

Exploring the pedestrian crash problem from the perspective of injured pedestrians

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Abstract

A survey of injured pedestrians conducted by the Transport Accident Commission (TAC) explored crash circumstances and pre-crash behaviour from the perspective of pedestrians. The exploratory survey was concerned with two pedestrian groups: pedestrians aged between 16 and 39 years; and pedestrians aged 60 years plus. The sample was drawn from pedestrians injured in crashes in 40, 50 and 60 km/h speed zones in Victoria. Information sought from the pedestrians focussed on factors contributing to the crash, and the intentions and relevant actions of the pedestrian and other road users preceding the crash. The survey revealed that injured pedestrians are usually not at fault when crossing at intersections, but mostly at fault when crossing the road mid-block, they are usually injured in familiar locations while on routine journeys. A particularly problematic interaction is that of a vehicle turning right at an intersection, failing to give way to a crossing pedestrian.

Key words

Pedestrian safety, Pedestrian behaviour, Older pedestrians, Pedestrian distraction

Introduction

Pre-crash behaviour of pedestrians is poorly understood. Understanding of crash circumstances is only marginally better. Police crash reports are typically compiled from the perspective of drivers and witnesses, while observational studies tend to focus on road user actions in defined areas rather than intentions and motives across a broad range of circumstances. The objective of this research was to gain an in-depth understanding of crash circumstances and pedestrian pre-crash behaviour.

The Transport Accident Commission (TAC) pays for treatment and benefits for people injured in transport accidents. It is also involved in promoting road safety in Victoria. The TAC is a "no-fault" insurance scheme, which means that medical benefits will be paid to an injured person regardless of who caused the accident. The overarching aim of the TAC's pedestrian strategy is to prevent pedestrian accidents and to reduce the severity of injuries sustained by pedestrians in the event of a crash.

Pedestrians are heavily represented in road trauma statistics. They have higher numbers of fatalities, catastrophic claims and lengthy hospitalisation stays than other road users. Traditionally, three cohorts of the Victorian community have been most susceptible to involvement in road crashes as pedestrians:

- Children;
- Intoxicated adults (aged from around 16 to 40);
- Elderly (aged around 60-plus).

An analysis of TAC claims data reveals:

- around 14% of medical treatment costs is for injuries to pedestrians;
- pedestrians represent an increasing share of injuries in Victoria;
- claims from older pedestrians are the most costly, while claims from children pedestrians are the least costly;
- 49% of costs (from pedestrians) relate to crashes in 60 km/h zones and 25% in 50 km/h zones.

The TAC commissioned research with its clients to explore crashes from the perspective of pedestrians. Information sought from the pedestrians focussed on factors contributing to the crash, and the intentions and relevant actions of the pedestrian and other road users preceding the crash. The outputs from the research were both quantitative and qualitative in nature, helping to build an understanding of the pedestrian crash problem. No efforts were made to explore personal characteristics of pedestrians.

This research was conducted with adult pedestrians in two age groups: between 16 and 39 years of age (at time of crash); and 60 years or over. The research focussed, therefore, on the two most prevalent and costly pedestrian groups, in locations in which pedestrian activity is expected, being 40, 50 and 60 km/h speed zones. The sample was drawn from pedestrians in the TAC database involved in crashes in Victoria.

This paper presents the findings of this research.

Methodology

The primary data collection tool used for this research was a telephone-administered (CATI) survey of 200 TAC clients. The questionnaire, which was developed by the TAC, sought to collect detailed information from clients to gain a clear picture of crash circumstances and pre-crash pedestrian behaviour. A mail-out component provided supplementary information. Specifically, clients were asked to draw a sketch of their crash circumstances, noting the road environment and the presence and movements of relevant road users. The questionnaire and the mail-out were developed by the TAC and refined through a qualitative testing phase, which preceded the telephone survey. The questionnaire is attached at Appendix 1.

Sample frame

Survey participants were recruited from the TAC clients database. In both qualitative testing and the telephone survey, the sample was drawn from clients injured as pedestrians where the following conditions were satisfied:

- Client's file was linked to an accompanying police report
- Age at time of crash was either 16-39 years or 60 years plus
- Speed zone was 40, 50 or 60km/h
- Crash occurred in Victoria

The sample of clients used in qualitative testing was drawn from those clients who met the above criteria, were injured since 2008, and who had previously (in an earlier, unrelated, TAC survey) stated their interest in participating in future research.

Several additional criteria for exclusion were observed for the telephone survey:

- Crash anniversary falls within 2 weeks of survey period
- Client was catastrophically injured, or known to be deceased
- Client has participated in TAC research within previous 6 months
- Client has refused to participate in previous TAC research or asked to be excluded from future research

Qualitative testing

The TAC commissioned the Social Research Centre to conduct ten face-to-face interviews followed by ten in-depth telephone surveys with a subsequent mail-out component. This testing took place in December 2009. The purpose of the qualitative testing was to:

- Test and refine the questionnaire;
- Assess the ability of injured pedestrians to recall crash circumstances and to draw a sketch of their crash;
- Verify the accuracy and suitability of police recorded data;
- Confirm that survey did not have any negative consequences for clients.

Telephone survey

I-View was commissioned to conduct 200 telephone surveys and administer the follow-up mail-out component. The telephone survey was conducted via Computer Assisted Telephone Interview over a two week period in March 2010. Included were 110 clients aged 16-39 and 90 aged 60 and over.

Respondents were invited to provide a sketch of their crash. Those willing to provide this sketch were mailed paper, a return envelope and basic stationery items, along with instructions on how to complete the sketch.

Specific aims of this phase were to collect information that would facilitate identification of:

- typical pedestrian crash circumstances;
- risk factors in pedestrian crashes;
- whether pedestrian factors, driver factors, location characteristics and weather and other conditions contribute to pedestrian crashes;
- issues that warrant further exploration.

Client sampling for telephone interviewing was managed so that clients with accidents occurring during 2009 were sampled first, moving back chronologically to achieve the sample. The sample was, therefore, not random. Attempts were made to contact all eligible clients in the most recent crash years. Sample quotas were set to ensure 110 younger clients and 90 older clients were selected. Towards the end of the survey clients with crashes in 60km/h speed zones were given preference.

Data collation and analysis

Data from several sources was utilised to construct a comprehensive picture of the circumstances of each crash. Client responses to the questionnaire and their hand-drawn sketches provided the majority of information. Where required, data from police crash reports (including police sketches) and TAC claim forms were used to confirm client responses or compensate for missing, incomplete or inaccurate client responses.

The questionnaire and hand-drawn sketches addressed the following issues:

- confirmation of crash address and date;
- crash circumstances, including vehicle(s) and pedestrian movements, and the road and roadside environment;
- purpose and nature of walking journey;
- vehicle driver/rider behaviour;
- pedestrian pre-crash behaviour;
- distracters and impairing factors.

The following information was obtained from police crash reports:

- crash location (eg. street, speed zone, town/suburb and map references);
- crash date and time;
- classification of crash type;
- movements of the pedestrian and vehicle;
- vehicle characteristics;
- sketch and description of crash (where required).

From TAC claim forms personal characteristics (name, contact details, age and sex) were obtained.

Crashes were individually examined and manually classified into four crash types:

1. Crossing the road at an intersection (if a crash could be placed within about 20m of the intersection, does not include roundabout crashes);
2. Crossing the road mid-block for all other crossing type crashes (not at an intersection);
3. Crossing the road at or near a roundabout (within approximately 20m);
4. Other crashes – this included crashes where a pedestrian was in a car park, a driveway, on the footpath, standing/sitting on the road, or inside a building or on private property.

An estimation of fault in the causation of the crash was made, taking into account the crash location, traffic signals and controls, and the pedestrians' and police officers' judgements about fault. Where either one of the pedestrian or driver appeared to have clearly violated road rules, fault was ascribed to them. In addition, where pedestrians or drivers undertook overtly dangerous behaviour, fault also applied. In some cases fault was allocated to both parties. In some cases it was difficult to determine fault. For example, critical information such as traffic light signals may have been absent. This measure should be interpreted with a degree of caution and should be considered only an estimate.

