work or as part of their job. It was known that 117 were familiar with their route and six were unfamiliar (75 unknown).

4.1.1.1 Pedestrian accompaniment

Table 4-3 presents information on whether the pedestrian was walking alone or with other people prior to the collision. The majority of adult fatalities were walking alone and the under 16s were more likely to be accompanied. In particular detailed information

was collected for the ten children aged less than 11 years. Of these, two were travelling in a pram/pushchair, one was holding an adult's hand, two were in close proximity to an adult, one was with an adult but it was unknown how close they were, two were in a group and two were alone. The collisions involving children are looked at in detail in Section 5.2.5.

Table 4-3: Pedestrian accompaniment by age group

Age group	Alone	Child & adult	Group	Unknown	Total
Under 16	5	7	6	0	18
16-24	20	0	4	0	24
25-29	7	0	1	1	9
30-39	21	1	3	0	25
40-49	18	0	4	1	23
50-59	15	0	2	0	17
60-69	16	0	1	0	17
70+	61	0	3	1	65
Total	**163**	**8**	**24**	**3**	**198**

4.1.1.2 Distractions

It was of interest to determine whether the pedestrian was distracted prior to the collision and so evidence of mobile phone use, interaction with other pedestrians and other distractions was looked for in the police files. The results are shown in Table 4-4. Overall 25 pedestrians were distracted. Four pedestrians were using a mobile phone prior to the collision; they were aged 19, 21, 38 and 74. Two pedestrians (aged 29 and 37) were known to be wearing headphones. Ten pedestrians were following other pedestrians across the road, 3 of which were known to be in a group.

Table 4-4: Pedestrian distractions

Distraction	Yes	No	Unknown	Total
Following other pedestrians	10	188	0	198
Talking to other pedestrians	6	192	0	198
Playing	4	194	0	198
Using a mobile phone	4	193	1	198
Wearing headphones	2	195	1	198
Yelling across the road	2	195	1	198
Eating & drinking	2	195	1	198
Reading	1	196	1	198
Walking a dog	0	198	0	198
Any distraction	**25**	**172**	**1**	**198**

4.1.1.3 Pedestrian visibility and items carried

The clothing that the pedestrian wore was known for 166 pedestrians. Of these, only three people were wearing high visibility clothing (one in the dark with streetlights, two in the daylight, all three were aged over 50). 'Pedestrian wearing dark clothing at night'

was thought to be a contributory factor in four collisions (contributory factors are discussed in more detail in Section 4.2.8).

It is known that two of the fatalities were pushing a pushchair/pram prior to the collision and that five pedestrians were pushing a shopping trolley/basket (they were all aged over 60).

It is known that 52 pedestrians were carrying something prior to the collision, the details of which are shown in Table 4-5. The majority of the pedestrians were carrying light loads; 20 pedestrians were known to be carrying a handbag or briefcase and 12 were carrying a single carrier bag.

Table 4-5: Loads carried by the pedestrians

Load	Total
Not carrying anything	74
Handbag/Briefcase	20
One carrier bag	12
Multiple carrier bags	7
Other	7
Light item e.g. newspaper	6
Unknown	72
Total	**198**

4.1.1.4 Pedestrian impairment, disabilities and illness

Information was collected from the files regarding impairment of the pedestrian by alcohol, drugs and fatigue as well as any relevant disabilities or illnesses (mental or physical). The impairment or illness could have influenced the behaviour of the pedestrian before and during the event as well as their reaction to the event.

Almost one-quarter of the fatalities in the sample were impaired by alcohol (48) and 11 were impaired by drugs (Table 4-6). The 25-59 year age group showed the highest incidence of alcohol impairment (47%). Collisions involving pedestrians impaired by alcohol are studied in detail in Section 5.2.8.

Table 4-6: Pedestrian impairment by age group

Impairment	0-15	16-24	25-59	60+	Total
Alcohol only	0	5	28	5	38
Alcohol & drugs	0	3	7	0	10
Drugs only	0	0	1	0	1
Fatigue	0	1	0	0	1
No Impairment	18	14	37	76	145
Unknown	0	1	1	1	3
Total	**18**	**24**	**74**	**82**	**198**

It is known that 13 of the fatalities were using a walking aid prior to the collision (ten were using walking sticks, two were using walking frames and one was on crutches).

Apart from the person using the crutches (age 46) all were aged over 67 years. It can be seen from Table 4-7 that three pedestrians had uncorrected, defective eyesight, five had impaired hearing and five had another relevant illness or disability.

Table 4-7: Pedestrian disabilities and illnesses (mental or physical)

Disability or illness	Yes	No	Unknown	Total
Walking aid	13	151	34	198
Uncorrected defective eyesight	3	190	5	198
Impaired hearing	5	188	5	198
Other relevant illness or disability	5	189	4	198

4.1.2 Vehicles and other participants in the collision

4.1.2.1 The vehicles involved

There were 205 vehicles involved in the 197 collisions. 189 collisions involved one vehicle and this was the vehicle that struck the pedestrian. Eight of the collisions involved two vehicles, one of which struck the pedestrian. The vehicle types are shown in Table 4-8. For the remainder of this report, only the vehicles that struck the pedestrian are included in the analysis.

Table 4-8: Other vehicles involved in the collision

Vehicle type	Vehicle that struck the pedestrian	Other vehicle involved	Total vehicles
Car/taxi	111	7	118
Bus/coach	33	0	33
HGV	27	1	28
LGV	12	0	12
Motorcycle	14	0	14
Number of vehicles	**197**	**8**	**205**

The pre-event condition was known for 185 of the vehicles involved and of these 176 had no defects, shown in Table 4-9. Nine vehicles had defects although only four were considered likely to have contributed to the collision. It was known that six vehicles that struck the pedestrian did not have a valid car tax out of the 132 for which information was known.

Table 4-9: Vehicle defects

Defect description	Total vehicles
No defects – 'good condition'	174
Defective lights	2
Defect to front tyre (may have contributed to the collision in one case)	2
Mirror defect (may have contributed to the collision in one case)	2
Defective horn	1
Suspension fault	1
Non road worthy condition (may have contributed to the collision)	1
Badly worn wipers and marked windscreen	1
Defective ABS, allowing brakes to be locked during emergency braking (may have contributed to the collision)	1
Unknown	12
Total vehicles that struck the pedestrian	**197**

A number of different mirrors are required by law to be fitted to HGVs, buses and coaches to improve the field of vision for drivers. These are intended to reduce blind spots in the immediate area surrounding the vehicle. Table 4-10 shows the types of mirrors fitted to the 60 HGVs and buses/coaches in the sample. Two HGVs were known not to have the front mirror fitted[1] and one HGV did not have the nearside wide angle mirror fitted. The missing mirrors were not a contributory factor in these collisions. In addition to mirrors, the researchers checked the files for evidence of off-side and near-side protective guards where it was relevant.

Table 4-10: Mirrors fitted to HGVs, buses and coaches

Type of mirror	Fitted	Not fitted	Not known	Total
Nearside main mirror (class II)	28	-	32	60
Offside main mirror (class II)	27	-	33	60
Nearside wide angle mirror (class IV)	17	1	42	60
Offside wide angle mirror (class IV)	9	-	51	60
Close proximity mirror (class V)	15	-	45	60
Front mirror (class VI)	12	2	46	60

[1] Front mirrors were required on new trucks (>7.5t) first registered after 2006. Trucks registered before that date have no requirement. Close proximity mirrors at the side were required on new trucks from the same time but in addition to this any truck (7.5t) registered since August 2000 not already equipped with a side mirror was required to retro-fit them by March 2009. The requirement was only enforced at annual inspection so in reality some may not have been equipped until mar 2010.

4.1.2.2 *The drivers of the vehicle*

Of the 197 vehicles that struck the pedestrian, 160 drivers were male and 36 were female (one unknown). Table 4-11 presents the age distribution of these drivers by vehicle type and Table 4-12 shows the ethnicity. The majority of the drivers were aged between 16 and 49 years, there was one underage driver and seven drivers were aged over 70 years.

Table 4-11: Age distribution of the driver of the vehicle that struck the pedestrian by vehicle type

Driver age group	Car	Bus/coach	HGV	LGV	Motorcycle	Total
under 16	1	0	0	0	0	1
16-24	24	1	0	1	0	26
25-29	13	1	3	3	2	22
30-39	37	8	11	2	6	64
40-49	15	13	5	3	3	39
50-59	4	5	5	2	2	18
60-69	6	4	2	1	1	14
70+	7	0	0	0	0	7
Unknown	4	1	1	0	0	6
Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

Table 4-12: Fatal file description of the ethnicity of the drivers

Driver ethnicity	Total
White	106
Asian or Asian British	26
Black or Black British	23
Mixed	1
Chinese or other ethnic groups	1
Unknown	40
Total drivers	**197**

Just over three-quarters of the drivers lived in London, 41 from inner and 110 from outer London (see definition given in Section A.1.1.1D.2.1). Eighteen drivers lived in other parts of the UK and three were drivers from abroad. This is shown in Table 4-13 by vehicle type.

Table 4-13: Area of residence of the drivers by vehicle type

Area of residence	Car	Bus/coach	HGV	LGV	Motorcycle	Total
Outer London	69	16	14	7	4	110
Inner London	23	9	3	2	4	41
UK – non-London	5	3	7	0	3	18
Non-UK	2	0	1	0	0	3

Unknown	12	5	2	3	3	25
Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

Table 4-14 shows the journey purpose by vehicle type. As would be expected the drivers of the HGVs, buses/coaches and the majority of LGVs were driving as part of their job. For the car drivers around two-thirds of the known journeys were for leisure purposes. The majority of the drivers were either very familiar or familiar with the route they were driving (132) with only five car drivers and one HGV driver being unfamiliar (Table 4-15).

Table 4-14: Journey purpose by vehicle type

Journey purpose	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
Part of job	11	32	27	7	1	78
Leisure	57	0	0	0	3	60
Journey to/from work	15	0	0	3	8	26
Shopping, school run	4	0	0	1	0	5
Unknown	24	1	0	1	2	28
Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

Table 4-15: Driver familiarity with route by vehicle type

Driver familiarity	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
Very familiar	37	15	8	4	5	69
Familiar	30	17	10	3	3	63
Regular commuting	14	0	0	3	4	21
Unfamiliar	5	0	1	0	0	6
Unknown	25	1	8	2	2	38
Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

There was no evidence of alcohol or drug impairment in the police files of drivers/riders of HGVs, buses/coaches, LGVs or motorcycles. In contrast six car drivers were known to be impaired by drugs and/or alcohol. Three drivers suffered a medical incident just prior to the collision and one bus driver was fatigued.

Table 4-16: Driver/rider impairment by vehicle type

Driver impairment	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
None	83	29	26	12	12	161
Alcohol	4	0	0	0	0	4
Drugs	1	0	0	0	0	1
Alcohol & Drugs	1	0	0	0	0	1
Defective eyesight	1	0	0	0	0	1
Illness or disability	2	1	0	0	0	3
Fatigue	0	1	0	0	0	1
Unknown	20	2	1	0	2	25

Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

Evidence of driver distraction was looked for in the fatal files and in the majority of cases there was none (150). In eight collisions there was some evidence of driver distraction inside the vehicle (such as a newspaper on the steering wheel, a bus passenger, a driver having a coughing episode) and in four collisions the distraction was due to pedestrians outside the vehicle. Four drivers were possibly distracted by a mobile phone and this was likely to have contributed to the cause of the collision in three cases.

Table 4-17: Driver distraction by vehicle type

Driver distraction	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
None	79	25	24	10	12	150
Distraction in vehicle	3	3	2	0	0	8
Distraction outside vehicle	1	1	1	0	1	4
Mobile phone	4	0	0	0	0	4
Unknown	24	4	0	2	1	31
Total drivers	**111**	**33**	**27**	**12**	**14**	**197**

Information on whether the driving licence was appropriate was found in the police records for 167 drivers and of these six did not hold a licence, one HGV driver did not have the correct licence for the vehicle and one driver had a fake Portuguese licence. Information on how long the driver had held their full driving licence was known for 114 drivers. Half of these drivers had held a full licence for more than ten years (59 drivers) while a sixth were inexperienced/novice drivers[2] (19 drivers).

Evidence was gathered from the police files regarding the conviction history for the drivers that struck the pedestrian. Eighteen drivers had previous convictions (unknown for 34 drivers). Eleven were for driving offences, 6 drivers had criminal records and 1 driver had an adult caution.

4.1.3 The road environment

4.1.3.1 Infrastructure

Road class, road type and speed limit at the location of the collision are presented in Table 4-18. The majority (178) of the collisions were on low speed roads (30mph or less), predominantly on single carriageway A-roads. Traffic conditions at the time of the collision were known for 142 locations. They were described as heavy at 39 locations (26 heavy and moving, 13 heavy and queued), moderate traffic in 54 locations and 49 collisions occurred in light traffic.

[2] defined as holding a full driving licence less than one year

Table 4-18: Number of collisions by road class by speed limit

Road Class	Road Type	Speed limit				Total
		10/20/30 mph	40 mph	50 mph	60/70 mph	
Motorways (M & A(M))		0	0	1	0	1
A-roads	Dual	36	11	3	2	52
	Single	84	0	1	0	85
	One way	6	0	0	0	6
	Unknown	2	0	0	0	2
B-roads		13	1	0	0	14
C & unclassified roads		37	0	0	0	37
Total		**178**	**12**	**5**	**2**	**197**

The majority of the pedestrian collisions were within 20m of a junction, the detail of which is shown in Table 4-19. At just over half of the locations was a T, staggered junction or crossroads.

Table 4-19: Junctions at the collision locations

Junction detail	Total
Not at or within 20m of junction	71
T or staggered junction	80
Crossroads	28
Roundabout	5
Multiple junction	6
Other junction	1
Private drive or entrance	2
Slip road	2
Unknown	2
Total collisions	**197**

The presence of a pedestrian crossing facility within 50m of the collision site was also recorded and this is presented in Table 4-20 There was a crossing facility within 50m of the collision site in 91 locations; note this does not mean that the pedestrian was using the crossing at the time of the collision (see Section 5.2.9).

Table 4-20: Pedestrian crossing facility within 50m of the collision locations

Crossing facility detail	Total
No crossing facility within 50m	104
Pedestrian phase at traffic lights (ATS)	24
Pelican/Puffin/Toucan/Other non junction crossing facility	38
Staggered Pelican/Puffin/Toucan/Other non junction facility	7
Zebra crossing	12
Central refuge - no controls	9
Subway	1
Unknown	2
Total collisions	**197**

The presence of a bus lane was recorded at 19 locations (not present at 105 locations). Table 4-21 shows whether a bus stop was close to the collision site and in 45 collisions a bus stop was within 50m. One-third of the collisions involving buses/coaches occurred within 20m of a bus stop while this proportion was lower for the other vehicle types that came into contact with the pedestrian. It is of interest to know whether the pedestrians involved in collisions near to bus stops were intending to catch the bus or had recently alighted from the bus. These variables have been analysed in Section 5.2.3.

Table 4-21: Distance from a bus stop by vehicle type

Distance from bus stop	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
At the bus stop	5	3	1	2	0	11
<10m	8	4	1	0	0	13
10-20m	6	3	2	1	1	13
21-30m	4	0	0	0	2	6
31-40m	0	0	1	0	0	1
41-50m	1	0	0	0	0	1
Not within 50m of a bus stop	87	23	22	9	11	152
Total	**111**	**33**	**27**	**12**	**14**	**197**

Guard rails (that is, railings intended to stop pedestrians leaving the pavement) were known to be present at 42 locations (not present at 62 locations). This was determined from the photographs or descriptions in the files. Road works/construction sites were present at 4 locations (the vehicles involved were all cars at these sites). Shared road space is defined as a street shared by all modes of traffic with no clearly defined boundaries or segregation and was found at two locations.

Pre-event pedestrian flows were estimated based on descriptions provided by the police and witnesses at the scene. Heavy flow was assumed to be where pedestrian's often interrupted each other's movements; this was found in only nine collisions. Light flow was most common, defined as 'pedestrians' were able to move freely', at 73 locations. Moderate flow was recorded at 49 sites and flow was unknown for 67 collisions.

4.1.3.2 *Time, lighting, weather and road surface*

The distribution of fatalities by the month of the collision is shown in Figure 4-2. The numbers of fatalities per month varied from ten in May to 21 in June and January.

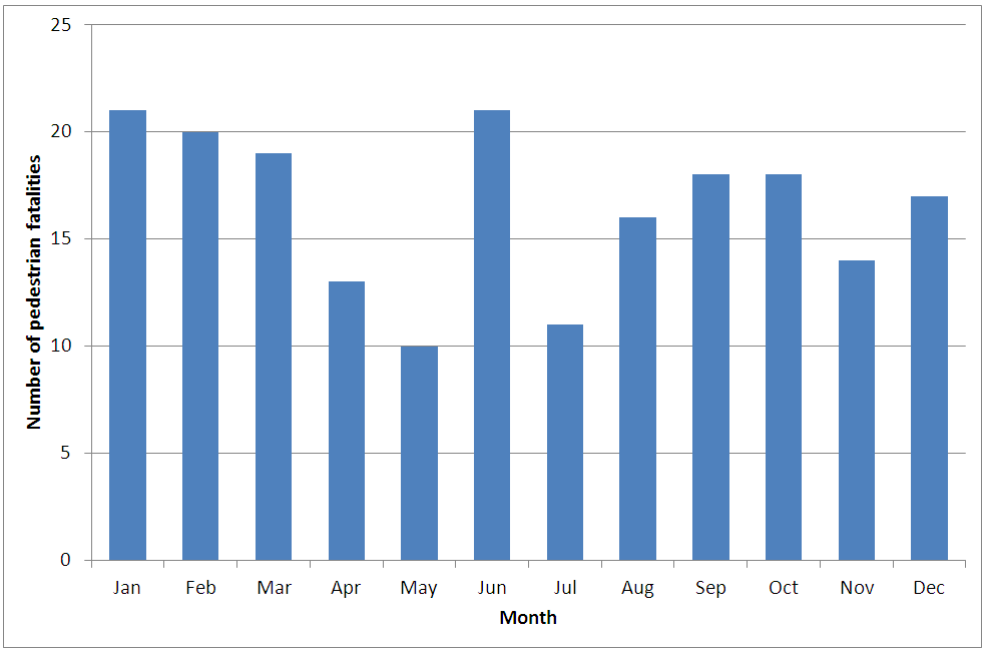


Figure 4-2: The number of pedestrians killed by month of collision

Figure 4-3 shows the number of pedestrians killed by day of week and whether it was during the day (6am-6pm) or night (6pm-6am). Overall, 117 of the pedestrian fatalities (59%) occurred between 6am and 6pm. On Mondays to Fridays there were more fatalities during the daytime compared to at night, whereas on Saturday and Sunday there were more fatalities at nights (that is, midnight to 6am and 6pm to midnight) compared to during the day, and may be as a result of increased social activity in the evenings involving alcohol. The influence of alcohol is discussed in more detail in Section 5.2.8.

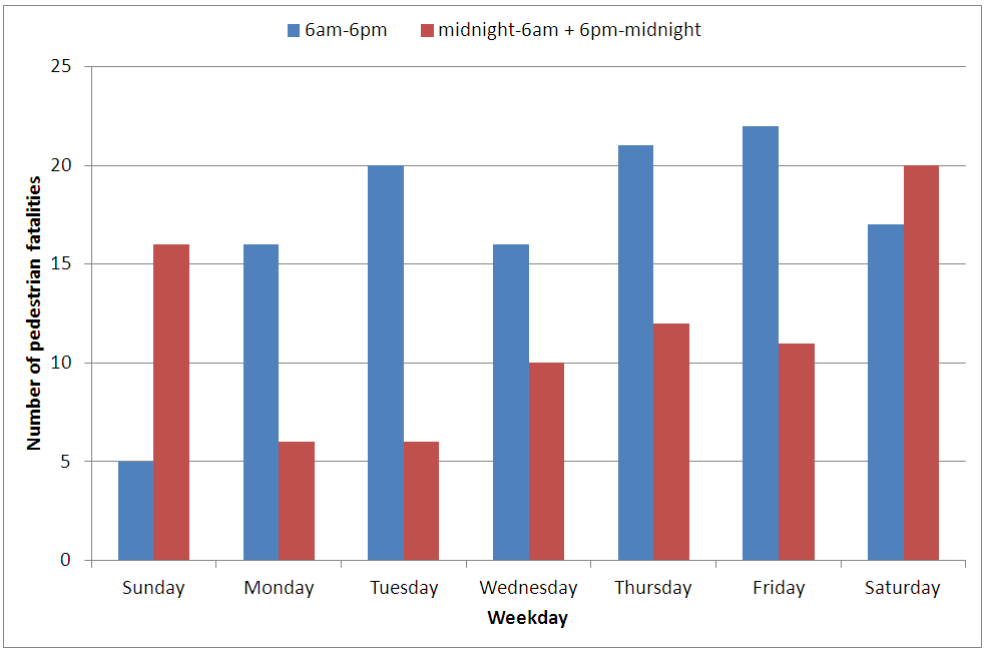


Figure 4-3: The number of pedestrians killed by day of week

Note that each time group includes times up to, but not including the end of the range listed, for example, 6am is included in the 6am-6pm group.

The light conditions were known for all of the collisions; 114 were in the daylight, 73 were in the dark with street lights, six in the dark with no or unknown streetlights and five at dusk/dawn. In addition to the lighting, the weather conditions were also recorded. The majority of the collisions were in dry conditions (176), 13 were in the rain, one in snow, one in 'hazardous' fog and seven unknown. The road surface was described as wet/damp in 38 collisions and icy in one collision.

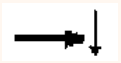
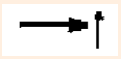
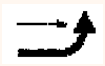
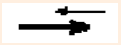
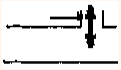
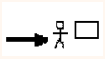
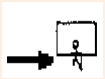
4.2 The event

This section describes the types of conflicts and the main factors that were thought to have contributed to the collision. Section 5.2 presents an in depth analysis of the main fatality groups identified in this section.

4.2.1 Conflict types

Each of the 197 pedestrian collisions was classified into a conflict type. There were three possible conflict types ('pedestrian crossing road', 'pedestrian other' and miscellaneous) and within these up to seven detailed conflict scenarios. Table 4-22 shows the type of collisions that resulted in a pedestrian fatality in London.

Table 4-22: Conflict types

Conflict			Total
N - Pedestrian crossing road			**177**
	N1	Vehicle going ahead, pedestrian left side	86
	N2	Vehicle going ahead, pedestrian right side	67
	N3	Vehicle left turn, pedestrian left side	9
	N4	Vehicle right turn, pedestrian right side	2
	N5	Vehicle left turn, pedestrian right side	0
	N6	Vehicle right turn, pedestrian left side	5
	N7	Manoeuvring vehicle	7
P - Pedestrian other			**16**
	P1	Walking with traffic	0
	P2	Walking facing traffic	1
	P3	Walking on footpath	12
	P4	Child playing/tricycle	0
	P5	Attending to vehicle	1
	P6	Entering or leaving a vehicle	0
	P7	Other	3
Q - Miscellaneous			**4**
	Q8	Other	4
Total collisions			**197**

By far the most common collision type was the vehicle going straight ahead and the pedestrian was crossing the road. This collision type accounted for over three-quarters of the sample (153), most commonly Vehicle going ahead, pedestrian left side (86) and Vehicle going ahead, pedestrian right side (67). There were 16 collisions which involved the pedestrian crossing the road and the vehicle turning left or right, and seven collisions which involved a manoeuvring vehicle (in all of these cases the vehicle was reversing).

There were 12 collisions where a vehicle hit a pedestrian that was on the footpath.

The 'other' seven conflicts (P7 and Q8) were as follows:

- Pedestrian impaired by alcohol laying in the carriageway;
- Pedestrian stumbled off kerb into carriageway (2 cases);

- Person climbing on railings fell into the carriageway;
- Alcohol impaired person hanging from a bridge and fell into the carriageway;
- Car collided into a tree, the tree fell onto a pram, the child was thrown against a wall;
- Bus driver pressed the accelerator instead of the brake and another bus driver was trapped between two buses.

Table 4-23 presents the most common conflicts by vehicle type. For the eight collisions that involved two vehicles, the vehicle type is defined as the first vehicle that came into contact with the pedestrian. For all vehicle types, the most common conflict involved the pedestrian crossing the road and the vehicle travelling straight ahead. Six out of the seven manoeuvring vehicles were cars and all the collisions of this conflict type involved the vehicle reversing.

Table 4-23: The most frequent conflicts by vehicle type

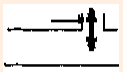
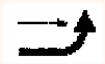
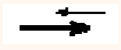
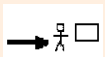
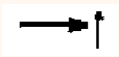
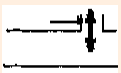
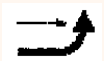
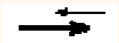
Conflict			Car/ taxi	Bus/ Coach	HGV	LGV	Motor cycle	Total
	N1	Vehicle going ahead, pedestrian left side	41	16	21	4	4	86
	N2	Vehicle going ahead, pedestrian right side	44	5	3	5	10	67
	P3	Walking on footpath	9	3	0	0	0	12
	N3	Vehicle left turn, pedestrian left side	1	5	2	1	0	9
	N7	Manoeuvring vehicle	6	0	0	1	0	7
	N6	Vehicle right turn, pedestrian left side	3	1	0	1	0	5
	Q8	Miscellaneous other	3	1	0	0	0	4
	P7	Pedestrian other	2	0	1	0	0	3
	N4	Vehicle right turn, pedestrian right side	1	1	0	0	0	2
	P2	Walking facing traffic	0	1	0	0	0	1
	P5	Attending to vehicle	1	0	0	0	0	1
Total vehicles that struck the pedestrian			**111**	**33**	**27**	**12**	**14**	**197**

Table 4-24 presents the most common conflicts by pedestrian age. Note that this table shows the total number of fatalities (198) whereas the previous tables count the number of collisions (197) this is because one collision resulted in two pedestrian fatalities and both have been included. For all age groups the most common conflicts involved the pedestrian crossing the road whilst the vehicle was travelling straight ahead. For the under 16 and 16-24 age groups, the pedestrian at the vehicle's right side was more common, however, for the 25-59 and 60+ age groups the pedestrian was more commonly approached from the vehicle's left side.

Table 4-24: The most frequent conflicts by pedestrian age group

Conflict			under 16	16-24	25-59	60+	Total
	N1	Vehicle going ahead, pedestrian left side	5	8	38	35	86
	N2	Vehicle going ahead, pedestrian right side	10	12	21	24	67
	P3	Walking on footpath	1	1	8	2	12
	N3	Vehicle left turn, pedestrian left side	0	1	2	6	9
	N7	Manoeuvring vehicle	0	0	0	7	7
	N6	Vehicle right turn, pedestrian left side	0	0	0	5	5
	Q8	Other	1	1	1	1	4
	P7	Other	0	0	2	1	3
	N4	Vehicle right turn, pedestrian right side	1	0	0	1	2
	P2	Walking facing traffic	0	0	1	0	1
	P5	Attending to vehicle	0	1	1	0	2
Total fatalities			**18**	**24**	**74**	**82**	**198**

4.2.2 Pedestrian manoeuvre and road position

The pedestrian manoeuvre and speed at the time of the event was recorded and this is shown in Table 4-25. In total 49 pedestrians were crossing the road using a pedestrian facility while 37 pedestrians had chosen to cross the road without using a crossing facility despite the presence of one within 50m of the collision site. These collisions are discussed in more detail in section 5.2.9. Fifteen of the pedestrians were on the footway/verge at the time of the collision; the vehicle mounted the footpath in 12 cases (conflict P3), the pedestrian was attending to their vehicle in two collisions (conflict P5) and one collision involved the vehicle knocking down a tree (Q8). These collisions are discussed in detail in section 5.2.10.

Whilst the majority of the pedestrians were walking across the road, 34 pedestrians were running. It was known that of the 34 running pedestrians, 11 were within 30m of a bus stop although the evidence suggested that only two were likely to have been running to catch a bus. Collisions involving buses/coaches are discussed in more detail in section 5.2.3.

Table 4-25: Pedestrian manoeuvre by pedestrian speed

Pedestrian Manoeuvre	Walking	Running	Stationary	Unknown	Total
In carriageway - crossing elsewhere	45	15	7	14	81
In carriageway - crossing at a facility	38	7	2	2	49
In carriageway - crossing within 50m of a facility	23	11	1	2	37
On footway or verge	8	0	4	3	15
In carriageway - not crossing/playing	2	1	2	0	5
On refuge / central island / central reservation	0	0	2	0	2
Unknown or other	3	0	2	4	9
Total fatalities	**119**	**34**	**20**	**25**	**198**

The majority of the pedestrians were upright (standing) at the time of the collision as shown in Table 4-26. It was known that 14 pedestrians accidently stumbled/fell and of these nine were impaired by alcohol (three also with drugs).

Table 4-26: Pedestrian stance

Stance	Total
Accidentally stumbled/fell	14
Lying in road	1
In pushchair/pram	2
Other	1
Standing	169
Unknown	11
Total fatalities	**198**

4.2.3 Pedestrian's line of vision

The pedestrian's line of vision was affected in 39 collisions and the detail is shown in Table 4-27. Parked vehicles obscured the vision at the time of the event for the majority (17 pedestrians) and slow moving vehicles for six of the fatalities. In fact pedestrians crossing the road masked by vehicles was a likely/possible cause in 21 collisions (Section 4.2.8 discusses contributory factors in more detail).