In each case the movement of the vehicle was identified (e.g. going straight ahead, turning right), using data from all sources. The side of the road on which the pedestrian was hit (either the near or far side, relative to where the pedestrian commenced crossing) was also established.

For crashes occurring at intersections, additional information was identified:

- the type of intersection (T, cross or complex) was identified from client sketches and street directories;
- whether the vehicle was exiting or entering the intersection at the point of impact;
- whether the pedestrian was struck on the near or far side of the intersection (see Appendix 2).

The following example (case 12) demonstrates how data from each data source was utilised.

Crash type = 1 (crossing road at an intersection)

This was established by looking at the crash location data from the police report, confirmed by Q1a from the survey and the client's sketch.

Pedestrian struck on near side

Not depicted on sketch but identified from police report DCA code and confirmed by Q1b_3 in the survey.

Vehicle was exiting intersection

Depicted in the participant sketch, confirmed by the crash location information and vehicle movements in the police report and Q1b_3 in the survey.

Location in intersection classification = 7 (Right turn, exiting)

Vehicle movement information from police report combined with entering/exiting above, also depicted in the participant sketch.

Driver at fault

Pedestrian and driver both had green light as reported in Q2b and Q2c. Pedestrian believes driver was mostly at fault as reported in Q5 and was distracted as reported in Q2n.

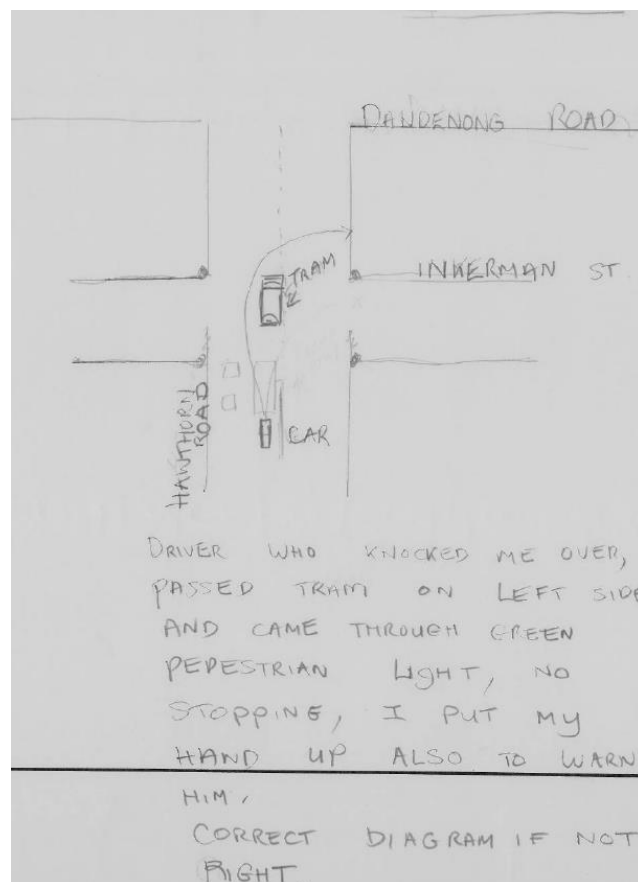


Figure 1: Pedestrian drawn sketch, Case 12

Crash location within the intersection was sometimes difficult to establish and required examining vehicle movements, entering/exiting data, pedestrian location on the near or far side of the road, police classification of crashes ('DCA' or Definitions Classifying Accidents codes), pedestrian and police sketches, survey reporting of the crash location, pedestrian and vehicle movements described in the survey, descriptions of the crashes given in the survey, and street directories.

Ethical considerations

All contact with clients was conducted in accordance with the TAC Research Charter and overseen by the TAC's Service Improvement team. All TAC clients give permission to the TAC to contact them for research purposes; however client participation in any TAC research is entirely voluntary. Client responses to this research remained anonymous, and had no impact on any aspect of the management of their insurance claim.

A letter was sent to all potential participants two weeks prior to telephone interviewing, explaining the survey and giving the clients an opportunity to opt out of the research. 33 clients contacted the TAC to request they be excluded from the research.

Telephone interview times were restricted to 9am-8pm during the week and 10am-5pm on weekends, unless otherwise directed by the respondent. All TAC research with its own clients is seen first as a client service, ensuring that research participation is a positive experience for clients, or at least a neutral experience. Interviewers were instructed never to pressure clients to provide responses, to accept "Don't know" answers and to behave with utmost courtesy and compassion during interviews.

Results

Telephone survey sample performance

In order to achieve the final sample of 200 participants, a file of 1119 potential participants was provided to the market research agency. Almost two thirds of these were aged 16-39 years. 780 of the potential participants were called to achieve the final sample. To achieve the 90 interviews with those aged 60+, 289 calls were attempted (31%), while 491 call attempts were made to call 110 clients aged 16-39 years (22%). Of participants who met all survey criteria and who were spoken with, 68% agreed to complete the survey.

The mean age of survey participants was 25 years at time of accident for the younger group and 68 years for the older group. There were marginally more female than male participants in the sample (55% v 45%).

All participants were invited to provide further information about their accidents in the form of an accident sketch. Of the 149 participants who agreed to provide sketches of their accidents, 92 returned completed sketches.

Accident Recall

Participants were asked about their recall of the accident. The majority (60%) reported they could recall all of the details of their accident, with 37% able to recall some of the accident details, and only 3% able to recall no accident details. Of the 80 participants whose recall was not complete, 45% had been subsequently informed about details they could not remember, 45% said they had not, with the remaining 10% not sure. The sources of information mentioned by clients were generally family/friends or a witness. Based on this level of recall, we can have reasonable confidence that the self report data is generally a reflection of the participant's experience of the crash.

Crash Location

A few accidents occurred in 40km/h speed zones (7%) with the majority in 50km/h or 60km/h speed zones (45% and 49% respectively). This should not be considered representative of pedestrian crashes in general, as 60km/h zones were favoured somewhat in the sampling.

Crashes generally occurred in suburban Melbourne (72%), with 10% of crashes in Melbourne's central business district and the remaining 18% in regional towns or cities. Crashes tended to occur in residential (36%), shopping (31%) or business (23%) areas.

Pedestrians were generally familiar with the area in which they were injured; 89% reported they were familiar with the area and 62% reported they had used the same crossing location on at least one occasion in the week prior to their crash. Consistent with this level of familiarity, the purposes of the pedestrians' trips reflect routine activities such as going to the shops (36%) or work/school (22%).

Crash Types

The majority (75%) of pedestrian crashes studied involved crossing the road. 40% of crashes involved crossing the road at an intersection, 31% involved crossing mid-block and 5% crossing at or near a roundabout. The remaining crashes were of various types, as illustrated in Table 1.

Table 1: Crash types by age of injured pedestrian

Crash type	% of crashes	Pedestrians aged 16-39		Pedestrians aged 60+	
		Number of crashes (n)	% of crashes	Number of crashes (n)	% of crashes
<i>Pedestrian crossing road</i>	75%	78	71%	71	79%
Crossing intersection	40%	38	35%	41	46%
Crossing mid-block	31%	37	34%	24	27%
Crossing roundabout	5%	3	3%	6	7%
<i>Pedestrian not crossing road</i>	26%	32	29%	19	21%
Car off-road / out of control	7%	10	9%	4	4%
Standing/Walking on road	4%	7	6%	1	1%
Private/Friendly	4%	4	4%	4	4%
Car-park	3%	3	3%	3	3%
Driveway cross-over footpath	3%	3	3%	2	2%
Struck while boarding/alighting	3%	3	3%	2	2%
Fall while boarding/alighting	2%	1	1%	2	2%
Other	1%	1	1%	1	1%

The younger age group was involved in relatively fewer intersection crashes and more mid-block and other types of crashes than the older group.

Intersection Crashes

Most intersection crashes occurred at cross intersections (62%), with a third at T- intersections and 4% at complex intersections.