Table 4-27: pedestrian line of vision affected by an object

Line of vision affected by:	Total
Bus at bus stop	2
Parked vehicle	17
Slow moving vehicle	6
Other vehicle	6
Street furniture	2
Vegetation	1
Road layout	1
Rain, sleet, snow or fog	4
Not affected	112
Unknown	47
Total	**198**

Two pedestrian's had their vision obscured by hoods.

4.2.4 Pedestrian's first point of impact with the vehicle

Table 4-28 shows the part of the vehicle the pedestrian came into contact with first. This is important when looking at the type of injuries the pedestrian sustained (described in Section 4.3.3). The majority of collisions involved the pedestrian coming into contact with the front of the vehicle. In the case of HGVs the majority of pedestrians were in front of the vehicle at the time of the collision.

Table 4-28: First point of impact with the vehicle

First point of impact	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
Front-nearside	42	15	7	3	3	70
Front	23	9	11	0	7	50
Front-offside	29	3	4	4	1	41
Rear-nearside	1	3	4	1	0	9
Nearside	1	1	1	1	3	7
Rear	5	0	0	1	0	6
Offside	3	1	0	0	0	4
Rear-offside	1	0	0	1	0	2
Underneath	1	1	0	0	0	2
Top	1	0	0	0	0	1
Unknown	4	0	0	1	0	5
Total vehicles	**111**	**33**	**27**	**12**	**14**	**197**

4.2.5 Driver manoeuvre

The manoeuvre or movement the vehicle was undertaking when it collided with the pedestrian is shown in Table 4-29. The majority of the vehicles were going straight

ahead at the time of the collision (134). All vehicles that were reversing were cars and all pedestrians hit by reversing vehicles were adults (seven were aged over 70 years).

Over half of the HGVs were moving off when they made contact with the pedestrians (15). Collisions involving HGVs are discussed in more detail in section 5.2.4.

Table 4-29: Vehicle manoeuvre by vehicle type

Vehicle manoeuvre	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total vehicles
Going ahead	87	17	10	6	14	134
Moving off	2	5	15	1	0	23
Turning left	3	5	1	1	0	10
Turning right	5	3	0	1	0	9
Reversing	7	0	0	1	0	8
Overtaking	2	1	0	2	0	5
Changing lane	3	0	0	0	0	3
Slowing or stopping	1	1	0	0	0	2
Waiting to turn/go ahead	0	1	1	0	0	2
Parked	1	0	0	0	0	1
Total vehicles	**111**	**33**	**27**	**12**	**14**	**197**

For completeness Table 4-30 presents the vehicle manoeuvre by conflict type. The seven manoeuvring conflicts (N7) all involved a reversing vehicle and one pedestrian on the footpath was knocked over by a reversing vehicle.

Table 4-30: Vehicle manoeuvre by conflict type

Vehicle manoeuvre	N1/N2	N3/N5	N4/N6	N7	P3	P2/P5	P8/Q8	Total
Going ahead	122	0	0	0	9	0	3	134
Moving off	22	0	0	0	0	0	1	23
Turning left	0	8	0	0	1	0	1	10
Turning right	0	0	7	0	1	0	1	9
Reversing	0	0	0	7	1	0	0	8
Overtaking	5	0	0	0	0	0	0	5
Changing lane	3	0	0	0	0	0	0	3
Slowing or stopping	1	0	0	0	0	1	0	2
Waiting to turn/go ahead	0	1	0	0	0	0	1	2
Parked	0	0	0	0	0	1	0	1
Total vehicles	**153**	**9**	**7**	**7**	**12**	**2**	**7**	**197**

4.2.6 Drivers' line of vision

The driver's line of vision was known to be affected in 69 collisions and the detail is shown in Table 4-31. The most commonly recorded was 'vehicle's blind spot', recorded for 20 drivers, including 13 HGV drivers. Parked vehicles obscured the vision for 19 drivers and slow moving and other vehicles for 15 drivers.

It was known whether the driver's vision was obscured by an item of clothing such as sunglasses, sun visor, hood, scarf etc. for 169 drivers and of these eight had their vision obscured.

Table 4-31: Driver's line of vision affected by vehicle type

Driver's line of vision affected by:	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
Not affected	63	18	11	5	7	104
Parked vehicle	12	3	0	2	2	19
Slow moving vehicle	4	0	0	0	1	5
Other vehicle	4	3	1	0	2	10
Vehicle blind spot	3	4	13	0	0	20
Dazzling sun	1	0	0	2	1	4
Dirty windscreen	0	0	0	1	0	1
Street furniture	2	2	0	0	1	5
Vegetation	1	0	0	0	0	1
Rain, sleet, snow or fog	3	1	0	0	0	4
Unknown	18	2	2	2	0	24
Total drivers of the vehicles that struck the pedestrian	**111**	**33**	**27**	**12**	**14**	**197**

4.2.7 Drivers' and riders' compliance with the law and Highway Code

The content analysis of the files involved gathering evidence as to whether the driver/rider of the vehicle was compliant with the traffic law and Highway Code. It was found that whilst 107 drivers/riders were compliant with both the law and the Highway Code, 44 drivers/riders were not compliant with the law and 53 were not compliant with the Highway Code at the time of the collision.

Insurance information was known for 144 of the 197 drivers/riders and of these drivers/riders 14 did not have the appropriate insurance. Eight drivers/riders did not have the correct driving licence of which two were driving whilst disqualified and one driver was underage. Four drivers/riders were possibly using a mobile phone and six were known to be impaired by drugs and/or alcohol. The speed of the vehicle was known in 122 cases, and 23 drivers/riders were travelling at a speed greater than the posted speed limit (these collisions are considered in more detail in Section 5.2.7). Twenty-four vehicles failed to stop following the collision (these collisions area analysed in more detail in Section 4.3.5). One vehicle was not in a roadworthy condition and one vehicle was known not to have a valid MOT. One car driver drove through a red light at a pedestrian crossing and one car driver drove through the amber flashing light at a crossing. One car driver was not wearing the appropriate glasses at the time of the collision.

Convictions of the drivers as a result of the collision are discussed in Section 4.3.4.

4.2.8 Contributory factors

A contributory factor in a road collision is a key action and/or failure that, in the reporting officer's opinion led to the collision. Each collision is assigned up to six

contributory factors, and they are based on the researcher's opinion after a detailed examination of the police file. A contributory factor is an indication of why the collision occurred rather than who was to blame. As part of the content analysis the researchers considered the evidence contained in the files and assigned up to six contributory factors to any of the vehicles, drivers, riders or casualties involved, based on the STATS19 system. The contributory factors were considered without referring to those in the file or in ACCSTATS.

The collisions were classified according to the attribution of factors between the pedestrian and vehicle, driver or rider. This suggests whose actions or behaviours contributed to the collision. Although doesn't necessarily imply who was to blame:

- Contributory factors assigned to the pedestrian only;
- Contributory factors assigned to the vehicle or driver/rider only;
- Contributory factors assigned to both the pedestrian and the vehicle or driver/rider.

Thirty-eight percent of collisions had factors attributed to both the pedestrian and the vehicle or driver/rider, 37% of collisions only had factors attributed to the pedestrian and 26% had factors attributed to the vehicle or driver only.

Table 4-32 shows this attribution by pedestrian age group. Although in some cases the number of collisions is small, generally the younger age groups (0-15 and 16-24) had a higher proportion of collisions with pedestrian factors only and a lower proportion with vehicle factors only. This trend was reversed for the oldest age group (60+).

Table 4-32: Number of collisions by attribution of contributory factors by pedestrian age group

Attribution of contributory factors	0-15	16-24	25-29	60+	Total
Pedestrian factors only	8	11	31	22	72
Vehicle or driver/rider factors only	3	3	18	27	51
Both pedestrian and vehicle/driver/rider factors	7	9	25	33	74
Total	**18**	**23**	**74**	**82**	**197**

Table 4-33 shows the attribution of contributory factor by the type of vehicle which struck the pedestrian. HGVs and motorcycles showed a different pattern to the other vehicle types; in these collisions it was less common for only the vehicle/driver/rider to have contributory factors and more common for the pedestrian only to have contributory factors. Collisions involving a bus/coach or cars were more commonly attributed vehicle/driver/rider factors only than the other vehicle types.

Table 4-33: Number of collisions by attribution of contributory factors by vehicle type

Attribution of contributory factors	Motorcycle	Car	Bus/Coach	LGV	HGV	Total
Pedestrian factors only	6	40	11	4	11	72
Vehicle or driver/rider factors only	2	31	11	3	4	51
Both pedestrian and vehicle/driver/rider factors	6	40	11	5	12	74
Total	**14**	**111**	**33**	**12**	**27**	**197**

There are 76 different contributory factors that can be assigned to a collision (see the contributory factor coding guidelines in Appendix B.8). Of these 76 factors, ten are for pedestrians only (factors 801 to 810) and a pedestrian can be coded with up to six factors. Table 4-34 shows the number of pedestrians with each of these factors by pedestrian age group.

Table 4-34: Pedestrian contributory factors attributed by pedestrian age group

Contributory factor		0-15	16-24	25-59	60+	Total
801	Crossing road masked by stationary or parked vehicle	4	2	7	8	21
802	Failed to look properly	14	10	38	34	96
803	Failed to judge vehicle's path or speed	3	6	14	9	32
804	Wrong use of pedestrian crossing facility	3	3	10	13	29
805	Dangerous action in carriageway	1	1	2		4
806	Impaired by alcohol	0	8	29	5	42
807	Impaired by drugs	0	2	6		8
808	Careless, reckless or in a hurry	1	3	4	4	12
809	Pedestrian wearing dark clothing at night	1	1	1	1	4
810	Disability or illness, mental or physical	0	2	2	4	8
Any pedestrian factor		15	30	57	55	147
No pedestrian factors		3	4	17	27	51
Total		**18**	**24**	**74**	**82**	**198**

Across all age groups, the most commonly recorded contributory factor for pedestrians was 'failed to look properly', with 96 pedestrians (49%) being assigned this factor. For children (0-15 age group), the occurrence of this was factor was higher (14 out of 18). 'Impaired by alcohol' was the second most commonly recorded factor for the 25-59 age group, recorded for 39% of pedestrians in this age group. Pedestrians impaired by alcohol are considered in more detail in Section 5.2.8. The second most common factor for the 60+ age group was 'wrong use of pedestrian crossing facility'.

There are 66 contributory factors on the coding guidelines (see Appendix B.8) that can be attributed to vehicles or drivers/riders. Table 4-35 shows the ten contributory factors reported which are most frequently attributed to the vehicle/driver/rider which struck the pedestrian.

Table 4-35: The ten most frequently recorded contributory factors attributed to the vehicle/driver/rider by vehicle type

Contributory factor		Car	Bus/Coach	LGV	HGV	Motorcycle	Total
405	Failed to look properly	23	6	5	3	3	40
306	Exceeding speed limit	20	0	1	1	2	24
710	Vision affected by vehicle blind spot	2	3	1	12	0	18
701	Vision affected by stationary or parked vehicle	7	3	2	0	1	13
602	Careless, reckless or in a hurry	8	2	0	0	0	10
406	Failed to judge other person's path or speed	5	3	1	0	1	10
410	Loss of control	8	2	0	0	0	10
501	Impaired by alcohol	6	1	0	0	0	7
509	Distraction in vehicle	3	3	0	0	0	6
304	Disobeyed pedestrian crossing facility	2	1	0	1	1	5
301	Disobeyed automatic traffic signal	5	0	0	0	0	5
607	Unfamiliar with model of vehicle	3	0	0	1	0	4
309	Vehicle travelling along pavement	4	0	0	0	0	4
Any vehicle/driver/rider factor		8	71	22	8	16	125
No vehicle/driver/rider factors		6	40	11	4	11	72
Total		**111**	**33**	**12**	**27**	**14**	**197**

The most commonly recorded contributory factor for the drivers or riders that struck the pedestrian was 'failed to look properly', followed by 'exceeding the speed limit' and 'vision affected by blind spot' (see Table 4-35). For HGV drivers the most common factor was 'vision obscured by vehicle blind spot' and for car drivers, the second most common factor was 'exceeding speed limit', recorded for 20 out of 111 vehicles.

There were 74 collisions where both the pedestrian and the vehicle or driver/rider were attributed contributory factors. The most common combination was both the pedestrian and the vehicle driver/rider failing to look, recorded in 16 collisions (see Table 4-36).

Table 4-36: The most frequent combinations of pedestrian and vehicle/driver/rider factors

Pedestrian factor		Vehicle/driver/rider factor		Number of collisions
802	Failed to look properly	405	Failed to look properly	16
802	Failed to look properly	701	Vision obscured by stationary or parked vehicles	8
802	Failed to look properly	306	Exceeding speed limit	6
802	Failed to look properly	710	Vision obscured by vehicle blind spot	6
803	Failed to judge vehicle's path or speed	405	Failed to look properly	6
806	Impaired by alcohol	306	Exceeding speed limit	5
806	Impaired by alcohol	405	Failed to look properly	5

4.3 Post-event

This section describes the post-event, namely the injuries of the pedestrian and whether there were any convictions of the other participants involved.

4.3.1 Pedestrian trajectory

Table 4-37 shows the trajectory of the pedestrian following the collision. The most common trajectory was the pedestrian being knocked to the ground and not run over (62). In total 56 pedestrians were run over (36 not thrown and run over, 12 thrown and run over and 8 thrown unknown and run over).

Table 4-37: Pedestrian fatalities by trajectory

Pedestrian trajectory	Total
Knocked to ground - not run over	62
Thrown over top of vehicle	19
Thrown/knocked forwards - then run over	12
Thrown/knocked to side of vehicle	35
Not thrown - run over	36
Throw unknown - run over	8
Throw unknown - not run over	2
Other	4
Unknown	20
Total fatalities	**198**

4.3.2 Impact with other objects

Table 4-38 shows whether the pedestrian impacted any objects following the collision with the vehicle. In 161 collisions the pedestrian did not impact any other object. The most common object was the kerb (9), followed by street furniture (7) and further vehicles (5). Further impacts are likely to be associated with further injuries.

Table 4-38: Impact with other objects

Impact with object	Total
Nothing further	161
Unknown	15
Kerb	8
Street furniture	6
Further vehicle(s)	5
Tree	2
Kerb and street furniture	1
Total fatalities	**198**

4.3.3 The pedestrian's injuries

The majority (115) of the pedestrians died at the scene of the collision, 37 died between one and three days later, 26 died between four and ten days later and 14 died more than ten days later.

The detailed injuries of the pedestrians were coded from the post mortem data in 50 of the files, using the abbreviated injury scale (AIS). The scale uses a scoring system for each body region, where zero is uninjured and six is the maximum. Although all of the pedestrians in this study died as a result of their injuries, scores of three or above are described as 'life threatening'. The injuries that were life-threatening can be used to identify the body regions where the most serious injuries occurred.

Table 4-39 shows the number of pedestrians with 'life-threatening' (AIS>=3) injuries to each body part by age group. Since each pedestrian can have injuries to more than one body part, the individual rows should not be summed.

Table 4-39: Injuries by body regions (with AIS >=3) and pedestrian age group

Body region with life threatening injury	0-15	16-24	25-59	60+	Total
Head	4	3	9	18	34
Thorax	2	3	10	16	31
Abdomen	0	1	0	3	4
Pelvis	0	1	1	3	5
Left lower limb	0	1	0	5	6
Right lower limb	0	0	2	4	6
Left upper limb	0	0	0	1	1
Right upper limb	0	0	0	1	1
Other	0	0	0	0	0
Any life threatening injury	4	4	13	28	49
No life threatening injuries (AIS <3)	0	0	0	1	1
Total	**4**	**4**	**13**	**29**	**50**

Note: 'Any life threatening injury' gives the number of pedestrians that had a life threatening injury to any body regions. This is less than the sum of each column since each fatality can have life threatening injuries to multiple body regions.

Head and thorax injuries were most common, with 34 and 31 fatalities with these life-threatening injuries, respectively. There were 18 fatalities with both head and thorax life-threatening injuries.

Table 4-40 shows the number of pedestrians by combination of life-threatening injuries.

Table 4-40: Number of pedestrians by combination of life-threatening injuries

Injury pattern	Head	Thorax	Abdomen	Pelvis	Limb	Other	Total
Head	13	-	-	-	-	-	13
Head, Limb	2	-	-	-	2	-	2
Head, Abdomen	1	-	1	-	-	-	1
Head, Thorax	12	12	-	-	-	-	12
Head, Thorax, Limb	4	4	-	-	4	-	4
Head, Thorax, Pelvis	1	1	-	1		-	1
Head, Thorax, Abdomen	1	1	1	-	-	-	1
Thorax	-	7	-	-	-	-	7
Thorax, Limb	-	2	-	-	2	-	2
Thorax, Pelvis, Limb	-	2	-	2	2	-	2
Thorax, Abdomen, Pelvis	-	2	2	2	-	-	2
Limb	-	-	-	-	2	-	2
Total	**34**	**31**	**4**	**5**	12	**0**	**49**

Note: This table does not include the pedestrian who was classed as having no life-threatening injuries. This pedestrian was aged 89 and died due to multiple organ failure following surgery for a fractured hip (AIS 2).

The most common injury was head only, accounting for 13 fatalities. There were 12 fatalities with life-threatening injuries to both the head and the thorax (only) and a further six fatalities with head and thorax injuries in addition to other injuries. The majority of limb injuries were in combination with other injuries, although there were two pedestrians with limb injuries alone. There were five fatalities where the cause of death described in the post mortem suggested that the death was due to complications following treatment for their injuries.

The Injury Severity Score (ISS) is based on the AIS coding and is used to assess trauma severity. The score is calculated as the sum of the squares of the highest three AIS scores by body region, except where a body region scores has an AIS of 6, in which case, the ISS is the maximum of 75. The maximum score of 75 (AIS 6 for at least one body region or three AIS 5 scores) is often classed as 'untreatable' or 'unsurvivable'. A score of 15 and above is sometimes used to define 'major trauma'. Table 4-41 shows the injury severity score for the 50 pedestrians by age group.

Table 4-41: Injury Severity Scores by pedestrian age group

Injury Severity Score	0-15	16-24	25-59	60+	Total
4-14	1	0	1	8	10
15-29	3	2	8	10	23
30-50	0	2	3	9	14
75	0	0	1	2	3
Total	**4**	**4**	**13**	**29**	**50**

All but ten of the pedestrian were classed as 'major trauma' (ISS score of at least 15). There were three fatalities (all adults) classed as 'unsurvivable' (ISS score of 75).

4.3.4 Convictions of the drivers of the vehicles that came into contact with the pedestrians

In total 68 of the 197 drivers of the vehicles that struck the pedestrian were convicted of a driving offence as a result of the collision. The majority of the drivers were convicted of one offence (52), 11 drivers were convicted of two offences and five drivers were convicted of three or more offences. Almost half of the car and motorcycle drivers/riders were convicted of a driving offence following the collision compared with just under a fifth of HGV and bus/coach drivers (43% compared to 18%).

Table 4-42 presents the type of convictions the drivers/riders received following the collision. Note the totals do not add to 68 as some drivers received more than one conviction.

Table 4-42: Type of conviction the drivers/riders received by vehicle type

Conviction type	Car/taxi	Bus/coach	HGV	LGV	Motorcycle	Total
Drink driving	4	0	0	0	0	4
Speeding	3	0	0	0	2	5
Careless driving	27	5	4	2	2	40
Dangerous driving	19	1	0	1	2	23
Construction and use	2	0	0	0	0	2
Other motoring offences	13	2	1	0	1	17
Total number of drivers/riders convicted	**48**	**6**	**5**	**3**	**6**	**68**

Note: 'Total number of drivers/riders convicted' gives the number of drivers/riders who were convicted for at least one offence. This is greater than the sum of the individual conviction types since some drivers/riders were convicted of more than one offence.

4.3.5 Vehicles that failed to stop

There were 24 vehicles that struck the pedestrian and failed to stop following the collision. In all cases the vehicle and driver was later traced. .

Table 4-43 shows the vehicles that failed to stop by vehicle type.

Table 4-43: Vehicles which failed to stop following collision

Vehicle type	Total
Bus/Coach	1
Car	19
HGV	4
Total	**24**

The majority of the collisions where a vehicle failed to stop occurred on A-roads (21). The most common period for these collisions was between 6pm and 6am on a Friday, Saturday or Sunday (14 collisions), as shown in Table 5-44.

Table 4-44: Vehicles which failed to stop following collision

Time period	Friday-Sunday	Monday-Thursday	Total
6am-6pm	3	4	7
6pm-6am	14	3	17
Total	**17**	**7**	**24**

Note that each time group includes times up to, but not including the end of the range listed, for example, 6pm is included in the 6pm-6am group.

Table 4-45 shows the convictions of the drivers in hit and run collisions following the collision. In total, 14 drivers were convicted of a driving offence, most commonly 'dangerous driving'. Six of the cars were exceeding the speed limit, although none of these drivers were convicted for a speeding offence.

Table 4-45: Convictions of drivers/riders of vehicles which failed to stop following collision

Conviction following collision	Total
Dangerous driving	8
Careless driving	7
Drink driving	1
Construction and use	1
Speeding	0
Other	6
Any conviction	14
No convictions	10
Total	**24**

Note: 'Any conviction' gives the number of drivers/riders who were convicted for at least one offence. This is greater than the sum of the individual conviction types since some drivers/riders were convicted of more than one offence.

5 Interventions for pedestrian safety

The overall aim of this study is to provide a better understanding of how fatal pedestrian collisions in London occur and could be prevented. Two approaches have been taken to describe the interventions identified:

- **Countermeasures:** A 'top-down' summary of the overall countermeasures for all the collisions investigated by the study (Section 5.1); and
- **In-depth analysis of fatality groups:** A breakdown of the different collision types or groups that were identified as being relatively common for the pedestrian fatalities (Section 5.2).

The 'top-down' approach provides a broad overview of the common countermeasures identified, which by their nature are intrinsically linked to the contributory factors.

Because collisions are complex events, the in-depth analysis of fatality groups provides more contextual descriptions of their characteristics. The groups described **are not** mutually exclusive, and the overlaps are explicitly summarised in Table 5-5.

5.1 Countermeasures

Countermeasures aimed at preventing the collision (primary) and aimed at reducing the severity (secondary) were proposed for 195 of the 197 collisions based on evidence in the fatal files[3]. The amount of evidence in each file varied and so an indication of whether the countermeasure was 'likely, 'probably' or 'maybe' was also given. The interventions have been grouped into three categories; those related to engineering, education (including training and publicity) and enforcement. A list of countermeasures was based on the literature review and expert knowledge before the files were coded and can be found in Appendix C.

Collisions and their outcome are determined by multiple factors. The proposed countermeasures may eliminate one factor but may not always be effective in preventing the collision. The effectiveness of each countermeasure has not been assessed.

In Table 5-1, the countermeasures are grouped by type. That is, if a collision had two countermeasures of the same type (for example, pedestrian education), it is only counted once in Table 5-1. Overall, primary countermeasures were identified more frequently than secondary countermeasures. The most frequent primary countermeasures were educational measures aimed at the pedestrian, followed by vehicle engineering and driver education measures.

[3] For two collisions, no countermeasures could be identified. One of these collisions had an unknown cause and there was not enough evidence to identify a countermeasure (pedestrians fell into road for unknown reasons). The other collision occurred when the pedestrian tried to force entry to HGV and was run over by the HGV.

Table 5-1: Number of collisions with each countermeasure type

Countermeasure type		Number of collisions
Primary	Engineering - environment	46
	Engineering - vehicle	96
	Education - pedestrian	114
	Education - drivers	89
	Enforcement	36
Secondary	Engineering - environment	3
	Engineering - vehicle	7
	Education - drivers	5

Table 5-2 shows the number of collisions by the primary countermeasures in each category and whether they were coded as likely, probably or maybe. The countermeasure types in Table 5-2 sum to greater than the totals given in Table 5-1 because some collisions had multiple countermeasures of the same type.

The most commonly recorded countermeasure was 'improved pedestrian awareness of other road users', recorded for 77 collisions (39% of cases). In order for this countermeasure to be effective, it needs to be targeted at appropriate groups, and the education needs to be effective at improving awareness.

'Improving driver awareness of pedestrians and speed' was recorded in 70 collisions, this reflects the number of vehicles that were speeding, and also additional collisions where although the vehicle was not speeding, a reduced speed may have helped prevent the collision.

The most common vehicle engineering primary countermeasures were automated emergency brake systems. This intervention would either alert the driver to the presence of the pedestrian and may allow more time for avoidance action, or some systems would automatically apply the brakes to reduce the collision speed if the driver failed to do so.

Table 5-2: Number of collisions with each primary countermeasure

Type	Countermeasure description		Likely	Probably	Maybe	Total
Engineering - road	103	Removal of on-street parking	0	6	3	9
	104	Reduce speed limit/20mph zones	0	1	1	2
	105	Provide traffic calming	0	1	4	5
	106	The use of advanced stop signs at pedestrian crossings	0	1	0	1
	108	(Other) improvements to existing pedestrian crossing facilities	1	2	4	7
	109	Provide or re-site pedestrian crossings	1	9	9	19
	110	Provide a central refuge	0	1	2	3
	111	Measures at signal-controlled junctions	0	1	0	1
	112	Improve existing street lighting	0	0	1	1
	113	Install street lighting	0	1	0	1
	114	Introduce guard railings		2	2	4
Engineering - vehicle	121	Improve forward, rear and side vision of the vehicle - mirrors	2	12	7	21
	122	Improve forward, rear and side vision of the vehicle sensors	10	15	3	28
	123	Improve forward, rear and side vision of the vehicle CCTV	1	11	5	17
	124	Automated emergency brake systems	1	15	44	60
	126	Intelligent speed adaptation	1	2	11	14
Education - pedestrian	131	Improved pedestrian awareness of other road users	3	30	44	77
	132	Highlight dangers of crossing road whilst distracted	0	2	2	4
	133	Improved pedestrian conspicuity	0	1	9	10
	134	Highlight dangers of pedestrians impaired by alcohol or drugs	0	9	38	47
Education – drivers/riders	141	Improve driver awareness of pedestrians and speed	1	7	62	70
	142	Work related road safety training	0	1	21	22
	143	Roadworthiness of vehicle	0		5	5
Enforcement	151	Speed enforcement	1	4	23	28
	152	Drinking and driving	3	3		6
	153	Driving/riding without a licence/uninsured	0	0	2	2
	154	General traffic law enforcement	0	1	7	8

Secondary countermeasures that were recorded are shown in Table 5-3. The most commonly recorded secondary countermeasure was 'pop up bonnets and improved bumper design, recorded in 6 collisions; far fewer than many of the primary countermeasures above.

Table 5-3: Secondary countermeasures

Type	Code	Description	Likely	Probably	Maybe	Total
Engineering – road	211	Traffic calming interventions targeted at reducing vehicle speeds	0	2	2	4
Engineering - vehicle	221	Improved side guards on heavy goods vehicles	0	0	1	1
	222	Vehicle design standards	0	0	1	1
	223	Pop up bonnets and improved bumper design	0	0	6	6
Education - drivers	241	Reducing speed	0	1	2	3
	242	Ensuring good road worthiness of vehicle	0	0	2	2

The countermeasures recorded for various groups of fatalities are considered in the next section.

5.2 In-depth analysis of fatality groups

5.2.1 Introduction

This section identifies the interactions between the pedestrian, the vehicle and the environment for subsets of the sample along with the appropriate countermeasures. These subsets were identified by experts as part of the analysis as being common groups, or groups that are of special interest. The subsets overlap and individual collisions may be included in more than one subset. For example an elderly pedestrian having been struck by an HGV will be included in both the 'collisions with HGVs' subset and the 'elderly' subset.

Table 5-4 gives a summary of the collision types considered, the definitions used and the number of pedestrian fatalities in each type.

Table 5-4: Collision types, definitions and number of casualties

Collision subset	Definition	Number of pedestrian fatalities in sample	Details given in section
Collisions with motorcycles	Pedestrian hit by motorcycle	14	5.2.2
Collisions with bus/coach	Pedestrian hit by bus or coach	33	5.2.3
Collisions with HGV	Pedestrian hit by HGV	27	5.2.4
Children	Pedestrians aged less than 16	18	5.2.5
Elderly	Pedestrians aged 80 or over	41	5.2.6
Speeding vehicles	Vehicles which hit a pedestrian which either: had a speeding conviction following the collision, had 'exceeding speed limit' as a contributory factor or were estimated to be travelling above the speed limit.	31	5.2.7
Alcohol-impaired pedestrians	Pedestrians with 'impaired by alcohol'	46	5.2.8
Fail to stop vehicles	vehicles which hit a pedestrian which failed to stop at the scene	24	4.3.5
Pedestrians at crossings	The collision occurred while the pedestrian was using a crossing facility	49	5.2.9.1
Pedestrians near crossings	The collision occurred when the pedestrian was crossing the road within 50m of a pedestrian facility	37	5.2.9.2
Pedestrians on the pavement	The vehicle hit the pedestrian while they were on the footpath	12	5.2.10

Table 5-5 gives the number of pedestrian fatalities by combination of collision type. These are explored in more detail in the sections relating to each collision type.

Table 5-5: Number of pedestrian fatalities by combination of collision type

	Motorcycles	Bus/coach	HGV	Children	Elderly	Speeding	Alcohol	Failed to stop	Pavement	At crossing	Near crossing	Total
Motorcycles	**14**	-	-	0	3	3	3	0	0	6	0	**14**
Bus/coach	-	**33**	-	2	4	0	10	1	3	9	7	**33**
HGV	-	-	**27**	0	10	1	4	4	0	4	11	**27**
Children	0	2	0	**18**	-	2	0	2	1	3	2	**18**
Elderly	3	4	10	-	**41**	2	1	4	2	11	10	**41**
Speeding	3	0	1	2	2	**32**	5	6	3	11	4	**32**
Alcohol	3	10	4	0	1	5	**46**	10	0	6	15	**46**
Failed to stop	0	1	4	2	4	6	10	**24**	1	5	6	**24**
Pavement	0	3	0	1	2	3	0	1	**12**	-	-	**12**
At crossing	6	9	4	3	11	11	6	5	-	**49**	-	**49**
Near crossing	0	7	11	2	10	4	15	6	-	-	**37**	**37**
Total	**14**	**33**	**27**	**18**	**41**	**32**	**46**	**24**	**12**	**49**	**37**	**198**

5.2.2 Collisions with motorcycles

5.2.2.1 Who was involved?

There were 14 collisions involving a motorcycle (14 fatalities), six of the pedestrians were female and eight were male. Almost half of the pedestrians were aged over 70 years but it was unknown if any of the older pedestrians had mobility issues. Three pedestrians were impaired by alcohol (aged between 30-59 years) and none were impaired by drugs.

Table 5-6: The age of the pedestrian fatalities in collisions with motorcycles

Age group	Total	Impaired with alcohol
Under 16	0	0
16-24	1	0
25-29	0	0
30-39	1	1
40-49	2	0
50-59	3	2
60-69	1	0
70+	6	0
Total	**14**	**3**

Thirteen of the motorcycle riders were male and one was female. Table 5-7 shows the age groups of the riders; all were aged over 25 years. Eleven of the riders held a full licence, six of which had held it for more than nine years (one for one year, and four for

an unknown length of time). One rider did not hold a licence because of a previous disqualification and one rider held a provisional licence. None of the riders were impaired by alcohol or drugs. Two riders had previous driving offences and both were breaking the law in this collision also (one riding whilst disqualified and one was exceeding the speed limit).

Table 5-7: The age of the motorcycle riders in collisions with pedestrians

Age group	Total
Under 16	0
16-24	0
25-29	2
30-39	6
40-49	3
50-59	2
60-69	1
70+	0
Total	**14**

5.2.2.2 Where and when?

All the roads where these collisions occurred had a posted speed limit of 30mph; ten collisions occurred on A-roads, one on a B-road, two on C-roads and one on an unclassified road. It was known that in nine of the locations the motorcyclist was not travelling in a bus lane (unknown if there was a bus lane at five locations). Nine of the collisions occurred at a crossroads, T or staggered junction.

All the collisions took place between 6am and 9pm, five of which were in the dark. Wet roads that retain surface water can increase stopping distances or cause instability for motorcycles. However, thirteen of these collisions were in fine weather conditions (one in the rain) and the road surface was most commonly dry. It was wet/damp in one collision. High friction surfacing was present in one location. No oil/diesel spillages, ironworks, potholes or debris were found at these collision locations.

5.2.2.3 What happened – the event

Table 4-23 shows the types of conflicts between the motorcycles and pedestrians. All the motorcycles were going ahead and one was known to be filtering. Two riders were known to be exceeding the speed limit at the time of the collision (one in excess of 50mph in a 30mph speed limit).

Six pedestrians were crossing at a facility (five against the lights) at the time of the collision. One rider was speeding and one rider was dazzled by the low sun.

Eight pedestrians were crossing the road where there was no pedestrian crossing facility to use within 50 metres. One of these pedestrians was reading a newspaper as they crossed the road. Of these eight collisions, the vision of five riders was obscured; 2 by parked cars, 2 by slow moving vehicles and 1 by street furniture.

5.2.2.4 Contributory factors

The actions of the pedestrian contributed to the event in 12 collisions and the actions of the motorcyclist contributed to the event in eight collisions (six collisions had contributory factors assigned to both parties). Table 5-8 gives the details of the contributory factors assigned to the pedestrians and Table 5-9 gives those assigned to the motorcyclists. In both cases 'failed to look properly' was the most frequently assigned factor. Pedestrians also 'failed to judge the motorcyclist's path or speed' (six) and 'crossed the pedestrian facility against the lights' (five), whilst the riders 'exceeding the speed limit' contributed to two collisions.

Table 5-8: Contributory factors assigned to the pedestrian

Contributory factor	Total
Failed to look properly	11
Failed to judge motorcyclist path or speed	6
Wrong use of pedestrian crossing facility	5
Crossing road masked by stationary/parked vehicles	3
Impaired by alcohol	3
Careless, reckless in a hurry	1

Table 5-9: Contributory factors assigned to the motorcyclist

Contributory factor	Total
Failed to look properly	3
Exceeding speed limit	2
Travelling too fast for conditions	1
Poor turn/manoeuvre	1
Vision affected by dazzling sun	1
Vision affected by parked/stationary vehicle	1
Sudden braking	1

Six motorcycle riders were convicted of a driving offence following the collision; two were convicted of careless driving, two for dangerous driving, two for speeding and one for an other motoring offence.

5.2.2.5 Countermeasures

Table 5-10 lists the most frequently recorded countermeasures for pedestrian collisions with a motorcyclist. Education measures may be the most appropriate here for both the pedestrian (11) and the rider (six). Automated emergency brake systems capable of detecting pedestrians may have helped prevent the collision in five cases by providing a warning to the rider seconds before the impact allowing them to reduce the vehicle speed.

Table 5-10: The most frequently recorded countermeasures for pedestrian collisions with a motorcyclist

Counter measure		Likely	Probably	Maybe	Total
131	Improve pedestrian awareness of other road users	1	3	7	11
141	Improve driver awareness of pedestrians and speed	0	0	6	6
124	Automated emergency brake systems	0	1	4	5
134	Highlight the dangers of pedestrians impaired by alcohol or drugs	0	0	3	3
133	Improved pedestrian conspicuity	0	0	2	2
151	General enforcement	0	0	2	2
126	Intelligent speed adaptation	0	1	1	2

5.2.3 Pedestrians involved in collisions with buses/coaches

5.2.3.1 Who was involved?

There were 33 pedestrian fatalities involved in a collision with a bus/coach, 16 were female and 17 were male. One-third of the pedestrians were aged over 60 years (12) and one-third were aged between 30 and 49 years (12). Ten of the pedestrians were impaired by alcohol (and four of these were also impaired with drugs). The majority of impaired pedestrians were aged 30-39 years, shown in Table 5-11.

Table 5-11: Pedestrian fatalities in collisions with buses or coaches

Age group	Total	Impaired with alcohol
Under 16	2	0
16-24	3	1
25-29	2	0
30-39	9	7
40-49	3	2
50-59	2	0
60-69	5	0
70+	7	0
Total	**33**	**10**

Three pedestrians had mobility difficulties; two were using walking sticks and one was on crutches although these were not the pedestrians who stumbled and fell. Four out of the six pedestrians who stumbled and fell were impaired by alcohol.

Five pedestrians were part of a group and 26 were alone (unknown for 2). None of the pedestrians were using mobile phones or headphones, none were reading (e.g. maps/books etc) and none were eating or drinking. Three pedestrians were talking to other pedestrians, two were yelling across the road and four were following other people at the time of the collision.

It was not possible to determine whether the vehicles were buses or coaches because the ACCSTATS uses one category for both buses and coaches and it was unclear in the fatal files. Thirty of the bus drivers were male and three were female. The majority of

drivers were aged 40-49 years. Twenty five drivers were London residents and three were from other UK regions (unknown for five).

Table 5-12: Age of bus driver

Age group	Male	Female	Total
16-24	1	0	1
25-29	1	0	1
30-39	7	1	7
40-49	11	2	13
50-59	5	0	5
60-69	4	0	4
Unknown	1	0	1
Total	**30**	**3**	**33**

The length of time that bus drivers had held their Public Service Vehicle (PSV) licence was known in 19 cases, shown in Table 5-13. All drivers had held them longer than 1 year and 12 drivers had held it longer than 5 years. None of the drivers were impaired by alcohol or drugs. One driver suffered a medical attack at the time of the collision. Four drivers were distracted at the time of the collision: one by a passenger, one by a coughing episode, one driver had a newspaper on the steering wheel, and one where a driver was distracted by people outside the vehicle.

Table 5-13: Length of time bus drivers held their PSV licence

Number of years	Total
1-2 years	4
3-4 years	3
5-10 years	7
Over 10 years	5
Unknown	14
Total	**33**

The types of mirrors fitted to the buses/coaches are shown in Table 5-14. In the majority of cases the mirror configuration was not easily determined from the photographs and evidence contained in the files.

Table 5-14: Mirrors fitted to buses/coaches

Type of mirror	Fitted	Not fitted	Not known	Total
Offside main mirror (class II)	12		21	33
Nearside main mirror (class II)	12		21	33
Offside wide angle mirror (class IV)	1		32	33
Nearside wide angle mirror (class IV)	2		31	33
Close proximity mirror (class V)	1		32	33
Front mirror (class VI)	4		29	33

5.2.3.2 Where and when?

All the collisions, except one, were on 30mph roads, the majority being A-roads. The traffic conditions at the time of the collision were described as being heavy in five cases, light traffic in six and moderate in nine (13 unknown).

Table 5-15: Bus/coach involved pedestrian fatalities by road class and speed limit

Road class	30mph	40mph	Total
A road	25	1	26
B road	1	0	1
C road	3	0	3
Unclassified	3	0	3
Total	**32**	**1**	**33**

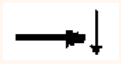
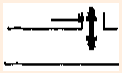
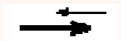
Twelve of the collisions were in the evening or at night (between 7pm-5am) and there were no clear differences between the days of the week. Eighteen were in the daylight and 14 in darkness. Thirty-two of these collisions occurred in fine weather and one occurred in the rain. Twenty-three of the collisions occurred at junctions. There was no pedestrian crossing facility at 14 of the locations.

Around one-third of the collisions involving a bus/coach were within 20 metres of a bus stop (ten fatalities). Of these it was thought that four pedestrians were intending to catch the bus (two were observed by witnesses to be running across the road in an attempt to catch the bus).

5.2.3.3 What happened?

Table 5-16 presents the type of collisions the buses/coaches and pedestrians were involved in. The majority of conflicts involved the bus/coach travelling ahead with the pedestrian crossing the road (21 fatalities). Of these eight were at a pedestrian crossing (six were crossing against the lights), six were crossing within 50m of a pedestrian crossing and six were crossing where no crossing facilities were present. There were three fatalities where the pedestrian was on the footpath and the bus driver lost control of their vehicle, mounted the footpath and struck the pedestrian. In these collisions, the loss of control was caused by the bus drivers coughing, suffering a medical episode and possibly reading a newspaper while driving.

Table 5-16: Collision types by pedestrian manoeuvre

	Conflict		In carriageway:						Total
			At pedestrian crossing	Within 50m of pedestrian crossing	Crossing elsewhere	On central island	On footway	Other/unknown	
	N1	Bus/coach going ahead, pedestrian crossing left side	6	4	5	0	0	1	16
	N2	Bus/coach going ahead, pedestrian crossing right side	2	2	1	0	0	0	5
	N3	Bus/coach left turn, pedestrian crossing left side	0	1	3	0	0	1	5
	P3	Walking on footpath	0	0	0	0	3	0	3
	N4	Bus/coach right turn, pedestrian crossing right side	0	0	0	1	0	0	1
	N6	Bus/coach right turn, pedestrian crossing left side	1	0	0	0	0	0	1
	P2	Walking facing traffic	0	0	1	0	0	0	1
	Q8	Miscellaneous other	0	0	0	0	0	1	1
Total			**9**	**7**	**10**	**1**	**3**	**3**	**33**

The bus/coach drivers' line of vision was affected in 13 of the 33 collisions, as shown in Table 5-17, most commonly by a vehicle blind spot, parked or other vehicle.

Table 5-17: Bus/coach driver's line of vision affected prior to the collision

Driver vision affected by:	Total drivers
Vehicle blind spot	4
Parked vehicle	3
Other vehicle	3
Street furniture	2
Rain, sleet, snow or fog	1
Driver vision not affected	18
Unknown	2
Total drivers	**33**

It was of interest to know how many pedestrians were involved in collisions after getting off a bus/coach. It was known that three pedestrians had collisions attempting to cross

the road within five metres of the bus stop and had just alighted from the bus. Two collisions were with cars and one was with an HGV. Two of the pedestrians were aged over 70 years and one was aged 16 on his/her way to school. None of them were crossing at a pedestrian crossing.

5.2.3.4 Contributory factors

Contributory factors were assigned to the pedestrian in 11 of the 33 collisions, to both the pedestrian and bus/coach driver in 11 collisions and to the other driver in 11 collisions. The most common contributory factors assigned to the pedestrians were:

- 'Failed to look properly' (16 pedestrians)
- 'Impaired by alcohol' (10 pedestrians)
- 'Failed to judge vehicle's path or speed' (6 pedestrians)

The most common factors assigned to the bus/coach drivers were:

- 'Failed to look properly' (6 drivers)
- 'Vehicle blind spot' (3 drivers)
- 'Stationary or parked vehicle' (3 drivers)
- 'Distraction in vehicle' (3 drivers)
- 'Failed to judge vehicle's path or speed' (3 drivers)

The bus driver was convicted of a driving offence following the collision in six collisions: five bus/coach drivers were convicted of careless driving and one convicted of dangerous driving (two of these drivers were also convicted of other motoring offences).

5.2.3.5 Countermeasures

Table 5-18 presents the countermeasures for collisions involving pedestrians and buses and coaches. The most frequently recorded countermeasures are education based, namely improving pedestrians' awareness of buses/coaches (12), highlight the dangers of pedestrians impaired by alcohol (10) and improving the work related training for bus drivers (12) in particular in around a third of the collisions the drivers' line of vision was affected.

Table 5-18: The most frequently recorded countermeasures for collisions involving buses/coaches

Counter measure		Likely	Probably	Maybe	Total
142	Work related road safety training for bus drivers	0	11	1	12
131	Improve pedestrian awareness of other road users	0	5	7	12
134	Highlight the dangers of pedestrians impaired by alcohol or drugs	0	7	3	10
124	Automated emergency brake systems	0	7	2	9
122	Improve forward, rear and side vision for large vehicles – CCTV	1	1	4	6
141	Improve driver awareness of pedestrians and speed	0	4	2	6
108	Improvements to existing pedestrian crossing facilities	1	2	1	4
121	Improve forward, rear and side vision for large vehicles – mirrors	1	3		4
123	Improve forward, rear and side vision for large vehicles – sensors	1	1	1	3

5.2.4 Collisions with HGVs

5.2.4.1 Who was involved?

There were 27 pedestrians killed in collisions with HGVs. Fifteen were male and 12 were female and almost two-thirds were aged over 60 years old (17).

Table 5-19: Ages of pedestrian fatalities in collisions with HGVs

Age group	Male	Female	Total
Under 16	0	0	0
16-24	1	2	3
25-29	0	1	1
30-39	1	0	1
40-49	2	2	4
50-59	1	0	1
60-69	1	3	4
70+	6	7	13
Total	**12**	**15**	**27**

Four of the pedestrians were impaired by alcohol (one also with drugs), two pedestrians were using walking aids, one had impaired hearing and one had poor eyesight and was fatigued. Five pedestrians had a disability/illness that contributed to the collision.

All the HGV drivers were male most commonly aged between 30-39 years (Table 5-20). All were driving as part of their job and all held a full driving licence. None of the drivers were impaired by alcohol or drugs but three were distracted. All drivers were compliant with the law except one who was speeding. One driver had a criminal record and two drivers had previous driving offences.

Table 5-20: Ages of HGV drivers

Age group	Total
16-24	0
25-29	3
30-39	11
40-49	5
50-59	5
60-69	2
Unknown	1
Total	**27**

Six of the HGVs were construction type vehicles. The types of mirrors fitted to HGVs are shown in Table 5-21. Two HGVs did not have the front mirror fitted and one did not have a nearside wide angle mirror.

Table 5-21: Mirrors fitted to HGVs

Type of mirror	Fitted	Not fitted	Not known	Total
Offside main mirror (class II)	15	-	12	27
Nearside main mirror (class II)	16	-	11	27
Offside wide angle mirror (class IV)	8	-	19	27
Nearside wide angle mirror (class IV)	15	1	11	27
Close proximity mirror (class V)	14	-	13	27
Front mirror (class VI)	8	2	17	27

5.2.4.2 Where and when?

The majority of the collisions involving pedestrians and HGVs were on A roads in a 30mph posted speed limit. The traffic conditions were described as heavy in 12 collisions, moderate in seven and light in four. None of the collisions involving HGVs were at a road works or construction site.

Table 5-22: HGV pedestrian fatalities by road class and speed limit

Road class	30mph	50mph	Total
A road	22	2	24
B road	2	0	2
Unclassified	1	0	1
Total	**25**	**2**	**27**

The majority of the collisions were during the day; nine were between 6am-noon and 13 were between noon-6pm. It follows that 22 were in the daylight and only four in the dark, and one at dawn. Twenty-six were in fine weather conditions and one in the rain. Pedestrian flow conditions were described as heavy in four locations.

5.2.4.3 What happened – the event

The previous Table 4-23 shows the types of collisions involving pedestrians and HGVs. The majority were N1/N2 conflicts (24), two involved the HGV turning left and one pedestrian had stumbled into the carriageway possibly suffering from a medical condition (conflict P7).

Table 5-23 shows the manoeuvre the HGV was making at the time of the collision and in more than half of the collisions the HGV was moving-off from a stationary position when they made contact with the pedestrians (15). This type of collision involved the HGV being stationary in traffic either at ATS junctions or in heavy traffic conditions. Generally, the pedestrian was in the blind spot of the HGV when it pulled away.

Almost all the pedestrians were crossing the carriageway at the time of the collision (26). When the pedestrian was crossing the carriageway using the designated crossing they all crossed during the green man phase (4). 11 pedestrians were crossing within 50m of a facility and 11 pedestrians were crossing the road where no facility was present.

Table 5-23: HGV manoeuvre by pedestrian manoeuvre

Pedestrian Manoeuvre	HGV Going ahead	HGV Moving off	HGV Turning left	Total
In carriageway - crossing on pedestrian facility	1	3	0	4
In carriageway - crossing elsewhere within 50m of crossing	4	6	1	11
In carriageway - crossing elsewhere	5	5	1	11
In carriageway - standing or playing (not crossing)	0	1	0	1
Total	**10**	**15**	**2**	**27**

5.2.4.4 Contributory factors

Contributory factors were assigned to the pedestrian in 23 collisions and to the HGV driver in 16 collisions (in 12 collisions both were likely to be at fault). Table 5-24 show the factors assigned to the pedestrian and Table 5-25 presents those assigned to the HGV driver. The most common factor for pedestrians was 'failed to look' in nine collisions while the HGV blind spot was a contributory factor in 12 collisions.

Table 5-24: Contributory factors assigned to the pedestrian

Contributory factor	Total
Failed to look properly	9
Wrong use of pedestrian crossing facility	6
Disability/illness	5
Impaired by alcohol	4
Failed to judge vehicle's path or speed	4
Road masked by stationary/parked vehicles	3

Table 5-25: Contributory factors assigned to the HGV driver

Contributory factor	Total
Vehicle blind spot	12
Failed to look properly	3
Exceeding speed limit	1
Poor turn/manoeuvre	1
Unfamiliar with model of vehicle	1
Defective or missing mirrors	1

5.2.4.5 Countermeasures

Table 5-26 lists the most frequently recorded countermeasures for pedestrian collisions with HGVs.

Engineering measures may be the most appropriate here by improving the forward and side vision for HGVs using CCTV (17), mirrors (14) and sensors (12). When an HGV is in stationary traffic and a pedestrian attempts to cross the road very close to the front of the HGV, the driver is sometimes completely unable to see them due to the height at which the driver sits in the vehicle reduces the line of vision close to the vehicle. Hence when the traffic clears or the lights turn green the driver pulls away, unable to see the pedestrian crossing in front of the vehicle and consequently hits the pedestrian. If the forward vision was improved to enable the driver to see the pedestrian it is almost certain the collision would not have happened. These improvements in combination with educating the pedestrian about the dangers of crossing the road directly in front of an HGV may have avoided the majority of HGV collisions.

Table 5-26: The most frequently recorded countermeasures for collisions involving HGVs

Counter measure	Name	Likely	Probably	Maybe	Total
122	Improve forward, rear and side vision for large vehicles – CCTV	9	6	2	17
121	Improve forward, rear and side vision for large vehicles – mirrors	1	10	3	14
131	Improve pedestrian awareness of HGVs	0	7	6	13
123	Improve forward, rear and side vision for large vehicles – sensors	0	9	3	12
142	Work related road safety training for bus drivers	0	0	7	7
134	Highlight the dangers of pedestrians impaired by alcohol or drugs	0	0	4	4
124	Automated emergency brake systems	0	2	1	3
141	Improve driver awareness of pedestrians and speed	0	0	2	2
108	Improvements to existing pedestrian crossing facilities	0	0	1	1
106	The use of advanced stop signs at pedestrian crossings	0	1	0	1
109	Provide or re-site pedestrian crossing	0	1	0	1
221	Improve side-guards on HGV	0	0	1	1

5.2.5 Children

There were 18 child pedestrians killed in the sample of files. This represents 9% of pedestrian fatalities. Eight of the pedestrians were aged 12 to 15 and five were aged less than five. All of the collisions involved a single fatality.

5.2.5.1 When and where

Eight of the child pedestrian fatalities occurred on an A-road, six of which were aged 12-15, as shown in the table below. The younger age groups were more commonly in collisions on unclassified roads. Twelve of the children were in collisions in outer London, and six in inner London.

Table 5-27: Child pedestrian fatalities by age group and road class

1st road class (ACCSTATS)	0-4	5-7	8-11	12-15	Total
A road	0	1	1	6	8
B road	1	0	0	0	1
C road	0	0	0	2	2
Unclassified	4	2	1	0	7
Total	**5**	**3**	**2**	**8**	**18**

Table 5-28 and Table 5-29 show the number of child pedestrian fatalities in each age group by day of the week and time period of the collision. The number of child fatalities

on each day was small, although there was a slightly higher number of children, especially older children in collisions on a Friday or Saturday. The most common time for collisions was between 4pm and 8pm, which coincides with after school activities.

Table 5-28: Child pedestrian fatalities by age group and day of week

Weekday	0-4	5-7	8-11	12-15	Total
Monday	1	1	0	0	2
Tuesday	0	0	0	0	0
Wednesday	1	0	0	1	2
Thursday	2	1	0	1	4
Friday	1	0	2	3	6
Saturday	0	1	0	3	4
Sunday	0	0	0	0	0
Total	**5**	**3**	**2**	**8**	**18**

Table 5-29: Child pedestrian fatalities by age group and time period

Time period	0-4	5-7	8-11	12-15	Total
midnight-4am	0	0	0	0	0
4am-8am	0	0	0	0	0
8am-noon	1	0	1	1	3
noon-4pm	2	1	0	1	4
4pm-8pm	1	2	1	5	9
8pm-midnight	1	0	0	1	2
Total	**5**	**3**	**2**	**8**	**18**

Note that each time group includes times up to, but not including the end of the range listed, for example, 4am is included in the 4am-8am group.

5.2.5.2 Child pedestrian

11 of the child pedestrians were male and 7 were female. Table 5-30 shows the accompaniment of the child pedestrians. Generally the younger age groups were accompanied by a parent or guardian, whilst the older ages were more commonly alone or part of a group.

Table 5-30: Child pedestrian fatalities by age group and accompaniment

Pedestrian accompaniment	0-4	5-7	8-11	12-15	Total
Child with parent/guardian	5	1	1	0	7
Part of group	0	2	1	3	6
Alone	0	0	0	5	5
Total	**5**	**3**	**2**	**8**	**18**

Table 5-31 shows the child travel mode. The pedestrians in the youngest age group included 2 in a pushchair or pram.

Table 5-31: Child pedestrian fatalities by age group and child travel mode

Travel mode (if child <11)	0-4	5-7	8-11	12-15	Total
Holding adult hand	1	0	0	0	1
In close proximity to adult	1	0	1	0	2
In pushchair/pram	2	0	0	0	2
Other	1	2	0	1	4
Not applicable	0	1	1	7	9
Total	**5**	**3**	**2**	**8**	**18**

The action or distraction of the child pedestrian was recorded where known, and the results shown in the table below. None of the children were reported to be using a mobile phone or headphones. Two pedestrians were talking with other pedestrians and three were following other pedestrians. Three children were reported as 'playing'.

Table 5-32: Child pedestrian fatalities by age group and action/distraction

Action or distraction	0-4	5-7	8-11	12-15	Total
Walking dog	0	0	0	0	0
Eating & drinking	0	0	0	0	0
Reading	0	0	0	0	0
Mobile to ear	0	0	0	0	0
Headphones	0	0	0	0	0
Other interaction with mobile	0	0	0	0	0
Talking to other pedestrians	0	1	0	1	2
Yelling across road	0	1	0	0	1
Following other pedestrians	0	1	1	1	3
Playing	0	1	0	2	3
Total child pedestrians	**5**	**3**	**2**	**8**	**18**

13 of the children were crossing the road, most commonly away from a pedestrian facility (8). Half of this latter group (4) were aged 12-15, all of whom were on A-roads.

Table 5-33 shows the speed of the pedestrian. The speed of nine of the children was recorded as running, including seven of the eight children aged 12 to 15 years.

Table 5-33: Child pedestrian fatalities by age group and action/distraction

Pedestrian speed	0-4	5-7	8-11	12-15	Total
Running	0	2	0	7	9
Walking	2	1	0	0	3
Stationary	1	0	0	0	1
Unknown	2	0	2	1	5
Total	**5**	**3**	**2**	**8**	**18**

Two children were on the footway or verge (see Section 5.2.10 for more details regarding pedestrians injured on the footway). Thirteen of the children were crossing the road and 2 were in the carriageway, standing or playing. One pedestrian was recorded as having accidentally stumbled/fell.

Table 5-34: Child pedestrian fatalities by pedestrian manoeuvre

Pedestrian Manoeuvre	0-4	5-7	8-11	12-15	Total
In carriageway - crossing elsewhere	2	1	1	4	8
In carriageway - crossing on pedestrian facility	0	1	1	1	3
In carriageway - crossing elsewhere within 50m of crossing	0	0	0	2	2
In carriageway - standing or playing (not crossing)	0	1	0	1	2
On footway or verge	2	0	0	0	2
Unknown or other	1	0	0	0	1
Total	**5**	**3**	**2**	**8**	**18**

5.2.5.3 Vehicle/driver

The majority of child pedestrians were struck by a car (15), two were struck by a bus or coach and one (a child aged less than five) was struck by an LGV.

Table 5-35: Vehicles which struck child pedestrians by pedestrian age group and vehicle type

Vehicle Type	0-4	5-7	8-11	12-15	Total
Car	4	2	2	7	15
Bus/Coach	0	1	0	1	2
LGV	1	0	0	0	1
Total	**5**	**3**	**2**	**8**	**18**

All of the vehicles were 'going ahead other' except for three vehicles (see Table 6-36), which were all cars.

Table 5-36: Vehicles which struck child pedestrians by pedestrian age group and vehicle manoeuvre

Vehicle Manoeuvres	0-4	5-7	8-11	12-15	Total
05 Moving Off	1	0	0	0	1
07 Turning Left	1	0	0	0	1
14 Overtake Stat Veh O/S	0	0	0	1	1
18 Going Ahead Other	3	3	2	7	15
Total	**5**	**3**	**2**	**8**	**18**

Two of the vehicles failed to stop at the scene, and two were travelling over the speed limit.

5.2.5.4 What happened

The majority of the conflicts involved the pedestrian crossing the road and the vehicle going ahead straight (conflicts N1 or N2). All the children aged over five were recorded with these conflicts. The younger age group were involved in conflicts which involved the vehicle turning or on the footpath.

Table 5-37: Vehicles which struck child pedestrians by pedestrian age group and vehicle manoeuvre

Conflicts		0-4	5-7	8-11	12-15	Total
N1	Vehicle going ahead, pedestrian left side	1	1	1	2	5
N2	Vehicle going ahead, pedestrian right side	1	2	1	6	10
N4	Vehicle right turn, pedestrian right side	1	0	0	0	1
P3	Walking on footpath	1	0	0	0	1
Q8	Other	1	0	0	0	1
Total		**5**	**3**	**2**	**8**	**18**

5.2.5.5 Contributory factors

In nine of the child pedestrian collisions only the pedestrian was assigned contributory factors. In six collisions both the pedestrian and striking vehicle/driver/rider were assigned factors and in three collisions only the vehicle was assigned factors. These latter three collisions all involved a pedestrian aged less than five.

Table 5-38: Contributory factor types assigned to child pedestrians

Type	0-4	5-7	8-11	12-15	Total
Pedestrian factors only	1	3	1	4	9
Vehicle/driver/rider factors only	3	0	0	0	3
Both pedestrian and vehicle/driver/rider factors	1	0	1	4	6
Total	**5**	**3**	**2**	**8**	**18**

Table 5-37 shows the number of child pedestrians with each of the pedestrian contributory factors. The most commonly recorded contributory factor for the child pedestrians was 'failed to look properly', recorded for 13 of the collisions. 'Crossing road masked by stationary or parked vehicles' was recorded in four collisions.

In both cases where a child aged less than five was assigned a contributory factor, the factor assigned was 'pedestrian failed to look properly'. Both cases involved a very young child (ages one and two) running into the road, in one case having broken away from their accompaniment. These young children may not have known that they should have looked, and the dangers of not doing so.