Pedestrians were most often involved in intersection crashes with a vehicle turning right (58%), with 22% of crashes involving the vehicle going straight ahead and the remaining 20% involving the vehicle turning left. In 77% of intersection crashes, the vehicles were exiting the intersection. Vehicles entering the intersection accounted for 17% of cases, with the remaining 6% unknown.

The most common intersection crash scenario, accounting for 54% of intersection crashes, involved pedestrians being hit by a vehicle exiting the intersection after turning right. In this particular scenario the pedestrians were usually finishing crossing and were on the far side of the road (63%), meaning that vehicles would have come from behind pedestrians, making it difficult for pedestrians to take evasive action. In fact, in the majority of these 'right turning exiting' crashes the pedestrians reported that they did not see the vehicle coming. Examination of the case studies reveals that in most of these cases, traffic lights were present and were green for the pedestrian and the driver too. In 30% of intersection cases no traffic lights were present. Of those intersection cases that had traffic lights, signals were most often green for the driver and pedestrian. The incidence of crossing against red signals or red light running is reasonably low in intersection crashes. Participants had difficulty in recalling lights that applied to the driver, so these results should be viewed with some caution.

Table 2: Signals applicable to pedestrians and drivers in crossing at intersection cases where traffic lights were present (n= 55)

	Red/ Don't Walk	Amber/ Flashing	Green/ Walk	Unknown
Ped Signals	9%	7%	74%	9%
Driver Signals	11%	4%	51%	34%

It is clear from an examination of case studies that in many of the crossing at intersection cases where the driver was at fault, there were elements of the crash that made seeing the pedestrian difficult: night, low light, dark clothing or rain were common, with multiples of these conditions sometimes present.

Mid-block crashes

There were 61 cases (31% of sample) that involved pedestrians being struck while attempting to cross a road mid-block. The most common mid-block crash scenario (72% of cases) is that of a vehicle travelling straight. In these situations the pedestrian is more commonly struck on the near side of the road, in approximately 70% of cases. Thirteen cases (22%) involved pedestrians who were crossing at a signalised pedestrian crossing or a zebra crossing.

Pedestrians are frequently struck by vehicles reversing out of parking spaces, or reversing along the road. One-fifth of the case studies involved reversing vehicles.

In 64% of mid-block cases pedestrians reported that an intersection was within 50 metres of the crash location. And in 64% of crossing mid-block cases pedestrians thought the gap in traffic was sufficient to allow safe crossing.

Participants were asked if the driver had recently turned into the road on which the pedestrian was struck or just pulled out of a parking spot. This was the case in approximately one-third of mid-block crashes.

There were just 5 cases in the sample that involved a pedestrian emerging from between parked cars and being struck by a vehicle on the near side of the road. Another 5 cases involved a pedestrian crossing the road between vehicles queued at intersections.

Pedestrians injured in mid-block crashes were asked to estimate how long they had been waiting at the side of the road prior to crossing. 26% reported that they didn't wait, 44% waited less than 30 seconds and 20% waited longer than 30 seconds (10% could not recall how long they had waited).

Some key differences between crossing at intersection and mid-block

There were significant differences between the crossing at intersection and crossing mid-block cases when looking at the location of the pedestrian on the road. Pedestrians crossing at an intersection were more likely to be hit on the far side of the road than the near side. In contrast, near side crashes were more frequent in crossing mid-block cases.

Table 3: Location of pedestrian on the road at the time of the crash (n= 138)

	Near side	Far side	Unknown	Total
Crossing at intersection	41%	51%	9%	100%
Crossing mid-block	58%	20%	22%	100%

There were significant differences in estimated fault according to the type of crash. In over three quarters of crossing at intersection cases the driver was estimated to have been at fault, compared to just under half the crossing mid-block cases. In comparison, in crossing mid-block cases, pedestrians were more likely to be estimated as at fault than in crossing at intersection cases. Due to lack of details and "don't know" answers in some cases, it was more difficult to determine fault in crossing mid-block cases.

Table 4: Estimated at fault party in pedestrian crossing at intersection cases and crossing mid-block cases (n = 138)

	Driver only	Pedestrian only	Both parties	Unclear
Crossing at intersection	79%	10%	5%	6%
Crossing mid-block	44%	30%	3%	23%

There were differences between crossing at intersection and mid-block cases with respect to pedestrian distraction. Few pedestrians reported being distracted at intersection crashes (9%), while significantly more reported they were distracted in mid-block crashes (23%).

Table 5: Distraction and impairment present in crossing road at intersection and mid-block cases (n = 138)

	Crossing at intersection	Crossing mid-block
Alcohol	10%	15%
Fatigued	6%	8%
Stressed	9%	10%
Listening to music	5%	10%
Talking to others	4%	8%
Distracted	9%	23%

Light conditions were classed as either difficult or not. Sun glare, night time (irrespective of street lighting) and low light (dawn or dusk) were all classified as difficult, with day time crashes (either clear or overcast) classed as easier conditions. In significantly more intersection cases than mid-block cases the light conditions were difficult (41% difficult at intersection v 21% difficult mid-block).

Roundabout crashes

There were only nine cases where pedestrians were hit at roundabouts. No clear trends emerge from such a small sample of crashes. The case studies showed that in three of the eight cases the pedestrians were aged 16-39 years and that in three cases there were difficult conditions (rain or dark).

Other crash types

This group of crashes accounted for 26% of all cases overall. The most common types of crashes in this category involved innocent bystanders who were struck when a vehicle left the road, usually out of control. There were 14 such cases in the sample. Another 8 cases involved a pedestrian struck while walking along the road or standing on the road, with the same number of cases involving accidents in which a person was struck by a vehicle operated by a friend or family, usually on private property. There were 6 cases involving pedestrians struck in car parks, 5 pedestrians struck by a car while boarding or alighting a tram or other vehicle and 5 pedestrians struck by a vehicle using a driveway as they were walking along the footpath. Attempts were made when drawing the sample to exclude private property and car park incidents; however the police data did not always allow this. For this reason, the proportions of these cases among the sample are not representative of the general level of these cases.

Other factors involved in pedestrian crashes

A quarter of the younger group had consumed alcohol in the three hours before the crash, and 3% of the older group. Examination of the case studies shows that crashes involving alcohol (at least on the part of the pedestrian) happened on the road, in car parks, or in residential driveways. The case studies show that other impairing or distracting factors were often present in these alcohol related cases, such as fatigue or talking with another pedestrian.

Overall, 14% of participants reported they were distracted at the time of the crash. Alcohol, fatigue and stress were also reasonably common among the participants (15%, 10% and 8% of participants respectively). Only one participant was looking at an iPod or mobile phone screen, four were talking on mobile phones and two were walking a dog at the time of the crash. There were no reports of illicit drug use by pedestrians prior to the crash. At the time of the crash the younger group was significantly more likely to have been impaired or distracted than the older group (see table 5).

Table 6: Percentage of participants in each group who reported impairing or distracting factors at the time of the crash (n = 200)

	Age 16-39	Age 60+
Alcohol	25%	3%
Fatigued	15%	3%
Stressed	14%	2%
Listening to music	10%	1%
Talking to others	15%	2%
Distractions	23%	2%

Note: these categories are not mutually exclusive and some pedestrians report more than one of the above categories.

The 25% of young people who had consumed alcohol in the three hours before the crash had consumed a mean of approximately seven standard drinks during that three hour period. In a handful of cases there were 12 or more drinks consumed, suggesting the level of impairment would have been significant.

The case studies show that some of the younger group often had multiple sources of distraction or impairment at the time of the crash. Often they had been drinking and were walking and talking with friends or were also tired. Other distractions also tended to co-occur with the younger group. Feeling stressed while on the way to work was reported by a number of the younger group. This level of urgency was not reflected in the older group, presumably because fewer were experiencing time pressure with the higher proportion of non work/school related trips.

There were significant differences between age groups in the purpose of the trip. The older group was more likely to be going to the shops or to an appointment than was the younger group. By comparison, the younger groups were far more likely than the older group to be out socially or going to/from work or school.