Table 5-39: Pedestrian contributory factors for child pedestrians

Contributory factor		0-4	5-7	8-11	12-15	Total
801	Crossing road masked by stationary or parked vehicles	0	1	1	2	4
802	Failed to look properly	2	2	2	7	13
803	Failed to judge vehicle's path or speed	0	1	0	2	3
804	Wrong use of pedestrian crossing facility	0	0	0	2	2
805	Dangerous action in carriageway	0	0	0	1	1
806	Impaired by alcohol	0	0	0	0	0
807	Impaired by drugs	0	0	0	0	0
808	Careless, reckless in a hurry	0	0	1	0	1
809	Pedestrian wearing dark clothing at night	0	0	0	1	1
Pedestrians with any pedestrian factor		2	3	2	8	15
Pedestrians with no pedestrian factor		3	0	0	0	3
Total child pedestrians		**5**	**3**	**2**	**8**	**18**

Table 5-39 shows the contributory factors assigned to vehicles, drivers or riders in collisions with child pedestrians. The most commonly recorded factor was 'vision affected by stationary or parked vehicles, recorded in three cases.

Table 5-40: Vehicle, driver and rider contributory factors in collisions with child pedestrians

Factor Code		Bus/Coach	Car	LGV	Total
701	Vision affected by stationary or parked vehicles	0	2	1	3
607	Unfamiliar with model of vehicle	0	2	0	2
410	Loss of control	0	2	0	2
405	Failed to look properly	1		0	1
306	Exceeding speed limit	0	1	0	1
709	Vision affected by visor or windscreen dirty or scratched	0		1	1
707	Vision affected by rain, sleet, snow or fog	0	1	0	1
710	Vision affected by vehicle blind spot	0	0	1	1
502	Impaired by drugs	0	1	0	1
203	Defective brakes	0	1	0	1
501	Impaired by alcohol	0	1	0	1

5.2.5.6 Countermeasures

The countermeasures recorded for the child pedestrian collisions are shown in Table 5-41. The most commonly recorded were 'improved pedestrian awareness of other road users' (10) and 'automated emergency brake systems'.

Table 5-41: Countermeasures for collisions involving children

Countermeasure		Maybe	Probably	Total
103	Removal of on-street parking	0	3	3
104	Reduce speed limit/20mph zones	0	1	1
105	Provide traffic calming	2	1	3
109	Provide or re-site pedestrian crossings	2	1	3
114	Introduce guard railings	1	0	1
124	Automated emergency brake systems	7	1	8
126	Intelligent speed adaptation	1	0	1
131	Improved pedestrian awareness of other road users	7	3	10
133	Improved pedestrian conspicuity	2	0	2
141	Improve driver awareness of pedestrians and speed	3	1	4
143	Roadworthiness of vehicle	1	0	1
151	Speed enforcement	1	0	1
152	Drinking and driving	0	1	1
153	Driving/riding without a licence/uninsured	1	0	1
154	General traffic law enforcement	2	0	2
223	Pop up bonnets and improved bumper design	3	0	3

5.2.6 Elderly

There were 41 pedestrians that were aged 80 or older. This group may have mobility difficulties which have an effect on their risk on the road. When involved in a collision this group are very vulnerable and may have higher injury severities or complications following the injuries. All of the collisions involved a single fatality.

5.2.6.1 Pedestrians

Table 5-42 shows the distribution of elderly pedestrians by age and sex. There were more females than males and more pedestrians aged less than 90 in the sample. This is likely to reflect the population and travel patterns of these age groups.

Table 5-42: Elderly pedestrians by pedestrian age group and sex

Age group	Female	Male	Total
80-84	8	6	14
85-89	10	8	18
90-94	5	1	6
95-99	1	1	2
100+	1	0	1
Total	**25**	**16**	**41**

The majority of the elderly pedestrians were alone (37). Three were part of a group and one was unknown. Two of the pedestrians were recorded as having accidentally stumbled or fell.

Table 5-43 shows the pedestrian manoeuvres for the elderly pedestrians by road class. 27 of the pedestrians were crossing the road, of which 16 were away from a pedestrian facility. These latter 16 were most commonly on an A-road.

Table 5-43: Elderly pedestrians by pedestrian manoeuvre and road class

Pedestrian Manoeuvre	A road	B road	C road	Unclassified	Total
In carriageway - crossing elsewhere	10	1	3	2	16
In carriageway - crossing on pedestrian facility	10	0	1	0	11
In carriageway - crossing elsewhere within 50m of crossing	8	2	0	0	10
On footway or verge	2	0	0	0	2
Unknown or other		0	0	2	2
Total	**30**	**3**	**4**	**4**	**41**

Table 5-44 shows the mobility of the elderly pedestrians and Table 5-45 shows the number of pedestrians with impairments.

There were ten pedestrians who used a walking frame or walking stick. Five of these were crossing an A-road within 50 metres from a crossing, but not at the crossing itself.

Table 5-44: Elderly pedestrians by pedestrian mobility

Mobility	Total
Walking frame	2
Walking stick	8
None	21
Unknown	10
Total	**41**

A small number of the pedestrians were impaired, most commonly with hearing problems (three). There were also two pedestrians with uncorrected or defective eye sight.

Table 5-45: Elderly pedestrians by pedestrian impairment

Impairment	Total
Alcohol	1
Drugs	0
fatigue	0
Uncorrected, defective eyesight	2
Hearing issues	3
Other relevant illness or disability	2
Total elderly pedestrians	**41**

5.2.6.2 Collision circumstances

Table 5-46 shows the elderly pedestrians by the road class and junction detail of the collision. Two-thirds of the casualties occurred at or within 20 metres of a junction.

Table 5-46: Elderly pedestrians by road class and junction detail

Junction detail	A roads	B roads	C roads	Unclassified	Total
T or staggered junction	15	2	1	1	19
Not at or within 20m of junction	9	1	2	2	14
Crossroads	5	0	0	0	5
Multiple junction	1	0	0	0	1
Private drive or entrance	0	0	0	1	1
Roundabout	0	0	1	0	1
Total	**30**	**3**	**4**	**4**	**41**

Table 5-47 shows the number of elderly pedestrian fatalities by day of week and time of day. The casualties were spread throughout the week, with the majority of casualties occurring between 8am and 8pm.

Table 5-47: Elderly pedestrians by day of week and time period

Time period	Sun	Mon	Tue	Wed	Thur	Fri	Sat	Total
00-04	0	0	0	0	0	0	0	0
04-08	0	0	0	0	0	0	1	1
08-12	1	3	3	3	2	2	2	16
12-16	2	0	2	1	2	3	2	12
16-20	1	3	2	2	2	1	1	12
20-00	0	0	0	0	0	0	0	0
Total	**4**	**6**	**7**	**6**	**6**	**6**	**6**	**41**

Note that each time group includes times up to, but not including the end of the range listed, for example, 4am is included in the 04-08 group.

5.2.6.3 Vehicles

There were 41 vehicles which struck the 41 elderly pedestrians. These were most commonly cars (as shown in Table 5-48), although there were also ten HGVs.

Table 5-48: Vehicles which struck elderly pedestrians

Vehicle type	Total
Car	19
HGV	10
LGV	5
Bus/Coach	4
PTW	3
Total	**41**

Over half of the vehicles were 'going ahead other' (Table 5-49). Five of the car collisions and one LGV collision involved the vehicle reversing, and four of the 1ten HGV collisions involved the HGV moving off.

Table 5-49: Vehicle manoeuvres of vehicles in collisions with elderly pedestrians

Vehicle Manoeuvre	Bus/Coach	PTW	Car	LGV	HGV	Total
Going Ahead Other	2	3	11	3	3	22
Reversing	0	0	5	1	0	6
Moving Off	0	0	0	0	4	4
Turning Left	1	0	2	0	1	4
Turning Right	1	0	0	0	1	2
Going Ahead Held Up	0	0	0	0	1	1
Overtake Stat Veh O/S	0	0	0	1	0	1
Going Ahead Left Bend	0	0	1	0	0	1
Total	**4**	**3**	**19**	**5**	**10**	**41**

Two cars and two HGVs failed to stop at the collision (although in both cases the HGV drivers did not realise they had been involved in a collision as these collisions occurred when the HGV was 'moving off' and 'going ahead, but held up' with the pedestrian crossing in the HGV's blind spot directly in front of the vehicle). Two of the vehicles (one car and one HGV) were speeding.

5.2.6.4 What happened

Table 5-50 shows the conflicts for the elderly pedestrians by vehicle type. Collisions involving the pedestrian crossing the road with the vehicle travelling straight ahead were the most common (N1 and N2, 16 and 11 collisions respectively). There were six conflicts which involved the vehicle manoeuvring (N7); in all cases the vehicle was reversing.

Table 5-50: Conflicts of collisions involving an elderly pedestrian by vehicle type

Conflict		Motorcycle	Car	Bus/Coach	LGV	HGV	Total
N1	Vehicle going ahead, pedestrian left side	0	5	1	3	7	16
N2	Vehicle going ahead, pedestrian right side	3	7	0	1	0	11
N3	Vehicle left turn, pedestrian left side	0	1	1	0	2	4
N6	Vehicle right turn, pedestrian left side	0	0	1	0	0	1
N7	Manoeuvring vehicle	0	5	0	1	0	6
P3	Walking on footpath	0	1	1	0	0	2
Q8	Other	0	0	0	0	1	1
Total		**3**	**19**	**4**	**5**	**10**	**41**

The number of days between the collision and the pedestrian's death is shown in the table below. Eighteen pedestrians died on the day of collision and a further eight within the first week. There was one case where the pedestrian died 30 days after the collision. Any casualty who dies as a result of the collision beyond 30 days is classed as a seriously injured casualty rather than a fatality in the national accident reporting system (STATS19).

Table 5-51: Elderly pedestrians by days to die

Days to die	Total
Died on day of collision	18
1-6	8
7-13	6
14-20	3
21-30	3
unknown	3
Total	**41**

5.2.6.5 Contributory factors

In the 41 collisions involving an elderly pedestrian, 17 had both pedestrian and vehicle/driver/rider contributory factors, 14 had vehicle only and 10 had pedestrian only.

Table 5-52: Elderly pedestrians by contributory factors assigned

Type	Bus/Coach	Car	HGV	LGV	Motorcycle	Total
Pedestrian contributory factors only	1	4	4	0	1	10
Vehicle/driver/rider contributory factors only	2	7	2	2	1	14
Both pedestrian and vehicle/driver/rider contributory factors	1	8	4	3	1	17
Total	**4**	**19**	**10**	**5**	**3**	**41**

Where there was a contributory factor assigned to the pedestrian, the most common was 'failed to look properly', recorded for 15 pedestrians. There were three pedestrians with the contributory factor 'wrong use of pedestrian crossing facility' who were struck by an HGV.

Table 5-53: Pedestrian contributory factors for elderly pedestrians

Factor Code		Bus/Coach	Car	HGV	LGV	Motorcycle	Total
801	Crossing road masked by stationary or parked vehicle	1	0	2	1	1	5
802	Failed to look properly	1	10	1	1	2	15
803	Failed to judge vehicle's path or speed	0	1	1	2	1	5
804	Wrong use of pedestrian crossing facility	1	1	3	0	0	5
805	Dangerous action in carriageway	0	0	0	0	0	0
806	Impaired by alcohol	0	1	0	0	0	1
807	Impaired by drugs	0	0	0	0	0	0
808	Careless, reckless or in a hurry	0	1	0	0	1	2
809	Pedestrian wearing dark clothing at night	0	0	0	0	0	0
810	Disability or illness, mental or physical	0	0	3	0	0	3
Any pedestrian factor		2	12	8	3	2	27
No pedestrian factor		2	7	2	2	1	14
All pedestrians		**4**	**19**	**10**	**5**	**3**	**41**

The most common factor for vehicles/drivers/riders was 'failed to look properly', recorded in 19 collisions. 'Vision obscured by vehicle blind spot' was the second most common, recorded in four collisions.

Table 5-54: Top 8 vehicle/driver/rider contributory factors for vehicles which struck elderly pedestrians

Factor		Bus/Coach	Car	HGV	LGV	Motorcycle	Total
405	Failed to look properly	2	10	3	4	0	19
710	Vision affected by vehicle blind spot	1	1	2	0	0	4
701	Vision affected by stationary or parked vehicles	0	2	0	1	0	3
403	Poor turn or manoeuvre	0	1	1	0	0	2
706	Vision affected by dazzling sun	0	0	0	1	1	2
306	Exceeding speed limit	0	1	1	0	0	2
406	Failed to judge other person's path or speed	1	1	0	0	0	2
410	Loss of control	0	2	0	0	0	2
Any vehicle/driver/rider factor		3	15	6	5	2	31
No vehicle/driver/rider factor		1	4	4	0	1	10
Total Vehicles		**4**	**19**	**10**	**5**	**3**	**41**

5.2.6.6 Countermeasures

The most commonly recorded countermeasure was 'improved awareness of other road users', recorded in 19 cases. 'Improving driver awareness of pedestrians and speed', 'automated braking systems' and 'improve forward, rear and side vision of the vehicle using sensors' were also commonly recorded.

Table 5-55: Countermeasures for collisions involving elderly pedestrians

Countermeasure		Likely	Probably	Maybe	Total
103	Removal of on-street parking	0	1	0	1
104	Reduce speed limit/20mph zones	0	0	1	1
106	The use of advanced stop signs at pedestrian crossings	0	1	0	1
108	(Other) improvements to existing pedestrian crossing facilities	0	1	1	2
109	Provide or re-site pedestrian crossings	0	2	2	4
121	Improve forward, rear and side vision of the vehicle - mirrors	0	2	3	5
122	Improve forward, rear and side vision of the vehicle sensors	3	7	1	11
123	Improve forward, rear and side vision of the vehicle CCTV	0	4	1	5
124	Automated emergency brake systems	0	2	12	14
126	Intelligent speed adaptation	0	0	1	1
131	Improved pedestrian awareness of other road users	2	7	10	19
133	Improved pedestrian conspicuity	0	0	2	2
134	Highlight dangers of pedestrians impaired by alcohol or drugs	0	0	1	1
141	Improve driver awareness of pedestrians and speed	0	2	13	15
142	Work related road safety training	0	0	7	7
143	Roadworthiness of vehicle	0	0	3	3
151	Speed enforcement	0	0	2	2
154	General traffic law enforcement	0	0	1	1
221	Improved side guards on heavy goods vehicles	0	0	1	1
242	Ensuring good road worthiness of vehicle	0	0	1	1

5.2.7 Speed

5.2.7.1 Introduction

There were three sources of data for determining whether the vehicle which struck a pedestrian was speeding:

- Whether the driver was convicted for speeding following the collision;
- Whether 'exceeding speed limit' was recorded as a contributory factor;
- Comparison of the estimated travelling or impact speeds compared with the speed limit of the road.

Table 5-56 shows the number of vehicles the hit the pedestrian by whether the vehicle was convicted for speeding following the collision. There were two motorcyclists and three car drivers convicted for speeding.

Table 5-56: Speeding convictions following collision by vehicle type

Speeding conviction following collision	Motorcycle	Car	Bus/Coach	LGV	HGV	Total
Yes	2	3	0	0	0	5
No	12	107	33	12	27	191
Unknown		1	0	0	0	1
Total	**14**	**111**	**33**	**12**	**27**	**197**

Table 5-57 shows the number of vehicles which were classed as exceeding the speed limit by vehicle type. Overall, 24 vehicles were attributed this contributory factor, the majority (20) being car drivers.

Table 5-57: Exceeding speed limit contributory factor by vehicle type

Was 'exceeding speed limit' a contributory factor	Motorcycle	Car	Bus/Coach	LGV	HGV	Total
Yes	2	20	0	1	1	24
No	12	91	33	11	26	173
Total	**14**	**111**	**33**	**12**	**27**	**197**

The estimated travelling speed of each vehicle, where known, was compared with the speed limit of the road. Where the minimum estimated speed was greater than 10% + 2mph of the speed limit the vehicle was classed as speeding (ACPO, 2000). Where the maximum travelling speed was lower than the speed limit of the road the vehicle was classed as not speeding. If the range of the travelling speed included the speed limit then it is uncertain whether the vehicle was speeding or not, and are classed as 'unsure' in Table 5-58. There were 122 vehicles with known travelling speed.

There were 23 vehicles, mainly cars (19), which were classed as travelling above the speed limit.

Table 5-58: Travelling speed by vehicle type

Was the vehicle's travelling speed in excess of the speed limit?	Motorcycle	Car	Bus/Coach	LGV	HGV	Total
Yes	2	19	0	1	1	23
No	5	42	16	5	16	84
Unsure	3	9	0	3	0	15
Unknown	4	41	17	3	10	75
Total	**14**	**111**	**33**	**12**	**27**	**197**

The chart below shows the estimated ranges of travelling speed (vertical bars) compared to the speed limit (horizontal lines). Each speed limit is shown with different coloured

bars. The bars that are clearly above the horizontal line represent those vehicles which were speeding.

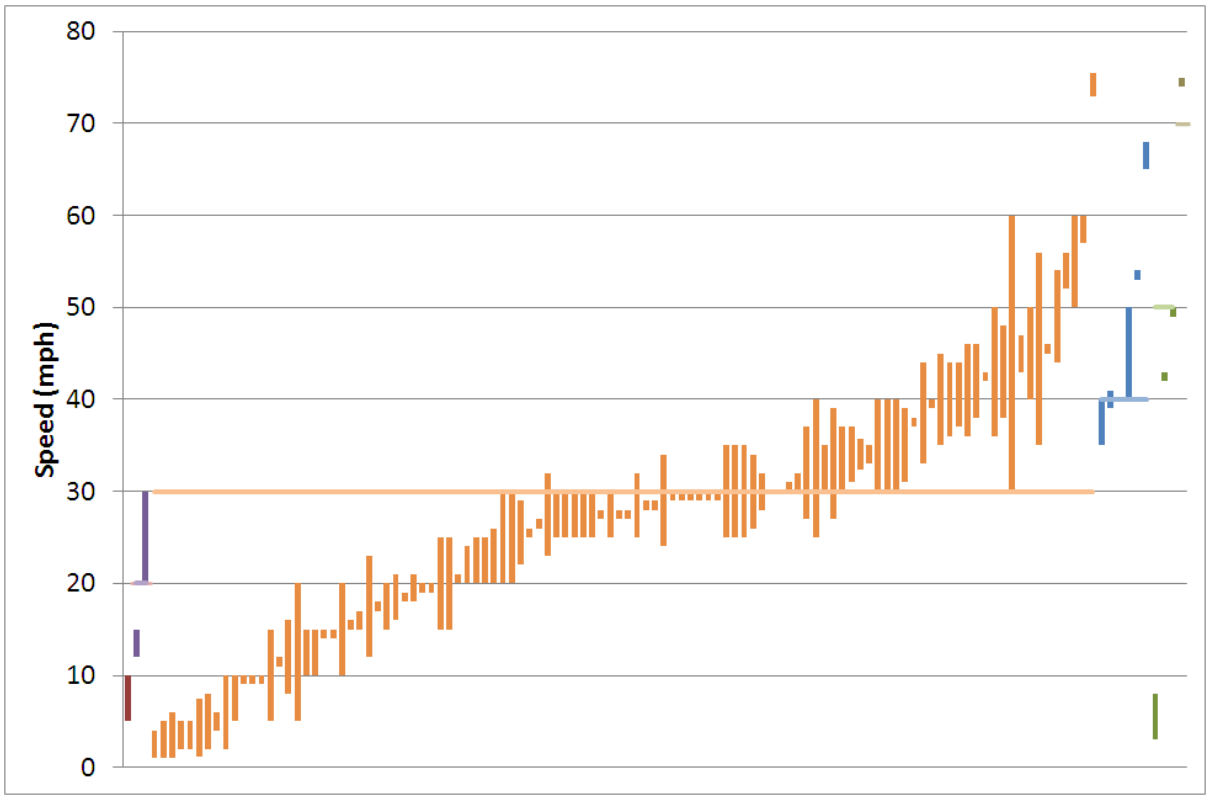


Figure 5-1: Travelling speeds of riders/drivers that struck pedestrians

The majority of collisions occurred on a road with a 30mph speed limit. On these roads the estimated travelling speeds of those exceeding the speed limit ranged from 35mph to 76mph.

The analysis in the reminder of this section is based on 31 drivers and vehicles which met at least one of the three criteria used above. There were just two drivers who met all three criteria.

5.2.7.2 Collision details

20 of the 31 collision involving speeding vehicles occurred in outer London.

Table 5-59: Speeding vehicles in pedestrian fatal collisions by area and vehicle type

Area	Motorcycle	Car	LGV	HGV	Total
Inner London	1	8	1	1	11
Outer London	2	18	0	0	20
Total	**3**	**26**	**1**	**1**	**31**

The collisions involving speeding occurred throughout the day (Table 5-60), although the speeding collisions between midnight and 8am represented a higher proportion of all collisions (32%) than at other times of the day (13%).

Table 5-60: Speeding vehicles in pedestrian fatal collisions by time of day and vehicle type

Time period	Motorcycle	Car	LGV	HGV	Total
midnight-4am	0	7	0	0	7
4am-8am	1	1	1	0	3
8am-noon	1	2	0	1	4
noon-4pm	1	5	0	0	6
4pm-8pm	0	6	0	0	6
8pm-midnight	0	5	0	0	5
Total	**3**	**26**	**1**	**1**	**31**

The vast majority of collisions involving speeding were conflicts N1 or N2, as shown in Table 5-61, that is, those where the pedestrian was crossing the road and the vehicle was travelling straight ahead.

Table 5-61: Speeding vehicles in pedestrian fatal collisions by conflict and vehicle type

Conflicts	Motorcycle	Car	LGV	HGV	Total
N1	0	12	1	1	14
N2	3	10	0	0	13
P3	0	3	0	0	3
P5	0	1	0	0	1
Total	**3**	**26**	**1**	**1**	**31**

Twenty of the speeding vehicles were in collisions on A-roads (see Table 5-62). However, the small numbers of speeding vehicles on B roads (4) represents a larger proportion of all collisions on these roads (see Table 4-18).

Table 5-62: Speeding vehicles in pedestrian fatal collisions by road class and vehicle type

Road Class	Motorcycle	Car	LGV	HGV	Total
A road	1	17	1	1	20
4 B road	1	3	0	0	4
5 C and unclassified	1	6	0	0	7
Total	**3**	**26**	**1**	**1**	**31**

5.2.7.3 Vehicle and driver

The conviction history of the driver was known in 19 of the 31 cases where the driver was speeding. The majority (14) had no conviction history, three had DVLA offences and two had a criminal court conviction. There were two car drivers who had no licence.

Table 5-63: Conviction history of speeding drivers

Conviction history	Motorcycle	Car	LGV	HGV	Total
Criminal record - court conviction(s)	0	2	0	0	2
DVLA offences only	1	2	0	0	3
No conviction history	2	10	1	1	14
Unknown	0	12	0	0	12
Total	**3**	**26**	**1**	**1**	**31**

Drivers aged between 20 and 29 years were over-represented in collisions where the vehicle was speeding (Figure 5-2); 13 of the speeders were in this age group and 30% of drivers in the sample in this age group were speeding compared with 16% of all drivers in the sample.

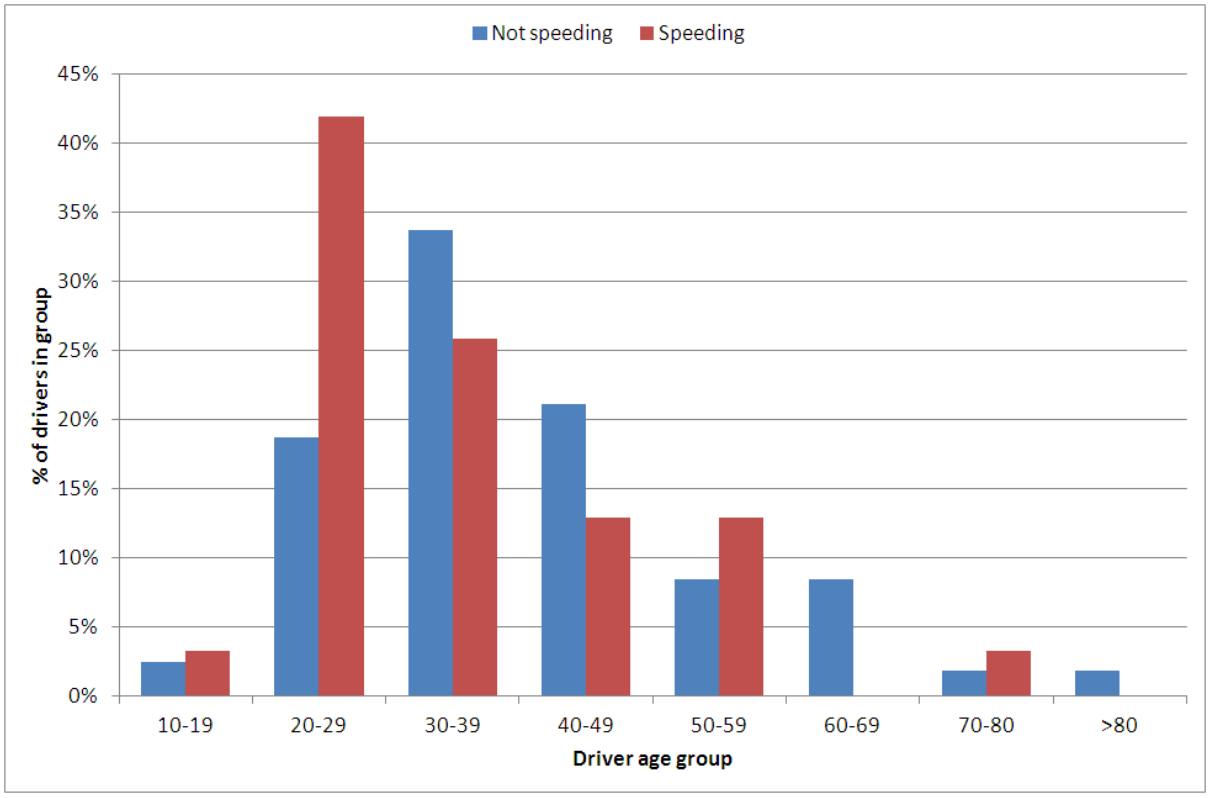


Figure 5-2: Driver age distribution of speeding vehicles

Table 5-64 shows the ethnicity of drivers that were speeding compared with those not speeding. Whilst the majority of speeders were recorded as White, the smaller numbers of Asian and Black drivers that were speeding represented a larger proportion of drivers in the collisions in the sample of that ethnicity.

Table 5-64: Ethnicity of speeding drivers

Driver ethnicity	Not speeding	Speeding	Total	% speeding
White	94	12	106	11%
White mixed	1	0	1	0%
Asian	21	5	26	19%
Black	17	6	23	26%
Other ethnic background	1	0	1	0%
unknown	32	8	40	20%
Total	**166**	**31**	**197**	**16%**

Six of the speeding vehicles (all cars) failed to stop at the scene of the collision.

Table 5-65: Speeding vehicles in pedestrian fatal collisions by vehicle type and failed to stop

Failed to stop	Motorcycle	Car	LGV	HGV	Total
Hit and run	0	6	0	0	6
Not hit and run	3	20	1	1	25
Total	**3**	**26**	**1**	**1**	**31**

Twenty-six of the speeding vehicle drivers were convicted of a motoring offence following the collision. Table 5-58 shows the number of vehicles with each type of collision. Note that some vehicles were given more than one conviction. The most common conviction was for dangerous driving (14), followed by careless driving (10).

Table 5-66: Speeding vehicles in pedestrian fatal collisions by convictions following the collision and vehicle type

Conviction following collision	Motorcycle	Car	LGV	HGV	Total
Speeding	2	3	0	0	5
Careless driving	0	10	0	0	10
Dangerous driving	2	11	1	0	14
Drink driving	0	2	0	0	2
Construction & use	0	1	0	0	1
Other motoring offences	0	5	0	0	5
Any conviction	3	22	1	0	26
No conviction	0	4	0	1	5
Total	**3**	**26**	**1**	**1**	**31**

Note: 'Any conviction' gives the number of drivers/riders who were convicted for at least one offence. This is greater than the sum of the individual conviction types since some drivers/riders were convicted of more than one offence.

5.2.7.4 Pedestrian

There were 32 pedestrians which were struck by a speeding vehicle. The majority were adults, including two pedestrians aged 80 or over, and there were also two children struck by a speeding vehicle. Six of the pedestrians were impaired by alcohol.

Table 5-67: Pedestrians struck by speeding vehicles by pedestrian age group and vehicle type

Pedestrian age group	Motorcycle	Car	LGV	HGV	Total
0-15	0	2	0	0	2
16-24	1	7	0	0	8
25-59	1	14	1	0	16
60-79	1	3	0	0	4
80+	0	1	0	1	2
Total	**3**	**27**	**1**	**1**	**32**

The majority of the pedestrians in these collisions were crossing the road; 11 at a pedestrian facility, four near a facility and 10 elsewhere. There were also five pedestrians on the footway or verge which were struck by a speeding vehicle (see Section 5.2.10 for more detailed analysis of pedestrians on the pavement).

Table 5-68: Pedestrians struck by speeding vehicles by pedestrian manoeuvre and vehicle type

Pedestrian manoeuvre	Motorcycle	Car	LGV	HGV	Total
In carriageway - crossing on pedestrian facility	1	9	0	1	11
In carriageway - crossing elsewhere within 50m of crossing	0	4	0	0	4
In carriageway - crossing elsewhere	2	7	1	0	10
In carriageway - standing or playing (not crossing)	0	1	0	0	1
On footway or verge	0	5	0	0	5
Unknown or other	0	1	0	0	1
Total	**3**	**27**	**1**	**1**	**32**

5.2.7.5 Contributory factors

The attribution of contributory factors to the pedestrian and/or the vehicle or driver was as follows:

- Two collisions with factors only attributed to the pedestrian
- 11 collisions with factors only attributed to the vehicle or driver
- 18 collisions with factors attributed to both the pedestrian and the vehicle or driver.

The factors for the pedestrian are shown in the table below. The most common factors for the pedestrians were 'failed to look properly', recorded in ten collisions, and 'disability or illness, mental or physical', recorded in eight collisions.

Table 5-69: Pedestrian factors in collisions where the vehicle was speeding

Contributory Factor		Number of collisions
801	Crossing road masked by stationary vehicle	3
802	Failed to look properly	10
803	Failed to judge vehicle's path or speed	5
804	Wrong use of pedestrian crossing facility	6
805	Dangerous action in carriageway	2
806	Impaired by alcohol	5
807	Impaired by drugs	1
808	Careless, reckless or in a hurry	0
809	Pedestrian wearing dark clothing at night	0
810	Disability or illness, mental or physical	8
Any pedestrian factor		20
No pedestrian factor		11
Total		**31**

Unsurprisingly, the most common contributory factor in speeding collisions was 'exceeding speed limit', recorded in 23 collisions. Although there were 18 collisions with more than one vehicle/driver/rider factor, the occurrence of any particular other factor was small, with the second most common factors 'failed to look properly' and 'careless, reckless in a hurry', recorded in four collisions.

Table 5-70: Vehicle/driver/rider factors in collisions where the vehicle was speeding

Contributory factor		Number of collisions
306	Exceeding speed limit	24
405	Failed to look properly	4
602	Careless, reckless or in a hurry	4
406	Failed to judge other person's path or speed	3
501	Impaired by alcohol	2
601	Aggressive driving	2
301	Disobeyed automatic traffic signal	2
410	Loss of control	2
605	Learner or inexperienced driver/rider	1
403	Poor turn or manoeuvre	1
701	Vision affected by stationary or parked vehicles	1
304	Disobeyed pedestrian crossing facility	1
409	Swerved	1
505	Illness or disability, mental or physical	1
607	Unfamiliar with model of vehicle	1
509	Distraction in vehicle	1
203	Defective brakes	1
510	Distraction outside vehicle	1
Any vehicle/driver/rider factor		29
No vehicle/driver/rider factor		2
Total		**31**

5.2.7.6 Countermeasures

Almost all of the collisions had the countermeasure 'speed enforcement' recorded. With this countermeasure, it is likely that speed enforcement at the time and location of the collision would have prevented the collision, but it is unknown whether a higher level of enforcement at locations across London would have been acted as a deterrent to reduce the driving speed.

'Improving driver awareness of pedestrians and speed' was recorded in 25 cases. The focus of this educational measure might include improved awareness of pedestrians near to pedestrian crossings and high pedestrian activity areas. In some cases this measure was not appropriate, for example, where speeding contributed to the vehicle losing control and mounting the pavement.

Vehicle engineering measures based on reducing speed, for example, automated brake systems and intelligent speed adaptation were also commonly recorded.

Table 5-71: Countermeasures for collisions involving a speeding vehicle

Countermeasure		Likely	Probably	Maybe	Total
103	Removal of on-street parking	0	0	1	1
105	Provide traffic calming	0	0	3	3
109	Provide or re-site pedestrian crossings	0	1	2	3
110	Provide a central refuge	0	0	2	2
124	Automated emergency brake systems	1	3	7	11
126	Intelligent speed adaptation	1	2	11	14
131	Improved pedestrian awareness of other road users	0	0	9	9
132	Highlight dangers of crossing road whilst distracted	0	0	2	2
134	Highlight dangers of pedestrians impaired by alcohol or drugs	0	1	4	5
141	Improve driver awareness of pedestrians and speed	1	3	21	25
143	Roadworthiness of vehicle	0	0	1	1
151	Speed enforcement	1	4	23	28
152	Drinking and driving	1	1	0	2
154	General traffic law enforcement	0	0	3	3
211	Traffic calming interventions targeted at reducing vehicle speeds	0	2	2	4
241	reducing speed	0	1	1	2

5.2.8 *Pedestrians impaired by alcohol*

5.2.8.1 Introduction

There are three measures of the impairment of pedestrians due to alcohol or drugs:

- Pedestrians where information in the fatal file led to the researchers coding that the pedestrian was impaired by drugs and/or alcohol;
- Pedestrians with 'pedestrian impaired by alcohol' as a contributory factor';
- The blood alcohol concentration (BAC) of the 50 pedestrians for which the post mortem data and detailed injures were coded.

Table 5-72 shows the number of pedestrians that were impaired by alcohol and/or drugs. In total there were 48 pedestrians impaired by alcohol, of which 10 were also impaired by drugs, and one pedestrian impaired by drugs only. The occurrence of impairment was highest for adults aged 25 to 59, with 26 out of the 74 pedestrians in this age group impaired.

Table 5-72: Impaired by alcohol and/or drugs by pedestrian age

Pedestrian impaired by...	0-15	16-24	25-59	60+	Total
Alcohol only	0	5	28	5	38
Drugs only	0	0	1	0	1
Alcohol and drugs	0	3	7	0	10
Total sample	**18**	**24**	**74**	**82**	**198**

Table 5-73 shows that there were 46 pedestrians with 'impaired by alcohol' as a contributory factor. There were two fatalities that were impaired by alcohol, but this did not contribute to the collision. In both cases the pedestrian was on the pavement.

Table 5-73: Pedestrians where 'impaired by alcohol was a contributory factor by pedestrian age by pedestrian age

Impaired by alcohol a contributory factor	0-15	16-24	25-59	60+	Total
Yes	0	8	33	5	46
No	18	16	41	77	152
Total	**18**	**24**	**74**	**82**	**198**

Table 5-74 shows the BAC levels recorded in the post mortems of the 50 fatalities for which these data were available. The BAC was known in 33 cases, and in the majority (25) there was no alcohol (<10mg/100ml) detected. Where alcohol was detected, it was often found at very high levels; five pedestrians had a BAC of over 160, twice the current drink drive limit, including one pedestrian with a level of more than four times the current drink drive limit.

Table 5-74: Post mortem data by pedestrian age

BAC (mg/100ml)	0-15	16-24	25-59	60+	Total
unknown	1	1	2	13	17
<10 (none)	3	2	5	15	25
10-80	0	0	0	1	1
81-160	0	1	1	0	2
161+	0	0	5	0	5
Total	**4**	**4**	**13**	**29**	**50**

5.2.8.2 Characteristics of pedestrians where 'pedestrian impaired by alcohol' was a contributory factor

As shown above, 33 out of 74 pedestrians aged 25-59 were recorded with 'impaired by alcohol' as a contributory factor. Figure 5-3 shows the age distribution in more detail. The highest incidence of alcohol impairment was for the 30-39 and 40-49 age groups, with about half of these pedestrians impaired by alcohol. 40 of the 46 pedestrians impaired by alcohol were male.

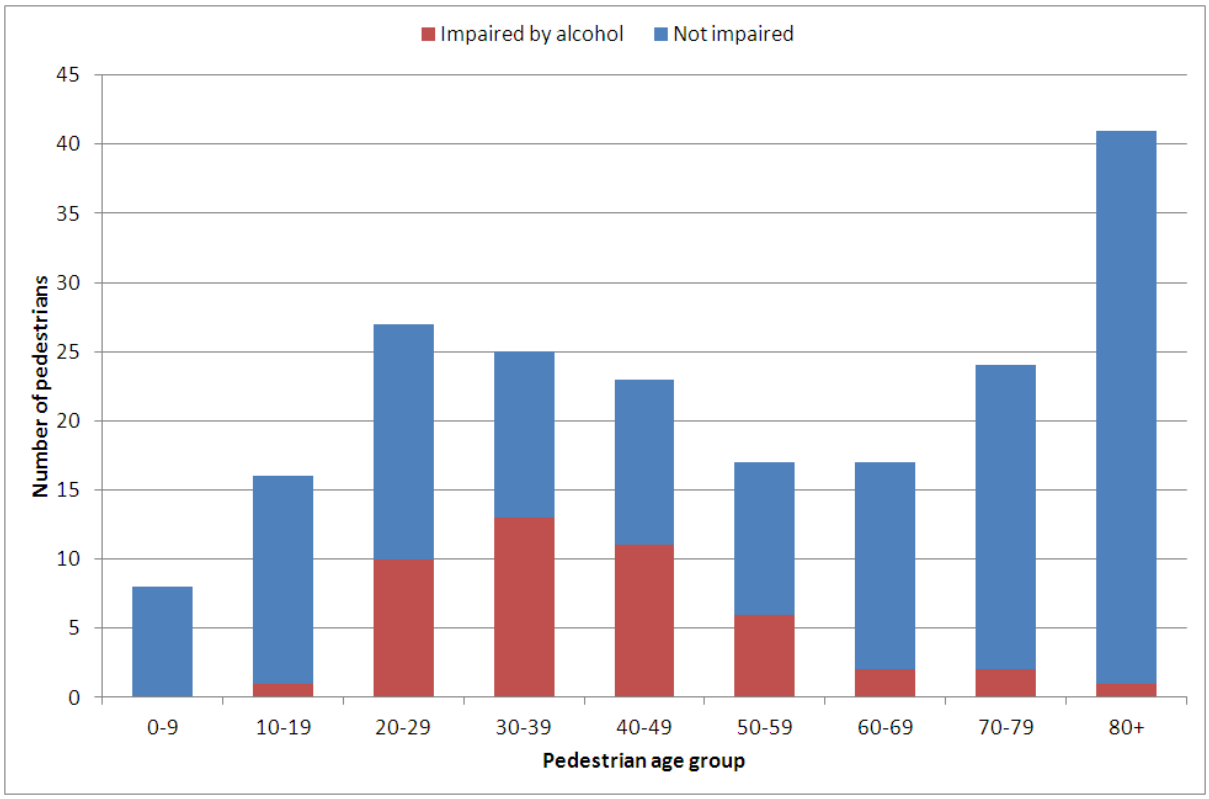


Figure 5-3: Age distribution of pedestrians impaired by alcohol

Table 5-75 shows the pedestrian manoeuvres for pedestrians by whether they were impaired by alcohol. In all cases where the pedestrian was impaired by alcohol the pedestrians was in the carriageway, and in all cases except one, the pedestrian was crossing the road. Whilst the percentage of pedestrians crossing elsewhere (away from a facility) was similar for those impaired and those not impaired, there was a higher percentage of pedestrians impaired by alcohol that were crossing within 50m of a crossing (but not at the crossing) (33%) compared with the unimpaired pedestrians (14%). (See Section 5.2.9 for further analysis of use of crossing facilities.)

Table 5-75: Pedestrian manoeuvres for pedestrians impaired by alcohol

Pedestrian Manoeuvre	Pedestrians impaired by alcohol	Pedestrians not impaired by alcohol	Total
In carriageway - crossing on pedestrian facility	6	43	49
In carriageway - crossing elsewhere within 50m of crossing	15	22	37
In carriageway - crossing elsewhere	19	62	81
On footway or verge	0	15	15
In carriageway - standing or playing (not crossing)	0	4	4
On refuge / central island / central reservation	0	2	2
In Road - Not Crossing	1	0	1
Unknown or other	5	4	9
Total	**46**	**152**	**198**

5.2.8.3 *Characteristics of collisions where 'pedestrian impaired by alcohol' was a contributory factor*

Thirty nine of the 46 pedestrians impaired by alcohol were in collisions on A-roads, including 22 on dual carriageways.

Figure 5-4 shows the number of pedestrian fatalities throughout the week by time period for pedestrians impaired by alcohol and unimpaired pedestrians. Twenty of the 46 pedestrians impaired by alcohol occurred on a Friday or Saturday and 21 occurred throughout the week between 6pm and midnight.

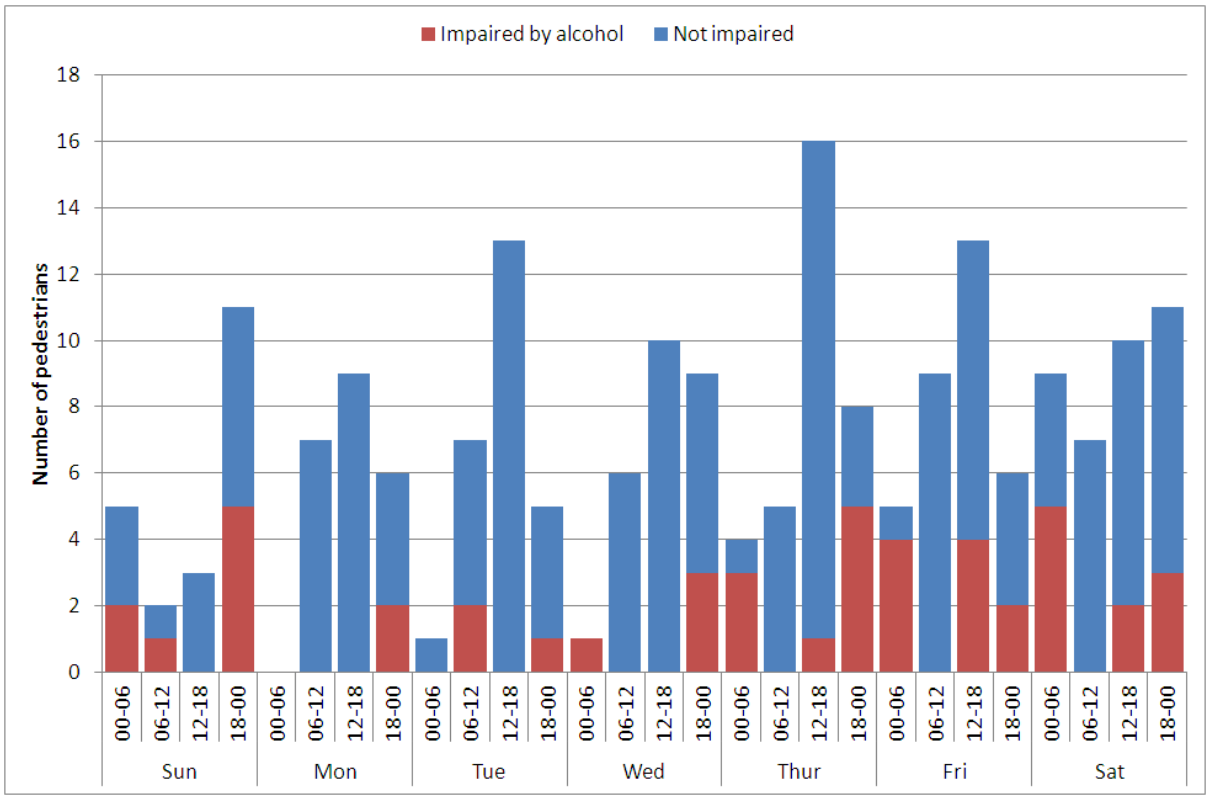


Figure 5-4: Pedestrians impaired by alcohol by day and time

Note that each time group includes times up to, but not including the end of the range listed, for example, 6am is included in the 06-12 group.

The majority of the conflicts were the pedestrain crossing the road whilst the vehicle was travelling straight ahead (conflicts N1 and N2).

Table 5-76: Pedestrian manoeuvres for pedestrians impaired by alcohol

Conflicts		Total
N1	Vehicle going ahead, pedestrian left side	21
N2	Vehicle going ahead, pedestrian right side	17
N3	Vehicle left turn, pedestrian left side	3
N7	Manoeuvring vehicle	1
P2	Walking facing traffic	1
P7	Other	2
Q8	Other	1
Total		**46**

5.2.8.4 Vehicles

Twenty-eight of the pedestrians impaired by alcohol were struck by a car. This included two taxis/private hire vehicles (Table 5-77). The majority of vehicles were 'going ahead other', although four were 'moving off' and five were turning left or right.

Table 5-77: Vehicle types that struck pedestrians impaired by alcohol

Vehicle type	Pedestrian impaired by alcohol	Pedestrian unimpaired	Total
Bus/coach	10	23	33
Motorcycle	3	11	14
Car	28	83	111
LGV	1	11	12
HGV	4	23	27
Total	**46**	**151**	**197**

Five of the drivers/riders were speeding and seven hit and ran. Nine drivers were convicted for a driving offence following the collision, most commonly for careless driving (5).

5.2.8.5 Contributory factors

Table 5-83 shows how the contributory factors were assigned to the participants of the collision. Since this collision group is defined by the pedestrian contributory factor 'impaired by alcohol' there were no collisions with vehicle/driver/rider factors only. Nineteen of the collisions had vehicle/driver/rider contributory factors in addition to any pedestrian contributory factors.

Table 5-78: Contributory factor types in collision where the pedestrian was impaired by alcohol

Vehicle type	Pedestrian factors only	Pedestrian and vehicle/driver/rider factors	Total
Bus/Coach	6	4	10
Car	15	13	28
HGV	2	2	4
LGV	1	0	1
Motorcycle	3	0	3
Total	**27**	**19**	**46**

In eight collisions 'pedestrian impaired by alcohol was the only pedestrian factor. After 'pedestrian impaired by alcohol', the most common pedestrian contributory factor was 'failed to look properly', recorded in 27 collisions.

Table 5-79: Pedestrian contributory factors in collision where the pedestrian was impaired by alcohol

Contributory factor		Total
806	Impaired by alcohol	46
802	Failed to look properly	27
803	Failed to judge vehicle's path or speed	8
807	Impaired by drugs	7
804	Wrong use of pedestrian crossing facility	5
808	Careless, reckless or in a hurry	4
805	Dangerous action in carriageway	3
810	Disability or illness, mental or physical	2
809	Pedestrian wearing dark clothing at night	1
801	Crossing road masked by stationary vehicle	1
All pedestrians		**46**

Table 5-80: Top 10 vehicle/driver/rider contributory factors in collision where the pedestrian was impaired by alcohol

Contributory factor		Bus/Coach	Car	HGV	LGV	Motorcycle	Total
405	Failed to look properly	6	23	3	5	3	40
306	Exceeding speed limit	0	20	1	1	2	24
710	Vision affected by vehicle blind spot	3	2	12	1		18
701	Vision affected by stationary or parked vehicles	3	6	0	2	1	12
602	Careless, reckless or in a hurry	2	8	0	0	0	10
406	Failed to judge other person's path or speed	3	5	0	1	1	10
410	Loss of control	2	8	0	0	0	10
509	Distraction in vehicle	3	3	0	0	0	6
501	Impaired by alcohol	0	6	0	0	0	6
304	Disobeyed pedestrian crossing facility	1	2	1	0	1	5
Any vehicle/driver/rider factor		4	13	2	0	0	19
No vehicle/driver/rider factors		6	15	2	1	3	27
All vehicles		**10**	**28**	**4**	**1**	**3**	**46**

5.2.8.6 Countermeasures

All of the collisions involving pedestrians impaired by alcohol were recorded with the countermeasure 'highlight dangers of pedestrians impaired by alcohol or drugs'. The perceptions and behaviour of pedestrians impaired by alcohol may be different from when they were sober, and it is difficult to know whether road safety education to sober pedestrians would be heeded when they are impaired. Road safety messages could be included in general education about the dangers of alcohol.

Table 5-81: Countermeasures in collisions where the pedestrian was impaired by alcohol

Countermeasure		Likely	Probably	Maybe	Total
103	Removal of on-street parking	0	1	1	2
109	Provide or re-site pedestrian crossings	0	1	0	1
121	Improve forward, rear and side vision of the vehicle - mirrors	0	2	1	3
122	Improve forward, rear and side vision of the vehicle sensors	1	1	2	4
123	Improve forward, rear and side vision of the vehicle CCTV	0	1	1	2
124	Automated emergency brake systems	0	3	10	13
126	Intelligent speed adaptation	1		2	3
131	Improved pedestrian awareness of other road users	0	5	10	15
132	Highlight dangers of crossing road whilst distracted	0	1	0	1
133	Improved pedestrian conspicuity	0	0	1	1
134	Highlight dangers of pedestrians impaired by alcohol or drugs	0	8	38	46
141	Improve driver awareness of pedestrians and speed	0	1	9	10
142	Work related road safety training	0	0	4	4
151	Speed enforcement	0	1	4	5
152	Drinking and driving	0	1	0	1
222	Vehicle design standards	0	0	1	1
223	Pop-up bonnets and improved bumper design	0	0	2	2
241	Reducing speed	0	0	1	1

5.2.9 Pedestrian crossing facilities

In the majority of cases it was known whether the pedestrian was using a pedestrian crossing facility during the collision event (unknown for nine pedestrians). Forty-nine pedestrians were using a crossing facility and 37 pedestrians were crossing the road within 50m of a crossing facility but had chosen for whatever reason to not use it (Table 5-82).

Table 5-82: Pedestrian position by age

Pedestrian manoeuvre	Under 16	16-29	30-59	60+	Total
Crossing at a pedestrian facility	3	8	15	23	49
Crossing within 50m of a crossing facility	2	7	14	14	37
Crossing elsewhere	8	11	24	38	81
On footpath	2	4	7	2	15
In carriageway - not crossing	2	1	2	0	5
On central reservation	0	0	0	2	2
Unknown	1	2	3	3	9
Total	**18**	**33**	**65**	**82**	**198**

5.2.9.1 Pedestrians crossing at pedestrian facilities

Twenty-five of the 49 pedestrians using a facility were crossing at a Pelican, Puffin, Toucan or other non-junction crossing, and 16 were crossing at a junction automated traffic signal (ATS) crossing shown in Table 5-83. Of the pedestrians crossing at signalled crossings, over two-thirds were known to be crossing against the lights (28 out of 41). The non-compliance with pedestrian signals was not limited to one age group, as can be seen in Table 5-84.

Table 5-83: Pedestrians crossing at facilities by crossing type and compliance

Pedestrian crossing facility	Compliance with signals			
	Yes	No	Unknown/not applicable	Total
Pelican, Puffin, Toucan & other non-junction crossing	4	14	1	19
Pedestrian phase at a junction ATS	0	11	5	16
Zebra crossing	0	0	7	7
Staggered Pelican, Puffin, Toucan & other non-junction crossing	2	3	1	6
Central refuge – no controls	0	0	1	1
Total	**6**	**28**	**15**	**49**

Table 5-84 presents various characteristics of the pedestrians crossing the carriageway using pedestrian facilities. Six of the 49 pedestrians were impaired by alcohol at the time of the collision (three in daylight, two in the dark, and one at dusk), five were using a walking aid and two had hearing issues.

Table 5-84: Characteristics of the pedestrians crossing at facilities by age group

Characteristic	Under 16	16-29	30-59	60+	Total
Total crossing at a facility	3	8	15	23	49
Not compliant with signals	2	4	10	13	28
Impaired by alcohol	0	0	5	1	6
Using a walking frame/ stick	0	0	0	5	5
Hearing issues	0	0	0	2	2
Using a mobile phone/headphones	0	3	1	0	4

Note that these categories are not exclusive

The vehicles involved in these collisions are shown in Table 5-85, of which the majority were cars (28). The drivers/riders of the vehicles were not all complaint with the law or Highway Code. Three car drivers were impaired by alcohol and five drivers failed to stop at the collision (one was impaired by alcohol). Four drivers were driving without insurance of which one had no vehicle tax and two did not have a valid driving licence. Three of these drivers also failed to stop at the scene. Ten drivers and one rider were exceeding the speed limit.

Table 5-85: The vehicles involved in collisions at pedestrian crossings

Vehicle	Total	Impaired by alcohol	Failed to stop
Car	28	3	5
Bus/coach	9	0	0
Motorcycle	6	0	0
HGV	4	0	0
LGV	2	0	0
Total	**49**	**3**	**5**

The driver/rider was convicted of a driving offence following the event in 20 of the 49 collisions (five drivers were convicted of multiple offences). These are shown in Table 5-86. Fifteen of these drivers were car drivers, two rode motorcycles, one was a bus driver, one was an HGV driver and one was an LGV driver.

Table 5-86: Driver convictions

Conviction (note a driver may be convicted of more than one offence)	Total
Dangerous driving	8
Careless driving	11
Speeding	2
Drink driving	3
Other motoring offence	5

5.2.9.2 *Pedestrians crossing within 50m of a pedestrian facility*

Thirty-seven pedestrians were crossing the road within 50m of a crossing facility but had chosen not use it. This is not limited to one age group and represents around one-fifth of pedestrians in each adult age group.

Fifteen of the pedestrians who did not use the crossing facility were impaired by alcohol (three were also impaired by drugs). Alcohol impaired pedestrians appeared not to use a pedestrian crossing more often than unimpaired pedestrians, Table 5-88. Five pedestrians using walking aids chose not to use the crossing.

Table 5-87: Characteristics of pedestrians crossing within 50m of a crossing

Characteristic	Under 16	16-29	30-59	60+	Total
Total crossing within 50m of a facility	2	7	14	14	37
Impaired by alcohol	0	4	10	1	15
Using a walking frame/ stick	0	0	0	5	5
Running	2	4	5	0	11

Note that these categories are not exclusive

Eleven pedestrians were running across the road at the time of the collision. Table 5-88 suggests that pedestrians choosing not to cross at the available facility were more likely to be running than those using the crossing.

Table 5-88: Pedestrians' choice to use a crossing facility by impairment and travel speed

Characteristic	Crossing at a pedestrian facility	Crossing within 50m of pedestrian facility	Total
Impaired by alcohol	6	15	21
Not impaired by alcohol	42	21	63
Unknown	1	1	2
Running across the road	7	11	18
Not running across the road	40	24	64
Unknown	2	2	4
Total fatalities	**49**	**37**	**86**

It was interesting to see that 13 pedestrians chose to cross away from the crossing facility when the traffic was heavy (Table 5-89). In fact in heavy queued traffic conditions and light traffic, pedestrians were more likely to not use the crossing available to them as shown in Table 5-90 (note this observation is based on very small numbers).

Table 5-89: Pedestrians crossing within 50m of a facility by vehicle type and traffic conditions

Vehicle	Heavy traffic - moving	Heavy traffic - queued	Light/ moderate traffic	Unknown	Total
Car	5	2	8	3	18
Bus/coach	0	0	4	3	7
HGV	2	3	4	2	11
LGV	0	1	0	0	1
Total	**7**	**6**	**16**	**8**	**37**

Table 5-90: Pedestrians' choice to use a crossing facility by traffic conditions

Traffic conditions	Crossing at a pedestrian facility	Crossing within 50m of pedestrian facility	Total
Heavy traffic -moving	7	7	14
Heavy traffic - queued	0	6	6
Moderate traffic	18	6	24
Light traffic	7	10	17
Unknown conditions	17	8	25
Total	**49**	**37**	**86**

The driver was convicted of a driving offence following the event in eight of the 37 collisions. These are shown in Table 5-91. Seventeen of these drivers were car drivers and one was an HGV driver.

Table 5-91: Driver convictions

Conviction (note a driver may be convicted of more than one offence)	Total
Dangerous driving	1
Careless driving	3
Speeding	2
Drink driving	1
Other motoring offence	2

5.2.9.3 Contributory factors

Contributory factors give an indication of the causes of the collision. These can be assigned to the pedestrian, driver/rider of the vehicle or to both. Of the 49 collisions where a pedestrian was crossing at a crossing facility, 17 were thought to have been caused by the pedestrian, 15 by the driver/rider of the vehicle and in 17 collisions it was thought both the pedestrian and vehicle/driver/rider contributed to the incident. Of the 37 collisions where a pedestrian chose not to use the available crossing facility, 18 were thought to have been caused by the pedestrian, one by the driver of the vehicle and in 18 collisions it was thought both the pedestrian and vehicle/driver/rider contributed to the incident.

Table 5-92: The most common pedestrian contributory factors where pedestrians were crossing at or within 50m of a crossing facility

Contributory factor	Crossing at a pedestrian facility	Crossing within 50m of pedestrian facility
'Wrong use of pedestrian crossing facility'	23	6
'Failed to look properly'	18	24
'Impaired by alcohol'	6	15
'Failed to judge vehicle's path or speed'	5	8
'Careless, reckless in a hurry'	4	3
Total pedestrians assigned factors	**34**	**36**

Table 5-93: The most common vehicle/driver/rider contributory factors where pedestrians were crossing at or within 50m of a crossing facility

Contributory factor	Crossing at a pedestrian facility	Crossing within 50m of pedestrian facility
'Failed to look properly'	13	8
'Exceeding the speed limit'	8	3
'Vehicle blind spot'	5	5
'Disobeyed automatic traffic signal'	4	0
'Distraction in vehicle'	4	0
'Careless, reckless in a hurry'	4	1
'Impaired by alcohol'	3	1
'Disobeyed a pedestrian crossing facility'	3	1
Total vehicles/drivers/riders assigned factors	**32**	**19**

5.2.9.4 Countermeasures

Table 5-94 lists the most frequently recorded countermeasures for collisions at pedestrian crossings. Education measures are suggested such as improving pedestrian awareness of other road users (25) and improving driver awareness of pedestrians and speed (24). This is directly related to the high frequency of the contributory factors 'wrong use of pedestrian crossing' and drivers 'failing to look properly' and 'exceeding the speed limit'. The engineering measure, automated emergency brake systems may have helped to prevent 21 collisions.