Table 7: Travelling purpose by age group (n=200)

	Age 16-39	Age 60+
To/from work	22%	9%
To/from school/uni	9%	1%
To from shops (bank, post office)	19%	56%
Walking for exercise	2%	8%
Social	36%	12%
Meeting/appointment	2%	7%
Other/Unknown	9%	8%

Related to the social aspect of trips, there were significant differences between the age groups in the time of the day of the crashes. Compared to the older group, the younger group was less frequently involved in crashes during the day. Accordingly, the percentage of night crashes was higher among the younger group than the older group.

Only few of the older participants were physically impaired (8%) at the time of the accident, and only one participant thought this impairment contributed to the crash.

The older group had significantly more conservative views about the speed zones that are appropriate for residential areas. They were more likely than the younger group to think that 50km/h (22% versus 11%) and 60km/h (33% versus 20%) speed zones were too fast in residential areas.

Summary of results – prevalence of risk factors by age and crash type

Issue	Younger	Older	Intersection	Mid-block	Roundabout and other crashes
Pedestrian at fault	34%	12%	16%	43%	18%
Familiar with location	90%	89%	91%	93%	83%
Heavy or congested traffic	23%	10%	11%	19%	26%
Poor light conditions	46%	26%	43%	22%	44%
Raining	8%	11%	14%	8%	5%
Tired/fatigued	15%	3%	6%	9%	15%
Stressed/anxious	14%	2%	9%	10%	7%
Distracted	23%	2%	9%	24%	10%
Impaired by alcohol	25%	3%	10%	15%	22%
Impaired by drugs	0%	NA	0%	0%	0%
Impaired mobility	NA	8%	5%	3%	2%

Discussion

It should be noted that this study did not sample at random from the population of injured pedestrians. Therefore the ability to generalise the results to injured pedestrians across Victoria is limited to pedestrians injured in low speed zones and those from the age group groups surveyed. The sample did, however, appear to be similar to the population of killed pedestrians in these age groups. Trends that emerged from the present research are likely to generally apply to pedestrian crashes, but should not be thought of indicative of population in prevalence terms.

Intersection crashes

In intersection crashes drivers were predominantly at fault. Drivers were most frequently exiting the intersection and often turning right. In most of the right turn exiting cases pedestrians were on the far side of the road and did not see the vehicle which would have been coming from behind them. In this crash scenario evasive action on the part of pedestrians is not possible. Drivers experience demanding cognitive load in negotiating right turns at intersections. They need to ensure the intersection is clear of oncoming cars, then execute the turn before the cars from the adjacent directions approach, finally checking for any pedestrians who are also trying to complete their crossings. Pedestrians are the last element to be encountered and occupy a relatively small area in the visual field, making the perception of pedestrians more challenging for drivers. Furthermore pedestrians are more easily obscured than vehicles, potentially by the A pillar of the vehicle or another vehicle or object.

The lack of visibility of pedestrians to drivers appears to be a problem, as in more intersection than mid-block crashes there was either difficult light conditions or rain. The lack of visibility is compounded by pedestrians wearing dark clothes. The case studies showed that the wearing of dark clothing often co-occurred with rainy or low light conditions. The high proportion of green traffic signals for both drivers and pedestrians indicate that deliberate red light running or crossing against red signals is probably not a key cause of pedestrian injury. The problem for many drivers appears to be related to cognitive load and allocation of attention, made worse by low levels of pedestrian visibility, rather than one of deliberately running red lights. Given that often lights were green for both pedestrian and driver it may also be that some drivers fail to understand the requirement to give way to pedestrians when turning.

While there was minimal evidence of red light running, in many cases it was not clear if vehicles were travelling against arrow signals or pedestrians were dashing across at the last minute and struggling to get to the far curb by the end of the cycle. Obtaining this type of information is a challenge and would be difficult to elicit in questionnaire research, as the traffic signals applying to drivers were not well recalled by pedestrians.

Right turning or 'right through' crashes are not only a problem area for pedestrians but feature in accidents involving other vulnerable road users (motorcyclists and cyclists), and are common crash scenarios in vehicle to vehicle crashes, indicating the difficulty that these types of manoeuvres present for drivers. Crash data shows that, compared to other manoeuvres, they are the most common scenario in casualty crashes at intersections. Traffic light signals and turning arrows are a common infrastructure solution to right turning crashes. Improving the management of right turns and pedestrian crossing phases in signal cycles would be one way to address this. Any measures that attempt to improve right turning at intersections should take pedestrian safety into account. Working with pedestrians to ensure that they increase their visibility particularly in difficult conditions should improve safety. However, this research suggests that improving infrastructure to restrict right turns or make turning right at intersections easier for drivers could offer the best benefits.

Mid-block crashes

Younger people were more likely than older people to be hit while crossing mid-block. This is likely to reflect the level of risk tolerated by the different age groups, with older groups behaving in a less risky manner. Older people are known to self regulate and change behaviour on the roads as drivers and this is probably just as likely in their behaviour as pedestrians. Crossing the road using intersections is generally safer and in the majority of mid-block cases an intersection or pedestrian crossing was close by.

In mid-block crashes pedestrians were generally hit on the near side of the road by vehicles going straight. Pedestrians were more likely to be at fault in these crashes than at intersection crashes. Where pedestrians were at fault it usually involved distraction or impairment and sometimes difficult light conditions. Pedestrians emerging from between parked cars or otherwise obscured by parked cars are particularly vulnerable to these crashes.

Vehicles are required to give way to pedestrians crossing the road they have just entered. One-third of mid-block cases involved a vehicle which had just turned onto the road being crossed by the pedestrian, or a vehicle having just pulled away from a parking space. In these situations the pedestrian will probably not have seen the vehicle prior to commencing crossing.

Another common scenario in non intersection crashes involved pedestrians being hit by drivers in the act of parking (reversing). While pedestrians may not necessarily have been at fault in these scenarios choosing to cross between parked cars is a risk for pedestrians. Reversing sensors in vehicles may offer some benefits to pedestrians in these types of crashes. There were a number of cases where pedestrians were trying to get to or from tram and bus stops and may have been in a hurry or taken risks to get to transport on time.

Clearly, slower travelling speeds in pedestrian activity areas are likely to help prevention of non intersection crashes where pedestrians are more unpredictable in their movements and difficult to see (emerging from between parked cars). Slowing traffic a little more would reduce stopping distances and give pedestrians and drivers more time to take evasive action. More crossing points where pedestrians frequently cross would also contribute favourably to safety. Pedestrian crossing behaviour, particularly among the younger group is also an area that could be targeted, with respect to distraction and impairment and choice of crossing location.

Other crash types

Little can be made of the roundabout crashes other than to assume that perhaps due to slower travelling speeds fewer pedestrians encounter problems at roundabouts. It may also be that pedestrians avoid crossing at roundabouts and that is why few roundabout crashes were evident. When crashes have occurred at roundabouts it seems to be most common among the older group, suggesting that this may be an issue more difficult for older pedestrians than younger pedestrians.

Crashes that fell into the other category present a significant challenge to road safety agencies as on the face of it, they often seem difficult to prevent. Alcohol and distraction featured commonly among these crashes involving young people. This is consistent with the notion that the use of alcohol places drinkers at risk of harm. Efforts to address problem or binge drinking would likely be beneficial for this

type of case. In most of these cases the purpose of the trip was social. Encouraging people to look after themselves and their friends when they are out drinking or at night may have some relevance.

Some crashes (particularly out of control crashes) were likely to have resulted from problem driver behaviour like speeding and drink driving. Slowing travelling speeds thereby reducing impact speeds would contribute to the prevention of the crashes where vehicles crashed out of control into pedestrians. Likewise, the prevention of drink driving would help address a small number of the other category crashes.

Other crashes involving drivers hitting the wrong pedal or drivers crashing into a family member in the driveway would not be easy to prevent and are probably related to momentary distraction, or impairment perhaps related to aging or to alcohol consumption.

Impairment and distraction

The results demonstrated that younger pedestrians were more likely to be impaired or distracted at the time of the crash than the older group. Impairing factors including alcohol use, fatigue and stress were relatively common. In the younger group, alcohol use and fatigue are likely to be related to the purpose of travel. They had a higher proportion of night or social trips than the older group. Alcohol use among injured pedestrians is consistent with fatality data that shows young pedestrians killed often have a blood alcohol content over 0.05. In some cases stress appeared to co-occur with travelling to work or school and this was much more common among the younger than the older group. Impairing factors are known to increase crash risk for all road users and it appears that pedestrians are no different. Travelling when alcohol-affected represents a challenge for road safety agencies. Pedestrians are doing the right thing by choosing not to drive or travel with an alcohol affected driver, but nonetheless face risks when negotiating travel as a pedestrian.

Distraction was present for the younger group and often co-occurred with impairing factors and mid-block crashes. Whether due to distraction or impairing factors this research supports the idea that decision making and judgment are compromised. Pedestrians in the younger group were often out with friends and were crossing the road while talking with friends. In these situations it is possible that pedestrians are distracted and the responsibility for ensuring that it is safe to cross is diffused among the group. Listening to music was also a risk factor present for some younger pedestrians. The level of impairment associated with alcohol, fatigue and conversations with friends presents a significant problem for younger people, which is then compounded by more difficult visibility for drivers when at night. Distraction, impairment and the fact they were crossing the road mid-block, help to explain why younger pedestrians were more likely to have been at fault than older pedestrians.

Familiarity and risk

The level of familiarity pedestrians had with the crash locations suggests that unfamiliarity with an area does not appear to increase crash risk for pedestrians. The majority of the sample was familiar with the area in which they were hit and had commonly crossed there before. In fact, based on the present research it could be argued that being familiar with an area may lead to a level of confidence and complacency about crash risk. Being in an unfamiliar environment is likely to heighten perceived risk and consequently vigilance by pedestrians.

The research appears to be consistent with the notion that younger age groups tend to employ more risky road crossing practices than the older pedestrians. The younger group was more likely to be hit crossing mid-block than the older group. It is likely that as pedestrians age they adopt safer road crossing approaches, such as choosing to use the traffic lights. It is known that older drivers commonly self regulate, adjusting their behaviour to minimise some risks and it is likely that as pedestrians, older people do the same. Furthermore younger pedestrians are more likely to be impaired or distracted and their ability to judge risk and detect hazards may be compromised.

Conclusions

Key themes and risk factors

Some clear themes emerge from the research that are consistent with and add to what is already known about pedestrian road trauma.

- Pedestrians were usually injured in places they are familiar and probably confident with, perhaps leading to a sense of complacency
- Pedestrians were generally struck in shopping, residential and business areas, on routine type trips related to work, school, or shopping
- Pedestrians were most likely to be injured when crossing at intersections, but fault generally applied to the driver
- Right turning manoeuvres were particularly problematic, probably because they place more cognitive demands on drivers than left turning manoeuvres, and frequently because the vehicle strikes the pedestrian from behind (pedestrians thus having no opportunity to take evasive action)
- Difficult light or weather conditions seem to contribute more to the intersection than non intersection crashes, probably by adding another level of difficulty to an already complex task
- Near side crashes were common in crossing mid-block cases with the presence of parked cars a risk factor
- Crossing between parked cars places pedestrians at additional risk from reversing cars
- Distraction plays a role in crossing mid-block, probably because the task is more difficult for the pedestrian than crossing at an intersection
- Alcohol was a common impairing factor among 16-39 year old injured pedestrians, and places them at risk of harm not only when crossing the road but on private property and in car parks and other public places
- Distraction was reasonably common among young people, particularly when crossing mid-block
- Travel for social purposes is common and talking with friends was one type of distraction present for some young people, this was often combined with low light conditions
- Multiple impairing and distracting factors were often present among younger pedestrians, and younger pedestrians were more often at fault than older pedestrians

Future research

While the research presented here was able to glean much information on crash causation, gaps still remain. Future research is required to understand the impact of traffic signals and traffic light cycles, particularly those that applied to the driver. Interviews with drivers involved in pedestrian crashes would be valuable, potentially revealing crash causation factors that impact on drivers in cases where drivers are at least partly at fault. Questions to be asked in such an interview would include visibility of pedestrian, obscuring factors such as A-pillars, presence of distraction, impairing factors and knowledge of road rules. There would also be value in conducting site inspections at signalised intersections where pedestrians have been injured to fully understand risks associated with traffic controls, particularly traffic light cycles.

This research project relied heavily on pedestrian sketches to determine the position on the road at which impact occurred and directions of travel of both pedestrian and vehicle. Asking telephone interviewers to complete sketches while speaking with the injured pedestrian may have improved the quality of completed sketches, and would have ensured a sketch was available for each case. Alternatively, prepared maps and photos of crash sites could be forwarded to pedestrians rather than providing a blank canvas.

Acknowledgements

Sharon Givans and Michael Murphy of the Social Research Centre
Naomi Summers and Mark Davis of I-View
Rani Khaira and Robert Johnstone, TAC Service Improvement
Sunil Kamath, TAC Information & Risk Management

Appendix 1 Questionnaire

Pedestrian Client Research 2009-10 Quantitative Questionnaire

INTRODUCTION SCRIPT

1(a). Good morning/afternoon/evening. My name is <interviewer name> from I-view calling on behalf of the Transport Accident Commission about a survey they are undertaking.

1(b). May I speak with <first name> <last name>.

(If "I am <first name> <last name>" then proceed to 2(a))

(If "Yes, I will put him/her on the phone" then repeat paragraph 1(a) above and then confirm that you are speaking with <first name> <last name>, then proceed to 2(a))

(If "No, I deal with the TAC on his/her behalf" then go to 1(c))

(If "No, he/she is not available now" then go to 1(d))

(If "No" then go to T1)

(If "What is this about" then go to 1(e))

1(c). I'm sorry, for this survey I am only able to speak with <first name> <last name>. Would it be possible for me to speak with him/her now?

(If "Yes, I will put him/her on the phone" then repeat paragraph 1(a) above and then confirm that you are speaking with <first name> <last name>, then proceed to 2(a))

(If "No, he/she is not available now" then go to 1(d))

(If "No" then go to T1)

1(d). When is a better time to call to speak with <first name> <last name>? Arrange call back.

1(e). It is for a survey that the TAC is undertaking. I'm sorry, I cannot give you any more information than this, because I am only permitted to speak with <first name> <last name>. Would it be possible for me to speak with him/her now?

(If "Yes, I will put him/her on the phone" then repeat paragraph 1(a) above and then confirm that you are speaking with <first name> <last name>, then proceed to 2(a))

(If "No, he/she is not available now" then go to 1(d))

(If "No" then go to T1)

2(a). The purpose of this research project is to enable the TAC to gain a greater understanding of pedestrian accidents from the perspective of pedestrians. The research is not about satisfaction with the final result or outcome of your case.

The survey will take less than 15 minutes.

We would like to ask you some specific questions about the accident you were involved in during {insert month year}.

Your personal responses will be completely anonymous and will not have any impact on your TAC claim in any way. You are under no obligation to participate.

2(b). Do you agree to participate in this survey?

(If "Yes" proceed to (next screen) paragraph 3)

(If "No, not now" go to 1(d))

(If "No" go to T1)

Main Survey

3. Are you aged 16 years or over?

(If "Yes" then proceed to paragraph 4)

(If "No" then go to T2)

4. Can I confirm that you were involved in an accident as a pedestrian in {Insert Month Year}?

NOTE: This includes clients in wheelchairs (motorised or manual) or other mobility aids, skateboards, in-line or roller skates, roller blades, toy scooters. Clients injured stepping on/off a bus or tram are included.

This excludes clients riding a bicycle, motorcycle, motorscooter or driving a motor vehicle, or passengers of any motorised vehicle.

(If “Yes” proceed to paragraph 5)

(If “No” go to T3)

5. Before we begin, I need to point out that this call may be monitored for training and quality purposes. If you don’t wish this to happen please let me know.