Table 5-94: The most frequently recorded countermeasures for collisions at pedestrian crossings

Counter measure	Name	Likely	Probably	Maybe	Total
131	Improve pedestrian awareness of other road users	2	14	9	25
141	Improve driver awareness of pedestrians and speed	1	19	4	24
124	Automated emergency brake systems	1	13	7	21
151	Speed enforcement	1	0	9	10
134	Highlight the dangers of pedestrians impaired by alcohol or drugs	0	6	0	6
142	Work related road safety training for bus drivers	0	6	0	6
108	Improvements to existing pedestrian crossing facilities	1	2	2	5
121	Improve forward, rear and side vision for large vehicles - mirrors	1	2	2	5
122	Improve forward, rear and side vision for large vehicles - CCTV	1	0	4	5
123	Improve forward, rear and side vision for large vehicles - sensors	1	2	2	5

Table 5-95 lists the most frequently recorded countermeasures for collisions within 50m of a pedestrian crossing. Education measures aimed at the pedestrian are most frequently suggested, such as improving pedestrian awareness of other road users (20) and highlighting the dangers of pedestrians impaired by alcohol or drugs (15) closely followed by improving driver awareness of pedestrians and speed (12). The engineering measures of improving the vision for drivers of large vehicles were also deemed to be important countermeasures for this group of collisions.

Table 5-95: The most frequently recorded countermeasures for collisions within 50m of a pedestrian crossing

Counter measure	Name	Likely	Probably	Maybe	Total
131	Improve pedestrian awareness of other road users	0	11	9	20
134	Highlight the dangers of pedestrians impaired by alcohol or drugs	0	11	4	15
141	Improve driver awareness of pedestrians and speed	0	1	11	12
122	Improve forward, rear and side vision for large vehicles - CCTV	4	1	4	9
121	Improve forward, rear and side vision for large vehicles - mirrors	0	2	5	7
123	Improve forward, rear and side vision for large vehicles - sensors	0	2	4	6
124	Automated emergency brake systems	0	5	1	6
142	Work related road safety training for bus drivers	0	6		6
151	Speed enforcement	0	1	3	4
114	Reduce speed limit or create 20mph zone	0	1	2	3

5.2.10 Pedestrians on the pavement

5.2.10.1 Who was involved?

There were ten male drivers and two female drivers that mounted the pavement and collided with a pedestrian. From Table 5-96, it can be seen that all ages of driver are involved in this type of conflict.

Table 5-96: Age groups of drivers in collisions with pedestrians on the footpath

Age group	Male	Female	Total
Under 16	0	0	0
16-24	2	0	2
25-29	2	0	2
30-39	0	1	1
40-49	2	0	2
50-59	2	0	2
60-69	2	0	2
70+	0	1	2
Total	**10**	**2**	**12**

Two drivers had no regard for the law; both were impaired by alcohol, both had no tax or insurance and one of these also did not hold a driving licence. Two drivers were speeding and one driver was using a mobile phone. Three drivers had a medical condition.

The pedestrians involved have not been described here as their personal characteristics are not relevant to the collision or how it could be avoided. The pedestrians were all on the footpath and just happened to be in the wrong place at the wrong time.

5.2.10.2 What happened?

Nine cars and three buses/coaches were involved in these collisions (see previous Table 4-23). Nine of the vehicles were going ahead, one was turning left, one was turning right and one vehicle was reversing.

Eleven of the vehicles mounted the footpath and struck the pedestrian:

- Driver experienced a medical event (3 collisions);
- Driver lost control (4 collisions):
    - Speeding driver turning left
    - Speeding driver struck kerb
    - Driver coughed
    - Mechanic testing an unfamiliar sports car
- Alcohol impaired driver (2 collisions):
    - Stuck kerb
    - Struck two vehicles & ended up on pavement
- Driver distracted (2 collisions):
    - By a newspaper and fatigued
    - By a mobile phone

One car was reversing out of a drive into the road and did not see the pedestrian on the pavement.

5.2.10.3 Contributory factors

Contributory factors were assigned to the driver in all cases as the pedestrian just happened to be on the pavement at that particular point in time. Table 5-97 shows the details.

Table 5-97: Contributory factors assigned to the driver

Contributory factor	Total
Loss of control	4
Illness, disability, mental or physical	3
Exceeding the speed limit	2
Impaired by alcohol	2
Distraction in vehicle	2

The three drivers that experienced a medical episode at the time of the collision were not convicted of a driving offence. Eight drivers were convicted of a driving offence; five were convicted of careless driving, four dangerous driving and one other motoring offence. One driver received a fine and a driving ban.

5.2.10.4 Countermeasures

Table 5-98 lists the recorded countermeasures for vehicles on the footpath conflicts. Engineering measures are suggested such as automated emergency brake systems (6), intelligent speed adaption (2) and improving the rear vision of the vehicles via sensors and mirrors (1). Speed enforcement and drinking and driving enforcement may have prevented two collisions. Reducing the vehicle speed through engineering methods such as traffic calming and educating drivers may have lead to a reduction in the pedestrian's injury severity.

Table 5-98: The most frequently recorded countermeasures for collisions where the vehicle mounted the footpath

Counter measure	Name	Likely	Probably	Maybe	Total
124	Automated emergency brake systems	0	0	6	6
141	Improve driver awareness of pedestrians and speed	0	0	3	3
142	Work related road safety training for bus drivers	0	1	2	3
151	Speed enforcement	0	0	2	2
152	Drinking and driving enforcement	1	1		2
126	Intelligent speed adaptation	0	0	2	2
121	Improve forward, rear and side vision of the vehicle - mirrors	0	1	0	1
122	Improve forward, rear and side vision of the vehicle sensors	0	1	0	1
154	General enforcement	0	0	1	1
211	Traffic calming interventions targeted at reducing vehicle speeds	0	0	1	1
241	Reducing speed	0	1	0	1

6 Conclusions

The fatal files for 197 pedestrians who died in road traffic collisions in London were reviewed as part of this project. The sample covered years 2006-10 and was selected to be broadly representative in terms of pedestrian age group, the vehicles involved and geography (inner or outer London).

A structured database was created, based on Haddon's Matrix (Haddon Jr, 1999), which included items related to the environment, the pedestrian, and vehicle(s) and their driver(s)/rider(s) in terms of pre-event, event and post-event.

The analysis did not include other pedestrian casualty injury severities, nor did it consider damage only collisions or account for exposure to risk.

STATS19, or ACCSTATS data, recorded for all reported collisions in Great Britain includes over 50 items of data, although this does not provide detailed information on every element of the collision, vehicle or casualty. The fatal collision files used for this research are a rich source of information and contain much greater detail about the collisions, vehicles and casualties than are routinely available. However, this is not an exhaustive collection of data due to the practical limitations of reviewing the files.

6.1 Key results in terms of Haddon's matrix

The key results from the 197 fatalities in terms of Haddon's matrix are:

- Pre-event
    - Pedestrians:
        - 57% of the fatalities were male;
        - 65 pedestrians (33%) were 70 years or over
        - Where known, the majority of pedestrians were familiar with their route;
        - Where known, the majority of journeys were leisure journeys;
        - 165 of the fatalities (83%) were from London;
        - The majority of adult pedestrians were walking alone while the under 16s were more likely to be accompanied;
        - Four pedestrians were using a mobile phone prior to the collision and two were wearing headphones (none of these were children);
        - Only three pedestrians were wearing high visibility clothing;
        - 48 of the pedestrians (24%)were impaired by alcohol (combined with drugs in 10 cases) and one pedestrian was impaired by drugs only;
        - The majority of the pedestrians did not have a disability or illness, although 13 fatalities were using a walking aid.
    - Vehicles and drivers/riders
        - 56% of the pedestrians were struck by a car, 17% by a bus or coach and 14% by an HGV;

        - The vast majority of vehicles had no defects prior to the collision;
        - About half of the drivers/riders were aged between 30 and 50; there was one underage driver and seven drivers aged 70 or over;
        - Where known, the majority of the drivers/riders were from London;
        - There was no evidence of alcohol or drug impairment for drivers of motorcycles, LGVs, HGVs or buses/coaches, but there were six car drivers impaired by drugs and/or alcohol;
        - Three drivers suffered a medical incident just prior to the collision; four were using a mobile phone and 12 had another distraction.
    - Road environment
        - 178 of the 197 collisions (90%) were on roads with a speed limit of 30mph or lower and 145 collisions (74%) occurred on A-roads;
        - 64% of the collisions were within 20m of a junction; most commonly at a T, staggered junction or crossroads;
        - There was a crossing facility within 50m of the collision site in 91 locations (46%);
        - 117 (59%) pedestrian fatalities occurred between 6am and 6pm; however, at weekends there were greater numbers of pedestrian fatalities at night compared with during the day.
- Event
    - Pedestrian
        - In 177 of the collisions (90%), the pedestrian was crossing the road, most commonly whilst the vehicle was travelling straight ahead;
        - 49 pedestrians (25%) were crossing at a facility and 37 (19%) were crossing within 50m of a facility;
        - 14 of the pedestrians accidentally stumbled or fell (9 of which were impaired by alcohol) just prior to the collision.
        - 12 pedestrians were in collisions on the footpath;
        - 7 pedestrians were in collisions with a reversing vehicle; all of these conflicts involved a car and an elderly pedestrian;
    - Vehicle and driver/rider:
        - 15 of the 27 HGVs which hit a pedestrian were moving off when they struck the pedestrian.
    - Contributory factors:
        - 96 pedestrians (48%) were recorded with 'failed to look properly' as a contributory factor and this factor was most common for all age groups;
        - 38% of adults aged between 16 and 59 were recorded with 'impaired by alcohol' as a contributory factor;

- 13 of the 82 pedestrians aged 60 or over (16%) were recorded with 'wrong use of pedestrian crossing facility' as a factor;
- The most commonly recorded contributory factor for vehicles was 'failed to look properly', recorded for 20% of vehicles; this was most common for all vehicle types except for HGVs, for which 'vision affected by blind spot' was more common (recorded for 12 out of 27 HGVs).

- Post-event
  - The most common trajectory for the pedestrians was being knocked to the ground, but not run over (62 collisions). In 56 cases the pedestrian was run over;
  - 115 the pedestrians (58%) died at the scene of the collision, and there were 14 who died more than 10 days later;
  - 68 drivers/riders (35%) were convicted following the collision, most commonly for careless driving (40);
  - 24 vehicles (12%) failed to stop at the scene of the collision, all of which were later traced. For large vehicles such as HGVs or buses/coaches, the driver may not have realised that a collision occurred;
  - For the 50 cases where the post mortems were coded, the most common life-threatening injuries were head (34) and thorax (31) injuries; 18 had both head and thorax.

6.2 Collision types

The following groups were identified as being of special interest. In each case the collisions within each group were analysed in terms of who was involved, the contributory factors, injuries and possible countermeasures. The groups of fatalities and the number of pedestrians in the sample are as follows (note that these groups are not exclusive):

Table 6-1: Collision types and number of fatalities in sample

Collision type	Number of pedestrian fatalities in sample
Pedestrians using a pedestrian facility	49
Pedestrians impaired by alcohol	46
Pedestrians aged 80 years and over	41
Pedestrians crossing the carriageway choosing not to use the available crossing facility	37
Pedestrians in collisions with buses/coaches	33
Pedestrians struck by speeding vehicles	32
Pedestrians in collisions with HGVs	27
Drivers that failed to stop	24
Child pedestrians	18
Pedestrians in collisions with motorcycles	14
Vehicles mounting the pavement/footpath	12

7 Recommendations

Overall, the most common countermeasures recorded were primary countermeasures, aimed at preventing the collision. Secondary countermeasures, aimed at reducing the severity of the collision were less frequently recorded, partly because a large proportion of the pedestrian sample was elderly and vulnerable to injury.

For primary countermeasures, the most commonly recorded type of countermeasure was pedestrian education. Vehicle engineering countermeasures and driver/rider education were also commonly recorded.

This project did not seek to consider the effectiveness of the countermeasures; therefore whilst they could have prevented the incident or reduced the severity of the incident, further work should be undertaken to understand the likely effect of any intervention on fatal collisions, other casualties and any other implications. The exact details of any educational measures, such as how these should be delivered, have not been considered.

Countermeasures may not be immediately applicable and may be developed in the medium to longer term.

The following countermeasures should be considered for action or further evaluation.

Improved pedestrian awareness of other road users (77 collisions)

This was the most commonly reported countermeasure overall, recorded in 77 collisions (39% of sample). It was also commonly recorded in the following collision types:

- Motorcycles (11)
    - The most common contributory factor for pedestrians was 'failed to look properly' and 'failed to judge motorcyclist path or speed'. Education and publicity measures which address these factors may help to reduce the number of these collisions.
- Buses and coaches (12)
    - As with other vehicle types, 'failed to look properly' was the most common contributory factor, therefore education and/or publicity measures which highlight the importance of looking properly for these vehicles may be of use.
- HGVs (12)
    - The most common contributory factor for this collision type was 'driver vision affected by vehicle blind spot'. In addition to ensuring that mirrors and/or sensors are fitted to these vehicles and used, education or publicity measures aimed at pedestrians, highlighting the problem of blind spots and discouraging pedestrians from crossing where they cannot be seen by a driver may help to reduce the number of collisions of this type.
- Children (10)
    - Children's failure to look was the most commonly recorded contributory factor. Education or publicity measures aimed at increasing children's

awareness of other road users in terms of looking may be beneficial. For some of the youngest age group, education or publicity aimed at people with responsibility for the young pedestrians may also be beneficial.

- Elderly (19)
    - Failed to look properly was the most common contributory factor. Common collision scenarios included crossing within 50m of a pedestrian crossing facility and crossing in a vehicle's blind spot. Education or publicity measures aimed at this group might include these problems in particular. The delivery of such education or publicity to this group may be difficult as the pedestrians may have long-term habits and may not feel the need for re-education. A study to investigate the behaviours of this group may be beneficial in order to target the education or publicity.
- Crossing at or near a crossing (25 and 20 respectively)
    - There were a considerable number of fatalities which occurred within 50m or a crossing or where the pedestrian crossed against the pedestrian signals. Education or publicity measures to improve the correct use of crossing may help to improve safety on the roads. In addition, there were several collisions involving impaired pedestrians (alcohol or mobility) which occurred within 50m of a crossing, and several collisions where a pedestrian crossed in the blind spot in front of a vehicle at a queue at traffic signals.

Highlight dangers of pedestrians impaired by alcohol or drugs (47 collisions)

Almost half of pedestrian fatalities aged between 30 and 49 were impaired by alcohol. These collisions generally occurred on evenings/nights and at weekends. Collisions often occurred within 50m of a pedestrian crossing. Where the level of alcohol was known, it was present in high concentrations. The perceptions and behaviour of pedestrians impaired by alcohol may be different from when they were sober, and it is difficult to know whether road safety education to sober pedestrians would be heeded when they are impaired. Road safety messages could be included in general education about the dangers of alcohol.

Countermeasures to reduce the incidence of speed-related collisions

Countermeasures aimed at reducing speed may reduce the incidence of speed-related collisions, that is, collisions where the vehicle was travelling above the speed limit. These countermeasures may also reduce the number of collisions where, although the vehicle was travelling within the speed limit, a reduced speed may have prevented or reduced the severity of the collision. The particular countermeasures identified were:

Improve driver awareness of pedestrians and speed (70)

- This countermeasure, aimed at drivers, was the most common countermeasure for collisions which involved a vehicle speeding. Speeding drivers were more likely to be aged 20 to 29, and the majority occurred on a 30mph limit road at speeds between 35mph and 76mph. Some of the speed-related collisions occurred near to a pedestrian crossing facility, and some of the collisions involving elderly pedestrians were also speed-related. Education or publicity measures focused on

speed and pedestrians may help to reduce the incidence of these types of collisions.

Automated emergency brake systems (60)

- This countermeasure may avoid a collision entirely or reduce the speed of the vehicle so that the severity is reduced. These systems automatically apply the brakes when the vehicle senses an impending impact. These systems are developed by vehicle manufacturers and their penetration into the vehicle fleet may be difficult to influence.

Speed enforcement (28)

- The number of speed-related collisions may be reduced with speed enforcement. With this countermeasure, it is likely that speed enforcement at the time and location of a collision would have prevented the collision, but it is unknown whether a higher level of enforcement on locations across London would have been acted as a deterrent to reduce the driving speed. Enforcement across London would need to be targeted to locations and time periods where maximum benefit could be achieved.

Improve forward, rear and side vision of the vehicle

- There were 20 collisions (13 of which involved an HGV) where the driver's vision was affected by a vehicle blind spot. The number of such collisions could be reduced by improving the vision of the driver; by ensuring that the required mirrors are installed, or by installing sensors, or by ensuring that the mirrors and/or sensors are used.

Secondary countermeasures

- Pop up bonnets and improved bumper designs were recorded as important potential countermeasures in six collisions. However, because of the difficulty of assessing how well an improved, more forgiving vehicle structure could have performed to prevent or mitigate injuries, this is likely to be an underestimate.

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Appendix A Haddon's Matrix for pedestrian fatalities

The structure of the Haddon's matrix which guided the content analysis of the police fatal files is shown below. It was developed by the project team drawing on their previous experience of what is available in the files and what is poorly collected. The matrix was used as the basis for the coding structure of the database.

	Pedestrian	Other vehicle/s involved (information collected for each vehicle involved)		Environment
		Vehicle	**Driver**	
Pre event	*Personal characteristics:* • Age/date of birth, • gender, • ethnicity, • postcode, • UK resident, • impairment (alcohol, drugs, fatigue) • Uncorrected eyesight, illness, hearing issues, disability • Mobility • special personal circumstances *Situation:* • journey purpose, • knowledge of route/location, • pedestrian accompaniment, • travel mode if child <11 • mobile phone, reading, headphones, eating/drinking, talking/interaction, playing, • manoeuvre, • stance (standing/fall/trip) • using pedestrian crossing • compliance with signals *Equipment etc:* • high visibility clothing, • eyes/face restricted by sun glasses, hood etc • carrying a load • pushing/pulling an object	*Vehicle characteristics:* • vehicle type, • vehicle make/model, • year of registration/age • insurance, • tax, • vehicle condition, • engine type/position, • For Buses/HGVs - details of mirrors fitted and protective guards, *Situation:* • travelling speed, • manoeuvres,	*Personal characteristics:* • age, • gender, • ethnicity, • postcode, • UK resident, • impairment (e.g. alcohol, drugs, illness, fatigue), • driving licence status • conviction history, • special personal circumstances, *Situation:* • journey purpose (e.g. private/work), • journey start point • type of route • knowledge of route/location, • distractions (mobile phone/passengers), • vision affected (e.g. by parked cars, road layout, vehicle blind spot, • number of passengers, • compliance with law, • compliance with highway code, • Appropriate signalling, • vision restricted by sun glasses, hood etc	*Situation*: • date/time, • day of week, • light conditions, • weather, • road class • road type (e.g. single, dual) • Borough, • speed limit, • traffic conditions (e.g. congested) *Road layout:* • junction details, • bus lane, • guard rails, • pedestrian infrastructure, • traffic controls, • crossing type

Event	Situation: • Manoeuvres • road position, • vision affected by parked vehicles, vegetation, road layout, dazzling headlight etc) • speed (walking, running), • distractions, • first vehicle hit • impact with objects • Interaction with vehicle	Situation: • impact speed, • manoeuvres - evasion, • first object hit, • interaction with pedestrian/other vehicles • details of other vehicles involved.	*Situation:* • Impairment, • distractions (internal/external to vehicle),	*Situation:* • using crossing facility, • proximity to bus stop, • road surface (quality, state including contamination, wet), • site maintenance (e.g. potholes, ironwork, debris),
	Detailed description of the event (the 'story')			
Post Event	*Outcome:* • cause of death, • date of death, • injuries incurred.		*Outcome:* • convictions in relation to this collision, • legal advice, • counselling.	

Appendix B Database coding guidelines

B.1 Introduction

This appendix was given to the coders to assist with coding police fatal files for the Pedestrian fatality project.

The majority of responses are in one of three formats:

1. **Drop down lists**

   Select the relevant answer; if regularly using the 'other' option discuss making changes to the drop down list. If 'other' is selected specify in the notes what the 'other' is. Do not leave these entries blank: select unknown or none from the drop down menus. If unknown is not an option on the drop down list, leave field blank and raise issue.

2. **Tick boxes**

   Tick = yes, blank = no, shaded = unknown / not applicable.

3. **Free text**

   Complete as appropriate, keep text as similar between records, and as concise, as possible. Where the information is unavailable enter "unknown" in a text field or "-9" in a numerical field.

The accident reference number is a unique reference that identifies each collision in the database and comprises the police force reference (01 for all of these files), the last two digits from the year and the 7 digit reference from the police (on the front of the file in pencil), for example, 0107TE00017. The database can be linked to the STATS19 report of the collision using this reference.

B.2 Guidance for each table/form/variable in database

B.2.1 Environment

The "Environment" form summarises the key circumstance of the collision. Several fields should be prefilled from the STATS19 records, although these will need to be checked, and additional information added.

Variable	Comments
ID	This is an automatically generated number field. This field does not need checking or changing.
Coded by	
STATS19 accident reference number	This is assigned to an accident by the police and consists of 11 digits. Where the STATS19 data has been prefilled this field will already be completed and accident records should be found by filtering on this field.
Accident date	Entered in the format dd/mm/yyyy. All dates in the pedestrian database are prefilled from STATS19 as 1st of the month change to the correct date.
Accident time	Enter in the format hh:mm using the 24 hour clock.
Light conditions	

Weather	This should have been prefilled with STATS19 data; however, the STATS19 list is different to the fatal files list so some records will need adjusting.
Speed limit	The speed limit of the road at the time of the collision, i.e. the maximum speed that any vehicle can travel. If a temporary speed limit is in operation then record this rather than the permanent speed limit on the road.
Borough	Filled in from STATS19
Road Class	Filled in from STATS19
Road Type	Filled in from STATS19
Traffic conditions	Light, Moderate, Heavy but free flowing, Heavy stop/start, Unknown
Bus lane	Was there a bus lane present at the scene of the collision that could have influenced the behaviour of the vehicles involved? If a bus lane is present but on the opposite side of the road to all vehicles involved in the collision this is unlikely to have contributed and hence tick box should be left blank.
Proximity to bus stop (pedestrian database only)	Rough distance to bus stop
Traffic control	Look at photographs and description if none seen or described mark as 'no', if seen or observed tick yes, else leave as unknown
Junction detail	filled in from STATS19
Road surface condition	filled in from STATS19
Site maintenance	Select none if none stated, only use unknown if collision circumstances are very unclear.
High friction surfacing	If described then yes. If not mentioned, then put unknown. Do not rely on photos.
Conflicts	Write code for conflict, see B.7
Story/Summary Text	This should concentrate on answering three main questions: what was the pedestrian/PTW doing before the collision? How did the pedestrian/PTW interact and what happened next. The story must be anonymous.
Road closed following acc?	If file says that road was closed then yes, if not mentioned then unknown
Pedestrian crossing type (pedestrian database only)	
Guard rails (Pedestrian database only)	look at photographs and description if none seen or described mark as 'no' else leave as unknown
Distance to crossing (Pedestrian database only)	
Pedestrian flow conditions (pedestrian database only)	Light: Pedestrians can move freely Moderate: Pedestrians occasionally interrupt each other's movement on the footway Heavy: Pedestrians often interrupt each other's movement on the footway
Roadworks or construction site present	
Shared space / pedestrianised	Shared space: A street shared by all modes of traffic that has no clearly defined boundaries of segregation Pedestrianised: A street which generally has no vehicular access

B.2.2 Pedestrian data

Variable	Comments
Pedestrian ID	A number that is unique within each accident in order to identify a selected pedestrian fatality. Usually there will only be one pedestrian fatality per accident so the pedestrian ID will be 1
1st vehicle hit by	The vehicle ID of the first vehicle to make contact with the pedestrian.
Age	
Date of birth	
Gender	
Ethnicity	
Postcode	Home postcode of the pedestrian.
Nationality	Was the pedestrian from the local area, from a nearby area or a visitor from another county or country?
Mobility	Assume none if not mentioned, or unknown if details are unclear.
Alcohol	Tick if pedestrian was IMPAIRED by. If not mentioned, assume none. Unknown if details are unclear
Drugs	
Fatigue	
Uncorrected, defective eyesight	
Hearing issues	
Other relevant illness or disability	
Journey purpose	
Knowledge of route/location	Regular commuting: journeys taken on most days of the week Familiar: journeys that have been taken before, but not on a regular basis unfamiliar: unknown routes
Pedestrian accompaniment	
Walking dog	Pedestrian distractions If not mentioned, assume none. Unknown if details are unclear
Eating & drinking	
Reading	
Mobile to ear	
Headphones	
Other interaction with mobile	
Talking to other pedestrians	
Yelling across road	
Following other pedestrians	
Playing	
Other	
Manoeuvre	
Stance	If not mentioned use ‘standing’. ‘Standing includes walking, running

Travel mode (if child <11)	
Pushing/Pulling	if not mentioned use none, use unknown if details are unclear
Pedestrian using crossing	Was pedestrian using the pedestrian crossing – includes refuge with no control. If unclear then unknown
Compliance with signals	Tick yes if the pedestrian crossed on green man (or flashing) phase. No if red man phase. Unknown if unclear
High visibility clothing	
Carrying load	
Evasion attempted	
Eyes/face covered/restricted by?	Assume none if not specifically stated that item restricted vision. If item mentioned but unclear whether it contributed to accident, select unknown
Line of vision affected by	If 'other' please specify in the pedestrian special details what this is and possibly give extra detail here. For example, vision may have been affected by a passing car.
Pedestrian speed	
Impact with objects	
Pedestrian trajectory	
Cause of death: Injury to	
Date of death	
Special personal circumstances	
wearing dark clothing at night'	

B.2.3 Other vehicle

Variable	Comments
Environment ID	Automatically completed from Environment form
Vehicle ID	The ID given to the other vehicle in the accident (must be completed)
Registration plate year	http://www.motorcycle.co.uk/reference-material/uk-registration-letters.aspx
Veh make	
Veh model	
Insurance	Tick if valid insurance mentioned, blank if definitely not, else unknown
Tax	Tick if valid tax mentioned, blank if definitely not, else unknown
Pre event vehicle condition	Was there any damage to the vehicle before the collision which may have contributed to the collision taking place? write 'unknown' if not stated
Engine type	
Engine position	
Offside main mirror	HGV and buses only
Nearside main mirror	
Offside wide angle mirror	
Nearside wide angle mirror	
Close proximity mirror	

Front mirror	
Off-side protective guard	
Near-side protective guard	
Driver age	
Driver gender	
Driver ethnicity	
Driver postcode	
Driver nationality	
Driving licence appropriate?	
Journey purpose	
Journey start point	enter a postcode or address
Knowledge of route/location	
Driver distraction	Assume none if not mentioned, or unknown if details are unclear. Select only if directly contributory to the collision
Driver impairment	Assume none if not mentioned, or unknown if details are unclear. Select only if directly contributory to the collision
Vision restriction	
Number of occupants/passengers	not including the driver
Manoeuvre	
Appropriate signalling	
Compliance with law	
If no state non compliance with law	
Compliance with highway code	
If no state non compliance with HC	
Line of vision affected by	
Evasion attempted Long	
Min travelling speed	Take information from police officer's report and not from the witness statements.
Max travelling speed	
Min impact speed	
Min impact speed	
1st point of impact with PTW	12 = front, 3 = left, 6 = rear, 9 = back etc
1st object hit	
Was vehicle driveable after acc?	
Conviction history	
Drink driving	Convictions as a result of this collision. Use the DVLA offence codes. So for example

Speeding	if the driver was convicted of driving without due care and attention, this should be recorded as Careless driving.
Careless driving	
Dangerous driving	
Construction & use	
Other motoring offences	
Special personal circumstances	
Legal advice	
Counselling	

B.3 Countermeasures/interventions

These are listed in Appendix C

B.4 Notes

Use to record important elements which are not recorded elsewhere.

B.5 Convictions

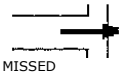
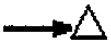
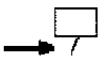
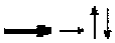
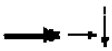
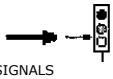
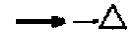
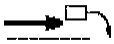
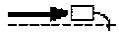
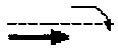
Code	Accident Offences
AC10	Failing to stop after an accident
AC20	Failing to give particulars or to report an accident within 24 hours
AC30	Undefined accident offences
Disqualified Driver	
BA10	Driving while disqualified by order of court
BA30	Attempting to drive while disqualified by order of court
Careless Driving	
CD10	Driving without due care and attention
CD20	Driving without reasonable consideration for other road users
CD30	Driving without due care and attention or without reasonable consideration for other road users
CD40	Causing death through careless driving when unfit through drink
CD50	Causing death by careless driving when unfit through drugs
CD60	Causing death by careless driving with alcohol level above the limit
CD70	Causing death by careless driving then failing to supply a specimen for alcohol analysis
CD71	Causing death by careless driving then failing to supply a specimen for drug analysis
Construction & Use Offences	
CU10	Using a vehicle with defective brakes

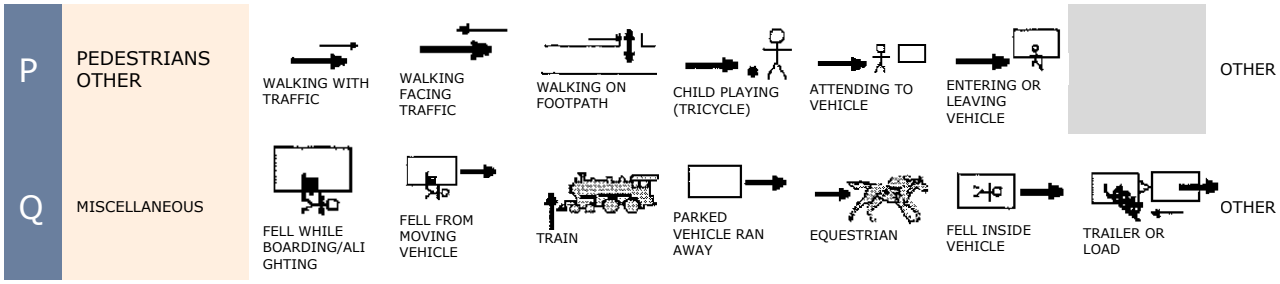
CU20	Causing or likely to cause danger by reason of use of unsuitable vehicle or using a vehicle with parts or accessories (excluding brakes, steering or tyres) in a dangerous condition
CU30	Using a vehicle with defective tyre(s)
CU40	Using a vehicle with defective steering
CU50	Causing or likely to cause danger by reason of load or passengers
CU80	Breach of requirements as to control of the vehicle, mobile telephones etc
Reckless/Dangerous Driving	
DD40	Dangerous Driving
DD60	Manslaughter or culpable homicide while driving a vehicle
DD80	Causing death by dangerous driving
Drink or Drugs	
DR10	Driving or attempting to drive with alcohol level above limit
DR20	Driving or attempting to drive while unfit through drink
DR30	Driving or attempting to drive then failing to supply a specimen for alcohol analysis
DR31	Driving or attempting to drive then failing to supply a specimen for drug analysis
DR40	In charge of a vehicle while alcohol level above limit
DR50	In charge of a vehicle while unfit through drink
DR60	Failure to provide a specimen for alcohol analysis in circumstances other than driving or attempting to drive
DR61	Failure to provide a specimen for drug analysis in circumstances other than driving or attempting to drive
DR70	Failing to provide specimen for breath test
DR80	Driving or attempting to drive when unfit through drugs
DR90	In charge of a vehicle when unfit through drugs
Insurance Offences	
IN10	Using a vehicle uninsured against third party risks
Licence Offences	
LC20	Driving otherwise than in accordance with a licence
LC30	Driving after making a false declaration about fitness when applying for a licence
LC40	Driving a vehicle having failed to notify a disability
LC50	Driving after a licence has been revoked or refused on medical grounds
Miscellaneous Offences	
MS10	Leaving a vehicle in a dangerous position
MS20	Unlawful pillion riding

MS30	Play street offences
MS50	Motor racing on the highway
MS60	Offences not covered by other codes as appropriate
MS70	Driving with uncorrected defective eyesight
MS80	Refusing to submit to an eyesight test
MS90	Failure to give information as to identity of driver etc.
Motorway Offences	
MW10	Contravention of Special Roads Regulations (excluding speed limits)
Pedestrian Crossings	
PC10	Undefined Contravention of Pedestrian Crossing Regulations
PC20	Contravention of Pedestrian Crossing Regulations with moving vehicle
PC30	Contravention of Pedestrian Crossing Regulations with stationary vehicle
Speed Limits	
SP10	Exceeding goods vehicle speed limits
SP20	Exceeding speed limit for type of vehicle (excluding goods or passenger vehicles).
SP30	Exceeding statutory speed limit on a public road
SP40	Exceeding passenger vehicle speed limit
SP50	Exceeding speed limit on a motorway
SP60	Undefined speed limit offence
Traffic Direction and Signs	
TS10	Failing to comply with traffic light signals
TS20	Failing to comply with double white lines
TS30	Failing to comply with a 'Stop' sign
TS40	Failing to comply with direction of a constable/warden
TS50	Failing to comply with a traffic sign (excluding 'stop' signs, traffic lights or double white lines)
TS60	Failing to comply with a school crossing patrol sign
TS70	Undefined failure to comply with a traffic direction sign

B.6 Boroughs and Inner/Outer London

B.7 Conflict options

	TYPE	1	2	3	4	5	6	7	8
A	OVERTAKING AND LANE CHANGE	 PULLING OUT OR CHANGING LANE TO RIGHT	 HEAD ON	 CUTTING IN OR CHANGING LANE TO LEFT	 LOST CONTROL (OVERTAKING VEHICLE)	 SIDE ROAD	 LOST CONTROL (OVERTAKEN VEHICLE)	 WEAVING IN HEAVY TRAFFIC	OTHER
B	HEAD ON	ON STRAIGHT	 CUTTING CORNER	 SWINGING WIDE	 BOTH OR UNKNOWN	 LOST CONTROL ON STRAIGHT	 LOST CONTROL OF CURVE		OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	OUT OF CONTROL ON ROADWAY	 OFF ROADWAY TO LEFT	 OFF ROADWAY TO RIGHT					OTHER
D	CORNERING	 LOST CONTROL TURNING RIGHT	 LOST CONTROL TURNING LEFT	 MISSED INTERSECTION OR END OF ROAD					OTHER
E	COLLISION WITH OBSTRUCTION	PARKED VEHICLE	 ACCIDENT OR BROKEN DOWN	 NON-VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	 WORKMAN'S VEHICLE	 OPENING DOOR			OTHER
F	REAR END	SLOW VEHICLE	 CROSS TRAFFIC	 PEDESTRIAN	QUEUE	 SIGNALS	 OTHER		OTHER
G	TURNING VERSUS SAME DIRECTION	 REAR OF LEFT TURNING VEHICLE	 LEFT SIDE SIDE SWIPE	 STOPPED OR TURNING FROM LEFT SIDE	 NEAR CENTRE LANE	 OVERTAKING VEHICLE	 TWO TURNING		OTHER
H	CROSSING (NO TURNS)	 RIGHT ANGLE (70 TO 110 DEGREES)							OTHER
J	CROSSING (VEHICLE TURNING)	 RIGHT TURN RIGHT SIDE	 LEFT TURN LEFT SIDE	 TWO TURNING					OTHER
K	MERGING	LEFT TURN IN	RIGHT TURN IN	TWO TURNING					OTHER
L	RIGHT TURN AGAINST	STOPPED WAITING TO TURN	MAKING TURN						OTHER
M	MANOEUVRING	PARKING OR LEAVING	"U" TURN	"U" TURN	DRIVEWAY MANOEUVRE	PARKING OPPOSITE	ANGLE PARKING	REVERSING DOWN ROAD	OTHER
N	PEDESTRIANS CROSSING ROAD	LEFT SIDE	RIGHT SIDE	LEFT TURN LEFT SIDE	RIGHT TURN RIGHT SIDE	LEFT TURN RIGHT SIDE	RIGHT TURN LEFT SIDE	MANOEUVRING VEHICLE	OTHER



B.8 Contributory factor codes

The figure below, reproduced from Stats20 (DfT, 2004) shows the contributory factors used in STATS19 which were used for this project, and brief guidelines on how to record the contributory factors. Further definitions are given in Stats20 (DfT, 2004).

MG NSRF/D

CONTRIBUTORY FACTORS

Sept. 2004

1. Select up to six factors from the grid, relevant to the accident.
2. Factors may be shown in any order, but an indication must be given of whether each factor is **very likely (A)** or **possible (B).**
3. Only include factors that you consider contributed to the accident. (i.e. do NOT include "Poor road surface" unless relevant).
4. More than one factor may, if appropriate, be related to the same road user.
5. The same factor may be related to more than one road user.
6. The participant should be identified by the relevant vehicle or casualty ref no. (e.g. 001, 002 etc.), preceded by "V" if the factor applies to a vehicle, driver/rider or the road environment (e.g. V002), or "C" if the factor relates to a pedestrian or passenger casualty (e.g. C001).
7. Enter U000 if the factor relates to an uninjured pedestrian.

Road Environment Contributed	101 Poor or defective road surface	102 Deposit on road (e.g. oil, mud, chippings)	103 Slippery road (due to weather)	104 Inadequate or masked signs or road markings	105 Defective traffic signals	106 Traffic calming (e.g. speed cushions, road humps, chicanes)	107 Temporary road layout (e.g. contraflow)	108 Road layout (e.g. bend, hill, narrow carriageway)	109 Animal or object in carriageway	
Vehicle Defects	201 Tyres illegal, defective or under-inflated	202 Defective lights or indicators	203 Defective brakes	204 Defective steering or suspension	205 Defective or missing mirrors	206 Overloaded or poorly loaded vehicle or trailer				
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) — Injudicious Action	301 Disobeyed automatic traffic signal	302 Disobeyed 'Give Way' or 'Stop' sign or markings	303 Disobeyed double white lines	304 Disobeyed pedestrian crossing facility	305 Illegal turn or direction of travel	306 Exceeding speed limit	307 Travelling too fast for conditions	308 Following too close	309 Vehicle travelling along pavement	310 Cyclist entering road from pavement
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) — Driver/Rider Error or Reaction	401 Junction overshoot	402 Junction restart (moving off at junction)	403 Poor turn or manoeuvre	404 Failed to signal or misleading signal	405 Failed to look properly	406 Failed to judge other person's path or speed	407 Passing too close to cyclist, horse rider or pedestrian	408 Sudden braking	409 Swerved	410 Loss of control
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) — Impairment or Distraction	501 Impaired by alcohol	502 Impaired by drugs (illicit or medicinal)	503 Fatigue	504 Uncorrected, defective eyesight	505 Illness or disability, mental or physical	506 Not displaying lights at night or in poor visibility	507 Cyclist wearing dark clothing at night	508 Driver using mobile phone	509 Distraction in vehicle	510 Distraction outside vehicle
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) — Behaviour or Inexperience	601 Aggressive driving	602 Careless, reckless or in a hurry	603 Nervous, uncertain or panic	604 Driving too slow for conditions or slow vehicle (e.g. tractor)	605 Learner or inexperienced driver/rider	606 Inexperience of driving on the left	607 Unfamiliar with model of vehicle			
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) — Vision Affected by	701 Stationary or parked vehicle(s)	702 Vegetation	703 Road layout (e.g. bend, winding road, hill crest)	704 Buildings, road signs, street furniture	705 Dazzling headlights	706 Dazzling sun	707 Rain, sleet, snow or fog	708 Spray from other vehicles	709 Visor or windscreen dirty or scratched	710 Vehicle blind spot
Pedestrian Only (Casualty or Uninjured)	801 Crossing road masked by stationary or parked vehicle	802 Failed to look properly	803 Failed to judge vehicle's path or speed	804 Wrong use of pedestrian crossing facility	805 Dangerous action in carriageway (e.g. playing)	806 Impaired by alcohol	807 Impaired by drugs (illicit or medicinal)	808 Careless, reckless or in a hurry	809 Pedestrian wearing dark clothing at night	810 Disability or illness, mental or physical
Special Codes	901 Stolen vehicle	902 Vehicle in course of crime	903 Emergency vehicle on a call	904 Vehicle door opened or closed negligently						*999 Other – Please specify below

	1st	2nd	3rd	4th	5th	6th
Factor in the accident						
Which participant? (e.g. V001, C001, U000)						
Very likely (A) or Possible (B)						

* If 999 Other, give brief details .....

(Note: Only use if another factor contributed to the accident **and include it in the text description of how the accident occurred**)

These factors reflect the reporting officer's opinion at the time of reporting and may not be the result of extensive investigation

UNCLASSIFIED

Appendix C List of available countermeasures and descriptions

This appendix provides a comprehensive list of interventions to improve pedestrian safety in London, including those considered by the researchers to be appropriate for the cases investigated. The list has been compiled based on published work, readily available grey literature and inputs from TRL and Transport for London pedestrian experts.

The interventions are grouped into the following types based on the Haddon's matrix:

- Primary safety interventions - those that may prevent the collision from occurring in the pre-collision phase;
- Secondary safety interventions - those that may reduce the severity of the injuries in the collision phase.

Within these groups the interventions have been further divided into three groups (the 3 E's):

- Engineering (environment and vehicles),
- Education (including training and publicity),
- Enforcement.

Some interventions include activity in more than one of the three E's. The three E's are commonly understood areas of activity within road safety. The funding, resources, skills and people charged with delivering each of these types of activity are often distinct. Sometimes, the interventions themselves are not so distinctly categorised. In such cases, the intervention has been assigned to one category (Engineering, Education or Enforcement), but the relevance to other categories has been noted. Working across these boundaries is strongly encouraged and can be expected to lead to improved delivery. For example, publicity advising of changes to enforcement practices is expected to lead to greater compliance, and therefore improved safety, than would be achieved with enforcement alone.

	Primary (collision prevention)	**Secondary (Injury prevention)**
Engineering - Road	1.1.1 Footway widening 1.1.2 Carriageway narrowing 1.1.3 Removal of on-street parking 1.1.4 Reduce speed limit or create 20mph zones 1.1.5 Provide traffic calming 1.1.6 The use of advanced stop signs at pedestrian crossings 1.1.7 Use raised pedestrian crossings 1.1.8 (Other) improvements to existing pedestrian crossing facilities 1.1.9 Provide or re-site pedestrian crossings 1.1.10 Provide a central refuge 1.1.11 Measures at signal-controlled junctions 1.1.12 Improve existing street lighting 1.1.13 Install street lighting 1.1.14 Introduce guard railings 1.1.15 Pedestrianisation/home zones/play streets	2.1.1 Traffic calming interventions targeted at reducing vehicle speeds
Engineering - Vehicle	1.2.1 Improve forward, rear and side vision for large vehicles – mirrors 1.2.2 Improve forward, rear and side vision for large vehicles – CCTV 1.2.3 Improve forward, rear and side vision for large vehicles – sensors 1.2.4 Automated emergency brake systems 1.2.5 'Noise' for electric cars 1.2.6 Intelligent speed Adaptation (ISA) 1.2.7 Improved conspicuity of the vehicle	2.2.1 Improved side guards on heavy goods vehicles 2.2.2 Vehicle design standards 2.2.3 Pop-up bonnets and improved bumper design

Education – Pedestrians	1.3.1 Improved pedestrian awareness of other road users 1.3.2 Highlight the dangers of pedestrians crossing the road whilst distracted with earphones, texting on the phone. 1.3.3 Improved pedestrian conspicuity 1.3.4 Highlight the dangers of pedestrians impaired by alcohol or drugs	
Education - Drivers	1.4.1 Improve driver awareness of pedestrians and speed 1.4.2 Work related road safety training – bus drivers 1.4.3 Roadworthiness of vehicle	2.4.1 Reducing speed 2.4.2 Ensuring good roadworthiness of vehicle
Enforcement - Drivers	1.5.1 Speed enforcement 1.5.2 Drinking and driving 1.5.3 Driving/riding without a licence/uninsured 1.5.4 General traffic law enforcement	2.5.1 Speed enforcement

1 Primary interventions

These interventions are measures that may have prevented the collision from occurring.

1.1 Engineering - Road

1.1.1 Footway widening

This should be coded when for example

- The footway was overly narrow (less than 1.2m) or was particularly overcrowded causing the pedestrian to be in the carriageway which led to the conflict.

Footway widening is likely to result in improved pedestrian safety and reduce conflict with traffic. Footways less than 1.2m wide can be difficult to use and can make it necessary for pedestrians to step into the carriageway to pass each other, causing potential conflicts with vehicles.

1.1.2 Carriageway narrowing

This should be coded when:

- Small reductions in speed may have enabled the collision to have been avoided as the driver would have had more opportunity to notice the pedestrian (or to have reduced the severity of the injury – use code 2.1.1).
- Higher probability should be used where alert, compliant drivers were involved, lower probabilities where non-compliant drivers were driving recklessly or at severely excessive speed.

Carriageway narrowing has been shown to reduce average driving speeds.

1.1.3 Removal of on-street parking

This should be coded when:

- the pedestrian has emerged from between or behind parked cars and the parked vehicle obscured either the pedestrian's view of the approaching vehicle and/or the driver's view of the emerging pedestrian and removing this impediment to view might have prevented the collision.

This would be more likely to be relevant to collisions where both parties were alert and speeds were sensible, less likely if one or more parties were distracted, agitated or impaired or if other impediments to view could have been a factor (e.g. A-pillar, heavy rain).

Removal of on-street parking can help to improve pedestrian safety the presence of parked cars on the street is also associated with a reduction in travelling speed so consideration should be given as to whether this might have eroded any of the benefit of removing the parked vehicles.

1.1.4 Reduce speed limit or create 20mph zones

This should be coded when:

- Excessive speed is a contributory factor in the cause of the collision
- The driver of the vehicle was travelling at the posted speed limit but this was still too fast for conditions

- Reductions in speed may have enabled the collision to have been avoided as the driver would have had more opportunity to notice the pedestrian (or to have reduced the severity of the injury – use code 2.1.1)

It would be more likely to be effective where a driver was complying with the existing speed limit but this was still too fast for condition and less likely where existing speed limits were grossly exceeded.

1.1.5 Provide traffic calming

This should be coded when:

- The driver of the vehicle was travelling above the posted speed limit (excessive speed was a contributory factor) and failed to give way such that a reduced speed on approach could have prevented the collision (or to have reduced the severity of the injury – use code 2.1.1)

Traffic calming measures reduce vehicle speed which is associated with a substantial reduction in pedestrian injury collisions and casualty severity. These include:

- Speed humps/cushions
- Chicanes/pinch points
- Rumbleweave surfacing.

1.1.6 The use of advanced stop signs at pedestrian crossings

This should be coded when:

- Drivers running red lights, edging onto the crossing before the green light or blocking the crossing has contributed to the cause of a collision.
- Drivers of stationary large vehicles failed to see a pedestrian in front of their vehicle because of the frontal blind spot and have pulled away from rest resulting in a collision, if moving the stop line a few metres back would have enabled the driver to see the pedestrian and thus prevented the collision.

The use of advanced stop lines at crossings are designed to hold traffic back further from the crossing compared to standard crossings. Research has found that moving the stop signs further from the crossing reduces the risk of drivers running red lights, edging onto the pedestrian crossing before the green light and blocking the crossing.

1.1.7 Use raised pedestrian crossings

This should be coded when:

- drivers have failed to give way or have attempted to stop but failed to do so such that reduced speed on approach could have prevented the collision

Raised zebra or signal-controlled crossings can help to reduce vehicle speed on the approach to the crossing and encourage vehicles to give way to pedestrians.

1.1.8 (Other) improvements to existing pedestrian crossing facilities

This should be coded when:

- Collisions on a zebra crossing where drivers failed to give way or tried to but failed.

- Collisions on a crossing where added time to cross the road would have prevented the collision from occurring.
- Collisions when the pedestrian crossed at a crossing on a red man (possibly due to impatience).
- When 1.1.6 and 1.1.7 is coded.

This countermeasure includes:

- The upgrading of zebra crossings to pelican or puffin crossings;
- The use of countdown devices showing how much longer the pedestrian has to wait for the green man;
- Changes to waiting time or green man phase;
- Road markings on approach to crossings;
- Writing on the road surface reminding foreign tourists to look left/right as appropriate;
- Skid resistant surfacing on the approach to the crossing to enable drivers to stop more easily;
- Widening the crossing so that pedestrians are less likely to walk off the crossing;
- Reducing the road width at the pedestrian crossing so the pedestrians have a shorter distance to cross;
- Flashing road studs to alert drivers to the presence of the crossing
- Add a central refuge so that pedestrians have fewer lanes to cross at a time
- Coloured surfacing on crossings

1.1.9 Provide or re-site pedestrian crossings

This should be coded when:

- The pedestrian tried to cross busy/fast roads between traffic that was not expecting the pedestrian and failed to stop and there was no other crossing within 50 metres.
- The pedestrian crossed near to the crossing but not on it

This countermeasure includes the installation of appropriate crossing facilities or improved siting of pedestrian crossings (to better cater for optimum route choice and encourage pedestrians to use the crossing). Clearly this countermeasure will not be suitable for all locations.

1.1.10 Provide a central refuge

This should be coded when:

- Pedestrians have tried to cross busy/fast roads between traffic that was not expecting the pedestrian and failed to stop.

A central refuge can improve safety by providing pedestrians with a safe place to stop while crossing a busy road.

1.1.11 Measures at signal-controlled junctions

This should be coded when:

- the pedestrian crossed at a signal controlled junction such that if there was a pedestrian phase the collision could have been avoided;
- the pedestrian crossed at a signal controlled junction on a red man (possibly due to impatience).

Measures include signal strategies that shorten waiting time for pedestrians, adding a pedestrian phase and providing an all red signal. This may be achieved by using shorter cycle times or increasing the window of opportunity for the pedestrian phase. These countermeasures will tend to increase delays to vehicles and will not be suitable for all locations.

1.1.12 Improve existing street lighting

This should be coded when:

- The collision took place in darkness where street lighting is already installed but where the pedestrian was still not very conspicuous, an alert vehicle driver failed to see the pedestrian and the sight lines were such that if the pedestrian had been seen at the earliest opportunity there would have been time for the driver to react and avoid a collision or at least to have braked and reduced the collision speed to the extent that the injury severity was less.

1.1.13 Install street lighting

This should be coded when:

- The collision took place in darkness with no street lighting and the pedestrian was not very conspicuous and an alert vehicle driver failed to see the pedestrian and if there was lighting and the sight lines were such that is the pedestrian had been seen there would have been time for the driver to react and avoid the collision.

1.1.14 Introduce guard railings

This should be coded when:

- The pedestrian crossed the road at an unsuitable point and the presence of a guard rail would have prevented the pedestrian from crossing and thus prevented the collision

Guard railings are intended to reduce conflicts between pedestrians and vehicles and to discourage pedestrians from crossing the road at unsuitable points; they also keep pedestrians on overcrowded footways from spilling into the road.

1.1.15 Pedestrianisation/home zones/play streets

This should be coded:

- For appropriate busy shopping streets with high pedestrian flow
- Residential minor streets and cul-de-sacs where a child pedestrian was playing

Busy shopping streets with high pedestrian flow are good candidates for pedestrianisation or semi-pedestrianisation which excludes private traffic and public transport. Such areas are designed to provide a safer environment for pedestrians leaving the space open for uncontrolled pedestrian movement.

A home zone is appropriate for residential streets. The road is shared between the pedestrians, cyclists and motorists where no one road user has priority but through design the road may be configured to make it more favourable to pedestrians and cyclists. http://www.rudi.net/files/dft_susttravel_612270.pdf. The road should have low vehicle flows (<100 vehicles per hour at peak time) and low vehicle speeds (<20mph)

A play street is appropriate for residential streets. The road is closed to all traffic during specific hours to permit a supervised program of recreational activity to take place in the road.

1.2 Engineering -vehicles

1.2.1 Improve forward, rear and side vision for large vehicles – mirrors

This should be coded:

- When the collision involved an HGV or large vehicle and the alert driver of the vehicle looking in the appropriate areas failed to see the pedestrian because the pedestrian was in the vehicle's blind spot and a correctly adjusted mirror or additional mirror would have meant the driver would have seen the pedestrian and prevented the collision.

This intervention is largely aimed at heavy goods vehicle and bus drivers. Examples of relevant collision types include:

- Where an HGV is waiting at a pedestrian crossing and a pedestrian attempts to cross just before the lights change. When a pedestrian is very close to the front of an HGV the driver is sometimes completely unable to see them, particularly if they are not very tall. Hence, when the lights turn green the HGV driver pulls away, because they cannot see anything in front of them, and runs the pedestrian over. If the forward vision is improved such that the driver is physically able to see the pedestrian it is almost certain that the collision could be avoided.
- A vehicle that is reversing fails to see a pedestrian behind and runs them over. If the view to the rear were improved such that the third party could be seen then the collision could be avoided.

A number of different types of mirrors are fitted to large vehicles to improve the field of view for the drivers. These are intended to reduce blind spots in the immediate area surrounding the vehicle. The intention of providing these mirrors to improve the field of view for the drivers depends on them being adjusted correctly and being used before and during the turning manoeuvre. It is the driver's responsibility to adjust the vehicle mirrors correctly before each journey and to use them while driving. Thus lower probabilities should be used if there is evidence to suggest the existing mirrors were poorly adjusted. Recent European Legislation (2007/38/EC) made it mandatory for most HGVs (those registered after 1/1/2000 and >3.5 tonnes) to be retrofitted with class IV wide angle mirrors and class V close proximity/kerb mirrors. This will not affect most of the collisions studied which will pre-date implementation of this Directive. It does also not affect the frontal blind spot because class VI frontal mirrors were not included.

New trucks and buses registered since the end of 2006 will have been required by Directive 2003/97/EC to have all the new mirrors including close proximity/blind spot

mirrors at the front and side. Some of these vehicles may appear in the collisions being studied

1.2.2 Improve forward, rear and side vision for large vehicles – CCTV

This should be coded:

- When the collision involved an HGV or large vehicle and the alert driver of the vehicle looking in the appropriate areas failed to see the pedestrian because the pedestrian was blocked from view by the vehicle structure and a vehicle sensor or CCTV would have alerted the driver that a pedestrian was there and prevented the collision.
- This should be coded whenever 1.2.1 is coded for mirrors.

The position of mirrors is constrained by the required view and during one left turn manoeuvre the driver needs to check the nearside blind spot mirror to check for the presence of cyclists, the frontal mirror to check for the presence of pedestrians then the offside mirror to assess any risks from tail swing, check the nearside mirror (and possibly wide angle mirror) to monitor the positioning of the rear axle relative to the road. All of this in addition to looking forward through the windscreen. This leads to a very high workload. CCTV screens can be placed in a position that makes it easier for the driver (e.g. less head movement) to monitor the multiple locations he or she is required to. Thus the probability assigned to CCTV should be greater than for mirrors if there is evidence to suggest the driver may have been struggling to monitor all the required mirrors. However, it should be noted that some systems can give a reduced quality of picture making it more difficult to identify what an object is. Therefore consideration should be given to reducing the probability if the view would have been complex (multiple indistinct objects in view).

1.2.3 Improve forward, rear and side vision for large vehicles – sensors

This should be coded:

- When the collision involved an HGV or large vehicle and the driver of the vehicle failed to see the pedestrian either through some form of inattention or because the pedestrian was blocked from view by the vehicle structure and making the driver aware that a pedestrian was in close proximity could have prevented the collision.
- This should be coded whenever 1.2.1 is coded for mirrors.

However, a sensor system would be expected to work by identifying the presence of a pedestrian (or other vulnerable road user) in a dangerous position and sounding some form of alarm such as a visual, audible or tactile warning to attract the driver's attention to the danger. This means that in addition to blind spot collisions where 1.2.1 might be coded, it might also be effective in collisions where the pedestrian would have been visible in the mirror but as a result either of excess workload, inattention or impairment the driver failed to see them.

The HMI is likely to be critical to the success of any sensor system to ensure that the driver's attention is attracted to the correct place and to ensure the danger is understood. This may require combination with CCTV or perhaps directional alarms where the sound or visual cue comes from the location of the hazard. For the purposes of this assessment it has been assumed that the HMI will be of sufficiently high quality to

ensure adequate detection without any unintended effects through providing excess information to the driver.

Lower probabilities should be used if the driver was seriously impaired or distracted.

1.2.4 Automated emergency brake systems

This should be coded:

- When the pedestrian has been in the road at risk of collision for a period of time before collision sufficient to allow significant braking to take place (e.g. >1sec) but where the driver did not brake or braked only gently prior to impact.

Collision avoidance/mitigation systems capable of detecting pedestrians and pedal cyclists as well as vehicles are becoming available on some new vehicles. Systems will typically function by providing a warning to the driver about 2 seconds before impact and if the driver does not take avoiding action then the system will autonomously brake the vehicle at about 1 second before impact in order to either avoid the collision or, more commonly, to reduce the vehicle speed at impact and hence injury severity.

1.2.5 'Noise' for electric cars

This should be coded when:

- The pedestrian was in a collision with an electric car and it was likely that the pedestrian was not aware of the car because of the lack of noise.

Pedestrians will often tend to rely on both visual and audible cues when assessing whether a vehicle is approaching and thus whether it is safe to cross, or walk in, the road. Audible cues are particularly important for visually impaired people. Electric vehicles are becoming more common and tend to be quieter than ICE vehicles, particularly at lower speeds where engine noise is more important than tyre noise. Research in the USA (Hanna, 2009) compared the 'collision experience' of hybrid electric vehicles (HEVs) and internal combustion engine (ICE) vehicles under similar circumstances, using state collision files. A higher incidence rate of both pedestrian and pedal cycle collisions was found for HEVs. By studying a variety of collision factors, it was found that HEVs were twice as likely as ICE vehicles to be involved in a pedestrian collision when the vehicle was slowing, stopping, backing up, or entering or leaving a parking space. During these manoeuvres, Hanna (2009) considered that the difference between the levels of sound produced by the two engine types would be greatest.

The probability should be higher for this where the pedestrian was visually impaired, and/or it was a pure electric vehicle travelling at low speed. Lower probability should be used where a fully sighted pedestrian was involved and/or it was a hybrid vehicle with an operating ICE and/or the vehicle was travelling at higher speed where significant tyre noise would be expected.

1.2.6 Intelligent speed Adaptation (ISA)

This should be coded when:

- The driver of the vehicle was travelling above the posted speed limit (excessive speed was a contributory factor) and failed to give way such that a reduced speed on approach could have prevented the collision

ISA is a technology designed to influence drivers speed by using roadside beacons, transmitters or tags to convey information to the car. This could be to advise the driver when they were reaching the speed limit through visual, auditory or haptic (in which the accelerator pedal becomes harder to press) means. It could also prevent the driver from driving above the speed limit by automatic application of the brakes.

1.2.7 Improved conspicuity of the vehicle

This should be coded when:

- Where the collision was caused because the pedestrian failed to see the vehicle because the vehicle did not stand out enough (but not due to street or vehicle lighting).

Improvements to conspicuity include making the vehicle stand out using reflective strips to the side, front or rear of a vehicle.