1. Monitor, proceed to interview question 1
2. Do not monitor, proceed to interview question 1

T1. Thank you for your time...
(use usual terminate script for wrong numbers/refusals)

T2. I’m sorry, I can only interview people aged 16 and over. Thank you for your time.

T3. My apologies. This survey asks questions about a particular accident, therefore the questions will not be relevant to you. Thank you for your time.

Record details where possible (eg. Wrong date, not a pedestrian, not involved in an accident)

T4. My apologies. This survey asks questions about accidents where a pedestrian was struck by a vehicle, so the questions will not be relevant to you. Thank you for your time.

Record details where possible (eg. fell from vehicle, was a passenger)

T5. My apologies. This survey asks detailed questions about your accident. Since you cannot recall any of the details the questions will not be relevant to you. Thank you for your time.

SURVEY

Participant consent and confidentiality

It's very important that you know we operate according to the Privacy principles designed for the market research industry. Your interview is one of many we are doing for this project. All the information that is provided in this discussion will not identify you personally in any report.

SECTION 1: CRASH CIRCUMSTANCES

I would like to ask you some questions about your accident during <Month> <Year>.

PRE1a To begin with, could you tell me, how well can you recall the details of the accident?

- | | | |
|--------------------------------|----|---------------|
| Can recall all of the details | 1 | (SKIP TO Q1a) |
| Can recall some of the details | 2 | (CONTINUE) |
| Can recall none of the details | 3 | (CONTINUE) |
| Don't know | 98 | (CONTINUE) |
| Refused | 99 | (CONTINUE) |

PRE1b Regarding the details that you can't remember, have you subsequently been informed of those details?

- | | | |
|------------|----|--|
| Yes | 1 | (CONTINUE) |
| No | 2 | (if PRE1a=2SKIP TO Q1a, if=3 go to T5) |
| Don't know | 98 | (if PRE1a=2SKIP TO Q1a, if=3 go to T5) |
| Refused | 99 | (if PRE1a=2SKIP TO Q1a, if=3 go to T5) |

PRE1c How did you find out about the details that you couldn't remember? Multi-responses

- | | |
|--|----|
| Family / friend who was with you at time of accident | 1 |
| Witness at the scene of the accident | 2 |
| Driver / passenger in the vehicle involved in the accident | 3 |
| Police | 4 |
| Other (Specify)_____ | 5 |
| DK / Can't remember | 98 |
| Refused | 99 |

Q1a. And could you tell me which of the following best describes your accident? What were you doing at the time you were struck (action when hit)? ... Were you (Read out, Single response) *INTERVIEWER NOTE: This is the action when the client was hit, for example if client got out of a car then crossed the road, it should be coded as crossing the road*

- | | |
|--|----|
| Crossing a road at an intersection | 1 |
| Crossing a road midblock | 2 |
| On a footpath (includes crossing driveway) | 3 |
| In a car park or shared space | 4 |
| Getting in or out of a car/truck/taxi | 5 |
| Walking on road or edge of road | 6 |
| Getting on or off a bus or tram, or | 7 |
| Standing or sitting near or on a road | 8 |
| Other (Specify) | 9 |
| DK | 98 |
| Refused | 99 |

INTERVIEWERS:

Explain to client that the police report for their crash has been checked, and ask the client to confirm the location details as described in police report.

Are crash address details accurate?

- Verify using Melways/VicRoads directory.
- If not accurate, ask if pedestrian recalls actual crash address.

This information is most important for crashes in which the pedestrian was crossing a road or walking along road (responses 1, 2 and 6 above). Exact location details are less important for other crash types.

Question Check:

At Q1a:

If client answered 1 or 2 go to Q1b

If client answered 3,4,5,7,9,98,99 go to Q1c

If client answered 6 go to Q1d

If client answered 8 go to Q1e

NOTE: Interviewer should consult the Melways or VicRoads directory (crash site reference supplied by TAC) prior to interview and use this to assist client in answering the following question.

If client answered “1/2: crossing road ...” at Q1a then ask the following:

Q1b. You have indicated that you were injured while crossing at an intersection. I will ask you some details about the accident, but want you to know that it is okay if you cannot remember exact details. It is okay to say you don't know.

Which road were you crossing?

Do you recall which direction you were walking in (client can describe this however they wish, eg. towards milk bar, up the hill, away from the beach, towards the city)?

Was the vehicle coming from your left or right? (Client can answer this in their own terms, eg. it is okay to say the vehicle was coming from behind them)

If client answered “3, 4, 5, 7, 9, 98 or 99” at Q1a then ask the following:

Q1c. Could you please briefly tell me what happened? Don't be concerned if you cannot remember details, it is okay to say you don't know.

Where did the vehicle come from immediately before it struck you?

(eg. around a corner, the same direction as the tram/bus, turned into a driveway)

Which direction were you heading in? (Client can describe this however they wish, eg. towards milk bar, up the hill, away from the beach, towards the city)

If client answered “6: walking along road or edge of road” at Q1a then ask the following:

Q1d. Why were you walking there at that time? (Was there a footpath available? Roadworks?)

Where did the vehicle come from immediately before it struck you?

(eg. around a corner, down the hill)

Which direction were you heading in? (Client can describe this however they wish, eg. towards milk bar, up the hill, away from the beach, towards the city)

If client answered “8 standing or sitting near or on edge of road” at Q1a then ask the following:

Q1e. What were you doing just before you were struck? (eg. waiting for bus, changing tyre on car)

Where did the vehicle come from immediately before it struck you?
(eg. around a corner, down the hill)

Q1f. Sketching the crash (all clients to be informed):

It is important for this research that the TAC is provided with a reasonable level of detail of your crash circumstances. In order to do this, we would like to invite you to provide a detailed sketch of your accident as follow-up to this interview.

If you are happy to do this we will send you a self addressed envelope, coupled with an explanation of what should be included in the sketch, for example, roads relevant to the crash, point of impact, directions of travel, footpaths, presence of parked cars, and so on.

In addition, we would welcome an feedback you may have on how you found this process and whether you need more information about how to complete this task.

Q1f - Are you happy to assist the TAC by providing a sketch of the crash circumstances?

1. yes
2. no

If 'yes'

Q1g – Can you please confirm your postal address so we can send this material to you?

Street 1

Street 2

Suburb

State

Postcode

SECTION 2: CRASH DETAILS

NOTE QUESTION INCLUSIONS BASED ON ANSWER AT Q1a

I would like to ask some questions about what factors might have caused the accident. I may prompt you for certain details, but remember you are not obliged to answer my questions, and it is okay to admit that you can't remember details. I assure you that all responses will be treated confidentially and will not be passed on to your claims manager or any other third party.

Q1a=ALL

Q2a. Which of the following best describes the actions of the vehicle driver/rider? (Read out)

Driving straight	1
Making a turn at an intersection	2
Entering or leaving a driveway or service road	3
Entering or leaving parking space on side of road	4
Making a U-turn	5
Other (specify)	6
Don't know / Can't remember	98
Refused	99

Q1a=ALL

Q2b Were there any traffic signals operating for the vehicle?

No	1
Yes, light was on red	2
Yes, light was on yellow/amber	3
Yes, light was on green	4
Yes, light was flashing	5
Don't know / Can't remember	98
Refused	99

Q1a=ALL

Q2c.	Were there any traffic signals operating for you as a pedestrian?		
	No	1	
	Yes, light was on red/don't-walk	2	
	Yes, light was on yellow/amber/flashing	3	
	Yes, light was on green/walk	4	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=1, 2, 4, 7			
Q2d.	Were you crossing at a designated school crossing?		
	Yes	1	→ Q2d_i
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Ask if Q2d=1. Others go to Q2e.			
Q2d_i.	Was the school crossing staffed at the time of your accident???		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=1, 2, 4, 7			
Q2e.	Were you crossing at a zebra crossing?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=ALL			
Q2f.	Did the vehicle driver/rider fail to give way as required by road rules?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=1, 2, 5, 6, 7, 8, 9			
Q2g.	Had the vehicle driver/rider recently turned into the road on which you were struck, or just pulled out of a parking spot?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=2			
Q2h.	Were there any intersections within about 50 metres of where you were struck?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	
Q1a=ALL			
Q2i.	Did you see the vehicle before (you started crossing the road/it struck you)?		
	Substitute text based on ans at Q1a		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Q1a=ALL

Q2j.	Do you think the vehicle driver/rider saw you before you were struck?		
	Yes	1	→ Q2j_i
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Ask if Q2j=1. Others go to Q2k.

Q2j_i. What made you think the vehicle driver/rider saw you/didn't see you? (Prompt if needed: eye contact was made, wearing bright colours, waved arms in air etc) (OPEN ENDED – PLS RECORD RESPONSE)

Q1a=ALL

Q2k.	Do you recall the presence of parked cars within a few metres of where you were struck?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Q1a=ALL

Q2l.	Did the vehicle driver/rider attempt to take evasive action, such as braking or swerving, before you were struck?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Q1a=ALL

Q2m.	Do you think the vehicle driver/rider was driving too fast?		
	Yes	1	
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Q1a=ALL

Q2n.	Do you think the driver was distracted?		
	Yes	1	→ Q2n_i
	No	2	
	Don't know / Can't remember	98	
	Refused	99	

Ask if Q2n=1. Others go to Q2p.

Q2n_i. Why do you think the driver was distracted? (OPEN ENDED – PLS RECORD RESPONSE)

Q1a=1, 2, 6, 7, 8

Q2p.	How would you describe the traffic conditions at the time you had your accident? (Read out)		
	Congested, stop-start traffic / or bumper to bumper traffic	1	
	Heavy traffic, flowing well	2	
	Moderate numbers of vehicles	3	
	Low numbers of vehicles	4	
	Don't know / Can't remember	98	
	Refused	99	

Q1a=ALL

Q2q. Were you by yourself or with a companion/s at the time of your accident? If so, how many? (INTERVIEWER NOTE: Do not prompt, an approximate answer is acceptable.)

This does not include people standing nearby who were not specifically with you.)

None	1
Number of companions (specify)	2
Don't know / Can't remember	98
Refused	99

Q1a=ALL

Q2r. (Aside from the people you were with,) roughly how many other pedestrians were within 50 metres of you at the time of your accident? (Read out)

(INTERVIEWER NOTE: Dogs do not count as pedestrians)

More than 50	1
Between 10 and 50	2
Between 3 and 9	3
1 or 2 others	4
Don't know / Can't remember	98
Refused	99

Q1a=1,2

Q2s. Before you had your accident, would you say that you regularly (at least once a week) crossed the road at this location?

Yes	1
No	2
Don't know / Can't remember	98
Refused	99

Q1a=1,2

Q2t. Describe the usual level of pedestrian activity in the area of your accident at around the time of your accident? Would you say pedestrians are (Read out)

Always present	1
Usually present	2
Present around half the time	3
Present occasionally	4
Rarely or almost never seen in the area	5
Don't know / Can't remember	98
Refused	99

Q1a=1,2

Q2u. Roughly how long were you waiting to cross the road at this point?

Didn't wait before crossing	1
Less than 10 seconds	2
Between 10 and 30 seconds	3
Between 30 and 60 seconds	4
Longer than 60 seconds	5
Don't know / Can't remember	98
Refused	99

Q1a=2

Q2v. Were there sufficient gaps in the traffic to allow pedestrians to cross safely?

Yes	1
No	2
Don't know / Can't remember	98
Refused	99

Q1a=1,2

Q2w. Were you crossing in between vehicles that were queued up at an intersection or stopped because of congestion?

Yes	1
-----	---

No	2
Don't know / Can't remember	98
Refused	99

Q1a=1,2

Q2x. Why were you crossing the road at this particular location? (*Multiple response: Select all that apply*)

Shortest, quickest route to destination	1
In a hurry	2
Didn't plan to cross the road at that point	3
Thought it was safe	4
Usual point / where I always crossed road	5
To get to a tram / bus stop	6
Got off tram / bus	7
Pedestrian crossing was too far away	8
Intersection was too far away	9
Other (specify)	

SECTION 3: LOCATION AND ENVIRONMENT**Ask all clients**

Q3a. How would you describe the location where you had your accident? (Read out. Accept multiple responses. NOTE: some mixed use areas will fall into multiple categories)

Rural (undeveloped)	1
Residential	2
Business district (City or Town Centre)	3
Street shopping strip	4
Shopping centre (Dedicated parking e.g. Chadstone)	5
School or university area	6
Industrial (eg. light industry, factories)	7
Recreational venue	8
Don't know / Can't remember	98
Refused	99

Q3b. How would you describe the light conditions at the time of your accident? (Read out)

Clear day, no cloud or light cloud cover only	1
Sun glare	2
Daytime, overcast	3
Low light (dawn or dusk)	4
Night, no street lighting	5
Night, poor street lighting	6
Night, good street lighting	7
Undercover carpark, good lighting	8
Undercover carpark, poor lighting	9
Don't know / Can't remember	98
Refused	99

Q3c. How would you describe the weather conditions at the time of your accident? (Read out)

Rain	1
Fog	2
Clear	3
Don't know / Can't remember	98
Refused	99

SECTION 4: JOURNEY AND PEDESTRIAN BEHAVIOUR

The next set of questions relate to your personal involvement in the accident. Your answers are very important for this research, because the point of view of pedestrians is not well understood. Your answers will remain strictly confidential. If there are any questions you would prefer not to answer, please let me know and we'll skip over them.

Ask All:

- Q4a. Were you familiar with the area which you were in at the time of your accident?
- | | |
|-----------------------------|----|
| Yes | 1 |
| No | 2 |
| Don't know / Can't remember | 98 |
| Refused | 99 |
- Q4b. Which of the following best describes the reason you were walking or in transit at the time of your accident? (Read out)
- | | |
|--------------------------------|----|
| Going to/from work | 1 |
| Going to/from school/uni | 2 |
| Going to/from shops | 3 |
| Health benefits or exercise | 4 |
| Socialising | 5 |
| Something else (Specify _____) | 6 |
| Don't know / Can't remember | 98 |
| Refused | 99 |
- Q4c. What was your pedestrian action before the accident? Would you say...(Read out)
(INTERVIEW NOTE: We are not talking about the evasive action but the lead up to the accident)
- | | |
|-----------------------------|----|
| Standing still | 1 |
| Running/jogging | 2 |
| Walking Briskly | 3 |
| Average walking pace | 4 |
| Walking slowly | 5 |
| Other (specify) | 6 |
| Don't know / Can't remember | 98 |
| Refused | 99 |
- Q4d. How would you describe the colour of your clothing at the time of your accident?
- | | |
|-----------------------------|----|
| Reflective | 1 |
| Light | 2 |
| Dark | 3 |
| Mixed | 4 |
| Something else | 5 |
| Don't know / Can't remember | 98 |
| Refused | 99 |
- Q4e. Would you say that you were very tired or fatigued at the time?
- | | |
|-----------------------------|----|
| Yes | 1 |
| No | 2 |
| Don't know / Can't remember | 98 |
| Refused | 99 |
- Q4f. Would you say that you were suffering from high levels of stress or anxiety at the time?
- | | |
|-----------------------------|----|
| Yes | 1 |
| No | 2 |
| Don't know / Can't remember | 98 |
| Refused | 99 |

We need to ask these next few questions to everybody who takes part in this survey, so I apologise if any of them seem inappropriate. Again, to confirm your answers will remain strictly confidential.

Q4h. Were you doing any of the following immediately before your accident? (Read out, accept multiple responses)

Having a discussion with another pedestrian	1
Walking with your dog	2
Talking on a mobile phone	3
Looking at mobile phone or I-pod screen	4
Listening to an I-pod or other music device	5
Texting with a mobile phone	6
Reading a book, magazine or some other text you were holding	7
None of these things	8
Don't know / Can't remember	98
Refused	99

Q4g. Would you say you were distracted immediately before your accident?