1.3 Education - Pedestrians

1.3.1 Improved pedestrian awareness of other road users

This should be coded when:

- The following contributory factors were assigned to the pedestrian: 'pedestrian failed to look properly', 'pedestrian careless/reckless/in a hurry', 'pedestrian failed to judge the vehicle's path or speed' and an improved awareness of other road users would have prevented the collision from occurring.

Road safety education can be delivered via a variety of methods which aim to promote safe behaviour. For example pedestrians could be educated to improve awareness of other road users' needs, to develop strategies to minimise the risk of being involved in a collision, or to increase general road safety knowledge (Highway Code)., Young pedestrians are generally easier to influence than older pedestrians possibly through education in schools.

This includes improving awareness of blind spots of large vehicles.

1.3.2 Highlight the dangers of pedestrians crossing the road whilst distracted with earphones, texting on the phone.

This should be coded when:

- The pedestrian was distracted whilst crossing the road and if they were not distracted the collision would have been avoided.

1.3.3 Improved pedestrian conspicuity

This should be coded when:

- The pedestrian was wearing dark clothing at night and the alert driver would have seen the pedestrian if they were wearing light coloured clothing or a conspicuity aid.

The use of conspicuity aids, especially at night, to improve the visibility of pedestrians.

1.3.4 Highlight the dangers of pedestrians impaired by alcohol or drugs

This should be coded when:

- The pedestrian was "impaired by alcohol" or "impaired by drugs" and this contributed to the collision

1.4 Education - Drivers

1.4.1 Improve driver awareness of pedestrians and speed

This should be coded when:

- The alert driver failed to see the pedestrian, passed too close to the pedestrian, was exceeding the speed limit or travelling too fast for conditions and if they were travelling at a slower speed they would have had more time for avoidance action.

For example, drivers slowing down near schools, busy shopping areas

1.4.2 Work related road safety training – bus drivers

This should be used when:

- The pedestrian was hit by a bus or there was a bus involved which was not hit and the collision could have been avoided if the bus driver had been given specific work related training.

1.4.3 Roadworthiness of vehicle

This should be coded when:

- The vehicle was found to be not road worthy and this contributed to the collision. For example, illegal tyres, defective lights, defective brakes, defective steering, defective mirrors, overloaded or poorly loaded vehicle.

Education interventions that ensure the driver understands the importance of the roadworthiness of their vehicle should reduce the likelihood that a vehicle will respond adversely when involved in a collision, for example, very low brake fluid may result in brake failure which could affect the severity of a collision.

1.5 Enforcement - Drivers

1.5.1 Speed enforcement

This should be used when:

- The driver was travelling above the posted speed limit and this contributed to the collision

The considerations for this are similar to those described for ISA but relate to the likely effects if more police and camera based enforcement was undertaken.

1.5.2 Drinking and driving

This should be used when:

- The driver was found to be over the legal limit of alcohol **and the resultant impairment contributed to the collision**.

1.5.3 Driving/riding without a licence/uninsured

This should be used when:

- The driver was found to not have the appropriate licence and/or was uninsured

A review (Greenaway, 2004) for the Department for Transport of the extent and costs of uninsured driving in the UK reported that 5% of vehicles are being driven without insurance, uninsured drivers are more likely to be involved in a collision, more likely to be non-compliant with other road traffic requirements and obligations and potentially to be involved in other criminal activity. Education, training and publicity addressing uninsured driving could be considered with the corresponding enforcement intervention

1.5.4 General traffic law enforcement

This should be used when:

- The driver was found to be impaired by drugs and this contributed to the collision.
- The driver was found to be not displaying lights at night and this contributed to the collision.
- The driver was found to be using a mobile phone and this contributed to the collision.
- The driver was found to be driving carelessly or dangerously and this contributed to the collision.
- The driver was breaking any other traffic law and this contributed to the collision.
- The vehicle was stolen or being used in the course of a crime and this contributed to the collision

And not when the offences with separate countermeasures listed above are listed.

If a particular category was being coded in several cases this should be recorded in the notes.

Law enforcement is necessary to ensure that laws and regulations relating to pedestrian safety are complied with, particularly regarding excessive speed which is a contributory factor in many collisions.

2 Secondary interventions

These interventions are measures that may reduce the severity of the injuries in the event of a collision.

2.1 Engineering – Roads

2.1.1 Traffic calming interventions targeted at reducing vehicle speeds

This should be coded when:

- Small reductions in speed may have reduced the severity of the injury.

Higher probability should be used where alert, compliant drivers were involved, lower probabilities where non-compliant drivers were driving recklessly or at severely excessive speed.

Traffic calming measures reduce vehicle speed which is associated with a substantial reduction in pedestrian injury severity. Interventions include:

- Vehicle speed-activated signs;
- 20 mph zones;
- Speed humps and cushions;
- Chicanes and pinch points;
- Rumblewave surfacing;
- Carriageway narrowing.

2.2 Engineering - Vehicles

2.2.1 Improved side guards on heavy goods vehicles

This should be coded:

- When a pedestrian fell sideways into the side of an HGV equipped with current side guards and experienced crush injuries (AIS 3 or greater to their thorax and at least one other body region) which contributed to their fatal injury.

A project carried out by TRL for the Department for Transport studied the integration of safety guards and spray suppression for heavy goods vehicles (Knight et al., 2005). Under consideration was the development of a stronger and lower integrated structure all the way round the lower part of a heavy goods vehicle. This presents a smooth uninterrupted surface to the vulnerable road user and is usually flush with the outer edge of the vehicle and covers the wheels with very low ground clearance. The smooth surface of this structure, originally intended to enhance aerodynamic performance, has been shown through test work to prevent violent head strikes on the side of the vehicle body and the load hooks, and also prevents heavy chest strikes on the outer edge of the rear tyre. An additional benefit is that clothing and limbs are less likely to get caught or dragged by the vehicle and the pedestrian is not thrown to the ground with as much force. Computer simulation showed that smooth flat panelled side guards did offer potential for improved protection for vulnerable road users. Although, in simulation, the vulnerable road user ends up very close to the wheels and there may be a risk of limbs being run over, this design may reduce the risk of head/thorax/abdomen being run over.

It should be noted that all of this work considered the effectiveness of a sideguard when the HGV was travelling in a straight line. The effectiveness of sideguards will, at best, be much reduced in collisions where the HGV was turning left or right, particularly where the initial contact with the pedestrian was near the front of the vehicle. This is because the pedestrian will be knocked to the ground and the trailer axles will cut in to the corner. During this process the sideguard is able to pass over the top of the prone pedestrian so that they are still run over by the rear wheels.

2.2.2 Vehicle design standards – pedestrian friendly front structure

This should be coded when:

- The pedestrian was NOT run over and the pedestrian was fit and healthy and aged under 60 years (over 60 years code as a maybe) and the impact speed was under 20mph (over 20mph code as a maybe) and the pedestrian hit the front of the vehicle.

This intervention is largely aimed at vehicle design regulators. Fatal collisions involving an impact with a car often result in the pedestrian's head striking the windscreen or bonnet. In the European New Car Assessment Programme (Euro NCAP, (NCAP,2008)) tests for pedestrians have been carried out replicating child and adult pedestrian collisions at 25mph. The new cars are awarded a star rating from one (least safe) to four (most safe).

EU Regulation 78/2009 lays down requirements for the construction and functioning of motor vehicles and frontal protection systems, with the aim of reducing the number and severity of injuries to pedestrians. It outlines manufacturer and member state obligations relating to type-approval, and states that "pedestrian protection can be significantly improved by a combination of passive and active measures which afford a higher level of protection than the previously existing provisions."

Although not yet implemented, these principles could also be applied to collisions involving vans, trucks and buses.

2.2.3 Pop-up bonnets and improved bumper design

This should be coded when:

- The pedestrian was NOT run over and the pedestrian was fit and healthy and aged under 60 years (over 60 years code as a maybe) and the impact speed was under 25mph (over 25mph code as a maybe) and the pedestrian hit the bonnet of the vehicle and suffered a head injury (AIS 3 or greater) or hit the bumper of the vehicle and suffered a fatal lower limb injury (AIS 3 or greater).

In the event of a frontal impact, pop-up bonnets (also known as active hood lift systems) provide a greater clearance between the bonnet and stiff underlying structures (e.g. engine components), thus allowing for controlled deceleration of the pedestrian's head and reduced risk of head injury. Pop-up bonnets are currently available on only a few car models.

The application of an energy-absorbing layer on the bumper combined with altered bumper geometry, height and orientation can reduce the risk of lower limb injuries. Deeper bumper profiles and support bars positioned below the bumper can also reduce knee-related injury by limiting rotation of the leg.

2.3 Education - pedestrians

2.4 Education –Drivers

2.4.1 Reducing speed

This could apply when:

- Speed has been coded as a contributory factor and a reduction in speed may lead to a reduction in injury severity

2.4.2 Ensuring good roadworthiness of vehicle

This could apply if:

- If countermeasure 1.4.3 has been coded

Education interventions that ensure the roadworthiness of vehicles on the road should reduce the likelihood that a vehicle will respond adversely when involved in a collision, for example, very low brake fluid may result in brake failure which could affect the severity of a collision.

2.5 Enforcement –Drivers

2.5.1 Speed enforcement

This could apply when:

- Speed has been coded as a contributory factor and a reduction in speed may lead to a reduction in injury severity of the pedestrian.

Speed, which is a major factor in pedestrian collisions, should be controlled for example through increased use of speed cameras and enhanced enforcement of speeding laws.

Speed enforcement could be undertaken by fixed speed camera sites or by mobile enforcement.

Appendix D STATS19 overview (2007-2010)

D.1 Comparison with GB

In the last four years (2007-2010) there were 351 pedestrians killed in London, 17% of all those pedestrians killed in Great Britain (2,123) and 48% of all fatalities in London (736).

Table D-1 shows the number of pedestrians killed in London and Great Britain by year.

Table D-1: Number of pedestrian fatalities in London and Great Britain, 2007-10

Year	London[1]			Great Britain[2]		
	Pedestrian fatalities	All fatalities	% pedestrians	Pedestrian fatalities	All fatalities	% pedestrians
2007	109	222	49%	646	2,946	22%
2008	95	204	47%	572	2,538	23%
2009	89	184	48%	500	2,222	23%
2010	58	126	46%	405	1,850	22%
Total	**351**	**736**	**48%**	**2,123**	**9,556**	**22%**

[1] Reproduced from Casualties in Greater London (2007-2010): (TfL, 2008), (TfL, 2009), (TfL, 2010), (TfL, 2011)

[2] Reproduced from Reported Road Casualties Great Britain (DfT, 2011)

The percentage of fatalities that were pedestrians over the four-year period was higher in London (48%) compared with Great Britain as a whole (22%).Table D-2 shows a comparison of fatalities in London with fatalities in all urban areas in Great Britain. In urban areas in Great Britain, 45% of fatalities were pedestrians. Over the four-year period the number of pedestrian fatalities in London has reduced by 47%, compared to 37% in all urban areas in Great Britain.

Table D-2: Number of pedestrian fatalities in London and urban areas in Great Britain, 2007-10 [1 2]

Year	London[1]			Great Britain urban areas[2]		
	Pedestrian fatalities	All fatalities	% pedestrians	Pedestrian fatalities	All fatalities	% pedestrians
2007	109	222	49%	427	973	44%
2008	95	204	47%	405	883	46%
2009	89	184	48%	357	771	46%
2010	58	126	46%	270	597	45%
Total	**351**	**736**	**48%**	**1,459**	**3,224**	**45%**

[1] GB figures from Reported Road Casualties Great Britain, 2006-2010: (DfT, 2007), (DfT, 2008), (DfT, 2009), (DfT, 2010) and (DfT, 2011).

[2] London data from TfL ACCSTATS data, 2006-2010.

D.2 Pedestrian fatalities in London

D.2.1 Collision conditions

Table D-3 shows the number of pedestrian fatalities in each of the London boroughs between 2007 and 2010 (also shown in the map below, Figure D-1). Of the 351 pedestrian fatalities in the period, 201 (57%) occurred in outer London. The highest number of pedestrian fatalities occurred in Westminster (27). The number of pedestrian fatalities in a borough will depend on a number of factors, including the road length and pedestrian and vehicular traffic.

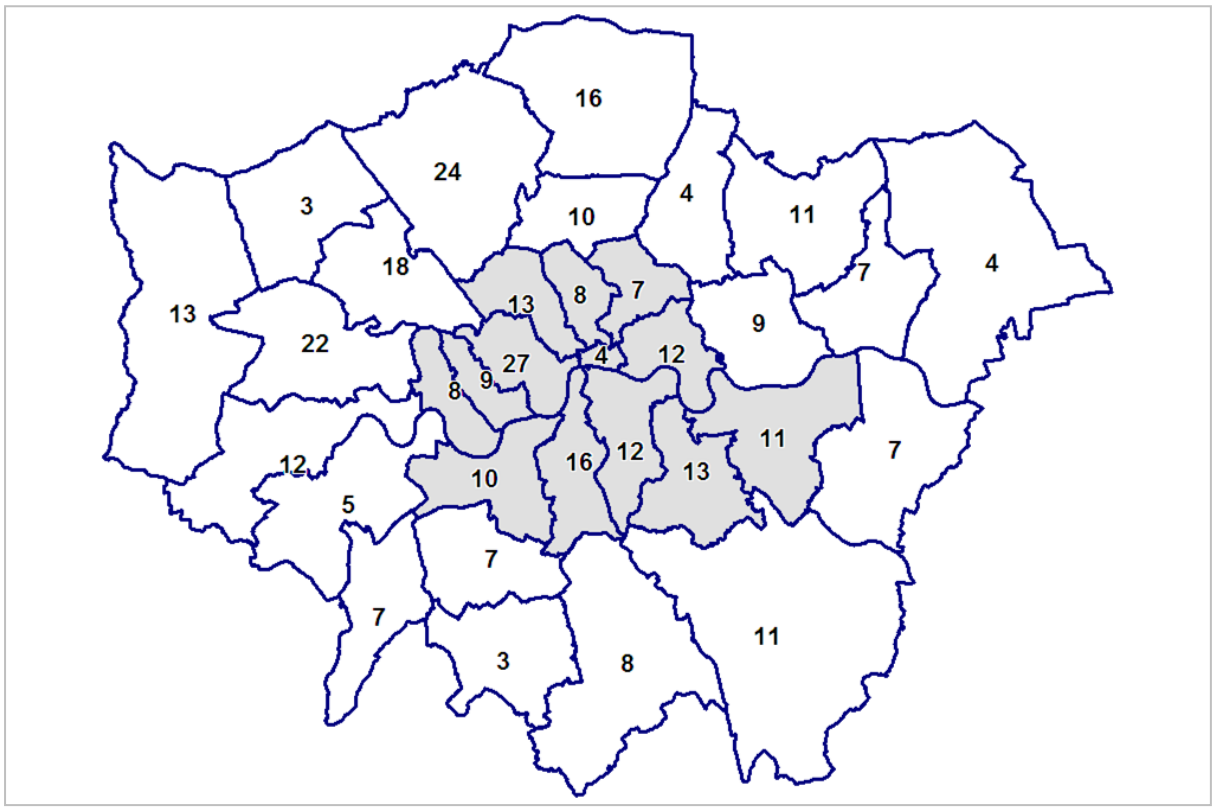


Figure D-1: Number of pedestrian fatalities by borough (2007-2010)

Table D-3: Number of pedestrian fatalities in London by borough, 2007-2010

Area	Borough	2007	2008	2009	2010	Total
Inner	Westminster	3	12	10	2	27
	Lambeth	9	5	1	1	16
	Camden	4	1	4	4	13
	Lewisham	6	2	3	2	13
	Southwark	2	4	3	3	12
	Tower Hamlets	1	5	3	3	12
	Greenwich	1	5	3	2	11
	Wandsworth	1	2	5	2	10
	Kensington & Chelsea	4	3		2	9
	Hammersmith & Fulham	5	1	1	1	8
	Islington	4	3	1		8
	Hackney		2	3	2	7
	City of London		1	2	1	4
Inner Total		40	46	39	25	150
Outer	Barnet	8	6	5	5	24
	Ealing	7	8	5	2	22
	Brent	5	5	5	3	18
	Enfield	6	3	3	4	16
	Hounslow	6	1	3	2	12
	Bromley	4	7			11
	Hillingdon	1	6	1	3	11
	Redbridge	3	2	3	3	11
	Haringey	3	3	4		10
	Newham	4		4	1	9
	Croydon	2	1	4	1	8
	Bexley	3		2	2	7
	Barking & Dagenham	3	2		2	7
	Kingston-upon-Thames	4	1	1	1	7
	Merton	4		2	1	7
	Richmond-upon-Thames	1		3	1	5
	Havering	3		1		4
	Harrow	1		2		3
	Waltham Forest		2	1	1	4
	Sutton	1	1		1	3
	Heathrow Airport		1	1		2
Outer Total		69	49	50	33	201
Grand Total		109	95	89	58	351

In total over the four year period, 68 pedestrian fatalities (19%) occurred on a Saturday compared to 39 (11%) on Sundays and Mondays. Overall the most common time period for fatalities was between 4pm and 8pm, when 28% of fatalities occurred. On a Saturday, pedestrian fatalities were most common between midnight and 4am (18 out of 68). Figure D-2 shows the distribution of pedestrian fatalities throughout the week by time period.

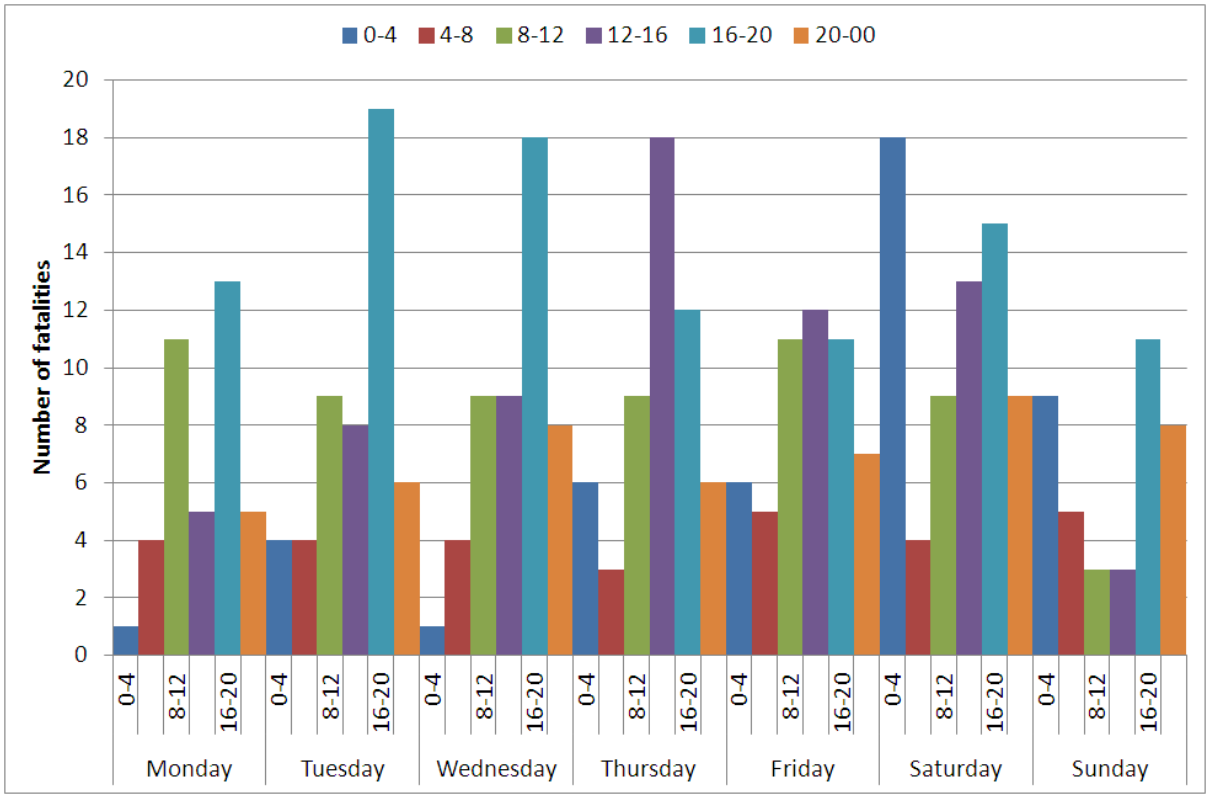


Figure D-2: Number of pedestrian fatalities by day of week and time period (2007-2010)

Note that each time group includes times up to, but not including the end of the range listed, for example, 4am is included in the 4am-8am group.

D.2.2 Pedestrians

Figure D-3 shows the distribution of pedestrian fatalities by age and sex. Overall 59% of fatalities were male, and for age groups between 0 and 59 there were more male fatalities than female fatalities but for ages 60 and above there were similar numbers of males and females.

Overall, 43% of pedestrian fatalities were age 60 or more, with 18% aged 80 or more, representing the most common age group for pedestrian fatalities. The second largest age group for pedestrian fatalities was the 20-29 age group, accounting for 15% of pedestrian fatalities

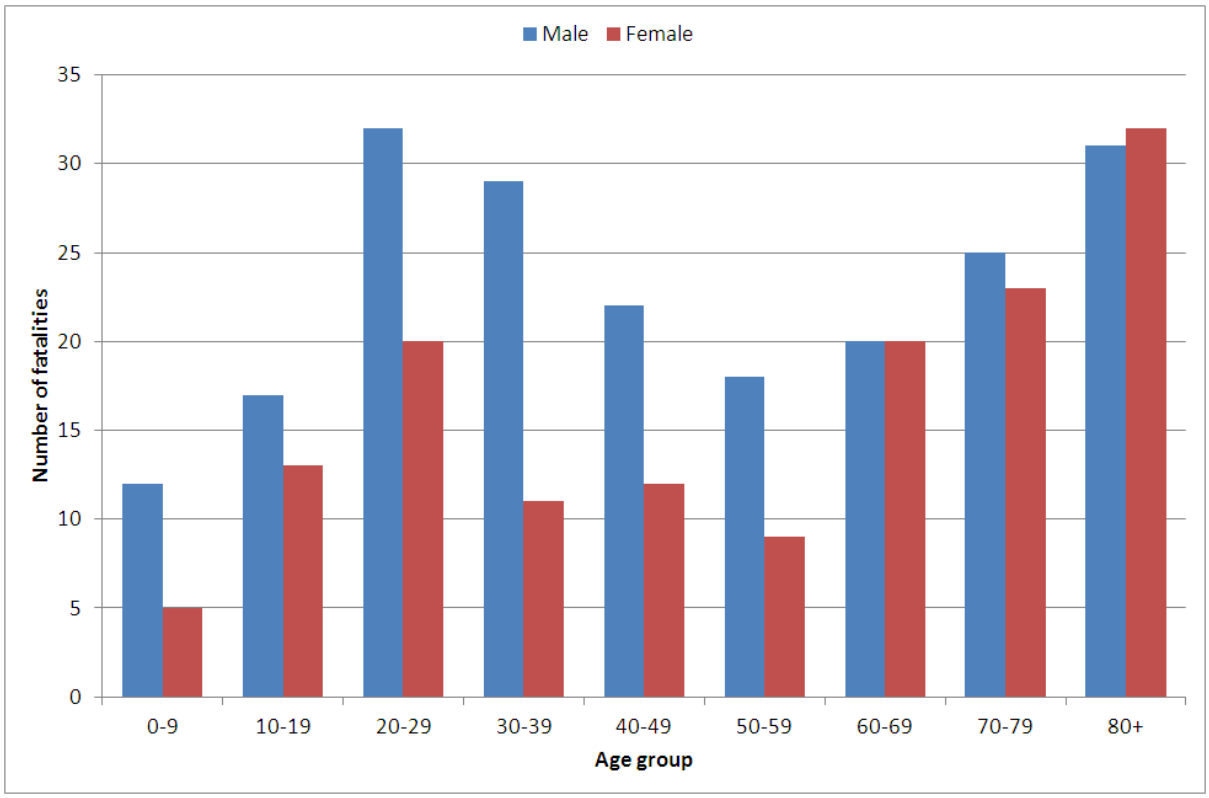


Figure D-3: Number of pedestrian fatalities by age and sex (2007-2010)

Figure D-4 shows the pedestrian fatality rate in terms of the number of pedestrian fatalities (between 2007 and 2010) per million population of Greater London (population estimates based on Office for National Statistics Population Estimates, 2011). These figures include all pedestrian fatalities, even though some of the fatalities were not London residents.

Figure D-4 shows that from the 40-49 age group, the fatality rate increases with increasing age group. The highest fatality rate was for the 80 year and over age group, with a fatality rate almost ten times greater than the 40-49 age group. For all age groups the male rate is higher than the female rate.

These figures do not take into account distance or time spent as a pedestrian for the different age groups.

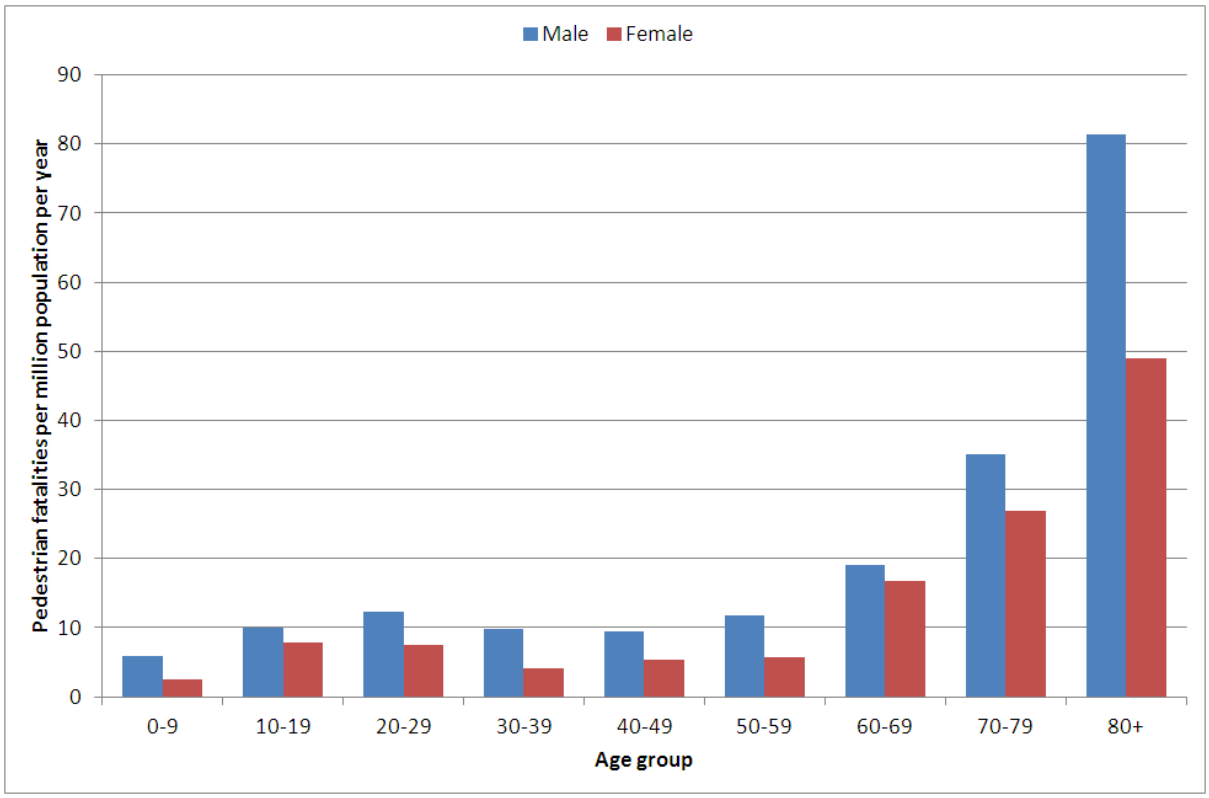


Figure D-4: Pedestrian fatality rate (fatalities per year per million population of Greater London) by age and sex (2007-2010 average)

D.2.3 Vehicles

Table D-4 shows the type of vehicles which struck the pedestrians. There were 347 vehicles involved in the 351 fatal pedestrian collisions. Of these vehicles, 193 were cars, including eight taxi or private hire vehicles and two minibuses.

Table D-4: Pedestrian fatalities London by vehicle hit by and year (2007-2010)

Vehicle Type	2007	2008	2009	2010	Total
Car	51	54	54	34	193
Bus/Coach	17	15	16	6	54
HGV	13	9	10	11	43
Motorcycle	12	8	0	4	24
LGV	10	1	4	1	16
Pedal Cycle	3	0	0	1	4
Other	3	6	3	1	13
Total	**109**	**93**	**87**	**58**	**347**

Overall, 42 vehicles failed to stop at the scene. This represented 12% of vehicles, slightly higher than the figure for all GB pedestrian fatalities (10%, derived from STATS19 data). The majority of vehicles that failed to stop in hit and run collisions with pedestrians were cars (see Table D-5).

Table D-5: Vehicles in fatal pedestrian collisions by hit and run (2007-2010)

Vehicle Type	Not hit and run	Hit and run	Total
Car	161	32	193
Bus/Coach	52	2	54
HGV	39	4	43
Motorcycle	22	2	24
LGV	14	2	16
Pedal Cycle	4	0	4
Other	13	0	13
Total	**305**	**42**	**347**

D.3 Pedestrian fatalities in London in collisions with pedal cycles and 'other vehicles'

Collisions involving a pedestrian and a pedal cycle or an 'other' vehicle (e.g. agricultural vehicle, ridden horse) were not included in this report. Fatal collisions involving pedestrians and these vehicle types were too small in number to be able to draw meaningful insights and were therefore excluded.