Yes	1	→ Q4g_i
No	2	
Don't know / Can't remember	98	
Refused	99	

Ask if Q4g=1. Others go to Q4i.

Q4g_i. What were you distracted by?

(INTERVIEWER NOTE: Open ended response. Do not prompt. Brief response required 1-5 words)

Again, we need to ask these next few questions to everybody who takes part in this survey, so I apologise if any of them seem inappropriate. And to confirm your answers will remain strictly confidential.

Q4i. Had you been drinking alcohol in the three hours prior to your accident?

Yes	1	→ Q4i_i
No	2	
Don't know / Can't remember	98	
Refused	99	

Ask if Q4i=1. Others go to Q4j.

Q4i_i. Roughly how many standard drinks did you have over the previous 3 hours?

(INTERVIEWER NOTE: If required explain that 1 standard drink would be approximately 1 pot/half-pint of beer, 1 small glass of wine, 1 shot glass of spirits)

Number given (specify)	1
Don't know / Can't remember	98
Refused	99

Ask of younger adult cohort only. Others go to Q4k.

Q4j. Had you taken any recreational drugs in the twelve hours prior to your accident?

Yes	1	→ Q4j_i
No	2	
Don't know / Can't remember	98	
Refused	99	

Ask if Q4j=1. Others go to Q4k.

Q4j_i. What type of recreational drug(s) had you taken prior to your accident?

(INTERVIEWER NOTE: Open ended response. Do not prompt)

Ask of older adult cohort only. Others go to Q5a

Q4k. Prior to your accident, did you suffer from impaired mobility in any way? (i.e. wheelchair/walking stick)

Yes	1	→ Q4k_i
-----	---	---------

No	2
Don't know / Can't remember	98
Refused	99

Ask if Q4k=1. Others go to Q5a.

Q4k_i. What kind of impaired mobility did you have?

(INTERVIEWER NOTE: Open ended response. Do not prompt)

Q4k_ii. Do you think this contributed to your accident at all?

Yes	1
No	2
Don't know / Can't remember	98
Refused	99

SECTION 5: COMMENTS & FEEDBACK**Ask All:**

And overall, in **your opinion**, who do you think was most at fault at the time of your accident? (accept multiples)

Driver was mostly at fault	1
Driver was somewhat at fault	2
I was somewhat at fault	3
I was mostly at fault	4
Another factor caused the accident (specify)	5
No one was at fault	6
Don't know / Can't remember	98
Refused	99

Q5a. Do you have any suggestions on how pedestrian safety at the location of your accident can be improved?

(INTERVIEWER NOTE: Try and keep response to a minimum)

Q5b. And do you have any suggestions on how general pedestrian safety could be improved?

(INTERVIEWER NOTE: Try and keep response to a minimum)

(These responses should be contained to brief statements. Keep responses to 30 seconds each. Detailed concerns can be forwarded by email to info@tac.vic.gov.au or in writing to **Road Safety, Level 3, 60 Brougham Street GEELONG 3220.**)

Q5c. Do you think 50 km/h speed limits are appropriate for residential streets? Would you say it is.... (Read out)

Too fast	1
Too slow	2
About right	3
Don't know / Can't remember	98
Refused	99

Q5d. Do you think 60 km/h speed limits are appropriate for major streets in residential areas that carry a lot of traffic? Would you say it is..... (Read out)

Too fast	1
Too slow	2
About right	3
Don't know / Can't remember	98
Refused	99

All:

Thank you for your participation in this survey. Your assistance is greatly appreciated. Just a reminder, my name is <interviewer name> calling from <I-view> on behalf of the Transport Accident Commission.

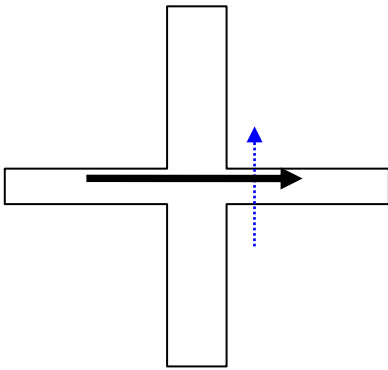
Appendix 2: Intersection classification diagrams

For crossing at intersection crashes (except round-about crashes). The same classifications apply with T-intersection crashes.

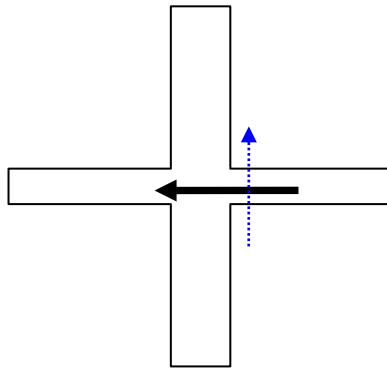
Vehicle movements in black (heavy line)

Pedestrian movements in blue (dashed)

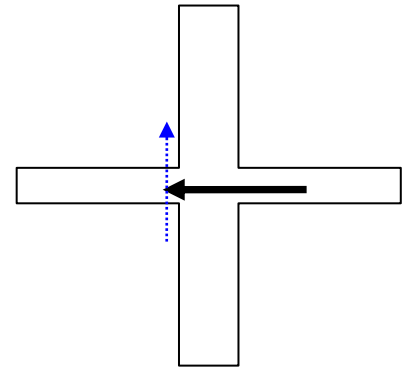
1. Car straight, exiting, far side



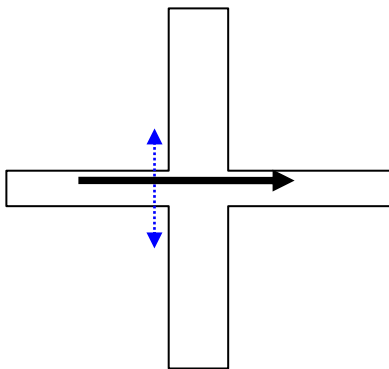
2. Car straight, entering, near side



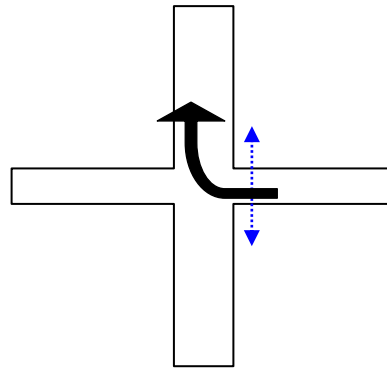
3. Car straight, exiting, near side



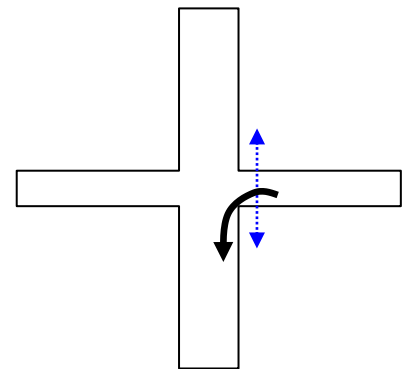
4. Car straight, entering, far side



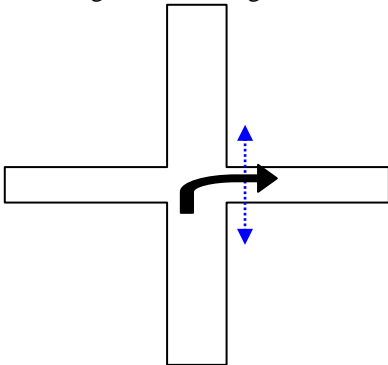
5. Car right turn, entering



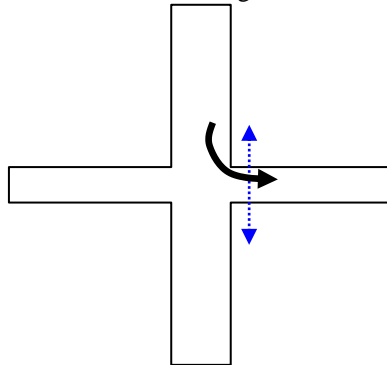
6. Car left turn, entering



7. Car right turn, exiting



8. Car left turn, exiting



9. Unknown